SDG BLOCKCHAIN ACCELERATOR

ROADMAP DOCUMENT

GENIUS TAGS - UNDP MALAWI

Challenge Definition

Malawi's humanitarian aid management system is fragmented, slow, and prone to duplication and exclusion. Multiple registries, including the Unified Beneficiary Registry (UBR), NGO-specific lists, and community-based records, operate in silos without real-time interoperability. Manual verification processes, outdated data, and lack of formal feedback channels mean that vulnerable groups such as the elderly, people with disabilities, and orphan-headed households are often left out. These issues are amplified by Malawi's high exposure to climate disasters such as recurrent cyclones, floods, and droughts, which require rapid, fair, and transparent aid delivery.

UNDP Challenge Summary

Malawi's disaster-prone geography, coupled with the increasing frequency of climate shocks, continues to place a significant burden on its humanitarian response systems. With recurrent cyclones such as Freddy, Gombe, Ana, and health emergencies like cholera and COVID-19, the country faces persistent food insecurity, loss of shelter, displacement, and infrastructure degradation.

At the center of aid delivery is the Unified Beneficiary Registry (UBR), a government-led system intended to provide a harmonized view of vulnerable households. However, community dialogues and field reports reveal that the current aid management process is hampered by data fragmentation, exclusion errors, manual verification procedures, and a lack of real-time interoperability between systems.

As humanitarian agencies and NGOs continue to operate using isolated beneficiary lists, communities frequently report duplicated support in some areas and total neglect in others. Vulnerable groups such as the elderly, people with disabilities, and orphan-headed households are often excluded due to lack of data visibility, poor targeting, and absence of accessible complaint mechanisms.

Local Context

Malawi, a landlocked country in south-east Africa, is among the poorest in the world, with more than 80 per cent of the population living in rural areas and relying on subsistence farming. Drought and floods are the most frequent and significant hazards, threatening what is mostly rain-fed agriculture. Severe floods and recurrent droughts reduce coping capacity, leading to crop and livestock loss, food insecurity, and periodic crises. In 2015, extreme events caused economic losses equivalent to 10 per cent of GDP and displaced up to **200,000 people**. Beyond drought and floods, Malawi also faces extreme heat, wildfires, cyclones, landslides,

earthquakes, pest infestations, and disease outbreaks, all of which are worsened by environmental degradation and climate change. In 2023, Tropical Cyclone Freddy affected over **500,000 people** in Malawi, with about **183,000 displaced** and more than **500,000 overall impacted**. For the 2024-2025 El Niño response, out of **5.7 million affected people**, **2.2 million** were reached with either cash or in-kind assistance. Damage estimates ranged up to **US $680 million** required for reconstruction.

Aid management in Malawi is primarily facilitated through a mix of national systems, local councils, NGOs, and UN agencies. The Unified Beneficiary Registry (UBR) serves as a centralized database under the Ministry of Finance and Economic Affairs. However, multiple parallel systems operate in silos, including NGO-managed lists and community-level registries maintained by Village Development Committees (VDCs) or Village Disaster Risk Management Committees (VDRMCs).

The existing model is heavily manual and fragmented, leading to inefficiencies, exclusion, and duplication. Communities, especially in districts like Phalombe, have called for more transparency, inclusion, and dignity.

Relevance to UNDP CO Priorities and Resource Mapping

This pilot responds to calls from the field, especially from districts like Phalombe, where communities have asked for more transparency, inclusion, and dignity. It aligns with UNDP Malawi's priorities on resilience, governance, and digital transformation. The proposed pilot directly aligns with UNDP Malawi's Country Office priorities under the Risk-Informed Development for Resilience (RID4R) Project. RID4R emphasizes strengthening disaster risk management systems, risk-informed planning, and resilient livelihoods, with a focus on improving data, transparency, and accountability in resilience programming.

By integrating Genius Aid's blockchain-enabled data verification and deduplication tool into humanitarian and social protection systems, this pilot supports:

- Enhanced transparency and accountability in aid delivery, directly contributing to RID4R's outcome of strengthening governance and institutional systems for resilience.

- Strengthened data ecosystems for risk-informed decision-making, complementing RID4R's support to DoDMA and partners in building robust information management systems.

- Improved coordination and efficiency among humanitarian actors, in line with UNDP CO's role in promoting coherence and collaborative approaches across development and humanitarian sectors.

- Scaling resilience through innovation, echoing RID4R's emphasis on adopting new tools and technologies to reduce vulnerability and enhance preparedness.

In essence, the pilot builds on the RID4R framework by providing a practical, technology-driven mechanism to ensure that aid reaches the intended beneficiaries, reduces duplication, and enhances community trust, all of which are central to UNDP Malawi's current strategic priorities.

The pilot will be implemented with in-kind technical support from Genius Tags and operational coordination from UNDP Malawi, leveraging existing field relationships and community networks.

Expected Impact (from CO perspective)

To establish an interoperable, blockchain-enabled aid ecosystem that:

- Significant reduction in duplication of beneficiaries
- Ensures accurate targeting of vulnerable households
- Empowers communities with tools for feedback and monitoring

Success could unlock national scale-up through UBR integration, multi-agency interoperability in disaster response, and application in other social protection programmes such as the Social Cash Transfer Programme (SCTP).

Target SDGs and SDG Indicators

- **SDG 1.3.1**: Proportion of population covered by social protection systems, by sex, distinguishing children, unemployed, older persons, persons with disabilities, pregnant women, newborns, work-injury victims, and the poor and the vulnerable.
- **SDG 2.1.2**: Prevalence of moderate or severe food insecurity in the population.
- **SDG 16.6.2**: Proportion of population satisfied with their last experience of public services.

User & Problem Mapping

Understanding the users and stakeholders affected by the challenge is essential for building impactful and context-aware solutions. This section helps articulate who the primary users are, what they aim to achieve, and which other actors are involved or impacted.

Primary User Persona

District councils, DoDMA/NGO field teams, and community-level actors (VDCs, VDRMCs, Traditional Authorities) who are responsible for registering, verifying, and distributing aid to vulnerable households during disaster response

User Story

As a humanitarian field officer, I want to verify beneficiaries and detect duplicates so that aid is distributed fairly and reaches those most in need.

Key Stakeholders/Partners

- UNDP Malawi (Lead)
- Genius Tags (Tech Partner)
- DoDMA (Observer role)
- International and local NGOs active in targeted districts
- Selected District Council for pilot implementation
- Local NGOs and community leaders

Solution Overview

Solution Summary

An integrated blockchain-based pilot to improve transparency, efficiency, and inclusiveness in aid distribution using Genius Tags tools. The solution enables privacy-preserving deduplication, digital aid distribution, and real-time monitoring without relying on full integration with the UBR. Beneficiaries are registered via KoboToolbox, data is hashed and uploaded to Genius Chain for deduplication, verified households receive QR codes, and Genius Aid manages digital delivery of in-kind and cash support.

Core Functionalities

- Data Integrity and Deduplication: Secure detection and removal of duplicate records across agencies using Genius Chain, supporting individual and household-level deduplication.
- Transparent and Inclusive Distribution: Genius Aid for digitized aid distribution through QR/NFC-based systems for cash, goods, and vouchers.
- Real-time Monitoring and Smart Auditing: Secure dashboards for agencies to visualize distribution flows, verify delivery, and manage vendors.

Tech Stack Overview

- Front-end: KoboToolbox forms, Genius Aid distribution interface,Genius Chain interface
- Back-end: Genius Chain blockchain deduplication engine on Cardano
- Data sources: NGO and DoDMA lists builk excel upload, KoboToolbox entries
- Connectivity: Offline-first design with bulk sync when internet is available

Cardano-Specific Elements

The deduplication ledger can be anchored on Cardano to benefit from its secure and low-cost transaction model, with hashed beneficiary records stored off-chain for privacy.

Prototype Plan (Sprint-Based)

Prototype Goal

To develop and validate a functional version of the deduplication and digital aid distribution system, including registration, QR code issuance, and dashboard monitoring.

Expected Outputs

- Functional deduplication process via Genius Chain
- On-chain or hashed beneficiary data with metadata
- User interface for beneficiary registration and aid distribution
- Minimum three stakeholder testing sessions

Sprint Timeline

(Break down the 10-day sprint into tasks and outcomes. Use this as a working plan for the team to stay aligned and focused. The table below is just an example. Please feel free to adapt the tasks and outcomes based on your solution's specific needs and development approach.)

Day	Description	Outcome
1	Define scope & SDG Indicators	Scope clarity
2	Move Genius Chain to Cardano	Successful tests
3	Set up Smart contract,UID generator,Cleaning Functions ,Project for Malawi Pilot	Working Smart contract with dummy data
4	Integration testing with Kobo after Moving to Cardano	Kobo Form deduplication detection with Malawi Smart Contract
5	Mid-review & QA	Testing link ready
6-7	Stakeholder testing	Feedback gathered
8-9	Iteration & polish	Demo-ready version

10	Final submission	All deliverables done

Success Metrics & Milestones

Tracking progress throughout the accelerator is key to building momentum and measuring real impact.
Below is a set of baseline success metrics that all teams are expected to work toward during the sprint, MVP refinement, and pilot-readiness phases. These ensure a consistent level of development and stakeholder engagement across all projects.
Teams are also encouraged to define additional metrics that are specific to their solution, context, and strategic goals. These custom metrics can relate to: social or environmental impact, technical milestones, community adoption, strategic partnerships, innovation outcomes.

Sprint Phase

Focus: Rapid prototyping, initial user testing, and validation of core functionality.

Category	Baseline Metric
Blockchain Interaction	One meaningful blockchain function implemented (e.g., token minting, VC issuance, on-chain hash).
Beneficiaries registered	Target 1000
Deduplication accuracy	95% or higher
SDG Integration	Incorporate SDG logic or tags into the metadata, user interface, or output, focusing on indicators your solution actively addresses.
Demo Readiness	Demo link or video walkthrough prepared and submitted by Day 10.

Post-Sprint Refinement

Focus: Iterating based on feedback, improving functionality, and aligning with pilot opportunities.

Focus Area	Baseline Metric
Feedback Integration	Minimum two user- or stakeholder-driven changes implemented in logic or UX.
MVP Stabilization	Functional testing completed with consistent results and no major blockers.
Stakeholder Alignment	At least one follow-up session with a CO or stakeholder to discuss next steps.

Pilot Readiness

Focus: Preparing the solution for deployment and scaling.

Goal Area	Suggested Metric
Institutional Buy-In	CO expresses interest in pilot exploration; early MoU or agreement in discussion.
Solution Readiness	MVP tested in an extended or external environment; improvements implemented.
Sustainability Path	Initial plan for post-program ownership or funding drafted.

Cumulative Tracking Suggestions

Consider using a simple dashboard or milestone tracker across the weeks to monitor:

- % completion of prototype milestones
- % of users tested
- % of stakeholder feedback items received & integrated
- % SDG contribution implemented in technical flow
- Progress toward pilot validation (e.g., 0–100 scale)

MVP Planning Table

After the prototype sprint, you'll begin shaping the full MVP. This table helps identify what's already been built, what needs improvement, and how each component will evolve into a pilot-ready version.

Component	Prototype Status	Improvement for MVP
UI/UX	[e.g., Form built]	[e.g., Add mobile layout]
Blockchain	[e.g., Hash created]	[e.g., Add QR or on-chain write]
SDG Tags	[e.g., Displayed]	[e.g., Make filterable]
Feedback	[e.g., 3 sessions]	[e.g., Expand to 5+ users]

Risk & Assumptions

Every project has uncertainties. Use this table to proactively identify key risks and assumptions and describe how your team plans to address them.

Risk/Assumption	**Description**	**Risk Level**	**Risk Mitigation Strategy**
[e.g. Limited Cardano experience]	The team lacks deep technical knowledge of Cardano-specific components.	Low	Pair devs with mentors
Low user engagement	Users may not participate in testing or provide meaningful feedback.	Medium	Pre-schedule testing calls

Team Profile

This section provides a comprehensive overview of the individuals and organizations behind the development and implementation of the proposed solution. It highlights the complementary expertise of both the Solution Makers and the Challenge Owners, underscoring the collaborative foundation of the accelerator.

Solution Makers

Introduce the team behind the solution, highlighting relevant skills and backgrounds that contribute to your ability to execute this project successfully.

Team Name
Genius Tags

Team Members & Roles

- *Zainab Amgd – [Product and project management and point of contact/Growth Product manager]*
- *Anas Khitou - [Product oversightand architect /Product director and COfounder]*
- *Yaman Alhalabi – [Development / Software and blockchain developer]*

Challenge Owners

The Country Office or institutional partners who defined the development challenge and provided critical context, feedback and collaboration throughout the accelerator.

Challenge Owner Organization Name:
UNDP Malawi

Team Members & Roles:

- Misheck Thawani – Geographic Information Systems Officer
- Vincent Guta – Software Developer
- Samuel Marcello – Software Developer

Area of Focus:
Public service transparency and accountability in humanitarian aid distribution, with a focus on reducing duplication of beneficiaries, strengthening trust in aid systems, and integrating climate-smart tracking mechanisms.

Notes & Insights

Use this section to capture key learnings, challenges, or insights discovered during prototyping. This could include quotes from stakeholders, reflections on usability, or ideas for future iterations.

- **On data access:** Gaining access to government and NGO datasets (e.g., UBR, CCODE) requires relationship building, clear communication, and assurances on data protection.
- **On usability:** Stakeholders emphasized the importance of **data privacy** and **local ownership**, preferring models where organizations upload their own data rather than centralizing sensitive information.
- **On relevance:** Government partners (DoDMA) and NGOs highlighted duplication of beneficiaries as a major barrier to **efficient and equitable distribution of aid**.
- **On future opportunities:** There is strong potential to integrate with existing national systems such as the **Unified Beneficiary Registry (UBR)** and district-level humanitarian coordination platforms.

Pilot Vision & Scalability Plan

This section looks beyond the prototype to outline the long-term vision for piloting and scaling your solution.

Pilot Vision (6–12 months)

The pilot will demonstrate how Genius Aid, a blockchain-based deduplication and aid-tracking platform, can:

- Flag and reduce duplicate beneficiary entries across multiple organizations.
- Provide **real-time transparency** on aid distribution while protecting sensitive data.
- Enable local NGOs and government actors to **trust shared data processes** without compromising beneficiary privacy.
- Layer in **climate-smart incentives**, e.g., tracking resilience-building interventions alongside relief distribution.

Target Users or Communities for Pilot

- **Government:** Department of Disaster Management Affairs (DoDMA), district councils in pilot areas.
- **NGOs/CSOs:** CCODE (already confirmed), other humanitarian actors working in food security, shelter, and WASH.
- **Communities:** Beneficiaries in **Phalombe, Chikwawa, and Mzuzu City**, who will experience more **transparent, efficient, and fair aid distribution**.

Scalability Plan

- **Short-term:** Expand from 2–3 partners (DoDMA + 1–2 NGOs) to a **cluster-level pilot** across multiple humanitarian sectors.
- **Medium-term:** Integration with Malawi's **Unified Beneficiary Registry (UBR)** to ensure alignment with government-led beneficiary management.
- **Long-term:** Scale across Malawi and adapt the solution to other countries in Southern Africa facing similar aid duplication challenges. The core blockchain-based deduplication logic and privacy-preserving workflows are **reusable across contexts**.

Support Needed

- **Technical:** Guidance on integrating Genius Aid with national systems (UBR, DRMIS) and ensuring compatibility with partner datasets.
- **Policy/Institutional:** Formal buy-in from DoDMA and partner NGOs, including data-sharing agreements and endorsement for piloting.
- **Funding:** Resources to support pilot deployment in 3 districts, training for partner staff, and continuous technical support.

- **Partnerships:** Engagement with humanitarian clusters (Health, WASH, Food Security, Protection) to broaden adoption.

Sustainability & Business Model (optional)

If relevant, describe how the solution can be sustained over time (financially, operationally, or institutionally).

Business or Funding Model

The pilot will be implemented with in-kind technical support from Genius Tags and operational coordination from UNDP Malawi. In the long term, the model could explore cost-sharing arrangements with humanitarian agencies or integration into government-managed aid systems, but it is not intended to generate direct revenue.

Key Resources & Partnerships

Ongoing resources required include cloud hosting and storage, continued software development and maintenance expertise, and secure data management infrastructure. Key partnerships include Genius Tags for technical support, UNDP Malawi for operational coordination, and government agencies and local NGOs for beneficiary onboarding, operational coordination, and compliance with data protection regulations.

Long-Term Ownership / Maintenance

After the pilot, ownership and maintenance are envisioned to transition to a public agency, such as the Department of Disaster Management Affairs (DoDMA), in collaboration with UNDP and technical partners. The pilot team will provide handover support, training, and documentation to ensure sustainability and ongoing system improvements.

Deliverables Checklist

- Prototype demo link
- Documentation / ReadMe
- Feedback summary
- Video walkthrough
- Next steps agreed

Team Reflection

Challenge Owner's Perspective

- "Participating in this accelerator gave us a practical understanding of how blockchain can be applied to improve transparency and accountability in humanitarian aid. Collaborating with the technical team helped us design a solution that addresses duplication, fragmented data, and delays in aid delivery reporting, while keeping the needs of beneficiaries at the center. The process also strengthened our capacity for innovation and digital partnerships, creating opportunities to scale these approaches across other programs and initiatives."

Solution Maker's Perspective

- *"During our early sessions with challenge owners, our focus was on improving operational flows before, during, and after climate hazards. Through those discussions, we shifted toward rethinking the governance layer itself.We began exploring how decentralization across multiple entities could democratize decision-making and enhance transparency in beneficiary deduplication."*
- *"We began to think more intentionally about the long-term sustainability of such programs, and how Blockchain Cardano-based mechanisms could open new pathways for financing them."*
- *"We also learned that implementing accountable and inclusive governance varies significantly by country and regulatory context. This made the ability to modify smart contracts in a low- or no-code way an essential feature for adaptability."*