SDG BLOCKCHAIN ACCELERATOR

ROADMAP TEMPLATE

Challenge Definition

The key challenge in climate resilience programs like LoGIC is ensuring transparent and trustworthy fund disbursement and beneficiary tracking. Current centralized systems face risks of data tampering, fund leakages, high administrative costs, and difficulties verifying identities of marginalized groups, undermining stakeholder trust and future climate finance. Blockchain offers a solution by enabling secure digital identities, automated fund releases via smart contracts, and immutable tracking of adaptation progress, restoring confidence among donors, governments, and communities while positioning Bangladesh as a leader in transparent, locally led climate adaptation.

UNDP Challenge Summary

UNDP Bangladesh faces ongoing challenges in disbursing climate adaptation funds to vulnerable communities. Current systems are **slow, opaque, and fragmented**, making it difficult to trace how funds reach local beneficiaries. There is no reliable, real-time way to track beneficiaries or measure the impact of funding. This results in **delayed support for communities at risk**, limited accountability to donors, and reduced confidence in program outcomes.

Local Context

Bangladesh is one of the most climate-vulnerable countries in the world. Rural communities and smallholder farmers are disproportionately affected by flooding, salinity, and other climate shocks. Fund disbursement for climate adaptation programs often passes through multiple layers of intermediaries, creating **delays, data gaps, and risks of mismanagement**.
Key stakeholders include:

- **UNDP Bangladesh** – managing climate resilience programs.
- **Government partners** – overseeing national adaptation priorities.
- **Local cooperatives** – implementing projects on the ground.
- **Beneficiaries** – climate-vulnerable households who depend on timely support.

Relevance to UNDP CO Priorities and Resource Mapping

This initiative directly aligns with UNDP Bangladesh's strategic priorities of climate resilience, financial inclusion, and digital transformation. It builds on the ongoing **LoGIC project (Local Government Initiative on Climate Change)**, a multi-donor initiative supported by the EU, Sweden, Denmark, UNCDF, and UNDP, which has already reached nearly 2 million people. By digitizing the **Community Resilience Fund (CRF)** through blockchain-enabled identities and transparent fund flows, the project enhances LoGIC's objectives while reducing risks of mismanagement.

Co-financing is already available in the form of **LoGIC project resources (human resources, systems, and donor support)**. Technical assistance is provided by **Cladfy and accelerator partners (AltFinLab, EMURGO Labs, Blockchain for Good Alliance)**, ensuring the initiative builds on existing infrastructure and donor investments rather than starting as a standalone effort.

Expected Impact (from CO perspective)

From the UNDP Country Office perspective, the successful pilot would:

- **Improve service delivery** by reducing delays in loan approvals and disbursements.
- **Enhance accountability and transparency** with immutable audit trails, strengthening donor confidence.
- **Empower communities** by providing secure digital financial access through mobile wallets, particularly for marginalized rural households.
- **Influence policy** by demonstrating how blockchain can support locally led adaptation and inform future national frameworks on digital climate finance.
- **Enable scale** by creating a replicable model for other adaptation funds or social protection schemes in Bangladesh.

Target SDGs and SDG Indicators

1. SDG 1 – No Poverty

- **Indicator 1.4.1:** Proportion of population living in households with access to basic services and financial resources.

  Contribution: By enabling digital wallets and transparent loan disbursement, the solution increases financial access for climate-vulnerable households.

2. SDG 5 – Gender Equality

- **Indicator 5.a.1:** Proportion of women with ownership or control over assets, land, and financial accounts.
  Contribution: 98% Beneficiaries of the LoGIC project are women. Women beneficiaries gain equal access to CRF funds via mobile wallets, strengthening their financial autonomy.

3. SDG 8 – Decent Work & Economic Growth

- **Indicator 8.10.2:** Proportion of adults with an account at a bank or other financial institution or with a mobile-money service provider.
- **Contribution:** The solution promotes financial inclusion by linking beneficiaries with formal digital financial services (MFS like bKash).

User & Problem Mapping

Primary User Persona

Beneficiary – A smallholder farmer in coastal Bangladesh. They have limited digital literacy but own a mobile phone with mobile money (e.g., bKash). They depend on adaptation grants and loans from their local co-operative to recover from flooding or invest in climate-smart farming.

Primary User Story

As a beneficiary, I want to request funds, receive funds directly in my mobile wallet so that I can use them immediately without delays or middlemen.

Secondary User Persona

Cooperative Committee - A trusted group of local representatives who act as intermediaries between beneficiaries and donors. They help validate applications, monitor distribution, and ensure fairness in fund allocation.

Secondary User Story

As a committee member, I want to review and approve loan requests so that the right members get support fairly and transparently.

Key Stakeholders/Partners

UNDP Bangladesh – Challenge owner, project coordination, and donor reporting.
Government of Bangladesh – Oversight, policy alignment with national adaptation plans.
Cladfy– Technical partner for blockchain, DID, and smart contracts.
Local cooperatives – Frontline implementation and beneficiary engagement.
Financial Service Providers (banks, bKash, MFS platforms) – Loan disbursement channels.

Solution Overview

Solution Summary

We propose a **hybrid blockchain + off-chain system** that creates **digital identities (DIDs)** for beneficiaries, links them to mobile wallets, and uses **Cardano smart contracts** to manage transparent fund disbursement and repayment tracking. This ensures every transaction is visible, verifiable, and directly tied to a beneficiary.

Core Functionalities

- **Decentralized Digital Identity (DID)** – Secure ID linked to NID + phone, with attributes for mobile wallet.

- **Smart Contract Approval** – Loan and fund requests are automatically checked against rules (history, limits, repayment).
- **Transparent Disbursement** – Blockchain triggers payment via MFS (e.g., bKash), logged immutably on-chain.
- **Repayment Tracking** – Automated or manual logging of repayments, hashed on-chain for accountability.

Tech Stack Overview

- **Front-end:** Mobile/web app for co-op leaders & admins.
  Back-end: Off-chain service for identity registry, integration with banks/MFS.
- **Blockchain:** Cardano for DID attributes, smart contracts, and on-chain hashing.
- **Integrations:** bKash API, Bank API, and webhook listeners.

Cardano-Specific Elements

- **Verifiable Credentials (VCs):** For decentralized identity.
- **Plutus Smart Contracts:** For loan approval logic.
- **Metadata Tagging:** Linking disbursements to SDG indicators.
- **On-chain Hashing:** For an audit trail of off-chain transactions.

Prototype Plan (Sprint-Based)

Prototype Goal

Build and demonstrate an **end-to-end flow**:

- Submit a loan request,
- Approve via smart contract,
- Trigger a disbursement event,
- Log the transaction on-chain.

Expected Outputs

- Loan request + smart contract approval.
- On-chain hash with SDG metadata.
- Basic UI flow (form + dashboard).
- Feedback from 3+ stakeholders.

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	UX & flow design	Flow ready
3	UI implementation	Frontend in place
4	Chain integration	On-chain hashing tested Smart contract tested
5	Mid-review & QA	Testing link ready
6-7	Stakeholder testing	Feedback gathered
8-9	Iteration & polish	Demo-ready version
10	Final submission	Deliverables complete

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, and innovation outcomes.

Sprint Phase

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

Category	Baseline Metric
Blockchain Interaction	On-chain hash, smart contracts
User Interface	Loan request, approval forms.
Stakeholder Testing	Testing: 3 stakeholder sessions.
SDG Integration	SDG logic: Tags visible in metadata.
Demo Readiness	Demo: Walkthrough ready.

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	An initial plan for post-program ownership or funding has been 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	Beneficiary web app built	Integrate with existing cooperative management system
Blockchain	Transaction hashing and smart contracts logic is built	Move to main-net

SDG Tags	Simulated data used	Ensure correct and sufficient data is used
Feedback	2 sessions	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
Data mismatch between on-chain transactions and the cooperative dashboard	Discrepancies may arise between blockchain records and off-chain reporting tools	Medium	Weekly reconciliation scripts + automated alert system
Low committee participation in governance	Cooperative committee members may fail to attend or engage in governance activities	Medium	Member incentives + capacity-building training sessions
Network downtime is affecting cooperative operations	Outages in Cardano nodes, APIs, or local infrastructure may halt cooperative transactions	High	Deploy redundant infrastructure + enable fallback manual reporting process
Loan defaults affecting cooperative KPIs	High default rates could reduce repayment adherence and harm cooperative sustainability.	High	Introduce risk-based credit scoring + staged loan disbursements to mitigate exposure.

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
Cladfy

Team Members & Roles

- Ebby Gatamu - Strategy Lead, CEO Cladfy
- Kibe John – UX/UI Designer/Product Lead, CTO Cladfy
- Duncan Warukira – Blockchain Engineer, Cladfy
- Hassan Rapando - Full-stack developer, Cladfy

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 Bangladesh (Country Office)

Team Members & Roles:

- A.K.M. Azad Rahman – Project Coordinator, LoGIC Project, UNDP Bangladesh
- Md. Humayun Kabir – MIS Officer, LoGIC Project, UNDP Bangladesh
- T.M. Selim – Programme Analyst, LoGIC Project, UNDP Bangladesh

Area of Focus:
Climate resilience, financial inclusion, and transparent fund flows.

Notes & Insights

- Stakeholders appreciated the simplicity of the on-chain activity.
- Challenge owners highlighted the need to integrate with the local mobile money wallet providers.

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)

(Describe what success would look like in a real-world pilot. What key outcomes would you aim to demonstrate?)

The pilot will focus on testing a **blockchain-enabled CRF fund disbursement system** within a selected set of cooperatives under the LoGIC project. Key elements include:

1. **Digital Identities (DIDs):** Create and issue digital identities for a subset of beneficiaries using their existing information (NID, mobile number).

2. **Smart Contract Loan Workflow:** Automate loan eligibility checks, approvals, and repayments through smart contracts.

3. **MFS Integration:** Disburse loans directly to beneficiary mobile wallets (e.g., bKash) to reduce travel burden and delays.

4. **Transparency Dashboard:** Provide real-time tracking of loan applications, approvals, and repayments for cooperatives, project management, and donors.

Target Users or Communities for Pilot

(Indicate who will benefit from the pilot deployment, specific regions, stakeholder groups, or institutions.)

The pilot will run for **0-3 months of development and testing**, followed by **3-9 months of live deployment** with ~1000 beneficiaries across 2-10 cooperatives.

Scalability Plan

(Explain how you envision scaling the solution after the pilot. What elements are reusable or adaptable across contexts?)

Short Term (Post-Pilot): Scale to multiple cooperatives within the current project districts, integrate with existing Cooperative Management System and ATM systems, and refine user experience (UX) in Bangla.

Medium Term (2–3 Years): Integrate DAO-based governance for loan approvals to further decentralize and democratize decision-making. Expand coverage across all 9 LoGIC districts, onboard thousands of beneficiaries, and introduce blockchain-based **carbon emission reduction tracking** to capture and verify community contributions from nature-based and climate-resilient schemes. This will open opportunities for **carbon credit funding** to support further scaling and sustainability.

Long Term (Beyond 3 Years): Position the system as a **national model for climate finance disbursement**, applicable to other adaptation funds and social protection schemes. Institutionalize the blockchain-enabled CRF system as a national best practice model. Integrate **carbon emission reduction tracking** and **carbon credit monetization mechanisms** into the system, ensuring long-term sustainability and alignment with global climate finance opportunities. Explore replication in other UNDP programs and in countries with similar contexts. Potential to replicate in other South Asian countries facing similar challenges.

Support Needed

(Briefly outline any technical, policy, or funding support required to move forward with a pilot or scale-up.)

Sustainability & Business Model (optional)

The sustainability of the blockchain-enabled CRF fund management system will be ensured through a multi-pronged approach:

1. **Integration into Existing Systems:**
   The solution will be embedded within LoGIC's Cooperative Management System and ATM system, ensuring that it becomes part of the regular workflow rather than a stand-alone tool. This reduces dependency on external systems and increases long-term usability.

2. **Cost-Sharing Model:**
   Initial pilot costs will be covered by UNDP and partner funding. In the medium term, operational expenses (such as server hosting, API maintenance, and MFS fees) will be partially shared by cooperatives through a minimal service fee deducted per transaction or loan disbursement, ensuring sustainability without burdening beneficiaries.

3. **Carbon Credit Financing:**
   With the planned addition of blockchain-based carbon emission reduction tracking, LoGIC will be positioned to attract funding from carbon markets. Verified climate impacts from community-based schemes (e.g., tree planting, resilient agriculture) can generate carbon credits, providing a new revenue stream to sustain and scale the system.

4. **Partnerships and Donor Engagement:**
   By demonstrating transparency and impact, the system will strengthen donor confidence and attract additional investments. Partnerships with financial institutions and mobile financial service providers will further reduce operational costs and ensure continuity.

5. **Scalability through Government Adoption:**
   In the long term, the system can be institutionalized by national authorities as a best-practice model for community-level fund management, ensuring policy-level sustainability and unlocking larger-scale funding streams.

Business or Funding Model

(Will your solution generate revenue, rely on grants, or operate through public partnerships?)

The blockchain-enabled CRF fund management system will be sustained and scaled through a blended funding and business model that leverages project resources, donor support, and innovative financing mechanisms:

1. Initial Pilot Funding:
   The pilot will be financed through UNDP Bangladesh and Accelerator partner contributions. This will cover solution development, system integration, training, and initial implementation costs.

2. **Operational Cost Recovery:**
   A **transaction-based cost-sharing mechanism** will be introduced. A very small service fee

(e.g., <1% per loan transaction) can be deducted from cooperative-level operations to cover recurring costs such as API maintenance, server hosting, and MFS integration fees. The fee will not burden beneficiaries but will ensure cooperatives contribute to system sustainability.

3. **Donor & Development Partner Support:**
   Given LoGIC's strong alignment with climate adaptation and financial inclusion, additional donor agencies (EU, Sweden, Denmark, UNCDF, etc.) can be engaged to support scaling. Donors will be encouraged by the improved transparency, accountability, and reporting capabilities provided by blockchain.

4. **Carbon Credit Financing:**
   In the medium to long term, the system will incorporate a blockchain-based carbon emission reduction tracking mechanism. This will enable LoGIC to generate and sell verified carbon credits from community-led climate adaptation initiatives, unlocking a new revenue stream to support system operations and expansion.

5. **Government & Institutional Adoption:**
   Over time, the Government of Bangladesh may adopt the solution as part of its climate financing architecture. This would open the door for budget allocations and institutional funding, ensuring large-scale sustainability beyond donor cycles.

Key Resources & Partnerships

(What ongoing resources (e.g., cloud services, development talent, regulatory access) are needed to maintain and grow the solution?)

To maintain, scale, and sustain the blockchain-enabled CRF fund management system, the following resources and partnerships are critical:

1. **Technical Resources**

   - **Cloud Infrastructure & Hosting:** Reliable and secure cloud services to host the blockchain solution, APIs, and data storage.

   - **Development Talent:** Continuous support from blockchain developers, integration experts, and system administrators for upgrades and maintenance.

   - **API Development & Integration:** Technical resources to connect existing LoGIC systems (Cooperative Management System and ATM system) with the blockchain

layer.

2. **Institutional Resources**
    - **Regulatory Access & Compliance:** Alignment with Bangladesh's financial regulations, mobile financial services (MFS) policies, and data privacy frameworks.
    - **Capacity Building:** Training resources for cooperative leaders, community beneficiaries, and UNDP field teams to ensure adoption and proper system use.
3. **Financial Resources**
    - **Seed Funding:** Donor and UNDP support for pilot implementation.
    - **Sustainability Financing:** Ongoing funding streams through donor partnerships, carbon credit financing, and small cooperative-level contributions.
4. **Key Partnerships**
    - **Solution Maker (Cladfy):** For blockchain solution design, technical expertise, and prototyping.
    - **EMURGO Labs:** For advanced technical support and architecture validation.
    - **Mobile Financial Service Providers (e.g., bKash):** For seamless fund disbursement and integration into beneficiaries' wallets.
    - **Government of Bangladesh & Regulators:** To ensure compliance, endorsement, and pathways for institutional adoption.
    - **Donor Partners (EU, Sweden, Denmark, UNCDF, etc.):** For scaling support and resource mobilization.
    - **Local Cooperatives & Community Institutions:** For implementation, governance, and beneficiary engagement.

Long-Term Ownership / Maintenance

(Who will manage and maintain the solution after the pilot: your team, a partner, or a public agency?)

The long-term management and maintenance of the blockchain-enabled CRF fund management system will follow a phased ownership approach:

1. **Pilot & Early Stage (During Cohort 1 and Pilot Rollout):**
    - The solution will be co-managed by the LoGIC project team at UNDP Bangladesh in collaboration with Cladfy and EMURGO Labs.
    - Technical support (e.g., upgrades, bug fixes, blockchain expertise) will primarily be provided by Cladfy and Accelerator partners.
2. **Medium Term (Post-Pilot, 2–3 Years):**
    - Ownership of day-to-day operations will gradually shift to the **LoGIC project team and national partners**.
    - Local cooperatives and their leaders will be trained and empowered to oversee loan governance processes using the system.
    - Maintenance of APIs and integrations with the Cooperative Management System and ATM system will be handled by UNDP's contracted local software vendors, supported by periodic input from blockchain experts.
3. **Long Term (Beyond 3 Years):**
    - The **Government of Bangladesh (through relevant ministries and agencies)** will be encouraged to formally adopt and institutionalize the solution as part of national climate financing and local adaptation fund management systems.
    - Technical maintenance can be transitioned to a **public-private partnership (PPP) model**, where government, financial service providers, and cooperatives share responsibility for sustaining the platform.
    - This institutional adoption will ensure long-term continuity, minimize donor dependency, and allow the system to scale nationally.

Deliverables Checklist

Use the checklist below to ensure all relevant final materials are prepared and submitted for review.

These are the suggested key outputs from the prototype sprint; not all items may apply to every team or solution, so please adapt as needed based on your project's scope and stage.

Please link all deliverables in a dedicated shared folder for your team for easy access by the program team and stakeholders.

- ☑ Prototype demo link
- ☑ Source code / GitHub repo
- ☑ Documentation / ReadMe
- ☑ SDG metadata logic
- ☑ Feedback summary
- ☑ Video walkthrough
- ☑ Feedback from Country Office
- ☑ Next steps agreed (e.g., pilot planning?)

Team Reflection

Use this space to share key takeaways and reflections from both the Challenge Owner and Solution Maker teams. This dual perspective helps document alignment, evolution of understanding, and mutual growth during the accelerator journey.

Challenge Owner's Perspective

From UNDP Bangladesh's perspective, this journey has been highly valuable in translating a long-standing operational challenge into an innovation-driven solution. We have gained a clearer understanding of how **blockchain can be applied to climate adaptation financing in a practical, community-friendly manner**.
Working with Cladfy and accelerator partners has allowed us to:

- Refine our challenge into implementable features.
- Test how transparency at the cooperative level can restore trust.

- Build internal capacity to explore advanced digital technologies like DID and smart contracts.

This collaboration strengthens our ability to ensure **climate finance reaches the most vulnerable households efficiently and transparently**, while positioning Bangladesh as a frontrunner in leveraging blockchain for development.

Solution Maker's Perspective

- We learned that transparency at the cooperative level matters most to users. We kept the blockchain invisible to end users while ensuring every transaction is verifiable on-chain.
- We learned that the end user- the beneficiary valued accessibility and simplicity - we made sure to build UI and end-to-end workflows that were smooth.