

**EVALUATION  
OF  
BLOCK CHAIN BASED  
CASH TRANSFER PILOT  
IN NEPAL  
(UNICEF-RAHAT)**

**FINAL REPORT**

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**Telephone:** + 977-1-4522623

**Email:** [contact@progressincompany.com](mailto:contact@progressincompany.com)

**Web:** [www.progressincompany.com](http://www.progressincompany.com)

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This evaluation has proven to be a profound and enlightening experience for our entire evaluation team. We wholeheartedly commend the pioneering initiative taken in integrating blockchain technology into cash voucher assistance. To the dedicated team at UNICEF and all stakeholders involved, we extend our best wishes for all your future endeavors.

***Progress Inc.***

***December 13, 2023***



Progress Inc. has prepared this report for UNICEF Nepal Country Office as a part of the external evaluation of the Rahat Project.

The evaluation was conducted by **Bibhav Basnet, PhD** (Founder/ Director) and **Pooja Koirala** (Founder/Director along with International Consultant **Edward Fraser** (CVA Lead) **and Bibek Poudel** (Blockchain Consultant).

A combination of quantitative and qualitative data collection methods was employed to derive the findings. The primary data collection for this evaluation was conducted in August-September 2023.

If you have any inquiries pertaining to the evaluation, please feel free to reach out to Progress Inc. through the following contact information:

[contact@progressinccompany.com](mailto:contact@progressinccompany.com)

**Authors:**

**Bibhav Basnet, PhD**

**Pooja Koirala**



## EXECUTIVE SUMMARY

Nepal, with its complex geological structure, active tectonic plates, and seismic activity, ranks among the top 20 most multi-hazard prone countries globally. The country faces significant risks, particularly from earthquakes and floods, which are respectively ranked 11th and 30th in terms of global risk. Monsoon seasons lead to swelling rivers and rivulets, causing damage to villages, livelihoods, and agricultural lands, resulting in disaster-related displacement.

Jaleshwor municipality, part of the flood-prone Madhesh Province, has a substantial vulnerable population. During the COVID-19 pandemic, these vulnerable households lost their livelihoods, exacerbating their need for alternative income sources. Additionally, the low HDI score in Mahottari district underscores the challenges faced by its residents.

To address disaster displacement, the Government of Nepal has established various policies and frameworks. Cash transfer programs have been a common approach for emergency relief. However, they have logistical limitations, including delays in reaching affected populations due to inaccessible roads and potential misallocation leading to corruption. Recognizing the need for immediate humanitarian aid, there's a growing demand for digitization. Mobile-based blockchain technology is emerging as a solution to enhance financial inclusion, transparency, and accountability in humanitarian efforts.

The evaluation sets the stage for exploring the integration of blockchain technology into humanitarian cash and voucher assistance (CVA) programs. It highlights the potential benefits of blockchain, such as transparency, accountability, reduced corruption, improved security, and programmability, in the context of CVA. The Rahat pilot program, conducted in partnership with UNICEF Office of Innovation (OoI), UNICEF Nepal Country Office, and the Rumsan team, aimed to enhance humanitarian aid efforts through blockchain-based digital cash and voucher systems. This innovative solution focused on

financial inclusion, accountability, and transparency during cash transfers. The pilot of program took place from August 2022 to February 2023.

**Objectives:** The evaluation aimed to achieve several key objectives, including assessing the effectiveness and transparency of blockchain technology in monitoring cash transfers, improving distribution for various user groups, generating equitable recommendations for scaling, evaluating scalability and cost-effectiveness, and documenting the advantages of blockchain over conventional cash transfer systems, underscoring its value.

The evaluation assesses blockchain-based CVA benefits for UNICEF Nepal Country Office, informs funding decisions for OoI, explores scalability for the local government, identifies technological lessons for Rumsan, and offers general insights for the broader CVA and blockchain community. It serves as a blueprint for advancing humanitarian efforts and shaping future strategies.

**Method:** In the evaluation, a mixed-method data collection approach was utilized, employing a concurrent embedded design. This approach placed primary emphasis on qualitative data collection to facilitate a deep understanding of the program's aspects related to relevance, efficiency, effectiveness, and sustainability. Quantitative data collection complemented these findings, offering insights into the relevance and efficiency of the technology for beneficiaries. The evaluation design was structured to serve both summative and formative purposes, focusing on assessing project achievements and identifying lessons for future directions.

The evaluation site was Jaleshwor Municipality in Mahottari District, Province 2. The study took place from July to September 2023. The evaluation covered the time period from August 2022 to February 2023.

In the data collection process, various methods were employed:

**Key Informant Interviews (KIIs):** Interviews were conducted with key stakeholders, including UNICEF, local government officials, and beneficiaries. Participants were purposively selected to ensure a diverse range of perspectives.

**Surveys:** Beneficiaries were randomly selected to participate in one-to-one in person satisfaction surveys using closed ended questionnaire, to gauge their experiences with the program.

**Focus Group Discussions (FGDs):** FGDs were held with beneficiaries to gain deeper insights into their experiences and perspectives.

**Secondary Data Review:** Existing reports, documents, and publications related to the Rahat project were comprehensively reviewed to gather information about its design and implementation.

Regarding the sampling strategy, for the surveys, a systematic random sampling method was used. The survey covered all 12 wards of Jaleswor municipality in Mahottari District. The goal was to include at least 15% of the total beneficiaries in the survey. The sample size of 320 households was calculated to achieve a confidence level of 95% with a margin of error of 5%. KIIs used a purposive quota-based sampling approach. The selection of participants was based on their expertise and their relevance to the evaluation objectives. For the FGDs, a systematic approach was followed. Initially, the evaluation randomly selected the wards as discussion locations to ensure diversity. Local government representatives and UNICEF District staff played a key role in identifying FGD participants representing various socio-demographic backgrounds.

#### **Criteria: Effectiveness**

**Finding: Secure and transparent Fund management:** Blockchain technology enhanced transparency and accountability in fund flow, simplifying monitoring, and reducing the need for extensive auditing. Integration of One-Time

Passwords (OTP) enhanced transaction verification for vendors.

**Finding: Data integrity and tamper-proof records:** Rahat's blockchain system eliminated the risk of double spending and ensured the system's integrity. QR code cards simplified token exchange for non-banked beneficiaries, enhancing reporting and monitoring. Blockchain's "write once, read only" principle ensured tamper-proof records. Debate existed regarding the effectiveness of blockchain in humanitarian action.

**Finding: Enhanced financial inclusion:** Rahat's approach benefited unbanked and phoneless beneficiaries, providing access to digital cash assistance. QR cards with PIN codes facilitated digital token redemption. Blockchain technology have the potential to benefit undocumented migrants and those without official identity cards. Beneficiaries without identification documents could access cash assistance via their linked phone numbers.

**Finding: Promotion of Collaboration Among Stakeholders:** Rahat's blockchain system ensured real-time reconciliation of funds and meticulous documentation, enhancing transparency and trust. Multi-node blockchain systems were vital for data integrity.

**Finding: Increased monitoring and financial management capacity:** Blockchain technology allowed for real-time monitoring and enhanced financial accountability and efficiency. Streamlined reporting provided comprehensive data from a single source for quicker decision-making.

**Finding: Empowering experience for ultra-poor, especially women:** Rahat empowered women (with 71.4% of surveyed women explicitly stating that they felt empowered after receiving cash assistance) by involving them in managing funds for basic needs and increasing their decision-making power. Women gained financial autonomy and reduced dependency on male family members. Cash assistance primarily addressed fundamental needs, supporting vulnerable communities' well-being.

## Effectiveness of blockchain compared with traditional CVA

Aspect	Block-chain based system	Traditional digital CVA
Security	Enhanced security due to blockchain's tamper proof data storage and encryption mechanism	Security reliant on traditional digital security measures.
Transparency	High level of transparency and immutability due to blockchain public ledger	Limited transparency, potentially leading to disputes and questions
Real-time monitoring	Provides real-time tracking of funds and disbursements, reducing the need for manual data entry	Real time monitoring might be limited or absent altogether, leading to delay in detection of errors.
Inclusivity	Inclusive approach that caters to both banked and unbanked beneficiaries.	Beneficiaries needs to have account or specific technologies.
Reconciliation	Real time fund reconciliation	Necessitates direct beneficiary confirmation due to intermediary involvement.

The evaluation additionally incorporates surveys targeting the actual cash assistance beneficiaries to gain insights into their firsthand experiences with the cash assistance program. The following section underscores the key findings generated from the survey:

- 95.7% of respondents had access to mobile phones and 94.8% of respondents had a bank account. Despite having bank accounts, only 82.6% received cash assistance in their accounts, revealing a gap in access. This prevalence of bank accounts is mainly driven by government mandates for social security access, resulting in beneficiaries having accounts even during the pilot phase.

- 93.8% of respondents received clear and concise information on how to receive cash.
- 100% of mobile users without bank access reported receiving OTP for cash redemption.
- 96.8% of respondents did not face any difficulties in submitting OTPs or PIN codes during the redemption process. Only 3.2% of respondents encountered difficulties.
- 98.7% of respondents did not face any challenges while accessing cash.
- Some beneficiaries preferred ward offices over banks for cash distribution due to proximity and cost considerations.
- Satisfaction with the cash assistance program: Satisfactory (91.8%), Dissatisfaction (1.2%), Neutral (7.0%).

### Criteria: Efficiency

Rahat's efficiency was evident in its real-time reconciliation, which saved time and human resources. The use of open-source solutions like KOBO and Somleng proved cost-effective compared to third-party services. The Rahat dashboard's reporting feature enhanced transparency, making transaction monitoring more efficient.

In comparison to traditional approaches, Palika and UNICEF Nepal mentioned the potential for lower operational costs once the blockchain system is established. However, no systematic cost-efficiency analysis was conducted during this pilot. Cross-case analysis in 2023 highlighted the time-saving and cost-saving benefits of various digital CVA, including blockchain-based CVA. These benefits were notably observed in processes related to value transfer, tracking, and payment reconciliation, achieved through digital tools and batch processing.

There are some costs saving benefits identified as well that applied generally to all blockchain based

CVA. Transitioning to digital payment systems from physical cash distribution reduces transfer costs and enhances program cost efficiency. Digital payments streamline reconciliation processes, reducing monitoring and evaluation expenses. Mobile money usage alleviates financial burdens on beneficiaries, eliminating transportation expenses and withdrawal/transaction fees. Blockchain technology can achieve remarkable cost reductions by eliminating the need for financial service providers, as observed in pilot initiatives in Jordan.

### **Criteria: Scalability**

In terms of scalability, Rahat benefits from a favorable infrastructure, leveraging open-source foundations for cost-free implementation within Nepal. The use of open-source tools like Kobo Toolbox and Somleng streamlined processes and reduced the need for additional hardware infrastructure. The choice of Ethereum's EVM technology allows for potential future public transactions, adding to its scalability. In Nepal, the capacity to comprehend blockchain technology is considered sufficient. The local production of technology is not a requirement, and users can effectively maintain and utilize it without in-depth technical knowledge. It's crucial to perform a robust cost-benefit analysis when scaling, ensuring that benefits extend to cash recipients and that incentives do not compromise the technology's humanitarian objectives.

### **Criteria: Relevance**

It appears that Rahat holds relevance in the context of humanitarian and cash transfer programs, particularly when the focus is on the benefits it provides in terms of real-time monitoring, efficiency gains, and its attribute of real-time transaction reconciliation. The project has demonstrated acceptability and interest among Palika authorities, who appreciate its efficiency, real-time monitoring, and transparency benefits. Furthermore, the system's ability to facilitate real-time reconciliation adds to its relevance. This feature streamlines the process of cross-verifying

and ensuring the accuracy of transactions, which is essential in humanitarian contexts.

Transitioning from traditional paper-based systems to digital platforms posed challenges in Nepal, with resistance from those hesitant to change the status quo. It is noteworthy that some recipients still prefer receiving cash directly based on their preferences, even if they have bank accounts. This preference, raised in various interviews, is relevant to all CVA initiatives and emphasizes the importance of tailoring CVAs to align with beneficiaries' choices, whether they are blockchain-based or not. However, equally important It is to carefully consider the associated risks of in-hand cash distribution.

### **Criteria: Coherence**

Rahat's approach to efficient and transparent cash transfers, real-time monitoring, and aid distribution aligns seamlessly with the goals of UNICEF's Shock Responsive Social Protection (SRSP) system in Nepal. By leveraging blockchain technology, Rahat contributes to the timely and effective support of vulnerable communities, especially in the face of natural disasters and pandemics. Furthermore, Rahat complements the government's social protection schemes by enhancing targeting precision, minimizing resource leakage, and enabling real-time monitoring, thereby amplifying the effectiveness of these initiatives. Moreover, as Nepal plans to implement an Integrated Social Registry, Rahat is well-positioned to collaborate, ensuring that eligible beneficiaries identified through the registry receive transparent, secure, and efficient aid, further strengthening the nation's social protection framework. The combination of these two systems creates a robust approach to social welfare, offering efficient identification and accountable aid delivery.

### **Unintended outcomes and limitations of blockchain based Rahat**

While the adoption of blockchain technology for CVA did not encounter significant delays, it is essential to highlight a challenge that emerged within the realm of project management.

Specifically, the complexity arose in reconciling data from beneficiary lists, some of which were several years old, with the most up-to-date information, leading to delays. The Rahat project strived to meet data standards, demanding meticulous data management.

The intended focus on unbanked beneficiaries was hindered due to a small percentage of unbanked beneficiaries in the target population, leading to missed opportunities.

There are certain limitations of blockchain in itself. Blockchain excels in securely managing digital records and transactions involving multiple stakeholders, but it faces challenges when handling the digital representation of physical records. A "last mile" trust issue can arise, often requiring human intermediaries. Blockchains depend on human involvement for tasks like updating software and making governance decisions, meaning they are not entirely self-sufficient. Blockchains operate best in online environments, making offline transactions or data access challenging, limiting usability in offline or unreliable internet scenarios.

## **Recommendations**

### **Recommendations for UNICEF Nepal:**

- Provide training and resources to UNICEF NCO staff to bridge the knowledge gap in Web 3.0 and blockchain technology.
- Disseminate key findings from blockchain-based CVA evaluations to foster transparency and informed decision-making.
- Conduct regular risk assessments at the beginning of each verification cycle and develop contingency plans to address challenges promptly.
- Identify the root causes of verification delays and develop strategies to prevent them.
- Streamline Banking Process through API Integration: Collaborate with banks to

integrate banking systems with blockchain-based platforms, improving efficiency.

- Prioritize data protection in future evaluations to ensure privacy and maintain stakeholder trust.
- Explore solutions like phone-based electronic Know Your Customer (eKYC) for scalability and inclusion.
- Investigate blockchain's potential for anticipatory actions in humanitarian response.

### **Recommendations for UNICEF OoI:**

- Evaluate the cost-effectiveness of blockchain-based pilots to ensure efficient use of resources without compromising the program's success.
- Enhance understanding of blockchain's impact by involving unbanked beneficiaries, especially during the piloting phase.
- Set clear baseline metrics to assess the quantitative advantages of blockchain-based CVA compared to traditional methods.
- Learn from verification delays to prevent future issues, ensuring timely beneficiary assistance.

### **Recommendations for Rumsan:**

- Develop user-friendly documentation explaining the blockchain-based CVA system's functionality, guidelines, and troubleshooting procedures in various formats.
- Implement a non-code-based workflow editor for flexible workflow design and modification.
- Enhance the platform's ability to track the reverse flow of unclaimed funds back to UNICEF.
- Partner with banks for API integration to streamline financial reconciliation and reduce manual efforts.

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## LIST OF ABBREVIATIONS AND ACRONYMS

API	Application Programming Interface
ATM	Automated Teller Machine
BNW	Basic Needs Wallet
CBO	Community-Based Organization
CHATS	Convexity Humanitarian Aid Transfer Solution
CSO	Civil Society Organization
CTP	Cash Transfer Programming
CVA	Cash Voucher Assistance
CVP	Cash Voucher Programming
DLT	Distributed Ledger Technology
FGD	Focus Group Discussion
FSP	Financial Service Providers
GoN	Government of Nepal
ID	Identity Document
IVR	Interactive Voice Response
KII	Key Informant Interview
KYC	Know Your Customer
eKYC	electronic Know Your Customer
MEL	Monitoring, Evaluation and Learning
MIS	Management Information System
OoI	Office of Innovation
OTP	One Time Password
PII	Personal Identifiable Information
PLWD	People Living with Disabilities
QR	Quick Response
SMS	Short Message Service
UNICEF	United Nations Children's Fund

# SECTION 1: INTRODUCTION

## 1.1 BACKGROUND

Characterized by complex geological structure with active tectonic plates and continued seismic activities and topography with varying climactic conditions, Nepal ranks among the top 20<sup>th</sup> list of the most multi-hazard prone countries in the world. The major disasters in the country are earthquake, and flood, ranking 11<sup>th</sup> and 30<sup>th</sup> in terms of risk worldwide (Dangal, 2011). The climate of Nepal is dominated by the monsoon circulation system and during the monsoon season, the rivers and rivulets swell, damaging villages, threatening livelihoods, and livestock and crop lands. The disaster displacement occurs in terms of evacuation from their homes, cost of rebuilding their homes, unemployment, and affected psychosocial well-being (Internal Displacement Monitoring Centre , 2021).

Jaleswor municipality is one of the most flood prone Palikas of the Madhesh Province. An initial Shock Responsive Social Protection Survey (2019/20) conducted by UNICEF identified 5,214 vulnerable HHs among the 8,764 HHs in the municipality. During the COVID-19 pandemic, almost all of the vulnerable households lost their livelihood and were in search of alternative income generating source. Moreover, compared to other districts, the residents of Mahottari district score very less on the HDI i.e. 0.4. Jaleswor municipality was identified as one of the major priority areas based on flood affected population (Nepal Flood Security Monitoring System, 2019).

The Government of Nepal has established several policies, framework, strategies or plans acknowledging internal displacement associated with disasters and aimed at mitigating its risk and negative consequences. Over the decade, cash transfer programs have additionally been widely applied by humanitarian aid workers to meet the minimum needs for good and non-food items among emergency-affected populations as disaster relief interventions. Although cash transfer highlights its functionality by being logistically simpler and its distribution being time efficient, it also has its inefficacies. Cash relief programs or any other disaster relief interventions often reach the emergency affected population late due to inaccessible road conditions. Furthermore, it can also be argued that misallocations of cash or commodities can be easily hidden, leading to corruption.

As the need for humanitarian aid in emergency situation is immediate, there is emerging need of digitization. The mobile based block chain technology promotes financial inclusion, accountability and transparency to enhance the humanitarian aid efforts. The system effectively manages and monitors the transaction flows by offering a real-time traceability of fund movements.

## 1.2 ABOUT CASH VOUCHER ASSISTANCE

According to the definition of CALP network, Cash and voucher assistance (CVA) refers to the direct provision of cash transfers and/or vouchers for goods or services to individuals, households, or group/community recipients (The CALP Network, 2022). In the context of humanitarian response, CVA excludes payments to governments or other state actors, remittances , service provider stipends, microfinance and other forms of savings and loans. The terms ‘cash’ or ‘cash assistance’ should be used when referring specifically to cash transfers only (i.e., avoid using ‘cash’ or ‘cash assistance’ when referring to cash and vouchers collectively).

In the humanitarian context, CVA plays a pivotal role, aiming to improve outcomes for individuals affected by crises. The collective vision is to establish CVA as a central, scalable component of high-quality and timely humanitarian assistance. The ultimate goal is to create a future where individuals can overcome crises with

dignity, exercising their right to self-determination and choice, which in turn contributes to their overall well-being (CALP network).

The CVA has proven to be an efficient and flexible modality for delivering assistance. It empowers recipients by giving them decision-making authority, which is crucial during crises. CVA has been valuable in meeting basic needs, supplementing household incomes, protecting livelihoods, supporting local markets, and reviving local economies. This modality also offers the advantage of providing remote assistance, making it a versatile approach. For populations excluded from or unable to access government social protection programs, scaling up CVA as part of humanitarian responses can serve as an entry point for accessing long-term social protection assistance (Intikane).

In the past few years, there has been a noticeable rise in systematic and policy changes within the realm of CVA. Humanitarian organizations have been progressively integrating cash transfers as a versatile tool in their disaster response strategies to address a wide range of emergencies. These include seasonal disasters, prolonged crises, sudden-onset disasters, gradual and ongoing chronic disasters, as well as preemptive measures. When deployed in the appropriate context, CVA proves to be an efficient and impactful form of humanitarian aid during emergency responses. It optimizes the utilization of limited resources, stimulates local economies, and upholds the dignity and autonomy of populations affected by crises.

The response to COVID-19 has accelerated the shift toward digital payments and innovative technologies for CVA. These technologies reduce the need for physical contact and enable remote assistance, even in challenging conditions. New approaches like voice ID and information and communications technologies have been explored for registration, verification, delivery, and monitoring.

The adoption of digital technologies within CVA programs brings substantial added value, primarily by significantly reducing operational costs and enhancing cost-efficiency. This cost reduction has a dual impact—beneficiaries are relieved of travel expenses to access funds from ATMs, and the saved resources can be reinvested to expand and scale program operations, extending their reach. This is evident in successful cases of mobile money transfers in countries like Ethiopia and Kenya, where technology-driven cost-efficiency measures have notably improved program effectiveness.

Moreover, digital technologies foster improved communication between humanitarian agencies and beneficiaries, leading to more precise and timely responses to community needs. However, it is essential to emphasize that this can only be achieved when beneficiaries' perspectives are integrated into program design, ensuring the quality of service ultimately delivered to them.

The advancement of digitalization in the humanitarian sector also contributes to enhanced data security, accessibility to beneficiary information, financial inclusion, and the ability to track and trace value transfers more effectively. Biometric data usage not only bolsters data privacy and protection but also addresses challenges related to KYC requirements, thereby promoting financial inclusion and social protection. Smart cards offer significant time and cost savings for organizations while remaining user-friendly for beneficiaries. Mobile money options bolster financial inclusion through simplified transfers and extensive networks, further reducing costs for those in need. Lastly, mobile platforms and applications streamline data collection, allowing for timely and remote monitoring and evaluation of CVA programs, enhancing data accuracy and overall program effectiveness.

Governments have also started to take a more prominent role in providing social protection through cash assistance. This has emphasized the importance of strengthening connections between CVA and national social protection systems. The collaboration between humanitarian organizations and governments is vital in ensuring more systematic and effective responses.

### 1.3 INITIATION OF RAHAT

In partnership with UNICEF Office of Innovation (OoI), UNICEF Nepal Country Office (NCO), and the Rumsan team, a pilot program was conducted in Jaleswor, Madhesh Pradesh, Nepal, utilizing the blockchain-based digital cash and voucher system called Rahat. This innovative solution aimed to enhance humanitarian aid efforts by promoting financial inclusion, accountability, and transparency throughout the cash transfer process.

**About Rumsan:** Rumsan is a pioneering digital innovation company with a strong presence in both Nepal and the United States. The company specializes in harnessing the potential of blockchain technology to create innovative solutions across diverse sectors, including agriculture, finance, healthcare, decentralized identity, and humanitarian initiatives.

Rumsan actively engages with businesses, governments, and non-governmental organizations. These collaborations serve as sources of inspiration, motivating the company to strive for a more inclusive, equitable, and sustainable world.

Rumsan's primary focus is on developing solutions that have a profound societal impact. The company's approach to blockchain development begins with a thorough understanding of its clients' unique goals and objectives. From there, Rumsan proceeds to implement practical, real-world blockchain innovations that align with the client's vision. This approach ensures that the technology not only meets the client's needs but also contributes to the betterment of communities and society as a whole (Rumsan).

Rumsan successfully secured approximately \$60,000 USD, encompassing funds allocated for technology development and operational costs. This financial support was complemented by an additional approximately \$112,500 USD, matched by UNICEF Nepal Country Office, resulting in a combined funding structure for the initiative. The collaboration between Rumsan and UNICEF reflects a joint commitment to leveraging these resources for the implementation of the blockchain-based CVA program, contributing to the advancement of their shared objectives.

Based on the Expression of Interest, Rumsan applied for and secured funding through UNICEF's Innovation Fund. This fund was designed to support early-stage, open source digital public goods that address critical challenges faced by children and youth. The primary aim of the Innovation Fund was to identify "clusters" or portfolios of initiatives related to emerging technologies, with a focus on shaping markets and leveraging these technologies to benefit children.

The Innovation Fund invests in solutions concentrated around industries with a market value of around \$100 billion in frontier technology areas, including blockchain, UAVs, virtual and augmented reality, machine learning, data science, and artificial intelligence. While the fund's interests are not limited to these areas, they are particularly keen on companies that employ technology in innovative, scalable, and globally applicable ways.

UNICEF's approach is unique in that they do not seek equity in return for their support. Instead, they require that all code, content, or hardware developed and tested as part of funded projects be open source and made publicly available. The Innovation Fund provides financial support, technical assistance, and access to a network that helps these companies grow. It also facilitates connections with similar early-stage projects in different countries, promoting faster and more robust development of these initiatives.

## 1.4 SELECTION OF THE SITE FOR PILOTING

The choice of Jaleshwor Municipality as the pilot site for the blockchain-based cash transfer program was deliberate and based on specific criteria. Jaleshwor Municipality, located in the flood-prone Madhesh Pradesh province of Nepal, had been adversely affected both socio-economically by the COVID-19 pandemic and by recurrent natural disasters, particularly flooding. Nepal is a country highly prone to various natural disasters, such as earthquakes, landslides, floods, and the impacts of climate change. Jaleshwor, located in the Terai region, faces particular vulnerability to flooding and cold waves during the monsoon and winter seasons. Given these challenges, Jaleshwor was identified as an ideal location for this initiative, aiming to provide support to the most vulnerable communities facing the socio-economic repercussions of both natural disasters and the pandemic.

Jaleshwor was selected for this project for three major reasons. Firstly, UNICEF Nepal provided household-level data pertaining to socio-economic and demographic vulnerabilities which was collected as part of Shock Responsive Social Protection programming. This dataset was provided by the palika which, consisted of approximately 8,764 households with children under the age of 5, comprising i) daily wage earners, ii) landless families, and iii) persons with disabilities. The primary motivation for collecting, verifying, and filtering this data was to align it with the specific aforementioned criteria, which closely mirrored the dataset obtained from Red Cross.

Secondly, Jaleshwor municipality also possessed digitized data from the Social Security Allowance registry that proved invaluable in identifying families with children under 5 years old. This rich source of digitalized information facilitated the filtering process, enabling a more precise selection of beneficiaries in alignment with the project's objectives.

Furthermore, the choice of Jaleshwor was influenced by its location as a flood-prone area in the Madhesh Pradesh province of Nepal and vulnerable socio-demographic characteristics of the people. This region had been significantly affected by both recurrent floods and the socio-economic impact of the Covid-19 pandemic, compounding the challenges faced by the local population. These combined factors made Jaleshwor an ideal location for the project, as it addressed the urgent needs of a vulnerable community.

## 1.5 STAKEHOLDERS IDENTIFICATION

Stakeholders	Role/Interest	Relationship
Rumsan	Digital Innovation Company, Fund Recipient	Collaborator with UNICEF and Local Government
UNICEF Innovation Fund	Funding Source	Collaborator with Rumsan and UNICEF
UNICEF	Funding and Implementing Partner	Collaborator with Rumsan and Local Government
Local Government (Municipality)	Implementing Partner	Collaborator with Rumsan and UNICEF
Children and Youth	Beneficiaries of the CVA Program	End-Users of the Program

## 1.6 RATIONALE OF INITIATING RAHAT BASED ON PROBLEM IDENTIFICATION

Rahat was initiated with the primary objective of delivering essential relief and humanitarian assistance, particularly in the context of disaster-stricken regions and underserved communities. The name 'Rahat,' which translates to "relief" in Nepali, epitomizes its mission to alleviate suffering and enhance the overall well-being of those in need.

Rahat's initiation in Nepal aimed to address various challenges within the realm of traditional CVA and even the digital CVA landscape. Traditional CVA, while an effective mechanism for providing aid, often encountered issues related to transparency, inefficiency, and accessibility in Nepal.

In the traditional CVA framework, ensuring transparency and accountability throughout the aid distribution process was a notable challenge, particularly in regions with limited digital infrastructure. Record-keeping and beneficiary verification processes were often cumbersome and error-prone, which left room for potential misuse of funds. Additionally, Nepal's digital landscape posed its own set of challenges, with not all aid recipients having access to traditional banking services, smartphones, or reliable internet connectivity. This limited the efficiency of digital CVA implementations, as many beneficiaries were unable to access their funds conveniently. Lastly, the last-mile distribution of aid in Nepal, with its geographical and infrastructural complexities, often proved inefficient and costly.

Rahat attempted to address these problems comprehensively by leveraging blockchain technology. The platform's blockchain-based approach provided a solution to enhance transparency, streamline processes, and improve accessibility. Every transaction became traceable and tamper-proof, ensuring full accountability and transparency in fund distribution. By providing digital tokens to beneficiaries, including those without traditional banking access, Rahat made it more convenient for individuals to access their aid. Real-time data updates and secure record-keeping reduced the likelihood of errors and fraud, thus improving overall efficiency. The optimization of the last-mile distribution process ensured that aid reached its intended recipients promptly and in a cost-effective manner.

The inception of this initiative was also driven by the need to strengthen the Shock Responsive Social Protection (SRSP) system of the UNICEF Nepal Country Office. This system seeks to extend support to communities that are most vulnerable and impacted by disasters and pandemics. Nepal's high susceptibility to various natural calamities, such as earthquakes, landslides, floods, and the effects of climate change, underscores the urgency of such initiatives.

## 1.7 NUMBER OF BENEFICIARIES REACHED

The pilot program identified and reached 1,900 (male: 1052 and female: 848) of the most vulnerable households within Jaleswor Municipality. The selection criteria was outlined by UNICEF Nepal for these households included being landless, daily wage earners, or having a family member with a disability. These households faced significant socio-economic challenges, especially during the COVID-19 pandemic when many of them lost their livelihoods. Through this initiative, the aim was to provide support to these vulnerable households by utilizing innovative blockchain technology to facilitate cash transfers, thus enhancing financial inclusion and ensuring transparency and accountability in aid distribution.

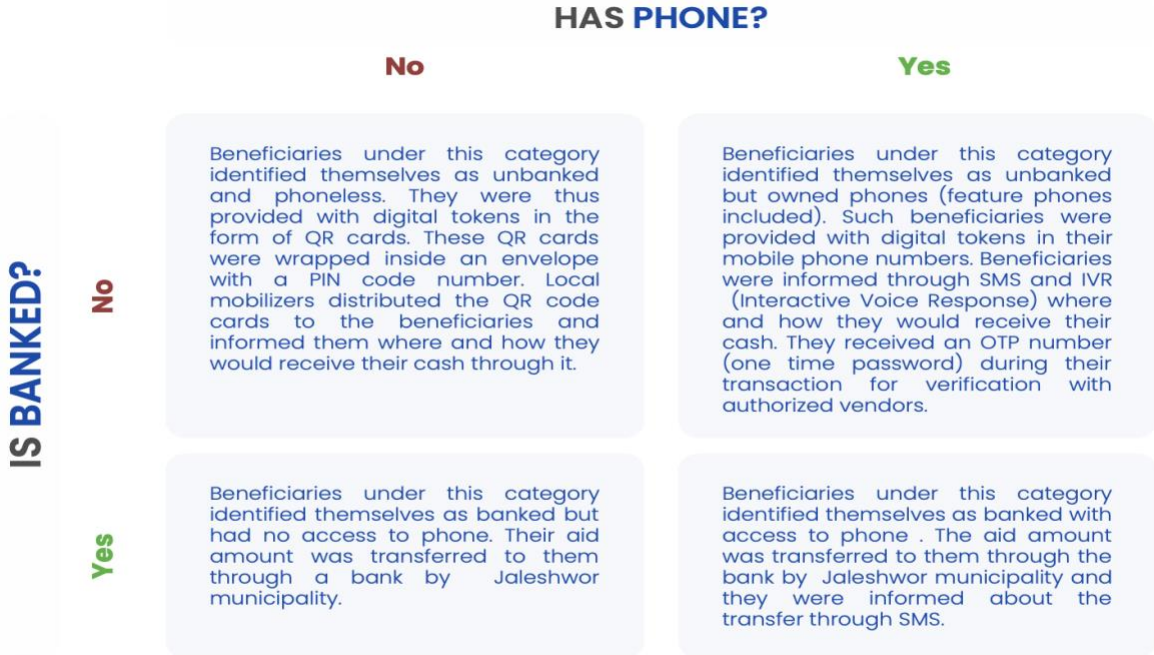
## 1.8 UNDERSTANDING RAHAT SYSTEM

Rumsan is a participant of the Financial Inclusion-focused Blockchain Cohort that was chosen by UNICEF's Venture Fund to execute the initiative in Jaleswor, an area prone to flooding and grappling with the socio-economic ramifications of the COVID-19 pandemic. According to the initial Shock Responsive Social

Protection Survey by UNICEF (2019/20), Jaleswor Municipality had a total of 8,764 households. Among these, 5,214 households were classified as highly vulnerable due to their reliance on socio-economic activities such as daily wage labor, landlessness, unemployment, or dependence on migrant labor. The COVID-19 pandemic significantly impacted these vulnerable households, leading to the loss of their livelihoods, and they were actively seeking alternative sources of income generation. The pandemic resulted in over 1,500 reported cases of COVID-19 infections in the area. Rumsan created Rahat, a system for managing digital CVA. This system, which operates through mobile devices, utilizes blockchain tokens to oversee and supervise aid transactions aimed at emergency response and recovery initiatives (UNICEF, 2023). This trial program is a component of the Office of Innovation's exploration into how blockchain technology can enhance Cash Transfer Programming ((UNICEF, 2023). The primary goals are to streamline the distribution of cash aid and enhance financial inclusivity, transparency, and accountability (UNICEF, 2023).Especially critical during crises, such as emergencies, this system holds the potential to significantly transform people's lives by offering prompt access to essential financial relief.

UNICEF Nepal initiated the project with a digital approach, integrating the respective Palika into the Rahat dashboard. The budget was transferred to the Palika's bank account, and every transaction was meticulously recorded and tracked through a blockchain "handshake" for enhanced security and transparency in fund management.

To onboard beneficiaries onto the Rahat platform, social mobilizers utilized the Kobo Toolbox. Beneficiaries were categorized into four specific groups based on their access to mobile phones and banking services: Unbanked with phone, Unbanked without phone, Banked with phone, and Banked without phone. This classification facilitated a customized and convenient distribution of aid for each group.



Source: Case Study prepared by Rumsan

The final list of beneficiaries was validated and approved by both the Palika and ward authorities, who allocated digital tokens representing the cash transfer amount using the Rahat dashboard. Once this was completed, both the Palika and UNICEF Nepal initiated the fund transfer to the beneficiaries by triggering approvals on their respective dashboards, and this multi-signature trigger event was securely recorded in the blockchain.

Beneficiaries with mobile phones were promptly notified about the assistance through SMS and automated voice messages, which included details on when, where, and how they could access their aid. Subsequently, these beneficiaries exchanged their tokens for cash at their designated ward offices, streamlining the distribution process and ensuring its efficiency.

By incorporating real-time monitoring, the pilot program achieved elevated transparency and efficiency. It also utilized automated and traceable reconciliation procedures, resulting in time savings, enhanced accountability, and the successful execution of cash transfers.

### 1.8.1 ACTIONS

Rumsan embraced a collaborative approach to launch the Rahat pilot project, working closely with key stakeholders, including UNICEF Nepal, Palikas, and UNICEF Office of Innovation. The core strategy involved building upon the existing Rahat open source code base while integrating other open source tools such as Kobo Toolbox and Somleng, which are essential for data collection, analysis, and voice and SMS communication. This collaborative effort entailed several steps:

**Analysis and planning:** The Rumsan team, in collaboration with UNICEF Nepal and Palika, conducted a thorough analysis of the field's existing processes and requirements. This analysis informed the development of essential documents, including a work plan, concept note, pre and post-cash distribution flow, grievance handling, and Monitoring, Evaluation, and Learning (MEL) strategy. This collective understanding led to the analysis and planning to scale and improve the existing open source Rahat platform.

To enhance local engagement, Palika enlisted local mobilizers who played a pivotal role in data collection, verification, and providing support during cash distribution.

**Design and development:** The design and development of the pilot cash flow distribution in Rahat was an iterative and inclusive process. Stakeholders collaborated on redesigning aspects of the platform, gathering user feedback, and fine-tuning the process flow. The primary focus was on creating an intuitive blockchain-powered platform to support CVA efforts for both banked and unbanked beneficiaries. Additionally, Rahat incorporated various elements to enhance accountability and transparency during the blockchain's design.

To ensure secure and traceable transactions, a multi-signature trigger was implemented, and a custodial wallet service was provided to stakeholders for secure identity verification within the blockchain. This approach empowered beneficiaries by granting them access to transparent financial services and involved them in the process. The blockchain technology also introduced real-time reconciliation processes, enabling immediate and accurate financial updates.

**Beneficiary data collection and validation:** A team of 12 trained local mobilizers used Kobo Tool to gather beneficiary data, resulting in 2,756 data entries. Palika and local wards collaborated to validate the collected data, ensuring that only valid beneficiaries received token assignments. The approved data sheets were seamlessly integrated into the Rahat system via API integration, automatically incorporating beneficiaries' information.

**Beneficiary communication:** Communication with beneficiaries varied based on their banking and phone status. Unbanked beneficiaries with phones received notifications via SMS and Interactive Voice Response

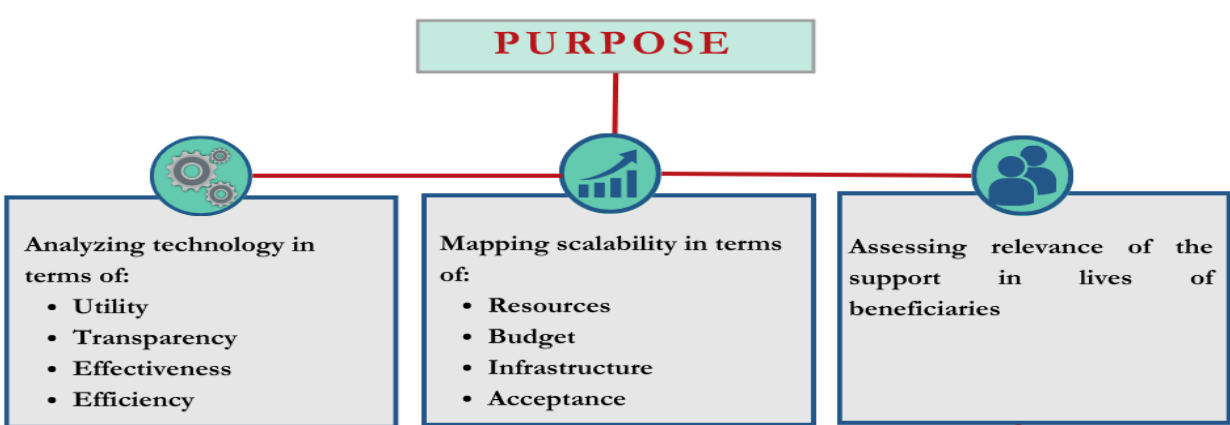
(IVR) to inform them of the distribution location and time. IVR was introduced based on feedback to enhance accessibility. Banked beneficiaries with phones received SMS notifications following bank deposit confirmation. Rahat provided comprehensive reporting on beneficiary communication for effective tracking.

**CVA mechanism:** The CVA program involved four primary stakeholders: UNICEF Nepal, Government bodies (including Jaleswor municipality, wards, and banks), local mobilizers, and beneficiaries. UNICEF Nepal generated tracker tokens allocated to Jaleswor municipality through the Rahat dashboard. Custodial blockchain wallets were established for every beneficiary, linked to their mobile numbers or designated QR codes. Banked beneficiaries had tokens assigned and coordinated fund transfers directly to their banks. For unbanked beneficiaries, tokens were transferred to local wards, facilitating distribution using QR cards or OTP verification. Secure records were maintained on the blockchain, ensuring transparency and accountability.

**Deployment and implementation:** The deployment phase involved close supervision by the Rumsan team to ensure a seamless transition during the Rahat system's implementation. Local team coordinators played a crucial role in documenting and troubleshooting any issues that arose. Key activities during deployment included dashboard setup, capacity building through training, and the establishment of grievance handling mechanisms.

### 1.9 OBJECTIVES

The evaluation served three primary purposes. These purposes encompassed the analysis of the technology concerning its utility, transparency, effectiveness, and efficiency. The second purpose involved mapping the scope of replicability and scalability aiming to comprehend the degree to which the necessary conditions can be met, while the third purpose focused on assessing the relevance of the support in the lives of the users and beneficiaries and impact of the process on the beneficiaries' lives.



The specific objectives listed out in the ToR were as follows:

1. To assess how real time monitoring of cash transfers can build transparency and improve accountability through increased insights for parties with oversight (UNICEF Nepal and Palika) to take appropriate action and save costs/increase efficiencies (during the distribution process and immediately after)
2. To compare how the technology has supported the ease of distribution for the banked and the underbanked, with and without phones and contributed to a more informed, accessible and dignified process of receiving cash.

3. To generate equity-focused recommendations to support scaling of this approach and future quality improvement of the intervention.
4. To provide insights into the potential scale at which such an approach might prove to be cost-effective for technology cost to implement blockchain backend CVA.
5. To document the value addition of using the blockchain modality over the regular government cash transfer system.

## 1.10 PURPOSE AND INTENDED USE

The evaluation of the Rahat pilot program serves as a critical examination with a multifaceted purpose, catering to diverse stakeholders involved in the initiative. The insights gained will contribute to a collective knowledge base, fostering a collaborative environment for continuous improvement and innovation in humanitarian aid and financial inclusion. In general, this evaluation serves as a blueprint for leveraging blockchain technology in CVA, influencing funding decisions, guiding local government practices, enhancing technological frameworks, and contributing to the advancement of humanitarian efforts on a broader scale.

- For UNICEF Nepal Country Office, the primary user, the evaluation aims to assess the tangible benefits and impact of the blockchain-based CVA pilot. By understanding the effectiveness of Rahat in facilitating cash transfers and evaluating the demonstrated benefits of blockchain technology, UNICEF can make informed decisions about potential future integrations into CVA programs. The evaluation also aims to extract valuable lessons and insights that contribute to the enhancement of CVA strategies and decision-making processes.
- For UNICEF OoI, the evaluation seeks to evaluate the outcomes and impact of the funding allocated to Rahat, providing insights that guide future funding decisions and strategies for CVA initiatives.
- For the local government, the assessment focuses on scalability prospects and the potential adaptation of blockchain-based CVA. Insights from the Rahat pilot will inform decisions regarding the adoption of blockchain technology within local government CVA programs, contributing to increased efficiency and effectiveness.
- Rumsan, as a blockchain-based organization, will benefit by identifying technological lessons and opportunities for improvement, ensuring that future initiatives are informed by the strengths and weaknesses of Rahat's blockchain implementation.
- Lastly, the evaluation holds significance for the broader CVA and blockchain-based community, as it extracts valuable lessons for general adaptation.

## SECTION 2: METHODOLOGY

In the evaluation, a mixed method of data collection was employed, using a concurrent embedded design. In this approach, qualitative data collection was assigned the primary role, enabling an in-depth exploration and understanding of the program's various aspects related to relevance, efficiency, effectiveness, and sustainability. Moreover, quantitative data collection complemented the qualitative findings, offering valuable insights into the relevance and efficiency gains of the technology in the lives of the beneficiaries.

The evaluation utilized a range of data collection methods, including Key Informant Interviews (KIIs) with key stakeholders, surveys with beneficiaries, Focus Group Discussions (FGDs) involving diverse participant groups, and a comprehensive review of secondary data such as reports and documents related to the Rahat project. The details are provided in Section 2.3.

Jaleshwor Municipality was selected as pilot site for the study hence Jaleshwor Municipality of Mahottari District (Province 2) was be the evaluation site. The time frame of the evaluation study was from July 2023 to September 2023.

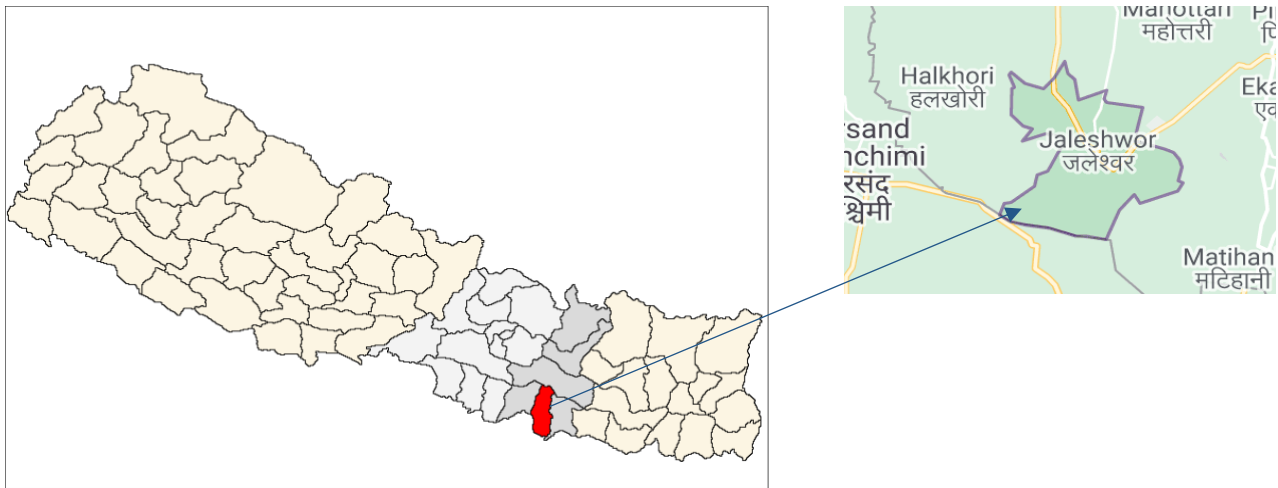


FIGURE 1: JALESHWOR MUNICIPALITY OF MAHOTTARI DISTRICT

### 2.1 EVALUATION APPROACH AND DESIGN

#### 2.1.1 EVALUATION APPROACH- OECD DAC CRITERIA

The evaluation design was structured to serve both summative and formative purposes. Its primary focus rested on assessing the project's accomplishments in terms of meeting its intended outcomes. This summative aspect aimed to determine the extent to which the project had successfully achieved its goals. Additionally, the evaluation took a formative approach, seeking to identify lessons learned and provide recommendations for future directions. The insights gained from the evaluation guided and shaped the project's trajectory.

Consistent with the OECD DAC criteria, the evaluation emphasized key dimensions of relevance, effectiveness, and sustainability. The relevance of the project was assessed by examining its alignment with the needs and priorities of the target population and the broader context.

Under the OECD DAC criteria, the evaluation assessed the project's effectiveness by analyzing its contribution to desired outcomes. This included evaluating the project's implementation strategies, identifying strengths and weaknesses, and determining the factors that influenced its effectiveness. The evaluation also examined its alignment with the needs and priorities of the target population and the broader context. Moreover, the evaluation explored the potential for the project's continuation and long-term impact. This involved assessing institutional support, capacity-building efforts, and stakeholder engagement to determine the project's sustainability beyond its initial duration. By exploring these factors, the evaluation aimed to provide insights into the project's long-term viability and potential for sustained outcomes.

The evaluation assessed the program's relevance, effectiveness, efficiency, coherence, and scalability. It evaluated the suitability of blockchain technology in local contexts, assessed UNICEF's alignment with its goals, and examined the impact of cross-sectoral partnerships.

In the evaluation process, several key dimensions were considered to assess the Rahat - UNICEF Nepal pilot program:

- **Relevance:** The evaluation focused on the suitability of blockchain technology for cash transfer programs in local contexts, aligning with UNICEF's goals, and identifying factors affecting intended results.
- **Effectiveness:** It examined Rahat's role in creating inclusive and transparent cash distribution processes, compared the performance of blockchain-based assistance to traditional methods, and explored conditions for scaling blockchain technology for cost-effectiveness. The impact of the COVID-19 pandemic and cross-sectoral partnerships on the program was also assessed.
- **Coherence:** The evaluation considered the applicability of the CVA model in Nepal, the alignment of the Rahat project with existing social protection policies, and the coordination between government entities.
- **Efficiency:** It analyzed the efficiency of fund distribution and resource utilization, with a focus on the role of digitization and real-time monitoring in enhancing accountability.
- **Scalability:** The evaluation assessed the technology's support for automated and scalable processes, the presence of necessary policies and resources, and lessons learned for program adaptation in diverse contexts with infrastructure and literacy challenges. Additionally, it explored the project's contribution to enhancing scalability capacity.

#### 2.1.1.1 KEY EVALUATION QUESTIONS

**Relevance:** How well does the use of blockchain technology for cash transfer programs in Nepal, considering its low-resource setting, low internet bandwidth, limited technical expertise, and restricted access to devices work in Nepal and also align with UNICEF's goals and objectives for cash transfer programs?

**Effectiveness:** How does Rahat's implementation of blockchain-based cash and voucher assistance compare to traditional cash transfer processes in Nepal, specifically in terms of creating a more inclusive, accountable, and transparent cash distribution process, while addressing the needs and priorities of various beneficiary groups?

**Coherence:** How effectively does the blockchain modality complement other development interventions and align with existing social protection policies?

**Efficiency:** How efficient was the distribution and flow of funds with the blockchain-based approach compared to traditional cash transfer modalities within the pilot, and to what extent did digitization and real-

time monitoring enhance accountability and support post-distribution financial reconciliation, taking into account the roles of UNICEF counterparts, government staff, and other stakeholders?

**Scalability:** What policies, legislation, infrastructure, and resources are in place to ensure the scalability and sustainability of the blockchain-based cash and voucher assistance program for long-term adoption in Nepal, and what lessons have been learned that can guide program adaptation in different locations with varying levels of infrastructure and literacy challenges while enhancing capacity for scalability?

### 2.1.1.2 OUTCOME HARVESTING

Outcome harvesting was employed to shape the key criteria established by the OECD DAC. During the initial phase, various outcomes relevant to each key criterion were gathered through a comprehensive process that involved document review and consultations with key stakeholders, including UNICEF Nepal, UNICEF OoI, and Rumsan. These harvested outcomes were subsequently validated and verified throughout the course of the evaluation.

The evaluation adopted outcome harvesting as the evaluation approach due to its suitability for adaptive programming and its ability to enhance result visibility. This method proved invaluable in identifying, describing, verifying, and analyzing the changes that occurred within the context of the intervention. By retracing the achievement of outcomes backward, it provided a comprehensive understanding of the factors that led to observed changes and the aspects that were either successful or in need of improvement. Unlike traditional evaluation methods that follow a linear tracking approach from outputs to outcomes and impacts, outcome harvesting took a retrospective approach, examining the causal pathways and understanding both intended and unintended changes that emerged during the process of achieving outcomes.

The selection of outcome harvesting was also motivated by its participatory nature, actively involving key stakeholders throughout all phases of the evaluation. Through collaboration with stakeholders, the evaluation sought insights into effective practices and areas requiring improvement. The outcomes were collectively harvested and validated during the data collection process, ensuring that the perspectives and contributions of all stakeholders were considered. This participatory approach fostered a sense of ownership among stakeholders, ultimately increasing the utility and relevance of the evaluation outcomes, as all parties were deeply engaged in the evaluation process and its results.

The steps for outcome harvesting is adapted from the one forwarded by the **Danish Institute for Human Rights**<sup>1</sup>. The process follows six steps and is detailed out below:

- **Step 1: Designing the Outcome Harvest** In this evaluation phase, key evaluation questions were developed, serving as the foundation for the entire outcome harvesting process. These questions guided the outcome harvesting process, covering various project dimensions, such as the suitability of blockchain technology for cash transfer programs in Nepal, the effectiveness of the Rahat project in creating an inclusive and accountable cash distribution process, and the project's efficiency in resource utilization and cash transfer monitoring. Additionally, the evaluation identified key stakeholders involved, including UNICEF Nepal, UNICEF OoI, Venture Fund team members, Rumsan, local government, beneficiaries, and UNICEF as the implementing organization and funder. Each stakeholder's role was clarified to ensure their active participation.
- **Step 2: Document Review** The evaluation team conducted a comprehensive review of relevant documents, such as reports, case studies, and literature related to cash-transfer initiatives. This review provided insights into the context and background of cash-transfer programs, their successes,

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<sup>1</sup> (The Danish Institute for Human Rights )

challenges, and impact on beneficiaries. Based on the document review, outcome statements were formulated that aligned with the Rahat project's objectives. These outcome statements outlined the changes and impact achieved through the project, considering both intended and unintended outcomes.

- **Step 3: Engaging Informants to Confirm Outcome Statements** The evaluation team collaborated with key stakeholders to confirm the formulated outcome statements. A sharing session organized by UNICEF provided valuable insights from Post-Distribution Monitoring results, allowing to validate the outcome statements.
- **Step 4: Substantiating Outcomes** The evaluation team collected empirical data through interviews with stakeholders, including UNICEF, local palikas, and CVA beneficiaries. This mixed-method approach triangulated the data, validating the outcomes and providing a comprehensive understanding of the project's impact.
- **Step 5: Analysis and Interpretation** The outcomes were categorized based on observed changes and the actors influenced by the Rahat project. Patterns and trends among the categorized outcomes were identified to discern broader implications and areas for improvement or scaling up. Quantitative data collected through surveys were analyzed using statistical tools like SPSS.
- **Step 6: Supporting Use** The evaluation compiled the findings into a draft report, which underwent review and feedback from UNICEF Nepal. A presentation of the draft report ensured the involvement of key stakeholders, and their feedback was incorporated into the final report.

## 2.2 PERFORMANCE CRITERIA FOR EVALUATION

The primary performance criteria aim to address the essential evaluation criteria related to the OECD DAC criteria.

TABLE 1: PERFORMANCE CRITERIA DETERMINED FOR EVALUATION

<b>Utility of blockchain technology</b> <b>Adherence with Evaluation Criteria: Effectiveness</b>	<i>Accountability and transparency:</i> Evaluating the extent to which blockchain technology improved transparency, accountability, and reduces fraud or mismanagement risks.
	<i>Data integrity:</i> Assess how blockchain technology resulted in producing tamperproof records and ensured secure and private data.
	<i>Real time monitoring:</i> Evaluating the extent to which blockchain technology improves the detection and prevention of anomalies / errors and also improve field coordination due to real time monitoring of transactions.
	<i>Single source of truth:</i> Evaluating the extent to which blockchain technology improves multiple parties agreeing and coordinating around data stored on a shared timestamped ledger.
	<i>Reporting and sharing of data:</i> Examining how blockchain technology has enhanced the precision and depth of reporting, ensuring a high level of trustworthiness through the use of irrefutable digital signatures and timestamping for transactions.
<b>Comparison with traditional CVA</b>	<i>Effectiveness:</i> Comparing the effectiveness of the blockchain-based approach to traditional cash transfer processes.
<b>Utility of blockchain technology</b> <b>Adherence with Evaluation Criteria: Efficiency</b>	<i>Real time reconciliation:</i> Evaluate the extent which users experienced improvements in terms of timing and decision making due to the real time fund transaction and reconciliation.
<b>Comparison with traditional CVA</b>	<i>Efficiency:</i> Assessing the cost and time savings achieved through the blockchain technology compared to traditional methods.

<b>Adherence with Evaluation Criteria: Efficiency</b>	
<b>Resource scalability Adherence with Evaluation Criteria: Scalability</b>	<i>Financial resources:</i> Evaluating the availability and sufficiency of financial resources to sustain and scale the program.
	<i>Technological infrastructure:</i> Assessing the scalability of the technological infrastructure required for blockchain transactions.
	<i>Open source tools:</i> Assess if use of third party open source tools or Rahat as an open source helps in scalability.
	<i>Technological factors:</i> Examining the suitability of blockchain technology for delivering cash transfer programs in local contexts such as Nepal, considering factors such as low-resource settings, limited internet bandwidth, low internet penetration, limited technical expertise, and limited access to devices.
<b>Acceptance and readiness Adherence with Evaluation Criteria: Relevance</b>	<i>Stakeholder acceptance:</i> Evaluating the willingness and readiness of stakeholders, particularly the government, to adopt and scale the blockchain-based approach.
	<i>Enabling policies and legislation:</i> Assessing the existing policies and legislation related to cash transfer programs and blockchain technology in Nepal to identifying any gaps or areas for improvement in the regulatory framework to ensure scalability and sustainability.
<b>Alignment with beneficiary needs and priorities Adherence with Evaluation Criteria: Relevance</b>	<i>Inclusion:</i> Evaluating the program's impact on gender equality and inclusion (including unbanked with no phones, marginalized and persons with disabilities), considering the diverse needs of different beneficiary groups.

### 2.3 DATA COLLECTION METHOD FOR SUBSTANTIATING OUTCOME

The data collection methods for the evaluation included various sources and techniques. The evaluation included data from both primary and secondary sources.

**Key Informant Interviews (KIIs):** The evaluation engaged key stakeholders, including UNICEF, the implementing partner, and local government officials, through informative interviews. These in-depth interviews explored the project's outcomes and assessed the blockchain-based CVA program's relevance, efficiency, effectiveness, and sustainability. Additionally, interviews were conducted with Global CVA Expert experienced in traditional cash transfer methods to enable a comparison of efficiency gains with the Rahat project. KIIs with UNICEF Country Office, Rumsan, and OoI were conducted virtually, while KIIs with local government representatives took place at their respective offices.

KII participants were purposively chosen. During the inception phase, UNICEF Nepal was consulted to identify the crucial entities that needed to be interviewed for the evaluation. When selecting participants within these entities, they were requested to nominate individuals from different departments who could address the evaluation questions. Typically, one representative from the program side, one from field operations, and one with expertise in blockchain technology were selected. As a result, two to three individuals from each entity were interviewed.

**Surveys:** The evaluation administered surveys to a selected group of beneficiaries. Beneficiaries were randomly chosen to ensure representation and unbiased feedback. The surveys aimed to capture beneficiaries' perspectives and gather their feedback on the efficiency of the blockchain-based system. These surveys were conducted within the households of the beneficiaries.

The surveys included closed-ended questions aimed at capturing the experiences of beneficiaries in accessing cash assistance through Rahat. These surveys featured both single-choice closed-ended questions and multiple-choice questions to gauge factors such as satisfaction, timeliness of cash receipt, encountered issues, and challenges related to OTP or SMS reception.

The sample participants were selected through a random sampling process. To ensure the representation of various beneficiary groups, such as those with or without a phone and banked or unbanked individuals, the population was stratified into these categories. Samples were then randomly chosen in proportion to the actual population, mirroring the population's distribution. The sample was drawn from the list of total beneficiaries shared by UNICEF Nepal in an Excel file, and the selection process was facilitated using Excel's random function.

**Focus Group Discussions (FGDs):** FGDs were conducted with the direct beneficiaries to gather insights into their experiences with receiving cash voucher support. These FGDs involved diverse groups of participants, facilitating a comprehensive exploration of their perspectives and feedback.

The strategy for selecting participants for FGDs involved a systematic approach. Initially, wards were randomly chosen as discussion locations to ensure diversity. Subsequently, collaboration with UNICEF District staff and local government officials helped identify participants representing various socio-demographic backgrounds. Purposive sampling was employed to select participants who could provide diverse perspectives. Efforts were made to include individuals with and without phones, as well as both banked and unbanked beneficiaries.

**Secondary data review:** In addition to primary data collection, the evaluation also conducted a comprehensive review of all existing reports, documents, and publications related to the Rahat project. This review aimed to gather comprehensive information about the project's design, implementation, and achievements. By analyzing existing data and reports, the evaluation validated and triangulated findings from other data sources, ensuring accuracy and reliability in the final assessment.

### 2.3.1 DATA TRIANGULATION

In terms of data triangulation, even though the evaluation had a limited number of participants, rigorous efforts were made to ensure the triangulation of data. Responses and information collected from one source were cross-validated with others. For instance, data provided by the UNICEF Country Office was corroborated by the UNICEF District Office, and claims made by Rumsan were verified through discussions with UNICEF Nepal. Similarly, responses from survey were cross-referenced with local government. The findings are presented collectively when they are affirmed by all stakeholders. In cases where a specific piece of information is supported by only one source, this is clearly indicated. Additionally, for certain aspects such as cost and timeliness analysis, secondary data were also utilized to further validate the findings, enhancing the overall credibility of the evaluation.

## 2.4 SAMPLING STRATEGY

**For survey:** The evaluation conducted a survey in all 12 wards of Jaleshwor municipality, Mahottari district, targeting households that participated in the pilot project. The survey ensured the inclusion of at least 15% of the total beneficiaries. For a population size of 1900, to achieve a confidence level of 95% and 5% plus or minus margin of error, the calculated sample size required for the survey was 320 households.

The following formula was used to extract the sample size:

$$x = Z \left( \frac{c}{100} \right)^2 r(100 - r)$$

$$n = \frac{Nx}{(N - 1)e^2 + x}$$

$$e = \sqrt{\frac{(N - n)x}{n(N - 1)}}$$

Where:

N is the estimated population size,

r is the fraction of responses,

Z  $\left( \frac{c}{100} \right)$  is the critical value for the confidence level c.

*Recruitment of the survey sample:* Random sampling was employed to select participants from the provided list. The survey sampling was meticulously conducted, considering the proportion of the population in each category. These categories were based on the presence or absence of a bank account and a mobile phone. To ensure representativeness, the sample size was also structured to mirror these proportions, making the survey findings more accurate and reflective of the entire population.

TABLE 2: SAMPLING DISTRIBUTION

	Sample size distribution
Banked with a phone: 57%	185
Banked without a phone: 27%	88
Unbanked with a phone: 13%	43
Unbanked without a phone: 3%	10
Total	327

Out of the total 327 respondents, 185 (56.5%) respondents were female respondents, and 142 (43.5%) were male respondents.

TABLE 3: GENDER DISTRIBUTION OF RESPONDENTS

Gender	Count	Percentage
Male	142	43.5%
Female	185	56.5%
Total	327	100

All the surveyed participants met the requirement of having a child under 5 years old. The survey also asked about the number of children in their homes, and all of them stated that, on average, there were three children in their households.

**For KIIs:** The sample size for KIIs was determined based on purposive quota-based sampling, considering the selection of participants who possess specific expertise that are relevant to the evaluation objectives with the aim is to ensure representation from different stakeholder groups and perspectives.

**For FGDs:** The recruitment strategy for FGD ( participants was executed in close collaboration with the UNICEF field representative and facilitated by the ward representative. The evaluation team implemented specific criteria to reach out to vulnerable beneficiaries within the selected ward, ensuring a balanced gender proportion and diversification of socio-economic demographics. The ward representative played a central coordinating role in gathering the direct participants for the FGD sessions. This strategy aimed to ensure that the FGDs included a representative and diverse group of participants.

The table below illustrates the sample size reached by the evaluation.

TABLE 4: SAMPLE SIZE

	Participants	Number	Gender
<b>Survey</b>	Total beneficiaries (15% of total sample)	327	142 Male, 185 Female
<b>KII</b>	UNICEF Nepal representatives	3	3 Male
	Rumsan representatives	3	1 Male 2 Female
	Local government (Palika Representative)	1	1 Male
	Local government (Ward Representatives)	4	4 Male
	UNICEF Office of Innovation's (OoI) Venture Fund Head	3	1 Male 2 Female
	Global CVA expert	1	1 Male
<b>FGD</b>	Direct cash assistance beneficiaries	4 FGDs 26 participants	Breakdown of FGDs <b>FGD 1:</b> Male 2   Female 5 (Ward 10) <b>FGD 2:</b> Male 1   Female 4 (Ward 3) <b>FGD 3:</b> Female 6 (Ward 11) <b>FGD 4:</b> Male 6   Female 2 (Ward 8)

## 2.5 RESEARCH ETHICS

The evaluation was guided by the UNEG ethical standards for evaluation. In the evaluation process, the evaluation established a comprehensive informed consent procedure. This entailed creating a consent process within Kobo Toolbox, where a dedicated consent question was integrated into survey forms. The consent question was designed to provide participants with clear information about the purpose of data collection, the intended use of their data, and the protective measures in place. Participants were required to explicitly consent by answering the question before proceeding with the survey. To offer flexibility, the questions were not designated as mandatory, allowing participants to skip or withdraw from the survey at any point if they wished.

For KII respondents, informed consent was obtained verbally from all adult participants. This process involved the evaluation team presenting a detailed overview of the study, including its objectives, procedures, potential risks, confidentiality measures, and the right to withdraw without facing penalties. Participants had ample opportunity to ask questions and seek clarification before providing their verbal agreement to participate, signifying their voluntary involvement.

To ensure ethical conduct, Progress Inc. diligently followed the code of ethics, maintaining a strong commitment to confidentiality and the principle of "do no harm." The research team also demonstrated deep respect for cultural and religious diversities, local traditions, gender roles, disabilities, age, and ethnic backgrounds. Furthermore, personal information, including names, was not collected from participants. Instead, unique IDs were randomly assigned through Excel, ensuring anonymity. Enumerators, while having access to participants' names for identification, never presented this information in the analysis to preserve confidentiality.

The process allowed participants to make informed choices regarding participation, respecting their autonomy. Moreover, data protection was a paramount concern, with surveys conducted on tablets securely stored on password-protected servers accessible only to the core research team members. Retention of

personal data only extended as long as necessary to fulfill the policy's outlined purposes, with the data promptly deleted upon project completion, if demanded by the client.

Protection of vulnerable groups: Given the vulnerability of the targeted group, the evaluation employed ethical considerations to safeguard their interests during the evaluation. Special attention was given to their needs and concerns to ensure inclusivity. In-depth interviews were conducted with ultra-poor and vulnerable households to gain a deeper understanding of their unique challenges and the benefits they derived from the cash assistance program, which was presented as case stories.

In addition to these measures, the evaluation also took great care to use gender-responsive language and ensure cultural sensitivity when engaging with vulnerable groups. The evaluation refrained from asking any questions that could be considered culturally, religiously, or politically provocative.

## 2.6 LIMITATIONS

- One notable limitation of this study pertains to the availability of data on blockchain-specific contexts. The evaluation found that the majority of the information was primarily sourced from Rumsan and the OoI blockchain focal person, resulting in a potential bias towards their perspectives. Additionally, the study revealed that users of the blockchain platform had limited understanding of the technology's intricacies, which, in turn, limited the depth of information we could extract from them. This limitation was particularly evident when examining the experiences of UNICEF Nepal and palika, as the information obtained was somewhat superficial, focusing mainly on platform usage and monitoring, with little exploration of how the system could enhance reporting capabilities that would aid in decision making.
- Furthermore, the study faced constraints when attempting to gather insights from end-recipients. Due to the complex nature of blockchain technology, it was unrealistic to expect end-recipients to fully comprehend its intricacies. As a result, the data collection from end-recipients primarily focused on their experiences with cash voucher assistance, leaving out the potential impact of blockchain on their interactions with the system.
- Lastly, a significant limitation lies in the absence of a cost analysis that would have allowed for a direct comparison between blockchain-based cash voucher assistance and traditional methods in terms of cost efficiency. This lack of cost-related data restricts the ability of the evaluation to draw comprehensive conclusions regarding the financial implications of the blockchain system in comparison to conventional approaches.
- Due to the evaluation's sample representation mirroring the population proportion, there was a limited scope to explore the impact on a higher proportion of unbanked beneficiaries. This proportionate representation constrained the in-depth analysis of the blockchain's full potential in addressing the unique needs and challenges faced by a larger unbanked population, which could be especially relevant in disaster-prone regions with migrant and refugee communities.
- Lack of data for cash usage comparisons is notable, with nearly 94% of sampled beneficiaries having no prior experience with CVA. As such, there is limited opportunity for comparing their experiences with traditional and blockchain-based CVA or assessing how they used cash received from these different sources. If the pilot aimed to facilitate direct comparisons with traditional CVA, beneficiaries should have been deliberately selected in piloting based on specific criteria, including prior CVA receipt and, especially, unbanked status.

## SECTION 3: EVALUATION FINDINGS

### FINDINGS UNDER OECD DAC CRITERIA OF EVALUATION

The following section presents the findings in alignment with the OECD DAC criteria. It is worth noting that each of these criteria corresponds to the outcomes that were harvested and evaluated in this assessment.

#### 3.1 CRITERIA: EFFECTIVENESS

##### **3.1.1 FINDING: SECURE AND TRANSPARENT FUND FLOW USING BLOCKCHAIN-BASED DIGITAL TOKENS, WHICH ENHANCED ACCOUNTABILITY AND TRANSPARENCY FOR BOTH UNICEF AND LOCAL GOVERNMENT USERS, WAS FACILITATED BY THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY).**

The evaluation uncovered some achievements in the realm of transparent and inclusive fund management. To corroborate, UNICEF Nepal in the KII reported that the utilization of blockchain technology yielded remarkable advancements in the transparency of fund flow (UNICEF Nepal KII). This achievement was particularly notable when dealing with multifaceted financial transactions involving numerous stakeholders. Unlike traditional banking procedures where fund transfers often occur discreetly, blockchain emerged as a transformative tool, capturing every step of the process. It served as a conduit for trust and transparency among stakeholders, providing real-time visibility into the progress of fund transfers.

***“Unlike traditional CVA, it is way easier to monitor through block-chain based system. We know exactly where the cash has reached. When recipient receives cash, it reflects on the dashboard instantly within seconds.” – UNICEF district representative***

The increased transparency has fostered accountability, and because audited records are readily visible on the dashboard, it reduces the necessity for supplementary auditing procedures. While audits may still be conducted for this project, over time, if such practices become widely accepted standards, they could potentially replace the need for extensive auditing processes.

A distinctive accomplishment of the Rumsan team’s approach was the introduction of “consent-based accountability.” Before funds reached their intended beneficiaries, funds seamlessly transitioned from the initial funder, such as OoI, to the Nepal UNICEF country office, then to the field office, the palika office, and, ultimately, the ward offices. The crux of this process lay in the notion of consent. Each fund transfer was symbolic of a digital handshake<sup>2</sup> between involved parties. Completion of the consent process necessitated validation from both parties, meticulously documented on the blockchain ledger.

Rahat integrated OTP (One-Time Password) with the blockchain. Users were each assigned their own custodial Ethereum wallet, linked to their phone numbers. When beneficiaries sought to initiate transactions with vendors via their phones, an OTP code was generated through a blockchain event. This OTP code was then hashed and stored within the blockchain. The vendor’s role was simplified to verifying the OTP before finalizing the transaction.

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<sup>2</sup> The sender affirmed, "I gave," and the receiver confirmed, "I received, and I accept."

*“We are using blockchain to track the flow of money through the traditional route. Essentially, the blockchain token (Rahat) serves as a shadow token for real currency in facilitating the flow of funds between the various parties involved. This shadow mapping is one-to-one. For example, UNICEF Nepal can authorize local palikas to use a certain portion of the funds, and palikas can disburse the funds using the “Transfer From” method in the ERC-20 standard. There are method calls to represent every step in the transfer process between the parties.”- Rumsan representative*

Both UNICEF Nepal and the local administrative bodies (palikas) highlighted the benefits of the blockchain-based approach, particularly in terms of transparency, in particular allowing, as it does, real-time tracking of cash-related transactions, such as the loading of funds onto the system or the eventual cash out by recipients. This is considered advantageous for the timeliness and content of both internal and donor-oriented reporting. This was corroborated by UNICEF OoI KIs, which highlighted key perceived benefits as improved transparency and accountability towards donors, in addition to improving administrative and distribution processes. To ensure transparency in tracking tokens and funds, the following innovative approaches were implemented, as explained by Rumsan.

- **OTP Integration:** Blockchain was used to generate OTP codes linked to custodial Ethereum wallets. Beneficiaries could initiate transactions via their phones, and the OTP code, once verified by vendors, facilitated secure transactions.
- **Shadow Token System:** The Rahat token (Rahat) was employed as a shadow token representing real currency. This one-to-one mapping simplified fund flow tracking between parties involved.
- **Verification and Reporting:** Reports from banks and other sources were systematically uploaded to the blockchain along with transaction IDs, ensuring verifiable transaction records.

### **3.1.2 FINDING: DATA INTEGRITY AND TAMPER-PROOF RECORDS WERE ENSURED BY THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY), RESULTING IN A MORE SECURE AND RELIABLE CASH TRANSFER PROCESS.**

Rahat’s blockchain system eliminated the possibility of double spending entirely. The fundamental principle behind this was the allocation of unique tokens to individual IDs. Every beneficiary, whether they had a bank account or not, was provided with digital tokens<sup>3</sup>, thus eradicating any risk of double spending. The core principle involves allocating unique tokens to individual IDs, ensuring a fair and inclusive process for every beneficiary, regardless of their banking status. This safeguard was effective for both cash recipients, who received OTP or QR cards, and for bank transactions. In cases where the list contained the same individual’s name paired with the same phone number twice, the blockchain system intervened to prevent the duplication of tokens.

To enhance inclusivity, QR code cards were introduced to offer a means for beneficiaries without bank accounts or phones to access their tokens, facilitating their exchange for cash assistance. Banked beneficiaries did not receive QR code cards, as their tokens were directly linked to their respective banks, using their bank

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<sup>3</sup> All beneficiaries, regardless of their banking status, received distinct tokens, which are traceable and can be monitored through the Rahat dashboard. Not to be confused with QR.

accounts as the medium for token exchange. Tokens were assigned for cohesive reporting purposes on the dashboard and to monitor the potential for double spending.

To put it simply, the evaluation considered this scenario: when dealing with a list of 1900 names, and the same person's name appeared twice, blockchain technology ensured that it was impossible to assign tokens to the same identity. This stringent verification process during token assignment made double spending an impossibility. The system crosschecked identity (which in the case of Rahat was phone numbers) during the initial token assignment, ensuring that there was no room for duplication or misuse.

The Rahat system inherited tamper-proof nature. Once the funds were transferred to the token-holder, they were securely locked within the custody of Rahat. To illustrate this tamper-proof feature, representative from Rumsan provided an example of a scenario involving the cash flow: when UNICEF Nepal Country Office sent funds to the palika, and by mistake, the palika disbursed an amount equivalent to 196 participants instead of the correct 195 to the ward office. It is important to note that neither the palika nor Rumsan could not rectify this error independently. Instead, the correction process required necessitating the return of funds from the ward to the palika. To elaborate, in contrast to other systems where a system administrator can step in to rectify erroneous transactions, blockchain operates differently. It adheres to a "write once, read only" principle, meaning that once transactional data is recorded, including any erroneous entries typically stemming from human error, it becomes an immutable part of the blockchain. Reversing such transactions necessitates consensus among all stakeholders involved. This procedure ensured that real-time record-keeping remained unalterable and that the chain of custody was preserved. In this blockchain system, data could not be modified or tampered with, providing a robust mechanism for maintaining the integrity of financial records. In contrast, traditional banking systems offer the option of manually revisiting bookkeeping records to correct such discrepancies.

These opinions were in line for most of the users, however, the Global CVA and Blockchain Expert questioned precisely which problem this was intended to resolve and whether or not alternative approaches might not already incorporate equivalent risk mitigation measures. This is one specific example of a broader point raised in a recent report on distributed ledger technology (DLT) in humanitarian action (Sovrin, 2019), which posits that the advantages associated with most adoptions of blockchain in humanitarian action could just as well have been achieved with a well-designed database not necessarily based on blockchain.

### **3.1.3 FINDING: FINANCIAL INCLUSION FOR ALL BENEFICIARIES, REGARDLESS OF THEIR BANKING STATUS, WAS PROMOTED BY ENABLING TOKEN REDEMPTION THROUGH FEATURE PHONES (VIA SMS) OR UNIQUE QR CODE CARDS, AS FACILITATED BY THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY).**

Note: It is important to acknowledge that the population of people reached through Rahat constituted only 16% unbanked individuals (i.e., 312 out of 1900 individuals). While these unbanked recipients benefited to some extent from Rahat's approach, which would have otherwise been excluded in traditional digital CVA programs, the project's reach was limited in this regard. Rahat's blockchain technology prioritized financial inclusion, ensuring accessibility for all beneficiaries regardless of their banking status. Although the unbanked beneficiaries constituted a minority, Rahat extended its advantages to this marginalized group, likely the most vulnerable individuals without access to financial services.

Rahat contributed in fostering financial inclusivity by addressing the needs of unbanked and phoneless beneficiaries who would otherwise have been excluded from digital cash voucher programs that typically require access to a phone or a bank account. In this context, Rahat introduced a system that utilized QR cards for unbanked and phoneless beneficiaries. These QR cards, along with a PIN code, were distributed by local mobilizers. Beneficiaries under this category identified themselves as unbanked and phoneless, which often

left them marginalized in traditional financial assistance programs. With Rahat's innovative approach, these individuals were provided with digital tokens encapsulated within QR cards, ensuring they could receive and access their financial assistance without the necessity of a bank account or a smartphone. This process enabled them to easily redeem their tokens for cash, making financial support more accessible and inclusive for those who are often left behind in traditional systems.

Rahat, in conjunction with blockchain technology, had the capability to transform any mobile phone into an equivalent of a bank account, enabling beneficiaries to receive funds without the need to establish a traditional financial institution account. This holds particular significance for the undocumented migrant population, for whom obtaining a bank account is exceedingly challenging. Rahat's commitment to equity and financial inclusion is evident in its technological choices, offering alternatives for those lacking technology.

Notably, Rahat achieved this without the strict requirement of a concrete identity card. Instead, blockchain technology played a role by linking individuals with their phone numbers. This approach meant that even individuals who did not possess official citizenship documents could still be included in the program. As long as their identity was linked to a valid phone number, they became eligible to receive cash support. This can be a game-changer, particularly in disaster situations where people might have lost their traditional identity cards. While the pilot phase included a population with access to official documentation, the significance of having this capability becomes more apparent in emergency and humanitarian contexts, such as disaster situations, conflicts, or refugee settlements.

It is to be noted that the vulnerable groups that Rahat aimed to support, including the unbanked and phoneless individuals, might not necessarily be excluded from in-cash hand distribution. In-cash hand distribution typically involves physically providing cash to beneficiaries, which can bypass the need for a bank account or smartphone. However, the challenge lies in ensuring efficient, secure, and transparent distribution when dealing with a large number of beneficiaries.

Rahat's approach was not limited to excluding these groups from cash distribution but rather to provide them with more efficient and technologically advanced means of receiving assistance. By introducing QR cards and digital tokens, Rahat sought to enhance the process of cash distribution for these vulnerable groups, making it more seamless, accountable, and secure, while also reducing the potential for fraud or errors that can occur in manual cash distribution.

While the use of QR codes and PINs can introduce beneficiaries to digital transactions and safe financial practices, it primarily addresses a basic level of financial literacy related to technology and security. The use of QR codes and PINs in Rahat's cash distribution process had other implicit benefits for beneficiaries. It helped them become more familiar with digital tools, an essential aspect of financial literacy in today's digital world. Learning to use these codes also educated beneficiaries about safe transaction practices, emphasizing the importance of keeping their PINs confidential to protect against fraud. Additionally, these tools promoted independence and control over financial transactions, reducing reliance on intermediaries and empowering beneficiaries to manage their financial affairs, a critical aspect of financial literacy.

The extent to which blockchain-based CVA has proven accessible and inclusive is very much contingent on context. In general, however, any intervention that relies, in part or in whole, on mobile technology risks being exclusionary. Rahat did make an effort to ensure programmes incorporate alternative means to assist those that lack the requisite technology and/or capacities to use it effectively, such as the paper-based QR cards for used by the Rahat system for beneficiaries without phone. In this respect, those supported via the Rahat system were afforded the choice between paper- and mobile-based means of receiving the related token (UNICEF Nepal KII). Furthermore, only very few instances were recorded of individuals failing to collect

their entitlements and, even then, a system of follow-up ensured that cash was eventually accessed wherever possible (UNICEF Nepal KII).

Research from entities as Ground Truth Solutions (Ground Truth Solutions ) consistently indicates that recipients prioritise basic aspects of cash programme design, not least transfer value, timing, duration, accessibility. This was also seemingly the case in Nepal, where ex ante consultation with target populations revealed a strong preference for cash/ or any other highly liquid assets over other modalities of assistance, rather than specifically for blockchain-based cash (UNICEF Nepal KII). It is important to emphasize that within this context, if the preference is for cash over other methods, blockchain-based processes introduce a level of transparency and streamlined financial reconciliation that cannot be achieved through traditional approaches.

**3.1.4 FINDING: COLLABORATION AMONG MULTIPLE STAKEHOLDERS (E.G., UNICEF, PALIKAS, WARDS, BENEFICIARIES, ETC.) TO EXECUTE COMPLEX PROGRAMS EFFECTIVELY WAS PROMOTED BY THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY), WHICH MAINTAINED A SINGLE SOURCE OF TRUTH.**

The Rahat blockchain system, through its inclusive approach and emphasis on transparency, served as a catalyst for collaborative efforts, ensuring equity and fairness in executing complex programs. The evaluation findings underscored the impeccable reconciliation capabilities of the blockchain system. It conducted real-time reconciliation whenever funds were transferred and maintained continuous real-time tracking. This eliminated the need for manual data input, streamlining the entire process. Stakeholders, at any point in time, had access to a unified view of fund locations and their mobilization. The evaluation further revealed that for unbanked beneficiaries, the blockchain was utilized in its true essence throughout the fund transfer process. Transactions were recorded in blockchain in real time and reflected in block explorer.

The screenshot displays a list of transactions in a blockchain explorer. At the top left, the word "Transactions" is visible. At the top right, there is a button labeled "View All Transactions". The list contains four entries, each with a status box on the left, transaction details in the middle, and block information on the right.

Status	Transaction Details	Block Information
Token Transfer Success	0x3b2938b16bc3eae7f361ab7b6c661d7dd4edeb4a3073bea2ed89a29c0e885470 0xac9650d8 0x752E31DCE3Fe332b5CA9e2D08129428859a5A247 - 0xA09335dC3B96a0c0dA9FD55CF1aBC0263bB9a86e 0 Fether 0.00000000127473 TX Fee 0xa09335-b9a86e - 0x7ea758-7544cf 10,000 UNP View More Transfers	Block #3324117 2 months ago
Token Transfer Success	0x1005e7eb224d667108e66d21c43d386a240e63cf2dadf0a68052c1957c0e495a 0xac9650d8 0x752E31DCE3Fe332b5CA9e2D08129428859a5A247 - 0xA09335dC3B96a0c0dA9FD55CF1aBC0263bB9a86e 0 Fether 0.000000002286273 TX Fee 0xe90ecd-76c38b - 0x536ae1-60a740 10,000 UNCTT View More Transfers	Block #2221380 4 months ago
Token Transfer Success	0x7cd3679a823fc3b7f387ed23345771826f7fb72b19d0edffafc7430308a7ba9 0xac9650d8 0x752E31DCE3Fe332b5CA9e2D08129428859a5A247 - 0xA09335dC3B96a0c0dA9FD55CF1aBC0263bB9a86e 0 Fether 0.00000000609423 TX Fee 0xe90ecd-76c38b - 0x5799ee-54479a 10,000 UNCTT View More Transfers	Block #2128805 5 months ago
Token Transfer Success	0xcd2dad04b90fd3bc7b3670320199e3e6db28f2093bdb535014d356e03150d4bc 0xac9650d8 0x752E31DCE3Fe332b5CA9e2D08129428859a5A247 - 0xA09335dC3B96a0c0dA9FD55CF1aBC0263bB9a86e 0 Fether 0.000000005809974 TX Fee 0xe90ecd-76c38b - 0x1c896d-e57d76 10,000 UNCTT	Block #2128791 5 months ago

**Note: Block explorer is a comprehensive list of all transactions in blockchain. Source: Rumsan**

As for banked beneficiaries, blockchain was applied up to the point of funds reaching the banks; however, the subsequent disbursement to beneficiaries occurred through traditional bank transfers. Nevertheless, Rumsan ensured that these transfers were meticulously documented within the system, even incorporating bank transfer documents as supporting evidence (UNICEF Nepal KII). This comprehensive approach guaranteed that the entire transfer process was recorded, leading to a single, unequivocal truth accessible to all stakeholders.

In a related context, while blockchain is commonly perceived as a trust-based system maintained by multiple nodes, preventing any single entity from altering or deleting content, one has to be careful that some humanitarian blockchain systems are being developed and operated by a single entity, effectively functioning as a singular node. This, in turn, compromises the purported immutability of the system.

### **3.1.5 FINDING: THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY) INCREASED UNICEF'S (AND THE GOVERNMENT'S) CAPACITY TO MONITOR FUND DISBURSEMENT AND RECONCILIATION IN REAL-TIME, IMPROVING THEIR FINANCIAL MANAGEMENT AND DECISION-MAKING.**

The evaluation recognized the seamless connection between real-time fund monitoring and the subsequent enhancement in financial management and decision-making. By leveraging blockchain technology, UNICEF and the government were able to establish a robust system for monitoring fund disbursement in real-time. This system provided a transparent and accurate view of financial transactions, irrespective of whether the beneficiaries were banked or unbanked. As a result, stakeholders had access to timely and reliable financial information. Moreover, it enabled them to respond swiftly to any discrepancies or irregularities, enhancing financial accountability and efficiency.

***“It has been much easier to monitor issues, real time monitoring of causes of delays (more ready), e.g., how long are field offices holding cash before transferring to Palikas.” – UNICEF Nepal CO representative***

The real-time monitoring facilitated by blockchain based CVA enabled UNICEF district office and local government in enhancing financial management and decision-making. UNICEF Nepal Country Office shared instances where the ease of real-time transaction visibility allowed them to monitor the process efficiently. Particularly, when some bank beneficiaries faced delays due to banking procedural challenges, the system's transparency prompted banks to expedite the process to meet beneficiaries' needs promptly as a result of request from UNICEF and local government. Had it not been for the real-time monitoring, the delays in the process might not have been brought to notice, potentially causing a lag in decision-making. The transparency provided by blockchain technology played a crucial role in identifying and addressing issues promptly, ensuring a more proactive and informed decision-making process.

The evaluation further highlighted an additional advantage stemming from this outcome: the ability to generate a cohesive report encompassing all beneficiaries. With blockchain technology's integration into Rahat, there was no need to sift through findings from different beneficiary groups or cohorts. This streamlined approach made it considerably more efficient for stakeholders to access comprehensive data from a single source, eliminating the need for time-consuming cross-referencing. Rumsan's careful work in recording even the details of bank transfers into the system made it easier for everyone to access important information. This helped decision-making become quicker and more informed.

### 3.1.6 FINDING: A DIGNIFIED AND EMPOWERING EXPERIENCE FOR THE ULTRA-POOR, ESPECIALLY WOMEN WHEN RECEIVING CASH SUPPORT, WAS FACILITATED BY THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY).

One of the positive outcomes envisioned by the project was that women felt empowered after receiving cash assistance. This was validated through the survey results where 71.4% of the women have explicitly stated that they felt empowered.



The respondents had the common understanding that the fund provided through Rahat were intended for nutrition or child care, as families with children under 5 years was one of the selection criteria to select beneficiaries. Since women are responsible to look after nutrition of children, they felt empowered in a way when they received cash.

***“Since we had our phone number registered, we receive the cash and use it to provide nutrition to the child. If the money had gone to the child’s father’s account, he could have used it anywhere but since we receive it, it is ensured that the money is being spent on the child.” - FGD ward 11***

In general, when the respondents were asked if they felt empowered after they received cash assistance through Rahat, majority (60.9%) responded positively.

The recipients’ limited comprehension can be readily attributed to the fact that a significant portion of them lacked digital literacy. During the FGDs, several women also disclosed that they were unaware of the content of the SMS messages they had received. It was only after the bank notified them of the crediting of their accounts that they became aware and subsequently checked the SMS messages. This demonstrates that the end-users were unfamiliar with the blockchain-based system.

TABLE 5: % OF RESPONDENTS WHO FELT EMPOWERED

Did you feel empowered by receiving cash assistance through Rahat? (n=327)	Female	Male	Total
Yes	71.4%	47.2%	60.9%
No	28.6%	52.8%	39.1%

Discussions in FGDs emphasized that women participating in Rahat experienced empowerment. Key aspects include financial autonomy, control and ownership over funds, and reduced dependency on male family members for child nutrition, fostering self-reliance. This empowerment can be critically analyzed in several key aspects.

- Firstly, women appreciated the financial autonomy provided by the program. By allocating funds specifically for child nutrition and involving them in the management of these resources, the program enabled women to make financial decisions independently.
- Secondly, women felt a sense of control and ownership over the funds they received. They believed that if the money had gone into the child's father's account, it might have been used for other purposes. By directly receiving the cash, they could ensure that it was spent exclusively on the child's well-being. This control over financial resources increased their decision-making power within the family and amplified their sense of empowerment.

- Moreover, the program's approach reduced women's dependency on male family members for financial support in the specific area of child nutrition. This reduced reliance on others for essential needs contributes to their feelings of self-reliance and empowerment.

Additionally, the program also changed the misconception that elderly people might struggle with technology. The program was inclusive, breaking the stereotype that elderly individuals might struggle with technology. It proved effective for beneficiaries with disabilities, ensuring an inclusive relief intervention approach. In some of the family, only elderly members had access to a bank account and these elderly beneficiaries/participants did not face any challenge to withdraw cash through the token system. The program enabled them to be independent.



The program not only delivered relief but also prioritized the inclusion of individuals with disabilities. In traditional relief interventions, the relief was distributed all at once which made it less accessible to those with disability. This program eliminated the need to wait in long lines and ensured an inclusive approach where they can access cash on their own terms as per their convenience. This created and introduced inclusive relief intervention approach, promoting an equitable relief intervention.

The survey further delved on how the received assistance was spent, to which a substantial 92.4% of the respondents reported using the assistance to meet their food needs, while 85.3% made health care expenditures from the received fund. There were 36.1% who spent it on education expenses and there were a small percentage of 2.8% who opted for other options. When further probed, they revealed that they had saved the money in the bank.

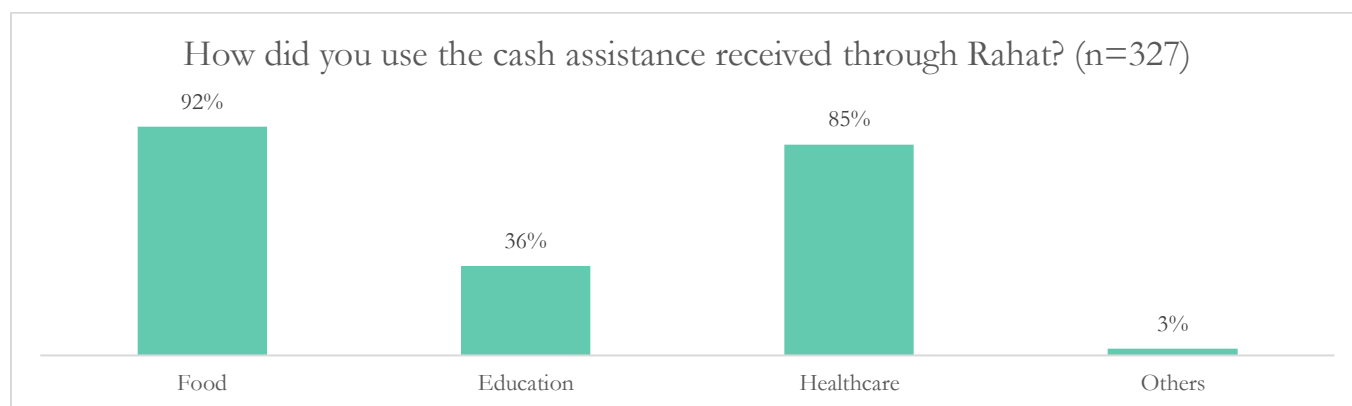


FIGURE 2: USE OF CASH RECEIVED FROM ASSISTANCE

A significant 94% of the survey participants stated that they had not previously received any form of cash assistance. During the FGDs, when asked about the distinctive features of this cash assistance, they emphasized that it was intentionally directed towards women, with a clear communication that this financial support was intended for mothers to benefit their children. The eligibility criteria, which focused on families with children under 5 years old, made it evident that the support was exclusively aimed at addressing children's nutritional needs. Moreover, in the FGDs, many participants shared that while they had received in-kind support during the COVID-19 pandemic and some assistance during flooding events, this type of cash assistance during regular circumstances was entirely new to them.

This data provides evidence from the field during FGDs with direct project beneficiaries that the cash assistance provided by the Rahat intervention primarily served to address the fundamental needs of the

recipients. Importantly, it also signifies that the funds were not diverted towards potentially detrimental uses, such as alcohol or gambling. This responsible utilization of financial support highlights how the Rahat program indirectly contributed to meeting the critical needs of vulnerable communities, ensuring that the assistance reaches its intended beneficiaries and supports their well-being.

### 3.1.7 COMPARISON ON EFFECTIVENESS WITH TRADITIONAL CVA

#### 3.1.8.1 DIFFERENT TRADITIONAL CASH ASSISTANCE MODALITIES

Traditional cash transfer modalities typically involve methods where cash is physically distributed to beneficiaries or transferred to their bank accounts. The section below presents some traditional cash transfer modalities:

- **In-person cash distribution or cheques:** In this method, cash is distributed directly to beneficiaries at specific distribution points, often organized by humanitarian organizations or government agencies. Beneficiaries need to be physically present to receive their cash assistance. Beneficiaries may receive paper cheques, which they can cash at banks. This method is less common due to the administrative burden of issuing and processing cheques.
- **Bank transfers:** Cash can be transferred directly to the bank accounts of beneficiaries. They can then withdraw the cash from ATMs or bank branches. This method is commonly used for government social protection programs and can be efficient for beneficiaries with bank accounts.
- **Paper-based voucher programs:** Some traditional programs provide beneficiaries with paper vouchers that they can redeem for goods or services at authorized vendors. Voucher programs are used when it's necessary to control the use of funds.
- **Digital voucher:** Digital voucher or token based method replaces traditional paper vouchers or physical cash with digital tokens or vouchers that can be easily redeemed for goods, services, or cash value through digital platforms. It leverages technology to streamline the distribution of funds, reduce administrative costs, and enhance the transparency and efficiency of cash assistance programs. In this system, beneficiaries typically receive a unique digital code, often sent via SMS or email, which they can use to access financial support or specific goods, such as food or essential supplies. This modern approach to cash assistance offers a secure and convenient way to provide aid to vulnerable populations while minimizing the risks associated with physical cash distribution.

#### 3.1.8.2 COMPARISON ON EFFECTIVENESS - BLOCKCHAIN VERSUS TRADITIONAL CVA

As compared to the traditional cash based assistance, blockchain based Rahat offered benefits in terms of:

1. Rahat blockchain eliminates the need for in-person cash distribution, reducing the associated logistical costs and risks. With blockchain, the transfer of funds is automated, reducing administrative overhead and potential errors in manual processes.
2. Blockchain enables real-time tracking of fund disbursements. Beneficiaries, program managers, and other stakeholders can monitor fund locations and mobilization at any given time.
3. The immutability of blockchain data ensures the integrity of information. It minimizes the risk of fraudulent activities, such as double-dipping or counterfeit transactions. Traditional methods are more susceptible to these issues.
4. Unlike voucher programs or in-person distribution, blockchain does not require the physical production of vouchers or the deployment of distribution teams. This can lead to lower overhead costs in the long run.

5. RAHAT's blockchain can efficiently serve unbanked beneficiaries, allowing them to receive cash digitally even if they don't have a bank account or access to traditional banking services. This inclusivity is a significant advantage, especially in regions with limited banking infrastructure.
6. During crises or emergencies, the blockchain-based system allows for swift fund transfers, ensuring that assistance reaches beneficiaries quickly. In contrast, traditional methods may face delays in such situations.

Blockchain offers several advantages over traditional digital tokens or vouchers in cash assistance programs:

1. Blockchain's decentralized ledger ensures that once data is recorded, it cannot be altered or deleted. This feature enhances the security and trustworthiness of transaction records, reducing the risk of fraud or manipulation.
2. Blockchain provides transparency by allowing all stakeholders to access and verify transaction data in real time. This transparency enhances accountability and trust among beneficiaries, implementing agencies, and donors.
3. Blockchain employs robust cryptographic techniques to secure data and transactions. This makes it extremely difficult for unauthorized parties to tamper with or gain access to sensitive information.
4. Blockchain enables real-time reconciliation, reducing the need for manual data entry and speeding up the cash transfer process. This, in turn, minimizes operational costs and ensures timely disbursements.
5. Blockchain records all transactions in a traceable manner. This feature helps in tracking the flow of funds, ensuring that they reach the intended beneficiaries.

TABLE 6: DIFFERENCE BETWEEN TRADITIONAL CVA AND BLOCKCHAIN BASED CVA

Aspect	Block-chain based system	Traditional digital CVA
<b>Security</b>	Enhanced security due to blockchain's tamper proof data storage and encryption mechanism	Security reliant on traditional digital security measures.
<b>Transparency</b>	High level of transparency and immutability due to blockchain public ledger	Limited transparency, potentially leading to disputes and questions
<b>Real-time monitoring</b>	Provides real-time tracking of funds and disbursements, reducing the need for manual data entry	Real time monitoring might be limited or absent altogether, leading to delay in detection of errors.
<b>Cost efficiency</b>	Streamlines the process and reduces operational costs due to automated reconciliation.	May involve manual data entry and additional HR, leading to higher operational cost.
<b>Inclusivity</b>	Inclusive approach that caters to both banked and unbanked beneficiaries.	Beneficiaries needs to have account or specific technologies.
<b>Reconciliation</b>	Real time fund reconciliation	Necessitates direct beneficiary confirmation due to intermediary involvement.

However, as compared to the digital voucher methods, there are some disadvantages of Blockchain identified from the evaluation:

1. Implementing a blockchain-based system can be complex and may require technical expertise. Managing and maintaining the infrastructure can be challenging. Furthermore, one of the challenges faced is the lack of understanding of blockchain by stakeholders. Many stakeholders need to realize that blockchain primarily serves as a secure record-keeping tool within a larger CVA ecosystem. It is not the entire system but rather an integral part of it. This misconception can hinder effective adoption and utilization of blockchain technology.
2. Initial setup and integration costs can be relatively high. However, proponents argue that long-term operational costs are lower.
3. Some blockchain networks, especially public ones, are criticized for their high energy consumption due to the consensus mechanisms used.
4. Depending on the jurisdiction, the use of blockchain and cryptocurrencies may face regulatory hurdles or legal uncertainties.
5. Blockchain systems often require the use of digital wallets for transactions and managing funds. The use of wallets can be challenging for beneficiaries. Observations revealed that beneficiaries used a mix of feature and smartphones. This indicates that individuals without access to smartphones may struggle with wallet applications, such as Khalti or e-Sewa. Additionally, even smartphone owners might require training or assistance to use wallets, as some needed help from others to read SMS messages sent to them.

The key reflection drawn from interviews with stakeholder is that the blockchain-based approach to delivering CVA in the context of Nepal was designed as a complement rather than a substitute for traditional cash delivery methods. When drawing such comparisons, it is first and foremost important to highlight that, in the case of this project, the blockchain-based approach is not intended as a substitute for but a complement to delivery of cash to the bank accounts or e-wallets of those that happen to possess them (75-80% of targeted individuals as identified by UNICEF enumerators according to UNICEF Nepal KII). It has, instead, been piloted as a means to deliver cash as efficiently and effectively as possible to unbanked populations, the majority of whom are women, or those who might otherwise face significant challenges in accessing distributed cash<sup>4</sup>. Secondly, it was also noted that Rahat was intended for humanitarian or emergency-related cash transfers as opposed to alternative, longer term social assistance so direct comparison might be difficult (UNICEF Nepal KII).

The comparison with traditional approaches, such as direct cash transfers by government representatives during humanitarian or emergency assistance reveals that while blockchain-based CVA offers efficiencies, it may not necessarily outperform bank transfers or e-wallets, especially in the short and long term. In this regard, both UNICEF Nepal and UNICEF OoI KIs noted that it was “unrealistic” to expect the blockchain-based approach to be more efficient or effective, in both the short and longer term. UNICEF OoI representative further explained that in Nepal's current situation, where cryptocurrency remains illegal, we are adopting the permissioned blockchain approach. This means that traditional bank transfers or electronic money remain the primary methods, and the drawbacks associated with traditional banking systems cannot

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<sup>4</sup> According to UNICEF Nepal KII, this might include people living with disabilities (PLWD) or chronic illnesses, the (digitally) illiterate, women (who often lack access to banking services), those lacking formal identification or those living in remote locations without mobile network.

be eliminated. However, in a potential future scenario where Nepal embraces cryptocurrencies or digital assets, driven by changes in global regulations like the Mica proposal in the EU and ongoing discussions about stable coins in the US, a blockchain and crypto-based approach could offer substantial gains in efficiency and cost-effectiveness.

There are, though, ready comparisons to be made with other modalities or delivery mechanisms, not least the direct delivery of cash to end recipients, as has been traditionally used for distributing cash to unbanked and other individuals in the Nepali context. In particular, most recipients would still need to travel to a distribution point (or equivalent) and engage representatives of either a private, humanitarian agency or public institution in order to receive the cash.

In respect of recipient experience, best practice states that the adoption of blockchain-based approaches to delivering CVA should, as a minimum, be neutral in terms of its implications, if not actually resulting in a more positive process and/or outcome. In principle, this should be the case, as the shift to blockchain-based approaches essentially entails the use of a different back-end database that should not materially influence recipient experience in most instances. In terms of effectiveness, this blockchain-based CVA has been recognized as highly effective by the users, especially regarding real-time monitoring. As UNICEF District representative pointed out, "When we distributed cash before, it wasn't possible to monitor cash redemption in real time. This system has enabled us to instantly track changes in funds as they are used through the platform." Another significant advantage noted is transparency.

### 3.1.7 EXPERIENCE OF THE END-USERS (BENEFICIARIES)

The evaluation delved into the firsthand accounts of community members who had received assistance from the Rahat program. The findings were comprehensively documented, encompassing both quantitative and qualitative data. The following section outlines the Rahat experience in terms of its efficiency, accessibility, the positive outcomes it yielded, as well as any obstacles encountered along the way.

#### 3.7.1.1 ACCESS TO BANK AND MOBILE PHONES

Almost all of the respondents (95.7%) reported having access to mobile phone with only 4.3% who did not have mobile phone. Though in the sample selection, almost 30% of the respondents were identified as having no phones. Similarly, 94.8% respondents reported having a bank account while only 5.2% who did not have one.

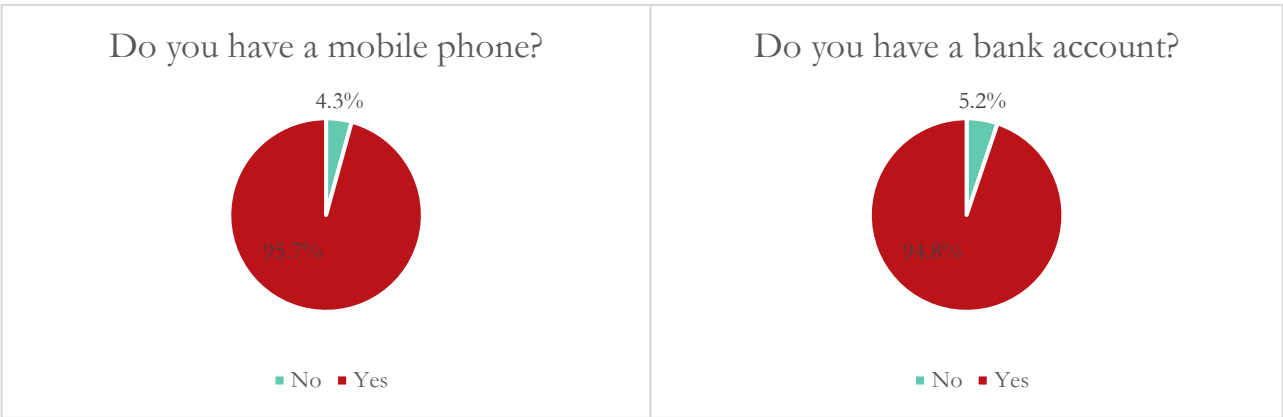


FIGURE 3: ACCESS TO BANK AND MOBILE PHONE

Despite having a bank account, only 82.6% reported that they received the cash in the bank, signaling that all those that had bank account did not get the cash assistance in the bank. The prevalence of bank accounts

among many people is primarily due to government mandates requiring families to open bank accounts in order to access social security schemes. Consequently, a significant number of beneficiaries now possess bank accounts as a result of these mandates, even during the time of the piloting and evaluation. Those individuals who possessed bank accounts were connected to the bank designated for receiving government social protection assistance. This connection was established because the pilot program was an integral component of the shock-responsive social protection mechanism. The primary intention behind this setup was to ensure that during crises or emergencies, assistance could be swiftly deposited into the bank accounts that the government had access to, thereby facilitating immediate relief efforts. Importantly, this approach strengthened the existing mechanism rather than creating a parallel one, which is a positive aspect of the initiative.

Although the overall population indicated that nearly 16% did not have a bank account, the survey's sample size contradicted this figure, with approximately 3% reporting a lack of bank accounts. This discrepancy can be attributed to two primary factors. Firstly, some of the individuals categorized as unbanked during the pilot phase had opened bank accounts between that time and the evaluation, thus no longer falling into the unbanked category. Secondly, the government identified another reason for this disparity, suggesting that some beneficiaries may have falsely claimed to be unbanked during the pilot due to concerns about how their bank account information would be used within the project.

### 3.1.7.1 INFORMATION DISSEMINATION AND COMMUNICATION CHANNELS FOR CASH TRANSFER

In regards to the experience of the beneficiaries in the information dissemination, majority of the respondents (93.9%) reported that they had received clear and concise information on where and how to receive cash. They further added that there had been proper communication on the cash transfer mechanisms from the initial phase of the project.

The method used to communicate information about cash distribution aligned perfectly with Rahat's envisioned approach. 75.8% reported receiving SMS notifications about cash transfer process. This was followed by 71.3% of the respondents who stated that they received the information through ward representatives. There were 14.1% who received information via IVR. Another 12.5% mentioned that the information was provided by municipality representatives. There were 3.7% who reported to have received information from 'other' sources, which was often friends and family, and even bank representatives.

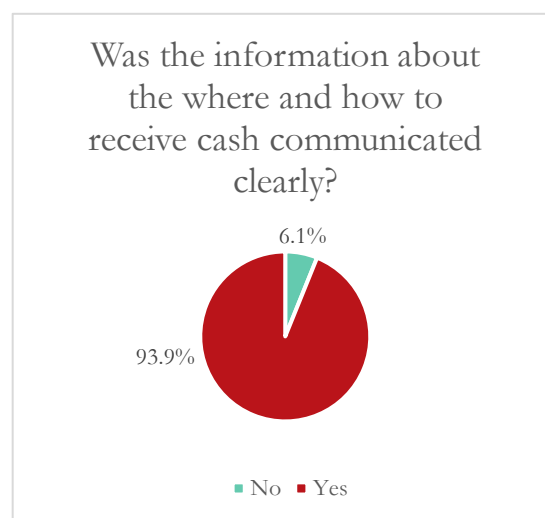


FIGURE 4: CLARITY OF INFORMATION

TABLE 7: RESPONDENTS INFORMED ABOUT THE TRANSFER OF CASH

How were you informed about the transfer of cash? (n = 327)	Count	Percentage
SMS	248	75.8%
Informed by ward representatives	233	71.3%
IVR	46	14.1%
Informed by municipality representatives	41	12.5%
Others	12	3.7%



### 3.1.7.2 GENERAL EXPERIENCE OF USING OTP

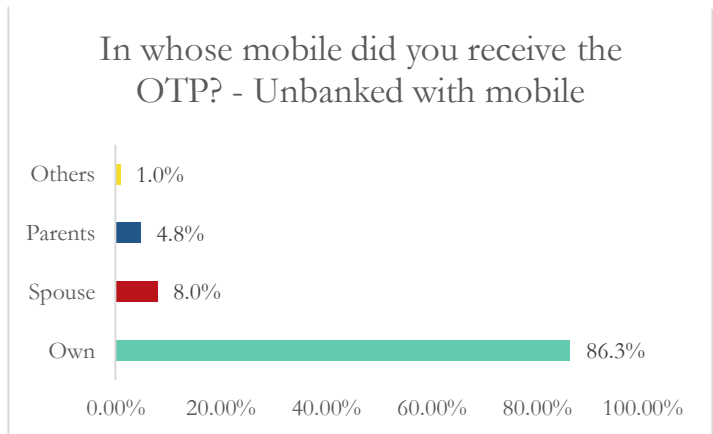
**Means of verification during cash redemption:** Those who were unbanked but had mobile phone received SMS containing OTP and the information was communicated via IVR. The unbanked respondents with mobile phones mentioned that even if they did not have a bank account, they needed to submit the received OTP and additional legal identity documents to Jaleshwor municipality to access the cash in-hand. Jaleshwor municipality had made compulsory to bring proof. Additionally, the respondents highlighted that for those who did not possess mobile phone, QR card was provided as means of verification at cash distribution points.

*"We received a number in our mobile phone which we were required to submit in the bank. We also needed to bring with us our citizenship or birth certificate of children to collect the cash. We were informed by ward representatives to come on certain day to collect cash with required proof of identities." – FGD, ward no 8*

In general, 100% of the mobile users who were unbanked have reported that they received OTP. Among the 313 respondents who reported having a mobile phone, the majority (86.2%) responded that they received OTP in their own mobile phones. It was only a smaller portion (7.9%) who mentioned receiving the OTP on their spouse's phone, while 4.7% said the OTP was received on their parent's phone.

During the discussion, women highlighted that the mobile phone numbers of others, such as parents or spouses, were shared because these individuals would be familiar with the context of the SMS messages.

FIGURE 5: OTP RECEIVED IN WHOSE MOBILE PHONE



*"Majority of the women have access to mobile phone, but they had given phone number of the person who could comprehend the message. The person could have been their children or anyone from the family" – FGD, ward no 8*

**Difficulties encountered in submitting OTPs and PIN:** The vast majority of respondents who received OTPs and PINs for QR Card (96.8%) respondents claimed they did not face any such difficulties while submitting OTPs, or PINs during cash redemption process, while there were only 3.1% respondents who encountered any difficulties. The data shows that the cash transfer process related to cash redemption was easily accessible and easy to comprehend process for the community members.

**TABLE 8: RESPONDENTS HAVING DIFFICULTY IN SUBMITTING OTP OR PIN**

Did you face difficulties in submitting OTPs or PIN codes during the redemption process? (n = 327)	Count	Percentage
Yes	10	3.2%
No	303	96.8%

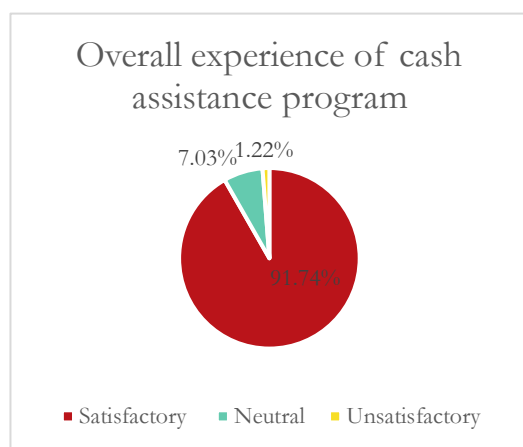
### 3.1.7.3 CHALLENGE IN ACCESSING CASH

When all 327 respondents were asked if they faced any challenge while accessing cash from any of the cash distribution points, almost all of the respondents (98.7%) reported that they did not face any challenge.

Despite the positivity, there were few considerations that beneficiaries shared during the discussions. The respondents expressed that they preferred ward offices as cash distribution point over bank as ward offices were more physically viable for them than the banks. They also had a viewpoint that going to bank required them to bear extra transportation expenses. The respondents further expressed their dissatisfaction that since ward has allocated only one specific day in the week for the beneficiaries to withdraw money from the bank, which overfills the bank and makes the whole process hassling.

*"It is obviously difficult to go to the bank. The ward office is near to our house. We also know everyone here. And the whole process is easy for us. It takes us 1 to 2 hours to reach bank. It costs us around NPR. 200 to reach bank. Sometimes even 400." – FGD, ward 11*

### 3.1.7.4 OVERALL EXPERIENCE OF THE RAHAT PROJECT



**FIGURE 6: OVERALL EXPERIENCE OF CASH ASSISTANCE PROGRAM**

Majority of the respondents found that the cash assistance program was satisfactory with only 1.2% respondents expressing dissatisfaction and the remaining 7.0% answered neutral to the question. The respondents enunciated that they were very much satisfied with the Rahat cash assistance system as it ensured that the assistance reached people who are in actual need of it and was fairly an easy process. They further emphasized that it reduced chances of fraud or same person receiving the same assistance more than once because of the OTP and the QR card that they were provided.

*"When we received goods or other cash as assistance before when there were floods, only people who were close to the representatives received them. Nothing*

*was in place. Some even received it twice and even thrice." – FGD, ward 8*

The respondents expressed that the Rahat program, in overall, has been very beneficial to them. The received funds had been utilized in food, followed by education and in the health care of their children. In addition, the respondents highlighted that along with cash assistance programs, they need to be introduced to capacity and skill building programs.

*“Everything is good about this. The fund received was utilized for education and health care. But we need something useful. We should be taught how to cook food and not just to eat it. We need skill building programs.” - FGD, ward 11*

## ALIGNMENT WITH SUSTAINABLE DEVELOPMENT GOALS

The Rahat pilot program demonstrated alignment with several United Nations Sustainable Development Goals (SDGs), showcasing its commitment to achieving positive outcomes in humanitarian aid and financial inclusion. The evaluation revealed key impacts across various SDGs:

**SDG 1: No Poverty** / Outcome 3: Financial inclusion for all beneficiaries: Rahat's blockchain technology ensured financial inclusion, reaching unbanked individuals and promoting equitable participation.

**SDG 2: Zero Hunger** / Outcome 6: Dignified and empowering experience for the ultra-poor: Rahat's focus on families with children under 5 enhanced women's empowerment as primary caregivers, contributing to child nutrition.

**SDG 5: Gender Equality** / Outcome 6: Dignified and empowering experience for the ultra-poor: Rahat empowered women by providing financial autonomy, control, and ownership, reducing dependency on male family members.

**SDG 10: Reduced Inequalities** / Outcome 3: Financial inclusion for all beneficiaries: Rahat's inclusivity for unbanked and phoneless recipients reduced inequalities, making cash redemption accessible without a bank account or smartphone.

**SDG 17: Partnerships for the Goals** / Outcome 4: Collaboration among multiple stakeholders: The evaluation highlighted the blockchain system's reconciliation capabilities, providing a single source of truth and fostering trust among stakeholders.

Additionally, the scalability aspect emphasized the alignment with SDG 9 (Industry, Innovation, and Infrastructure) by leveraging open-source foundations and Ethereum's EVM technology, positioning Rahat for potential expansion beyond Nepal. The emphasis on trust in system reliability aligned with the need for strong institutions, a crucial aspect of achieving sustainable development goals.

## 3.2 CRITERIA: EFFICIENCY

### 3.2.1 OUTCOME: CASH DISTRIBUTION TO BENEFICIARIES WAS EXPEDITED, AND RECORD-KEEPING IMPROVED COMPARED TO TRADITIONAL METHODS, RESULTING IN TIME AND COST EFFICIENCIES DUE TO THE RAHAT IMPLEMENTATION (BLOCKCHAIN TECHNOLOGY).

The evaluation revealed that real-time financial reconciliation, made possible by blockchain technology, eliminated the need for manual data entry and significantly accelerated the process. This efficiency gain not only streamlined financial record-keeping but also omitted the requirement for additional human resources solely dedicated to data input in traditional voucher assistance programs.

**Cost saving benefits:** Within existing CVA programs, humanitarian agencies have come to realize that transitioning from physical cash distributions to digital payment systems can lead to reduced transfer costs and enhance program cost efficiency (Lebanese Red Cross, 2018). Additionally, this transition has proven to decrease monitoring and evaluation expenses, as digital payments streamline the reconciliation process, saving time and resources (Aggiss, 2016). Furthermore, instances have illustrated that the utilization of mobile money can alleviate financial burdens on beneficiaries. By eliminating the need for ATM withdrawals, mobile money mitigates transportation expenses and withdrawal/transaction fees, ultimately benefiting the recipients (UNCDF, 2018).

Pilot initiatives exploring novel technologies present even more potential. In Jordan, UN Women and WFP harnessed blockchain technology for distribution, and this approach resulted in a remarkable 98% cost reduction by eliminating the requirement for Financial Service Providers (FSPs) (UN Women Jordan, 2021). While the transfer costs remained relatively stable compared to other methods, the platform effectively curtailed indirect and overhead costs through its user-friendly interface and automated functions. However, it's worth noting that such pilot projects have, so far, exclusively involved small, controlled cohorts, which encompass initial setup expenses.

**Timely distribution of cash:** Efficiency gain afforded by blockchain-based approaches might allow for more timely distribution of cash, which is of particular relevance to the stated ambitions of improving the shock-responsiveness of Nepal's social protection system (UNICEF Nepal KII). This may have been delayed in the case that distributing agents (or equivalent) lack internet or mobile network access at the time of distribution, but the associated delay is usually immaterial in the majority of contexts.

Moreover, interviews with Rumsan shed light that Rahat demonstrated its efficiency through several key features and strategies. Real-time reconciliation within the blockchain system contributed in reduced the time required for verifying transactions and managing the distribution process, thereby saving valuable time and human resources. By incorporating open-source solutions like Kobo and Somleng for data collection and communication, the project achieved a more cost-effective approach compared to engaging third-party services for the same tasks and even saved time to develop new solutions. Additionally, the Rahat dashboard's feature for reporting basic transaction status offered a streamlined and transparent way to track and monitor the progress of transactions, further enhancing the overall efficiency of the system.

The case study provided by Rumsan underscores the notable efficiency achieved through Rahat. To gauge the pilot's efficiency, Rahat conducted a meticulous analysis of time durations associated with various processes, such as end user onboarding, cash distribution, transaction verification, and validation. This scrutiny allowed us to evaluate the overall speed and effectiveness of the Rahat system in expediting these critical stages within the CVA workflow.

1. Social mobilizers collected an average of 25.51 data entries per day using Kobo Tool, resulting in a total of 2,756 data entries.
2. The vendor app enabled rapid transactions that averaged between 2 to 3 minutes. OTP transactions were even quicker, taking just around 28 seconds.
3. Insights gathered from municipality staff revealed that distributing cash to unbanked beneficiaries took 1-2 administrative days, while transferring funds to banked beneficiaries required approximately one week. This highlights the potential for streamlined and expedited aid distribution when beneficiary lists are prepared in advance.
4. The average time required for cash distribution to beneficiaries, including sharing phone numbers or scanning QR cards, as well as the OTP verification process, was under 5 minutes. Blockchain transactions were even faster, typically taking between 4 to 8 seconds. Unbanked beneficiaries with

mobile phones received their OTP in roughly 28 seconds, ensuring prompt and secure transactions. These findings underscore the efficiency of the Rahat system in facilitating essential steps within the CVA workflow.

Regarding time efficiency, project beneficiaries who have received cash transfer programs from the government, particularly related to nutrition allowances, shared their experiences during the FGDs. They expressed that the utilization of QR codes significantly streamlined and expedited the process. According to the participants in the FGDs, the provision of QR cards and OTPs/PINs facilitated quicker transactions. One participant mentioned, *"The cash was directly delivered to the intended recipient, leaving no room for anyone else to claim the funds. We received a mobile notification and could promptly visit the office to collect the cash."*

### INEFFICIENCY STEMMED FROM NON-BLOCKCHAIN FACTORS

Efficiency losses became evident in situations where human intervention was required. For instance, beneficiary verification proved to be a time-consuming challenge that caused implementation delays. There were also reported instances of beneficiaries receiving payments twice. It's important to note that these issues were unrelated to the blockchain system; rather, they resulted from errors in preparing beneficiary lists, where two phone numbers were assigned to the same beneficiary.

In respect of time efficiency, UNICEF Nepal KIIs presented anecdotal evidence that the most significant delays experienced during the project, such as those faced during the targeting phase, were in fact entirely unrelated to the blockchain approach. This was reiterated by UNICEF OoI KIIs, who noted significant delays in determining whether or not individuals were banked and, more broadly, emphasised the importance of appreciating that the complex and new context in which the pilot was conducted was not necessarily conducive to (dis)proving the utility of blockchain technology.

Since the pilot did not partner with bank, the bank transfers were manually entered in the system. The bank transfer in general was causing delay (not the blockchain). The delay primarily occurred due to discrepancies in the names and account numbers within the list of bank beneficiaries provided by the municipality or social security fund. As a result, extra time was needed for thorough verification. It's important to note that the banks executed bulk transfers rather than individual ones, which further contributed to the delay.

***"In this context, the palika has commended the timeliness of blockchain based Rahat more than bank transfer. When palikas sent banks request to transfer fund, it took 3 to 6 days on average- if blockchain was used in whole transfer process, it would not take long at all."***  
***UNICEF District representative***

These challenges suggest that, regardless of potential or actual benefits of blockchain-based approaches, they are not necessarily a silver bullet for all programmatic or operational challenges. As such, any future iterations of this pilot should build upon lessons learned in respect of these delays and take suitable measures to mitigate the risk of reoccurrence.

### 3.2.1 COMPARISON ON EFFICIENCY – BLOCKCHAIN VERSUS TRADITIONAL CVA

When considering cost efficiency in comparison to traditional approaches, users such as Palika and UNICEF Nepal have indicated that while the initial system-building cost may be relatively high (approximately USD 250,00 for deployment only) , once the system is established, operational costs are expected to be significantly lower than those associated with traditional CVA methods. However, in the case of this pilot, UNICEF Nepal KIIs noted that no systematic cost efficiency analysis had been undertaken at the time of meeting. It was explained by UNICEF OoI that the primary goal of the pilot was to establish a baseline for future comparisons. While there were attempts to gather more information on the costs of traditional methods, the data was limited. In theory, blockchain technology has the potential to offer cost advantages, but there was no concrete data from this pilot to quantify the benefits in comparison to alternative methods.

Nevertheless, a study on cross-case analysis of benefits and risks, published in International Journal of Disaster Risk Reduction in 2023 highlights the time saving and cost saving benefits of different digital CVA, including block-chain based CVA.

**Time saving benefits:** The most significant time savings were consistently observed in the processes related to value transfer and tracking. Utilizing blockchain-based platforms, smart cards, e-vouchers, and mobile money all have demonstrated notable improvements in delivery time. These technologies facilitated the efficient transfer of cash to beneficiaries through electronic means and streamlining the resolution of last-mile distribution challenges (The CALP Network, 2021). Furthermore, the duration required for payment reconciliation and verification (The International Federation of Red Cross and Red Crescent Societies (IFRC), 2017) was notably reduced through the application of digital accounting tools and batch payment processing.

***Other comparable approaches that have been piloted or taken to scale:*** Experiences with blockchain-based applications in cash programming have been mixed, with some projects succeeding and expanding while others have ceased after the pilot phase. It remains uncertain whether blockchain-based approaches will have a more significant role in cash programming or humanitarian programming in general. The lack of concrete evidence on the benefits of blockchain in these contexts adds to the uncertainty.

UNICEF OoI KIs, noted that there were various other examples of the use of blockchain, that this was the first use within cash programming. Comparable approaches, though not always specifically in respect of cash programming, have been piloted and/or taken to scale:

- Kenya and Ecuador by CARE International – [Blockchain and Cryptocurrency Projects at CARE - CARE](#);
- Vanuatu by Oxfam International – [UnBlocked Cash: Piloting accelerated cash transfer delivery in Vanuatu \(openrepository.com\)](#);
- Bangladesh by WFP - [How blockchain is helping WFP's fight against coronavirus in Bangladesh | by World Food Programme | World Food Programme Insight | Medium](#)
- Ukraine by WFP - [Registration-Targeting-and-Deduplication-Emergency-Response-inside-Ukraine-Thematic-paper-1.pdf \(calpnetwork.org\)](#)
- Ukraine by UNHCR - [UNHCR launches pilot Cash-Based Intervention Using Blockchain Technology for Humanitarian Payments to People Displaced and Impacted by the War in Ukraine – UNHCR Ukraine](#)
- Afghanistan by Code to Inspire: [Starving Afghans Use Crypto to Sidestep Sanctions, the Taliban \(theintercept.com\)](#)

Experience from these applications have varied widely, with certain ceasing after the pilot phase and others being deemed a success and, as such, expanded. However, these instances are currently peripheral and, as such, it remains to be seen if blockchain-based approaches will ultimately play a more significant role in cash programming or, for that matter, humanitarian programming more broadly. This is not helped by the notable lack of evidence on the use of blockchain in either respect. Even then, where evidence of benefits does exist, it remains unproven as to whether they could have been achieved or even exceeded with a well-designed, centralised data system not based on blockchain or just a standard closed-loop e-voucher system.

### 3.3 CRITERIA: SCALABILITY

**Is the infrastructure favorable?** In the context of scalability, as explained by the Rumsan representative, the infrastructure is favorable. The blockchain utilized for Rahat is built upon open-source foundations, resulting in cost-free implementation within Nepal. Incorporating Rahat's code base, and integrating it with open-source tools such as Kobo Toolbox and Somleng, the process was streamlined. Notably, the blockchain architecture does not necessitate any additional hardware infrastructure. Incorporating open-source solutions like Kobo and Somleng proved to be a more cost-effective option compared to engaging third-party services for the same tasks. This approach diminished reliance on external service providers and enhanced time efficiency by minimizing the need for iterative feedback and revisions. This highlights Rahat's ability to seamlessly integrate with other open-source tools, promoting modularity and aligning with the principle of reuse and improvement (Principles for Digital Development).

**Kobo Toolbox:** A free open-source tool, Kobo Toolbox enabled mobile data collection in the field using various devices, including mobile phones, tablets, paper, and computers. Rahat adopted this tool for beneficiary enrollment.

**Somleng:** An Open Source Telco-as-a-service and Cloud-communications-as-a-service platform, Somleng was utilized for IVR management.

Moreover, Rumsan justified the selection of Ethereum's EVM technology for its ability to facilitate crypto-to-crypto transfers, supporting the project's extended scope beyond Nepal. The versatility of Ethereum's EVM technology aligned with the potential for future public transactions.

***“While other private blockchains like Hyperledger Fabric or Corda may have been suitable for some use cases, they did not align with our goal of enabling public transactions in the future. We aim to work within the legal framework, and as regulations evolve in Nepal, we anticipate the possibility of using public blockchains.”***  
– Rumsan representative

**Is capacity enough?** Furthermore, addressing the capacity to comprehend blockchain technology, it was reflected that while Nepal does not locally produce this technology, it can be effectively maintained and utilized. There is no requirement for an in-depth understanding of the technical intricacies; rather, trust in the system's reliability is paramount. *“Blockchain should be approached as a utility tool, akin to everyday technologies like microwave ovens,”* cited Rumsan representative.

In scaling up it is vital not only to undertake a robust cost-benefit analysis of such an approach, reflective of the benefits accrued and costs incurred by all participating stakeholders. Those responsible should also ensure that any benefits accrue or “trickle down” to cash recipients, not just implementing agencies, donors or other stakeholders. More broadly, when scaling such approaches, it is important to consider the various incentives of respective stakeholders, not least those of the organisation that has developed the system and is set to benefit substantively from its application. This is not to say that profiting from the rollout of new technologies, such as blockchain, is inherently bad, simply that such incentives should not compromise objective, nuanced evaluation of blockchain’s utility with respect to achieving humanitarian objectives.

### 3.4 CRITERIA: RELEVANCE

**Is legal and regulatory environment favorable?** Since September 2021, the NRB has outlawed the use of crypto trading and mining in the country. Nepalese residents have been urged to refrain from participating in any cryptocurrency-related activities, as they would face legal consequences if caught (Nepal Rastra Bank, 2021). The initial concerns regarding legal complexities and compliance issues related to blockchain technology were dispelled through the evaluation. It was clarified that using private tokens, as done in Rahat, is not illegal. While there exists a common misconception that blockchain technology is associated with illegality, this pertains primarily to public cryptocurrencies, not private tokens. Furthermore, there is absence of specific crypto laws in the country and is guided foreign currency law. However, it was acknowledged that the scope could expand further if certain regulations were established to allow for in-country bound cryptocurrency transactions. However, if cryptocurrency were subject to regulation, and one could employ a public blockchain that would simplify the on-ramping<sup>5</sup> and off-ramping processes.

**Is there acceptability from users?** In terms of acceptability at the Palika level, it was notably high, as indicated by interviews with Palika-level stakeholders and UNICEF Nepal representatives who were users of the blockchain-based Rahat system. There are instances where Palika representatives expressed interest in replicating the same system for their own social security schemes. The Palika authorities appreciate the blockchain-based system for its efficiency and its attributes of real-time monitoring and transparency, as highlighted in the UNICEF Nepal representative.

In assessing the level of engagement among the stakeholders, representative from Rumsan however highlighted how there was mixed response among the stakeholders. Some members were enthusiastic about blockchain technology and recognized its benefits. However, there were also individuals who were curious but not fully motivated to embrace the technology. Their engagement and skepticism varied. Some appreciated the transparency it offered, while others were concerned about excessive transparency, especially regarding financial matters.

Furthermore, it was also noted that in Nepal, transitioning from traditional paper-based systems to digital platforms also posed some level of challenge. Local stakeholders had to adapt to the new system, and sometimes there was resistance due because they did not want to challenge the status quo. Nevertheless, the project has worked on educating team members and partners about the technology's advantages and worked closely to address any concerns or questions they had.

In the case of this pilot, it was noted that some recipients still received cash assistance directly, as previously, based on their preferences (UNICEF Nepal KII). Interestingly, certain amongst those identified as having bank accounts still expressed a preference for receiving cash, revealing the potential risk that people deliberately fail to disclose that they are in fact banked (UNICEF Nepal KII). This risk was also underscored in the UNICEF OoI KII. Nonetheless, this preference is relevant to all CVA initiatives, raising a question on how CVAs should be tailored to align with the beneficiaries' preferences, regardless of whether they are blockchain-based or not.

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<sup>5</sup> On-ramp crypto involves converting fiat currency (like US dollars or NPR) into cryptocurrencies, while off-ramp crypto entails the conversion of cryptocurrencies into fiat currency. To put it simply, on-ramps provide entry to the cryptocurrency realm, while off-ramps facilitate exit.

### 3.5 CRITERIA: COHERENCE

Rahat's focus on efficient and transparent cash transfers, real-time monitoring, and aid distribution makes it a coherent and valuable tool for UNICEF's SRSP system in Nepal. It can contribute to timely and effective assistance to vulnerable and disaster-affected communities, helping to mitigate the impact of both natural disasters and pandemics.

Rahat also has a scope to align with and complements the government's social protection schemes in Nepal through its use of blockchain technology. It improves targeting, reduces resource leakage, and enables real-time monitoring, making government initiatives more effective. Rahat's blockchain-based system can improve the targeting of beneficiaries, ensuring that assistance reaches those who need it the most. By incorporating digital identity verification and beneficiary enrollment, Rahat can work in tandem with government databases to identify and reach vulnerable populations. With the ability to respond rapidly to shocks and disasters, Rahat enhances the government's ability to provide timely assistance to vulnerable communities. Its open-source and adaptable nature facilitates integration with existing government systems, promoting coherence and efficiency.

**How Rahat complements Integrated Social Registry in Nepal:** There is a need for an Integrated Social Registry in Nepal, emphasized by the World Bank. The article from the World Bank introduces the idea of an Integrated Social Registry as a solution to these challenges. It explains that Nepal has multiple social protection programs, each with its own beneficiary identification process and data collection. These programs are not effectively reaching all those in need due to fragmented information systems. It outlines four main advantages of the Integrated Social Registry:

1. It can serve as a comprehensive database for multiple social protection programs, enabling them to use a shared platform for beneficiary identification and enrollment. This integration is expected to promote better planning, delivery, and monitoring at all levels of government.
2. The registry can minimize data duplication across programs, making data collection more efficient. It will also help coordinate who receives what benefit, reducing redundancy and expanding coverage.
3. The Integrated Social Registry will enable local authorities to identify all households eligible for different programs, promoting greater inclusion and ensuring that those in need can access vital services.
4. By having data on all households in one place, the government can better prepare for disaster relief and respond more efficiently to crises. The registry will help identify vulnerable individuals and ensure they receive timely assistance during shocks or emergencies.

In this context, there is a potential for Rahat to play a complementary role to Nepal's planned Integrated Social Registry, even though this synergy was not observed during the pilot phase. While the Integrated Social Registry aims to streamline social protection programs and improve their efficiency through data integration, Rahat specializes in transparent and accountable aid distribution, particularly in crisis situations. By seamlessly integrating with the Integrated Social Registry, Rahat can ensure that eligible beneficiaries identified through the registry receive timely and secure assistance, leveraging blockchain technology to provide an auditable and efficient distribution process. The combination of these two systems has the potential to create a robust framework for social welfare, encompassing efficient identification and inclusive, accountable aid delivery.

### 3.6 UNINTENDED OUTCOMES OF RAHAT PROJECT

The implementation of the blockchain-based Rahat system highlighted some logistical challenges. While the blockchain system itself performed efficiently, issues unrelated to the blockchain technology itself surfaced. These logistical challenges included beneficiary data management and verification. Although not directly related to blockchain, the pilot aimed to adhere to data standards, which required meticulous data management. The process of verifying existing data and ensuring data accuracy added complexity and resulted in delays.

The critiques specific to blockchain based Rahat system encompass:

- The blockchain pilot was intended to complement, not replace, existing cash delivery methods to the banked population. Comparisons should focus on assisting the unbanked.
- Recipients still needed to travel to distribution points and interact with staff, similar to traditional cash distributions. The blockchain backend did not necessarily improve the recipient experience.
- The role of the blockchain provider expanded beyond just the technology, creating some confusion over responsibilities.

**There were some limitations of blockchain identified in the evaluation:**

- Blockchain technology offers unique advantages when it comes to securely storing and managing digital records or transactions involving multiple stakeholders. Its ability to create an immutable and transparent ledger is particularly beneficial in scenarios where trust and data integrity are essential. However, it's important to recognize that blockchain has limitations, especially when dealing with the digital representation of physical records. In these cases, a "last mile" trust issue arises, where a human intermediary is often required to bridge the gap between the offline world (physical records) and their digital counterparts.
- Blockchains, while often seen as cutting-edge technology, are not entirely self-sufficient. They depend on human involvement for essential tasks like updating software, overseeing network nodes, and deciding on network improvements. In this sense, they still require a level of human governance to function effectively. Blockchain technology offers automation and transparency, but it is not entirely divorced from human decision-making and management.
- Blockchains are designed for an online world. This means that conducting transactions or accessing data on the blockchain can be challenging or even impossible when offline. The technology relies on real-time connectivity to validate and record transactions. While offline solutions are being developed, the current blockchain infrastructure may not be suitable for environments with unreliable or no internet access, limiting its usability in certain situations.

## SECTION 4: CONCLUSION

The Rahat pilot program, integrating blockchain technology into humanitarian CVA programs, aimed to enhance financial inclusion, transparency, and accountability in aid distribution. The evaluation, conducted in Jaleshwor Municipality, identified several outcomes:

- *Outcome 1* Secure and transparent fund: The evaluation highlights the impact of blockchain-based digital tokens, exemplified by the Rahat system, in achieving transparent and inclusive fund management. Blockchain acts as a conduit for trust, capturing every step of the financial process with real-time visibility. This increased transparency fosters accountability and holds the potential to reduce the need for extensive auditing procedures, envisioning a future where such practices become standard.
- *Outcome 2* Data integrity and tamper-proof record: The Rahat blockchain system, examined through an equity lens, stands as a robust guardian of data integrity and security in cash transfers. By allocating unique tokens to individual IDs, Rahat ensures a double spending-free process for all beneficiaries, irrespective of their banking status. The inclusion of QR code cards for those without traditional banking access reflects a commitment to equitable participation.
- *Outcome 3* Financial inclusion for all beneficiaries: Rahat's blockchain technology ensured financial inclusion for all beneficiaries, reaching 16% unbanked individuals (312 out of 1900) often excluded from traditional digital CVA programs. The innovative use of QR cards for unbanked and phoneless recipients promoted inclusivity, allowing cash redemption without a bank account or smartphone. Blockchain's role in linking individuals with phone numbers enabled participation without official documentation, crucial in emergency contexts. Rahat didn't just exclude vulnerable groups; it enhanced their experience, making cash distribution more seamless, accountable, and secure.
- *Outcome 4* Collaboration among multiple stakeholders: The evaluation highlighted the blockchain system's impeccable reconciliation capabilities, emphasizing real-time tracking and fund transfer reconciliation without the need for manual data input. This transparency provided a single source of truth, fostering trust among stakeholders.
- *Outcome 5* Increased capacity of UNICEF to monitor fund disbursement: The impact of blockchain technology on real-time fund monitoring, led to enhanced financial management and decision-making. This inclusive approach ensured transparency and accuracy in financial transactions, benefitting both banked and unbanked beneficiaries. Stakeholders, equipped with timely and reliable financial information, could promptly address discrepancies, fostering financial accountability and efficiency.
- *Outcome 6* Dignified and empowering experience for the ultra-poor: The Rahat implementation, empowered by blockchain technology, not only provided essential cash assistance but also fostered a dignified and empowering experience, particularly for ultra-poor women. Survey results revealed that a significant 71.4% of women explicitly expressed a sense of empowerment after receiving cash support. The program's focus on families with children under 5 underscored the understanding that these funds were dedicated to child nutrition, enhancing women's empowerment as primary caregivers. Discussions from focus group discussions highlighted crucial empowerment aspects, including financial autonomy, control, ownership, and reduced dependency on male family members for child nutrition.

**Reflection on end-users experience:** The survey data reflects the positive and empowering experience of project beneficiaries, showcasing ease in accessing benefits despite the use of complex blockchain technology. The introduction of OTPs and PINs was well-received, signifying a step towards ownership and scalability.

However, challenges exist, as not all vulnerable communities may have dedicated phone numbers. Information flow was generally smooth, with ward representatives addressing digital literacy challenges by disseminating crucial information. Only 6.4% had received prior cash assistance, highlighting Rahat's efficiency in reaching underserved populations. The project's emphasis on individuals with young children contributed to women feeling uniquely valued and empowered, fostering financial independence. Access to funds in their names provided a dignified experience, allowing them to transition from dependents to active contributors in their families and communities.

**Comparison between traditional CVA and blockchain based CVA:** The evaluation juxtaposes the effectiveness of blockchain-based Rahat with traditional CVA, revealing several advantages. Rahat's blockchain streamlines processes by eliminating in-person cash distribution, automating fund transfers, and enabling real-time tracking, reducing logistical complexities. The immutability of blockchain ensures information integrity, reducing fraud risks. Compared to traditional methods, it avoids physical voucher production and provides inclusivity for unbanked beneficiaries. During crises, blockchain facilitates swift fund transfers, addressing delays in traditional approaches. The advantages extend to security, transparency, real-time monitoring, cost efficiency, and inclusivity. Blockchain's decentralized ledger enhances security and trust, while real-time monitoring reduces manual errors. It offers transparency through a public ledger, crucial for accountability. The efficient automated reconciliation minimizes operational costs. Inclusivity is a hallmark, catering to both banked and unbanked beneficiaries.

However, challenges arise, including the complexity of implementation, initial setup costs, energy consumption concerns, and potential regulatory hurdles. The need for digital wallets poses usability challenges for beneficiaries. Importantly, the blockchain-based approach is positioned as a complement rather than a substitute for traditional methods.

In terms of efficiency, blockchain-based CVA offers potential long-term cost advantages, with lower operational costs once the system is established, despite higher initial building costs. A study highlights significant time savings in value transfer and tracking through digital CVA methods, including blockchain. However, experiences with blockchain in cash programming vary, with successes and discontinuations in different projects globally. The lack of conclusive evidence raises uncertainty about the broader role of blockchain in humanitarian efforts compared to conventional systems.

**Relevance:** The evaluation highlights the potential benefits of blockchain in humanitarian CVA programs but also underscores the need to address challenges and adapt to specific contexts to maximize its effectiveness. It also emphasizes the importance of tailoring CVA initiatives to beneficiary preferences and carefully considering associated risks. Future research and practical experiences will be valuable in further advancing the use of blockchain in humanitarian aid. Notably, end-recipients, who may not possess blockchain awareness, have attested to the system's timeliness and user-friendly features, particularly with OTP and QR card payments. User, specifically, UNCEF District Representative (Field Office) who was tasked with implementation found the system valuable for cash tracking and reporting purposes.

While the end-recipient and users advocated for cash-based assistance, it is crucial to consider that cash in hand have logistical hurdles including the security risks associated with transporting cash to distribution sites, where there is a threat of theft. Moreover, the manual handling of money will introduce the potential for human errors, such as mistakenly delivering 11,000 instead of 10,000, which could impede the process of physical reconciliation.

**Scalability:** The scalability of Rahat's blockchain implementation demonstrates several key advantages. The infrastructure is favorable, leveraging open-source foundations for cost-free deployment in Nepal. The system seamlessly integrates with open-source tools like Kobo Toolbox and Somleng, promoting modularity and

aligning with principles of reuse. Ethereum's EVM technology adds a future-ready dimension, facilitating crypto-to-crypto transfers and positioning the project for potential expansion beyond Nepal. Addressing the capacity to comprehend blockchain technology, it's emphasized that an in-depth technical understanding is not necessary; rather, trust in system reliability is crucial. Scaling up requires a comprehensive cost-benefit analysis to ensure benefits extend to cash recipients, emphasizing the alignment of stakeholder incentives with humanitarian objectives in the evaluation process.

## 4.1 LESSONS LEARNED

- True essence of blockchain technology could be best harnessed for unbanked beneficiaries, and the pilot missed the opportunity due to the relatively small percentage of unbanked beneficiaries in the target population. The pilot was not able to fully leverage this technology due to the relatively small percentage of unbanked beneficiaries in the overall beneficiary population. This outcome could indeed be considered an unintended consequence, emphasizing the importance of careful beneficiary selection and assessment before implementing such technology-driven initiatives. The presence of government mandates regarding bank accounts in Nepal is an important contextual factor that the pilot should have taken into account during the planning phase.
- Rahat system exclusively focused on transaction recording and bookkeeping, without taking into account beneficiary enrollment. Targeting is also a crucial aspect of CVA, and it should be integrated into the existing Rahat system for better coordination.
- One of the notable oversights in the pilot project was the failure to address privacy concerns adequately. It is essential for future initiatives to prioritize privacy concerns as a crucial necessity to minimize the risk of exposing sensitive personal information, especially since third-party entities play a significant role in blockchain-based cash delivery.
- In light of the challenges posed by the absence of integration with the banking system, leading to manual reconciliation of banking transactions through email reporting and subsequent delays, it is strongly advised that partnerships should be established with banks for API integration.
- Evaluation has indicated that there is room for greater user engagement. The level of stakeholder involvement was perceived as limited, potentially attributed to the novelty and complexity of the technology involved. In this context, there is an opportunity to enhance the capacity of potential users before their onboarding, enabling them to grasp the benefits of blockchain in transparency, financial reconciliation and appreciate its efficiency.

## SECTION 5: RECOMMENDATIONS

### Recommendations to UNICEF Nepal

*The recommendations presented to UNICEF NCOs are the outcome of collaborative consultations with key stakeholders, such as UNICEF Nepal Country Office and OoI, as well as local government representatives from the targeted municipality. This collaborative approach ensures a participatory process that takes into account the perspectives and intentions of all stakeholders involved. Additionally, certain recommendations are informed by independent reflections and findings from evaluators, contributing to a comprehensive and well-rounded set of recommendations.*

#### Short term recommendation

**Recommendation 1: Advance equitable blockchain education and awareness:** Prioritize blockchain education and awareness efforts within UNICEF Nepal Country Offices (NCOs), recognizing the potential for disparities in understanding within the organization. Addressing the Knowledge Gap in Web 3.0 and Blockchain Technology is crucial, particularly for staff who may be less familiar with these concepts. Provide inclusive training and educational resources that are accessible and considerate of diverse learning needs. *The concept is relatively novel, and staff may not fully understand its potential.* Comprehensive sessions on blockchain technology, emphasizing its principles and advantages, are essential to ensure all staff can fully comprehend its potential impact.

**Recommendation 2: Promote inclusive dissemination of key findings:** Share key findings widely from blockchain-based CVA evaluations to bridge existing evidence gaps and contribute to knowledge dissemination in a transparent manner. Prioritize the inclusion of perspectives from vulnerable and marginalized communities in the sharing process to ensure diverse voices are represented. *This approach aligns with the principles of equity and intersectionality, allowing humanitarian organizations to make well-informed decisions about the adoption of blockchain technology.*

**Recommendation 3: Prioritize early identification of verification challenges through an equity lens:** Conduct regular risk assessments at the onset of each verification cycle, recognizing the potential for vulnerabilities among beneficiaries. Develop contingency plans that promptly address any challenges. *Proactively identifying and addressing potential verification challenges through an equity-focused approach is crucial to minimize delays and ensure an inclusive verification workflow.*

**Recommendation 4: Equitably document lessons learned for verification delays:** Documenting lessons learned from verification delays is essential to mitigate such issues in future programs, irrespective of whether blockchain-based CVA is utilized. Prioritize the inclusion of perspectives from diverse stakeholders, particularly those who may face additional barriers in accessing assistance. *This equity-focused documentation aims to identify and address the root causes of verification delays, developing strategies that promote timely assistance and inclusivity for all beneficiaries.*

#### Mid-term recommendation

**Recommendation 5: Streamlining the banking process through API integration.** Establish partnerships and collaborations with banks and utilize API (Application Programming Interface) technology to connect banking systems with the Rahat/ or other blockchain based platform. This integration will streamline financial reconciliation and provide real-time data transfer, ensuring a more efficient cash transfer process. *The rationale is because the integration simplifies financial transactions and reduces manual efforts, leading to more efficient and cost-effective operations.*

**Recommendation 6: Mainstream data protection:** Ensuring that data protection is mainstreamed in future evaluations of blockchain-based CVA programs is critical. *The rationale is to safeguard the privacy and security of beneficiary data, address regulatory and ethical concerns, and maintain the trust of all stakeholders involved in CVA programs.*

**Recommendation 7: Foster inclusive beneficiary onboarding with phone-Based eKnow Your Customer (eKYC):** Addressing the challenge of onboarding beneficiaries without smartphones or internet access is essential for scalability and inclusion. *Explore innovative solutions like phone-based eKnow Your Customers verification, prioritizing accessibility and ensuring that the solution caters to a broader spectrum of beneficiaries, including those facing barriers to technology access. This approach aims to promote wider adoption and inclusion, aligning with principles of equity.*

**Recommendation 8: Prioritize accessibility in communication strategies:** Implement communication strategies in communicating about the support that prioritize accessibility, considering diverse linguistic, cultural, and literacy needs. Provide information in multiple formats, such as audio, visual, and written materials, to ensure that all stakeholders, including those with varying levels of literacy or language proficiency, can understand and engage with the content effectively.

**Recommendation 9: Foster inclusive stakeholder engagement for holistic perspectives:** Expand stakeholder engagement by including representatives from diverse backgrounds, such as local community leaders, advocacy groups, and individuals from marginalized populations. *This inclusive approach ensures that the design and implementation of blockchain-based CVA programs incorporate a variety of perspectives, prioritizing the needs of those who may be traditionally underrepresented or face barriers to participation.*

**Recommendation 10: Establish a feedback mechanism for continuous improvement:** Establish a robust and inclusive feedback mechanism that allows beneficiaries, particularly those from marginalized communities, to continuously share their experiences and insights. *This approach ensures that the changing needs and challenges faced by diverse populations are considered for ongoing improvements and adaptations in the program.*

#### Long-term recommendation

**Recommendation 10: Pursue equity in blockchain-enabled anticipatory action:** Investigate the potential of blockchain-enabled CVA for anticipatory action, focusing on the pre-identification of vulnerable populations and early cash transfers in anticipation of crises. *This exploration is essential to enhance the preparedness and responsiveness of humanitarian organizations, with a commitment to equity by prioritizing the needs and perspectives of marginalized communities in the face of climate-related or other emergencies.*

#### Recommendations to UNICEF OoI

*The UNICEF OoI recommendation has been formulated by the evaluation team, drawing upon the insights obtained. These insights comprise input from the Global CVA Expert as well as contributions from the Rumsan team.*

#### Short-term recommendation

**Recommendation 1: Undertake systematic cost-efficiency analysis:** Conducting a cost-efficiency analysis for blockchain-based pilots is essential to determine whether the technology provides value for money. However, it is crucial to recognize that cost-efficiency should not be the sole defining characteristic of success. *The rationale is to ensure that financial resources are used effectively in humanitarian efforts. Cost-efficiency analysis will help in evaluating the financial feasibility and sustainability of blockchain-based CVA programs.*

#### Mid-term recommendation

**Recommendation 2: Prioritize the inclusion of unbanked beneficiaries for comprehensive insights:** During the piloting phase of blockchain-based CVA, intentionally include a substantial number of unbanked

beneficiaries to gain valuable insights into how the technology can address the unique needs of marginalized and underserved populations. *Prioritize inclusivity in the selection process, recognizing the potential barriers faced by unbanked individuals, and ensure that the technology is accessible and beneficial to all, aligning with principles of equity and inclusion.*

**Recommendation 3: Prioritize inclusive and diversified funding: Prioritize projects and initiatives that demonstrate a commitment to inclusion and diversification:** Support efforts that actively engage stakeholders from diverse backgrounds, including local community leaders, advocacy groups, and individuals from marginalized populations. Emphasize the importance of projects that not only address immediate needs but also contribute to long-term equity and inclusivity. *Funders should consider allocating resources to initiatives that integrate these principles into their design and implementation, fostering a more comprehensive and impactful approach to humanitarian assistance.*

**Recommendation 3: Establish baseline metrics with an equity focus:** To assess the advantages and disadvantages of blockchain-based CVA equitably, establish baseline metrics that consider the diverse needs and impacts on different communities. *Comparing quantitative aspects, such as cost and time, between traditional CVA and blockchain-based CVA, will provide a clear and data-driven assessment of the technology's impact with a commitment to equity.*

**Recommendation 4: Equitably document lessons learned for verification delays:** Documenting lessons learned from verification delays is crucial to mitigate such issues in future programs, irrespective of whether blockchain-based CVA is utilized. Prioritize the inclusion of perspectives from diverse stakeholders, particularly those who may face additional barriers in accessing assistance. *This equity-focused documentation aims to identify and address the root causes of verification delays, developing strategies that promote timely assistance and inclusivity for all beneficiaries.*

## Recommendations to Rumsan

*The recommendations provided for Rumsan is derived from insights gleaned from the findings and a thorough examination of pertinent documents aimed at identifying potential solutions. Furthermore, certain recommendations have been shaped by user input, including perspectives from UNICEF NCO, OoI, and a global blockchain expert. Additionally, the Rumsan team has been actively involved in reviewing and discussing these recommendations.*

### Short-term recommendation

**Recommendation 1: Comprehensive User Documentation.** Develop inclusive user documentation that comprehensively describes the blockchain-based CVA system's functionality, user guidelines, and troubleshooting procedures. Ensure the documentation is user-friendly and accessible to a diverse audience by offering it in various formats, such as printed guides, online resources, and video tutorials. Emphasize not only how the system operates but also provide guidance on its inclusive utilization and instructions for addressing any potential issues.

### Mid-term recommendation

**Recommendation 1: Implement a non-code-based workflow editor to empower users to design and modify workflows through intuitive drag-and-drop actions.** *Rationale:* The current system may necessitate manual editing of the blockchain code for workflow changes, creating barriers for users. To enhance flexibility, introduce a non-code-based workflow editor that enables users to design and modify workflows seamlessly through drag-and-drop actions, fostering greater accessibility and adaptability to changing requirements.

**Recommendation 2: Enhance the platform's capability to trace the reverse flow of unclaimed funds back to UNICEF. Strengthening this aspect will ensure a more comprehensive financial tracking process throughout the entire cash transfer cycle.** *Rationale:* While the platform effectively tracked funds from UNICEF to the Palika, it lacked the ability to trace the reverse flow of unclaimed funds back to UNICEF. Improving this aspect is essential for achieving a more inclusive financial tracking process throughout the entire cash transfer cycle.

**Recommendation 3: Form partnerships with banks for API integration to address challenges arising from the absence of integration with the banking system.** This strategic move will streamline financial reconciliation, reducing manual efforts and potential delays. *Rationale:* Given the challenges posed by the lack of integration with the banking system, leading to manual reconciliation through email reporting and subsequent delays, it is strongly recommended to establish partnerships with banks for API integration. This approach will enhance efficiency and promote a more inclusive financial ecosystem.

## ANNEX

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