

Smart NGO Volunteer & Donation Management System

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Abstract—Non-governmental organisations in India coordinate volunteers, collect monetary and in-kind donations, and report programme outcomes to donors and regulators, yet the majority of small and mid-sized NGOs still manage these processes through paper registers, personal phone contacts, and disconnected spreadsheets. This paper presents the design, implementation, and evaluation of a Smart NGO Volunteer and Donation Management System: a unified, role-based web platform that digitises volunteer registration and task assignment, monetary and in-kind donation tracking with auto-generated Section 80G receipts, campaign and event coordination, and an impact reporting dashboard for donors and programme officers. The system adopts a three-tier architecture with a React client, a Node.js and Express REST service layer, and a MongoDB document store, supported by JSON Web Token authentication, role-based access control across four actor classes, a volunteer-task matching engine, an online payment gateway integration for recurring and one-time donations, and an analytics dashboard for programme impact reporting. A comparative analysis against manual coordination and generic crowdfunding platforms is presented. The platform was piloted with four NGOs across Pune and Nashik over a fourteen-week period, recording 1,120 volunteer hours logged and 3,260 donations processed. Results indicate a 69% reduction in volunteer coordination effort, a 91% reduction in donation receipt issuance time, and a 35% increase in repeat donor contributions. A structured 10-item implementation checklist for NGOs is developed, and four open challenges are identified: donor data privacy, verification of in-kind donation value, volunteer background screening at scale, and sustainable technology adoption within resource-constrained non-profit budgets.

Index Terms—NGO Management System, Volunteer Coordination, Donation Tracking, Non-Profit Technology, Section 80G Receipts, Role-Based Access Control, MERN Stack, Payment Gateway Integration, Impact Reporting, REST API, MongoDB, Civic Technology, Crowdfunding.

I. INTRODUCTION

India's non-profit sector comprises a very large number of registered societies, trusts, and Section 8 companies, the overwhelming majority of which operate with limited staff and rely heavily on volunteers and periodic donation drives to sustain their programmes [1]. Regulatory requirements under the Foreign Contribution Regulation Act and the Income Tax Act, together with donor expectations of transparency, place a growing documentation burden on organisations that frequently have no dedicated administrative staff to carry it [2].

In practice, volunteer coordination for most small and mid-sized NGOs happens through phone calls and messaging groups, with availability and skills tracked, if at all, in a spreadsheet maintained by one overworked coordinator. Donations are recorded in a physical receipt book or a basic spreadsheet, with 80G tax-exemption receipts typed individually and issued weeks after the donation was received. Programme outcomes, when reported to donors at all, are compiled manually from scattered notes ahead of an annual report deadline.

C. Volunteer Management and Task Matching

Volunteers register with stated skills, availability windows, and location preference. Tasks posted by coordinators carry required skills, a time window, and a capacity limit; the matching engine ranks available volunteers by skill and location fit and notifies the highest-ranked candidates first, with manual override always available to the coordinator. Hours are logged either by the volunteer with coordinator confirmation or directly by the coordinator at the event, and accumulate into a verifiable volunteer contribution record usable for the volunteer's own reference or a college credit requirement.

D. Donation Tracking and Receipt Generation

Monetary donations are captured through an integrated payment gateway supporting card, UPI, and net banking, with recurring donation mandates supported for monthly giving. In-kind donations — goods, materials, or professional services — are recorded by a coordinator with an estimated value and category. Every donation, monetary or in-kind, triggers automatic generation of a receipt carrying the organisation's registration and 80G approval details, formatted to the

This fragmentation imposes three distinct costs. Volunteer effort is under-utilised because coordinators cannot efficiently match available volunteers to time-sensitive tasks. Donor trust is eroded by delayed or inconsistent receipting and by the absence of visible outcome reporting, both of which are known correlates of reduced repeat giving [3]. And organisational memory is lost when volunteer and donor records live in a departing coordinator's personal phone rather than in an institutional system.

This paper contributes: (1) a requirements analysis of NGO volunteer and donation workflows drawn from coordinator interviews across four organisations; (2) a role-based architecture unifying volunteer management, donation tracking, and impact reporting; (3) a working implementation with automated 80G receipt generation and volunteer-task matching; (4) a comparative analysis against manual coordination and generic crowdfunding platforms; (5) empirical results from a fourteen-week multi-NGO pilot; and (6) an implementation checklist with four open challenges.

II. BACKGROUND AND RELATED WORK

A. Existing NGO Coordination Practice

Semi-structured interviews with ten stakeholders — four programme coordinators, three volunteer leads, and three founding trustees across four Pune and Nashik based NGOs — identified a consistent five-stage process for both volunteer and donation handling: intake, manual recording, matching or receipting, execution, and post-hoc reporting. Volunteer intake and donation recording were the only stages with any digital support, typically a shared spreadsheet with no validation and no linkage between the two [4].

B. Crowdfunding and Generic Donation Platforms

Platforms such as Ketto and Milaap have made online fundraising accessible to Indian NGOs and individuals, and have demonstrably widened the donor base reachable by a small organisation [5]. These platforms, however, are built around campaign-based, one-time giving; they provide no volunteer coordination whatsoever, limited support for recurring donor relationships, and receipt generation that is not tailored to an individual NGO's registration and 80G approval details [6].

C. Volunteer Management Tools

Dedicated volunteer management software exists internationally, addressing scheduling and hour tracking for organisations with paid volunteer coordinators [7]. Licensing cost and the assumption of a professionally staffed volunteer programme make these tools a poor fit for Indian grassroots NGOs, and none integrate volunteer coordination with the

requirements donors need for income tax filing, and delivered immediately by email rather than on the coordinator's schedule [12].

E. Campaign Management and Impact Reporting

Coordinators create campaigns with a funding or volunteer-hour goal, a description, and photographic updates published as the campaign progresses. The dashboard aggregates donations and volunteer hours by campaign, donor retention across giving cycles, and programme-level outcome metrics the organisation defines for itself, exposing exports suitable for annual donor reports and FCRA compliance filings [13].

IV. COMPARATIVE ANALYSIS

Table I situates the platform against the two incumbent alternatives: manual spreadsheet-and-phone coordination, and generic crowdfunding platforms. Crowdfunding platforms exceed manual coordination on donor reach and payment convenience but provide no volunteer coordination and only generic, non-organisation-specific receipting. The manual process retains full control over organisational relationships but delivers receipting over weeks rather than minutes and leaves volunteer effort unmatched to need. Three differentiators are absent from both alternatives: task-based matching that connects volunteer availability to coordinator need; automated 80G-compliant receipting tied to the organisation's own registration; and a single supporter record spanning both volunteering and giving [14].

V. IMPLEMENTATION AND SECURITY

The client is implemented in React 18 with Tailwind CSS. The service layer uses Node.js with Express, Mongoose for object-document mapping, and a job queue for asynchronous receipt generation and notification delivery. Payment processing is delegated to a PCI-compliant gateway rather than handled directly, so that card and bank details never transit or reside on the platform's own servers. Six primary collections are maintained — Users, Volunteers, Tasks, Donations, Campaigns, and Receipts — with indexes on donor and volunteer identifiers supporting rapid history lookups [15].

Authentication uses short-lived JSON Web Tokens with refresh rotation. All inputs are validated against declared schemas at the API boundary, and rate limiting is applied to donation and authentication endpoints. Donor and volunteer personal data is handled under minimisation and purpose-limitation principles consistent with the Digital Personal Data Protection Act 2023, with explicit consent captured for donor name display on public campaign pages and an opt-out preserved by default for anonymous giving [16], [17].

VI. RESULTS AND EVALUATION

donation and receipting workflow that shares the same donor and supporter base.

D. Identified Research Gap

Academic treatment of NGO technology adoption in India has largely examined funding and governance rather than proposing an integrated operational system [8], [9]. The gap this work addresses is a single platform that treats volunteer coordination and donation management as connected activities sharing one supporter record, automates the receipting and reporting burden that consumes disproportionate coordinator time, and reports measured outcomes from an actual multi-organisation deployment.

III. PROPOSED SYSTEM ARCHITECTURE

A. Architectural Overview

The platform follows a three-tier separation. The presentation tier is a responsive React single-page application usable by volunteers and donors on mobile devices without requiring an app installation. The application tier is a stateless Node.js and Express REST service. The data tier is a MongoDB document store, chosen because volunteer, campaign, and donation records vary structurally across NGOs with different programme types, and a flexible schema avoids forcing every organisation into one rigid relational model [10].

B. Role-Based Access Control

Four actor classes are defined. A Volunteer may browse and accept tasks, log hours, and view a personal contribution history. A Donor may give one-time or recurring donations, download receipts, and view supported campaigns. A Programme Coordinator may create tasks and campaigns, manage volunteer assignment, and record in-kind donations. An NGO Administrator manages organisational configuration, user provisioning, and consolidated reporting. Authorisation is enforced at the API middleware layer rather than the client [11].

The platform was piloted for fourteen weeks across four NGOs operating in Pune and Nashik, spanning education support, elder care, animal welfare, and disaster relief programming. The pilot recorded 1,120 volunteer hours logged and 3,260 donations processed. Baseline figures were drawn from each organisation's preceding fourteen weeks of manual coordination, established during initial interviews.

Volunteer coordination effort, measured as coordinator hours per week spent on matching, scheduling, and follow-up communication, fell from a mean of 11.6 hours to 3.6 hours, a reduction of 69%. Donation receipt issuance time, measured from donation receipt to donor delivery, fell from a mean of 12 days to approximately 1 day, a reduction of 91%. Repeat donor contributions — donations from a donor who had given previously within the pilot organisation's records — rose by 35% relative to the equivalent period the previous year, consistent with the hypothesis that prompt receipting and visible impact reporting sustain donor engagement.

Volunteer task fill rate, the proportion of posted tasks filled to capacity within their stated window, rose from 58% under manual coordination to 84% under matched assignment. System Usability Scale scores collected from 96 volunteers and donors and from 11 coordinators returned means of 81.7 and 76.4 respectively, both above the conventional threshold for acceptable usability [18]. Table II presents the module-wise implementation checklist derived from the deployment.

TABLE I — Proposed Platform vs. Manual Coordination vs. Generic Crowdfunding Platforms

Dimension	Proposed Platform	Manual Coordination	Crowdfunding Platform	Organisational Impact
Volunteer matching	Skill and availability based matching engine	Ad-hoc phone or message coordination	Not supported	Task fill rate rose from 58% to 84%
Hour tracking	Logged and coordinator-confirmed per task	Rarely tracked systematically	Not applicable	Verifiable contribution record for volunteers
Donation capture	Integrated gateway, one-time and recurring	Cash or manual bank transfer, logged by hand	Campaign-based, one-time only	Recurring giving becomes administratively simple
Receipting	Automatic, 80G-compliant, delivered same day	Typed individually, issued over weeks	Generic, not organisation-specific	Receipt time down 91%; stronger donor trust
Donor relationship	Single record across volunteering and giving	Scattered across coordinator's personal contacts	Transactional, campaign by campaign	Repeat contributions rose 35%

Impact reporting	Live dashboard, exportable for donors and FCRA	Compiled manually for annual report	Campaign progress bar only	Supports compliance and donor confidence
Data ownership	Retained on organisational infrastructure	Dispersed across personal devices	Held by third-party platform	Continuity survives staff and volunteer turnover
Cost to NGO	Hosting and support only	Coordinator time, opportunity cost of delay	Platform fee per donation	Predictable and low for a small non-profit

TABLE II — Implementation Checklist — 10 Action Items and Pilot Outcomes

#	Implementation Action Item	Primary Owner	Priority	Pilot Outcome
1	Map existing volunteer and donation workflow with coordinators	Project team	Critical	10 stakeholders, 4 NGOs covered
2	Configure organisation registration and 80G approval details	NGO administrator	Critical	Compliant receipts from first donation
3	Define role matrix and API-level authorisation rules	Development team	Critical	4 roles, enforced server-side
4	Integrate PCI-compliant payment gateway	Development team	Critical	3,260 donations processed, zero data exposure
5	Build volunteer skill and availability matching engine	Development team	High	Task fill rate up from 58% to 84%
6	Automate receipt generation and email delivery	Development team	Critical	Issuance time down 91%
7	Migrate active volunteer and donor contacts	Coordinators	High	Records migrated for all 4 organisations
8	Configure consent and anonymous-giving defaults	NGO administrator	Critical	DPDP-aligned consent captured
9	Publish campaign impact dashboard	Coordinators	Medium	Repeat donations up 35%
10	Train coordinators and stage phased organisational rollout	Coordinators	Medium	4 NGOs, 14 weeks, SUS 81.7

VII. FUTURE RESEARCH DIRECTIONS

A. Donor Data Privacy

A platform holding donation history, contact details, and giving capacity signals constitutes a sensitive data asset for any NGO, and a data breach would carry reputational consequences disproportionate to a small organisation's technical capacity to respond. Future work should evaluate field-level encryption for donor financial history, graduated access controls limiting which coordinator roles can view full donor profiles, and lightweight breach response playbooks suited to organisations without dedicated security staff [19].

B. Verification of In-Kind Donation Value

In-kind donations are currently valued by coordinator estimate, which is adequate for internal tracking but insufficient for formal tax or audit purposes. Research into standardised valuation references for common donated goods, and into lightweight third-party appraisal workflows for higher-value in-kind gifts, would strengthen the credibility of receipts issued for non-monetary contributions [20].

C. Volunteer Background Screening at Scale

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Programmes involving children or vulnerable populations require volunteer screening that the pilot organisations currently perform manually and inconsistently. Integrating a screening-status field into the volunteer record, and researching how to do so without creating a de facto criminal-history database that itself becomes a privacy liability, is an open design problem specific to child- and elder-facing NGO programming [21].

D. Sustainable Technology Adoption

The pilot was hosted without cost to participating NGOs; a viable long-term model must recover hosting and support cost from organisations operating on thin administrative budgets. Research into shared, cooperative hosting across NGO networks, transaction-based cost recovery tied to donation volume, and philanthropic subsidy models would inform a path to sustained adoption beyond a funded pilot [22].

VIII. CONCLUSION

This paper presented the design, implementation, and evaluation of a Smart NGO Volunteer and Donation Management System that unifies volunteer coordination, donation tracking with automated 80G receipting, campaign management, and impact reporting within a single role-aware platform. The differentiator for NGO deployment is not fundraising reach, which crowdfunding platforms already supply, but integration of the volunteer and donor relationship into one connected, promptly serviced record.

A fourteen-week pilot across four NGOs, covering 1,120 volunteer hours and 3,260 donations, produced a 69% reduction in coordination effort, a 91% reduction in receipt issuance time, a 35% increase in repeat donor contributions, and a volunteer task fill rate rising from 58% to 84%. Usability scores were above accepted thresholds among both supporters and coordinators.

Four open challenges remain: protecting sensitive donor data within organisations lacking dedicated security staff; verifying the value of in-kind donations for audit purposes; scaling volunteer background screening for child- and elder-facing programmes; and establishing a hosting model sustainable on non-profit budgets. None undermines the central finding that volunteer and donor coordination, long treated as an unavoidable administrative burden for small NGOs, is addressable through the same connected-record approach that has proven effective in other institutional domains.

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