निर्वाचन आयोग, नेपाल
ELECTION COMMISSION, NEPAL

UNDP Nepal

Preparation

of

Voter List with Photograph

Kathmandu, Nepal

July 16, 2009

UNDP Electoral Support Project (ESP)

1. Document Objectives

This document is designed to support the ECN in undertaking a comprehensive assessment of the feasibility, options, methods, and costs of implementing a modern and efficient voter registration system that can update the Voter List on a continuous basis. The document will be used as a basis for initiating dialogue with potential stakeholders and to develop a comprehensive project proposal for establishing a new, more reliable, and more credible voter registration system. The new registration system may facilitate future systems and processes to provide Nepal with a reliable civil registry and a durable multipurpose national identification document.

To increase the sustainability and local ownership of electoral processes, there are movements internationally away from costly and laborious periodic registration exercises to permanent and centralized continuously updated voter register databases. In many countries, linkages are formed to the civil registration process with Voter Lists extracted from the register as required.

Nepal currently has a system that calls for annual voter registration updates. The current civil registration system is administered by Village Development Committees which are responsible for the recording of births, marriages, and deaths. Over the past decade, the maintenance of both the civil and voter registration processes has fallen behind due to the challenging country context.

To assist ECN to meet the voter registration requirements of Nepal, this document has been developed to meet the following objectives:

- To enable ECN to clearly outline the requirements, methodology, timeframe, budget, and implementation plans for the establishment of a Voter List with photos for Nepal.
- Include provisions for the process of continuous update of the Voter List.
- Provide linkages to Civil Registration and the potential issue of a multi-purpose National ID card.

2. Objectives of the Project

The project in its inception has a single major objective, this being to develop a continuously updateable Voter List with photograph, and to institutionalize the mechanisms for the continued maintenance and support of this process. However, through the mechanisms to be put in place to achieve this objective, the ECN has the opportunity to facilitate other beneficial processes for Nepal.

The adoption of a modern registration process and development of a Voter List database with photograph and fingerprints has significant benefits. These benefits include the clear identification of voters on Election Day, the deterrence of false voting, the ability to detect and remove duplicate registrations, and the ability to manage internal migration of voters between locations.

The adoption of a continuous update methodology over the current annual update approach will have positive impacts on the maintenance of a list quality and significantly reduce the ongoing cost of list maintenance, 94.2 million rupees annually. By allowing voters to register at any time through visiting a District Election Office, voters may update their details at any time of their convenience. Voters may register at the time of their entitlement or at time of migrating to a new voting district. No longer will voters be disenfranchised through not being home during the annual enumeration process as they will be able to register at the District Office on their return.

The ECN currently spends a significant amount of money each year on national mobilization for the annual enumeration process. The process not only requires a significant annual budget but places significant load on District and VDC offices, and occupies the time of local officials such as

civil servants, teachers and others. The continuous update methodology removes the requirement for the annual update process.

The national ICT network (intranet) to be established for the future continuous updating of the Voter List will also facilitate more efficient electoral administration, internal communications, and greater data sharing between central and field offices.

The ECN has expressed the willingness to collect additional data to facilitate the development of a civil registration database through the voter registration process. As the implementation of the new voter registry required a national data collection campaign, a small number of questions could be added to the voter registration form to gather information of interest to the civil register. At the completion of voter registration this data could be made available for the civil register and potential issuance of a multipurpose national ID card.

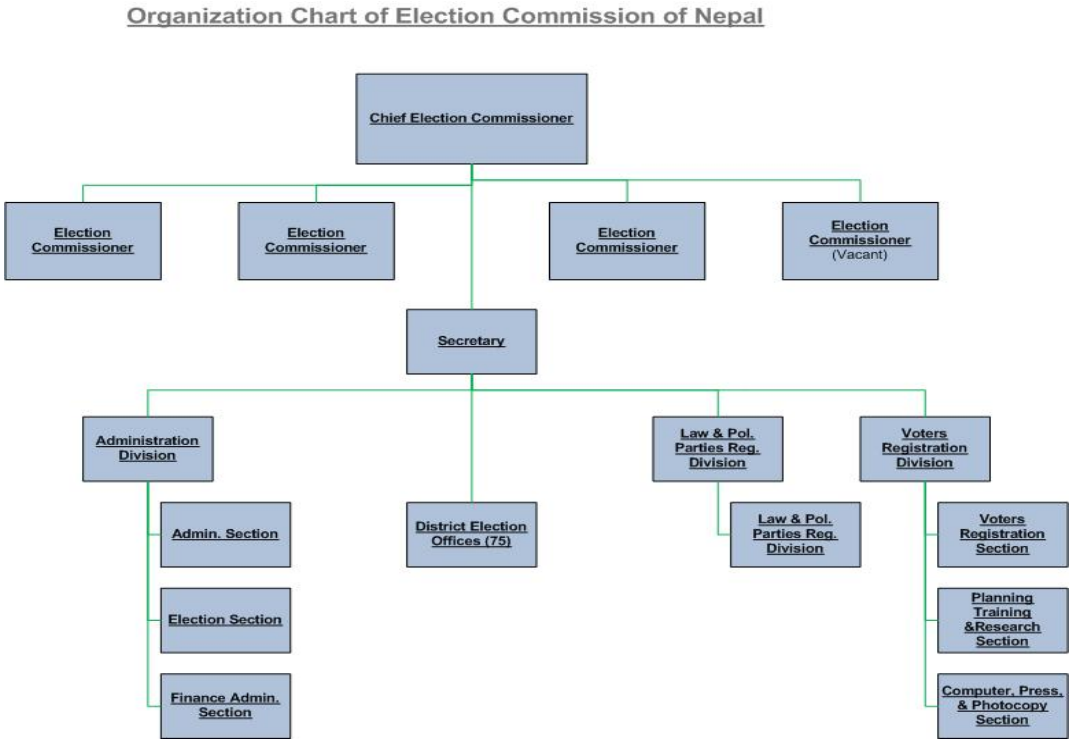
The collection of digital data for all voters in Nepal requires significant investment in data collection technology. This equipment will not be a single use commodity. All equipment being purchased for the project will be of a general specification which can be used for any future automation purpose. The project will develop a handover plan for all equipment to ensure that it can be reused to benefit the development of national ICT initiatives. It is likely that some equipment will be retained by ECN for future Voter List maintenance and election management activities, the remaining may be used for civil registration, education, and the promotion of electronic information and services including decentralized service provision.

The initial voter registration process will employ over 10,000 data entry operators throughout the country. These staff will be engaged from locations throughout the country and employed in their local areas. The recruitment, training, and provision of several months of ICT related working experience to young people throughout the country is expected to provide some level of social benefit.

The project will develop a Geographic Information System (GIS) to develop digital mapping of the country including all administrative and electoral boundaries with population and voting statistics. Each voter will be linked to a geographic unit such as ward, Polling Location, and/or settlement. The development of the GIS will assist with election planning including the allocation of locations and resources for Polling Locations, and provide a vital tool for the efficient and accurate delimitation of electoral boundaries.

3. Situation Analysis

3.1. Structure of ECN



The ECN is structured under a Chief Election Commissioner and four Commissioners. The operational component is headed by a Secretary and is broken into three Divisions, Administration which oversees standard administrative and financial activities plus election management, Law which administers and reviews the legal provisions of the commission, and Voter Registration which oversees registration, planning, and ICT.

3.2. Field Office Structure

<u>District Election Offices</u>

The ECN maintains a District Office in each of the 75 administrative districts with each office managed by a District Election Officer. Of the 75 current District Election Officers, 24 are permanent officers and 51 are acting.

The offices are located in either rented or Government properties. The offices buildings have sufficient office space for staff, the storage of ballot boxes and other election materials, and in many cases living quarters.

Offices are staffed with between five and seven staff depending on requirements. The typical staffing of each office is as follows:

- District Election Officer
- Assistant
- Accountant
- Computer Operator (many of these positions are vacant)
- Clerk

- Messenger/Driver

Approximately 67 of the District Election Offices are accessible by road, with many of the remaining being only accessible by foot. Each of the offices with road access has a vehicle (pick-up). The vehicles are generally in good working condition but have a minimal annual fuel budget of approximately 10,000 NRP.

District Offices have between one and three computers. Each office was provided with a new computer, printer, and UPS for the CA elections and this computer is of a recent specification. Other computers available in the offices are generally old and in most cases not operational. Most offices have access to both fixed line (PSTN) and mobile phone connectivity.

Village Development Committee (VDC)

There are approximately 4,000 VDC offices spread throughout Nepal. The VDC are responsible for tasks such as revenue functions as well as the maintenance of the civil register through the recording of births, marriages, and deaths. The VDC structures and staff play an important roll in assisting the ECN with current electoral activities including voter registration.

Approximately 40% of VDC office locations are accessible only by foot. Each office is planned to be no more than 3km from any household.

Each VDC area is made up of nine wards.

Polling Locations

There are approximately 10,000 Polling Locations throughout Nepal with a total of approximately 21,000 Polling Centers.

Approximately 40% of Polling Locations are accessible only by foot and each is planned to be no more than 2.5km from any voter's household.

Polling Locations are generally established in schools, VDC offices, and occasionally other Government buildings.

3.3. Action Plan

In April 2009 ECN completed an Action Plan for the implementation of the Strategic Plan. The Action Plan identified continuous voter registration as one of the highest priorities for the electoral cycle 2009-2013. It stated that the voter registration process must be developed to meet the requirements of integrity, inclusiveness, comprehensiveness, accuracy, accessibility, transparency, security, and credibility.

The broader Action Plan identifies several main areas of activities for capacity development, these being:

- Enhancement of organizational effectiveness and management to respond to emerging challenges in a timely and cost effective manner;
- Electoral framework reform;
- Continuous voter registration: increase the enfranchisement and inclusiveness of potential voters through a more accurate register, and strengthen the local/field institutions with direct impact on the accuracy of the voter's register;
- Voter identification with photograph;

- Electronic voting: acquisition and use of Electronic Voting Machines (EVMs);
- Civic and voter education;
- Strengthening political parties and civil society;
- Monitoring mechanisms and media.

The proposed voter registration process will not only deliver the continuous voter registration and voter identification requirements of ECN, but will have positive impacts on the majority of other activities identified in the ECN Action Plan.

3.4. Election Cycle

Nepal held Constitutional Assembly elections in April 2008 to elect 240 Constitutional Assembly members through a first past the post (FPTP) system and 335 members through a proportional representation (PR) system. A further 26 members were appointed by the cabinet, bringing the total number of members to 601.

The elections were widely praised by international observers, national monitors, and other stakeholders. Notwithstanding these achievements, there were some shortcomings and irregularities.

International observation groups issued a series of recommendations, one of which was:

- Improve the quality of voter registration and consider the adoption of the Automated Fingerprint Identification System (AFIS); create a more inclusive and accurate voter list; mandate voter identification with a voter identification card and end involvement of party volunteers in the voter identification process.

The timeframe for the Constitutional Assembly to draft a new constitution for Nepal expires in May 2010. If the new constitution is completed within this timeframe the option exists to put the new constitution to a public referendum. If a new constitution cannot be completed within the timeframe of the Constitutional Assembly, the timeframe may be extended through revision of the current interim constitution.

Local Government elections have not been held in Nepal for approximately 10 years due to civil unrest. If a new constitution is finalized, Local Government elections may be held in 2010.

The timeframe for Parliamentary elections is currently unclear due to the current processes of the Constitutional Assembly. Whilst the current expectations are that these elections will fall within 2011, no certain data can be anticipated.

The new voter registration system is expected to produce a Voter List with photographs by the end of 2010. For any elections falling before this time it is anticipated that the current format Voter List will be utilized. The current Voter List is presently being updated.

3.5. Current Registration Process

The enumeration process is carried out jointly between the District Election Office and VDC offices. The District Election Officer takes the role of the Registration Officer and each VDC Secretary the role of Assistant Registration Officer.

Each VDC office recruits enumerators to work in their area. Enumerators are recruited from local teachers and civil servants and at least one enumerator is recruited to cover each village. The enumerators effectively report to the Assistant Registration Officer.

In the current update process notices are posted at ward level to inform voters of the date and location of collection centers. A collection center is established in each ward. Voters from the ward come to the collection center to notify the enumerators of additions and changes to the Voter List.

Registration forms are completed at the collection center and the enumerator returns to the VDC office with the completed forms. The forms are compiled and scrutinized at the VDC office to ensure that the forms are completed correctly and to authenticate the voter's location and entitlement.

When scrutiny of all forms is completed at the VDC office they are forwarded to the District Election Office. The forms are then checked for completeness and entered into the computer in the District Election Office.

Notices may be posted to inform the community that additions and changes to the Voter List are available at the District Office for scrutiny. Following this process the data is forwarded to the ECN central office.

All registration forms are kept in the District Election Office for a period of one year before being destroyed.

It has been reported that voters are generally not interested in the annual update process and do not notify enumerators or the District office of required additions and changes to the Voter List. The level of disinterest continues until the date of election nears, at which time voters agitate to ensure that they are included on the Voter List. There is a general resistance to the removal of names from the Voter List due to death or outward migration from the location.

Recent assessments of the Nepal Voter List and registration process have identified a number of issues. These issues include:

- Duplicate registrations
- Inclusion of deceased voters
- Voters missing from the list
- Errors in voter's names and date of birth
- Lack of accommodation for seasonal workers and internal migration.
- Exclusion of minorities and disadvantaged groups

The IFES Voter Registration Assessment made the following recommendations:

- Create and maintain a completely new Voter Registry database with a new reliable and sustainable registration process.
- Store the data in modern computer characters that allows for proper Nepali script, alphabetical order, and searching.
- Allocate every voter with a unique identification number that never changes for that individual. This would remove the need to distribute voter slips for the purposes of finding voters in the voter list, along with other benefits.
- Record the biometrics (photo and fingerprints) of each voter to allow for removal of duplicates through fingerprint matching and use for identification of voters on election day through the use of a voter list that includes photos.
- Creation of a government-wide GIS (Geographical Information System) to allocate every voter with a Geographical Code that locates the person geographically in order to allocate and in future re-allocate them to polling centres.

- Create a sustainable method of removing deceased/migrated people.
- Provide better access to the electoral process for the disabled, the disadvantaged and people in mountainous areas. This would include mobile registration and voting teams.
- Provide permanent facilities to register voters and allow them to change their polling centre at any time.
- Recruit and train permanent Election Commission staff.

3.6. Identity Card

Nepal currently issues a Citizenship Certificate to all citizens aged 16 and over. Estimates of eligible citizens that have been issued with a Citizenship Certificate range from between 70% and 90%.

The certificate is a one-time issued document and includes the photograph and two fingerprints of each citizen. The card is made from paper onto which the citizen's information is handwritten and the card laminated.

Nepal has in the past conducted a project in 100 constituencies to issue a voter ID card to eligible voters. The process followed a non-digital method in which photos were taken of groups of voters and an attempt made to match the photographs to the respective voter's information. Consistent with the experience of other countries that have applied this technique, the process suffered from some degree of mismatching of voters photographs and information.

The project suffered issues in the distribution of cards and momentum for the initiative was not continued effectively in the annual update process. The process was ultimately abandoned.

3.7. ICT Systems

The current ICT team consists of two professionals. The central facilities are well organized and in good condition and provide a good basis for further expansion. Current systems have backup UPS facilities but the systems rarely charge to full operational capacity due to the irregular grid power supply.

3.7.1. ECN Central Systems

Systems currently running on the central facilities include the central Voter List database and election results systems.

The current Voter List is published on the web.

Software development tasks are typically outsourced. The same software development company has been used for most software development tasks for the last 15 years.

3.7.2. Field Office Systems

Each District Office has more than one desktop computer. All District Offices received a new desktop computer during the Constitutional Assembly elections. The recently provided computers are of current specification and in good working condition but other ICT equipment is old and requires replacement.

The District Offices operate the district Voter List systems on their current computers. The systems are typically updated by the office's computer operator.

Some District Offices have dialup access to the central office. Most District Election Offices have access to fixed line (PSTN) communication and mobile telephone networks.

3.8. Civil Register

Discussions are currently being held within the Government regarding the implementation of a modern civil register and multipurpose national ID card. The ECN is involved in these discussions and is emphasizing the importance of reaching a conclusion on this issue due to the potential strong linkages to the voter registration project and other electoral processes.

4. Data Collection Options

Three methods are available for the implementation of voter list with photograph projects, these being full manual (non digital) data collection and integration, Optical Mark Reading (OMR) technology, and full digital data collection and integration.

All three methods have been utilized in the international environment with varying degrees of success. All techniques have strengths and weaknesses, and it is important to recognize that the success of a photo Voter List project is more dependent on operational factors than purely technology selection.

4.1. Non Digital

The non digital method of voter data collection is based on the traditional approach of collecting voter details through form collection and manual data entry. Photos are captured using a Polaroid camera and attached to the voter form.

In the simplest applications, voter details can be handwritten into a voter list with attached photograph. When an electronic voter list is required the voter details must be captured using manual data entry and photographs electronically scanned.

Some countries have modified this process through the capture of digital photographs as opposed to Polaroid photographs. This method makes better use of modern technologies but accurate integration of voter data and voter photographs is more difficult.

If biometric data such as fingerprints are required on the registration form this is achieved through the traditional method of using ink pads. If digital biometrics are required, the fingerprints may be scanned from the form although the fingerprint images will not be of sufficient quality for matching purposes.

Countries using this technique in recent years have identified procurement issues with the availability of Polaroid cameras and photo paper as this technology has effectively been replaced by digital devices.

In summary this technique operates as follows:

1. Voter completes form
2. Polaroid photo taken and attached to form (or voters may be requested to supply photo)
3. Forms are manually data entered into computer
4. Photographs (and fingerprints) are scanned into computer

The advantages of this method are:

- Relatively low cost per voter.
- Low technology requirements in the field.
- Low skill requirements in the field.

The disadvantages of this method are:

- Dependency on manual matching and integration of data and photographs.
- Quality of photo and fingerprint not sufficient for further electronic processing.
- Large data entry requirements with additional time requirements for scanning of photo and fingerprint.

4.2. Optical Mark Reading

The Optical Mark Reading (OMR) approach is based on the marking of scannable forms and the passing of these forms through an OMR machine which can scan both text and images. Similar technologies exist which include Optical Character Reading (OCR) which actually interprets the handwritten characters. The OCR technology has not proven to be sufficiently accurate for voter list application.

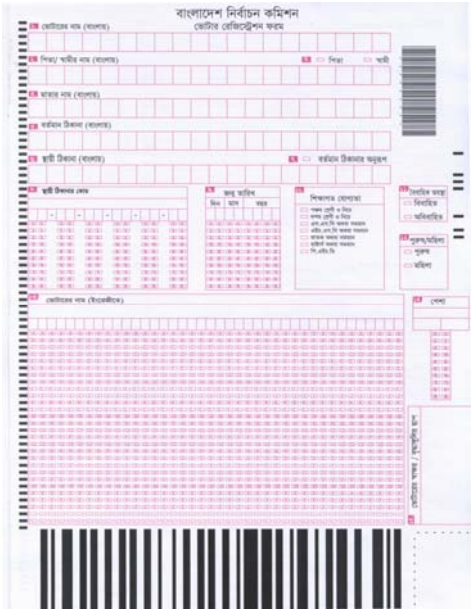
Scannable fields are currently only suited to the English alphabet due to the relative complexity of Nepali script. Therefore the OMR technique would initially result in voters name and address details being captured in English along with selective listed data such as gender, marital status, occupation, and geocode data. Fingerprint and signature can be scanned as images and integrated with the scanned data.

Nepali name and address data would be captured through a manual data entry process and integrated with the scanned data.

In the electoral context many countries use OMR systems for the scanning of ballots and calculation of results. Several developing countries have used OMR technology for voter list preparation in combination with the manual integration or scanning of voter photographs.

In summary this technique operates as follows:

1. Voter completes form
2. Photograph taken at field location with form barcode visible
3. Field team mark the form for scanning
4. Forms scanned at central scanning center
5. Photos uploaded at center and matched with scanned data at scanning center
6. Nepali text entered through manual data entry



The advantages of this method are:

- Medium level cost per voter.
- Low technology requirements in the field.
- Low to medium skill requirements in the field.
- Reduced data entry.

The disadvantages of this method are:

- Scanned data based on English and numeric.
- Nepali data relies on manual data entry system.
- Requirement for special scanning equipment.
- Quality of fingerprint not sufficient for further electronic processing.
- Operational complexity of integration process.
- High quality imported paper required.

4.3. Full Digital

The full digital approach is based on the use of field level computer technology such as notebook computers and/or specialized voter registration units. The field units have a combination of integrated or auxiliary cameras, fingerprint scanners, and signature capture devices to supplement voter data entry requirements.

The full digital voter registration process has become the standard method of photo voter list creation in countries where sufficient field level computer literate registration staff are available. Most typically where this has been done in a short period of time the voting population has been relatively small.

The success of full digital registration is dependent on the ability to mobilize sufficient equipment and to have access to field level staff with basic computer operation skill to work in all areas of the country.

In summary this technique operates as follows:

1. Voter completes form and comes to a registration center
2. Voter details are entered into a notebook computer, photo, fingerprint, and signature are captured.
3. All details are later uploaded to a central computer.

The advantages of this method are:

- Instant integration of all voter details and photograph.
- Capture of full digital biometrics.
- Relatively simple integration process.
- Most equipment can be reused for other purposes.

The disadvantages of this method are:

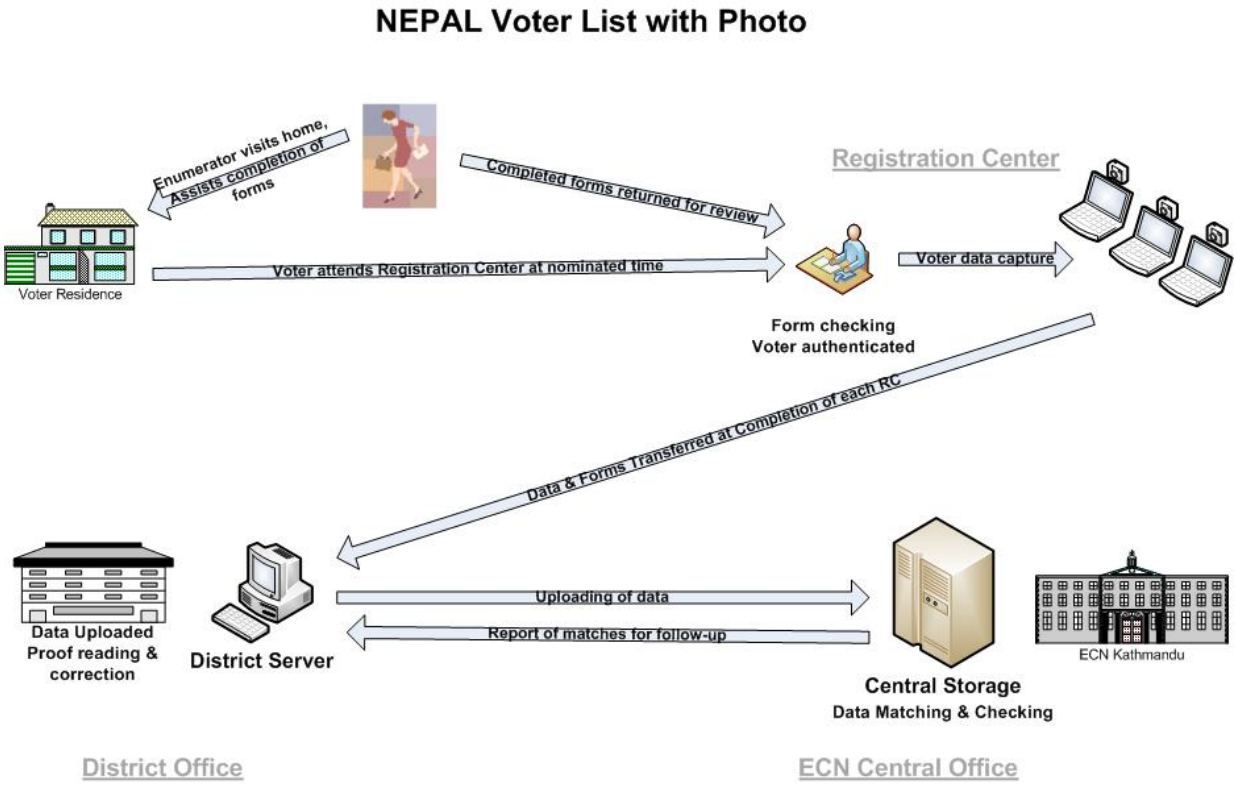
- Higher cost per voter.
- High field technology requirement.
- Higher field level skill requirement.

4.4. Overall Evaluation

The digital approach has been selected for Nepal due to the instant integration of all voter details, the simplicity of operational structure, the ability to locate duplicate registrations through biometric matching, potential linkages to a future Civil Register, and the method being proven in other regional countries.

5. Proposed Methodology

The methodology for this process has been designed to supplement the current ECN enumeration processes through the addition of digital processes. For the initial registration it is important to accommodate legacy processes to ease the transition to the new registration process.



5.1. Enumeration

The enumeration process must be conducted approximately two weeks prior to the Registration Center opening in each Polling Location.

A comprehensive voter awareness campaign must be conducted prior to the enumeration to ensure that all voters in the locality have knowledge of the process, will be home for the enumeration process, and understand the importance of attending the Registration Center.

The followings steps must be completed during the enumeration process:

1. Enumerator visits each household and assists voters with the completion of uniquely numbered voter registration forms.
2. Enumerator raises awareness within the household of the registration process and the requirement to visit the Registration Center.
3. The enumerator will issue a receipt to each voter with the form number and the allocated date, time, and location for the voter to attend the Registration Center.
4. The enumerator will return to the VDC office at the end of the day with all completed registration forms. The forms are reviewed by the registration officials to authenticate the voters and to ensure completeness of the form.

5.2. Registration Center

Registration Centers will be established in each Polling Location and will be open for approximately six days in each location.

The followings steps must be completed during the Registration Center process:

1. Voters attend the Registration Center at their appointed date and time with the receipt issued by the enumerator.
2. The receipt is handed to an official who uses the form number to locate the voter's completed form.
3. The voter proceeds to the registration units with their form. Each registration unit is comprised of a laptop computer, camera, fingerprint scanner, lighting, and photo screen.
4. The data entry (registration) operator types the basic voter information from the registration form into the computer.
5. The data entry operator captures the voter's photo, fingerprint, and signature into the computer.
6. The voter is now free to return home.
7. Any remaining information from the registration form can be typed into the computer at the end of the day when the Registration Center is closed.

5.3. Process for Missed Voters

It is inevitable that some voters will not be home at the time of enumeration. It will be possible for these voters to attend the Registration Center directly for registration. It is crucial that these voters identity, place of residence, and entitlement are confirmed prior to registartion.

The followings steps must be completed to register missed voters:

1. Voters who were not home at time of enumeration may attend Registration Centers to complete registration forms and become registered in a single step.
2. Voters must be authenticated by local officials or be verified by reference to the existing Voter List.
3. A secondary registration process will be held at a later date by establishing Registration Centers at VDC office locations. Voters that were missed in the original registration process may register at these centers.
4. Voters may register at any time by visiting District Election offices.

5.4. District Election Office

Each District Election Office will be provided with a new computer server to be utilized for both the new data collection process and for the future continuous updating of the Voter List. The District

Election Office will be the coordination point for all voter awareness, enumeration, and Registration Center activities in the district.

The followings steps will be completed at the District Election Office:

1. At the completion of registration activities for each Registration Location and VDC area, all registration forms and voter data will be transferred to the District Office.
2. Voter data will be uploaded to the District server.
3. Data on the server will be proof read from the server against the registration forms.
4. Draft Voter Lists may be printed and made available for public verification & comments.
5. Corrections will be incorporated into the computer server at the District Office.
6. When all corrections are completed, the final Voter List data is transferred to ECN central data center.
7. District servers will become the contact point for the future continuous updating of the Voter List.

5.5. ECN Central Data Center

The current ECN server room facilities will be enhanced to function as the central data center for the new Voter List. All collected data will be stored and managed from the ECN Central Data Center.

The followings steps will be completed at the ECN Data Center:

1. Finalized Voter List data will be received from each District Office.
2. All data received from the District Offices will be uploaded to the central server systems.
3. Biometric (fingerprint) information will be matched across the national database to identify any duplicate registrations.
4. Duplicate entries will be reported back to the relevant District Offices for field level follow-up and action.
5. The Voter List without photographs will by published on the internet.
6. The Voter List with photographs will be managed centrally from the ECN Data Center.

5.6. Special Considerations

It must be recognized that a degree of flexibility will be required in the methodology to accommodate areas of special needs. This could include hard to reach areas, ethnic minorities, the elderly or disabled, and other segments of the population for which the methodology and Registration Center approach may not be suitable.

Registration staff including enumerators and data entry staff will be drawn from local populations to ensure compatibility with local culture and language. To ensure the participation of the local community in areas of particular sensitivity, the ECN will engage with local community based groups to raise awareness in the process prior to the commencement of registration activities.

In hard to reach locations the project will deploy a large number of smaller mobile registration teams. These teams will generally comprise of two or three registration staff and will conduct simultaneous enumeration and registration at village and settlement areas.

In areas where voters are required to walk long distances to reach registration areas, the project may coordinate with local communities to ensure that market provisions including food and other basic supplies are available at the time of registration.

Adaptation of the methodology, including the use of mobile registration units will be at the discretion of the Regional Operations Manager and District Election Officer.

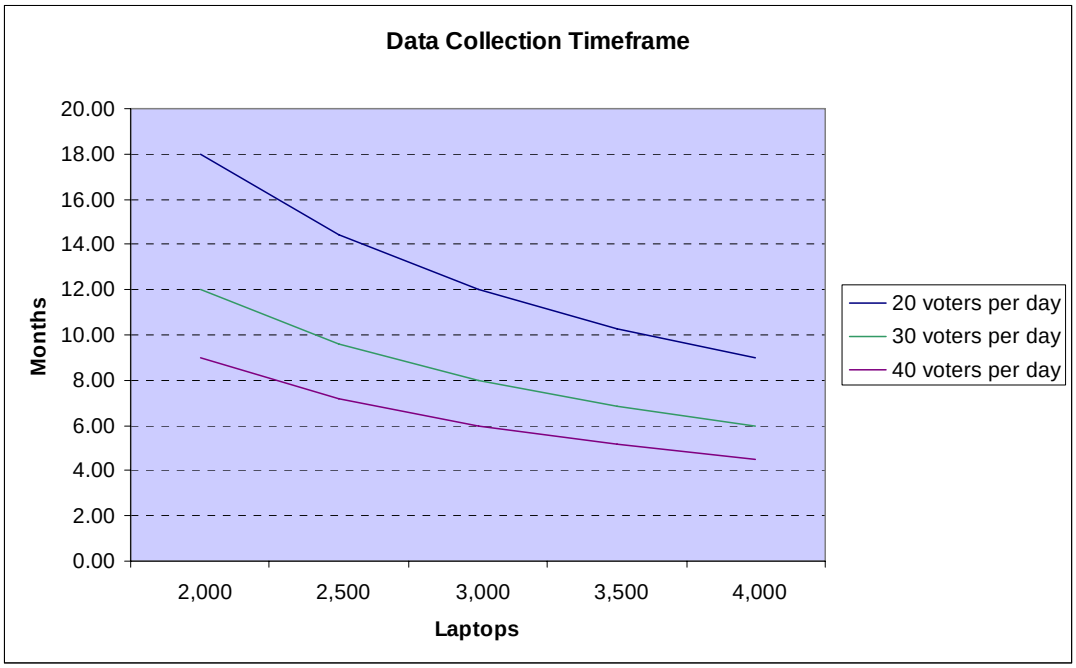
6. Deployment of Equipment

The most critical part of the voter registration process is the field level deployment and management of personnel and equipment. A balance must be made between the desired timeframe for complete nationwide data collection, and the level of staff and equipment that can be effectively managed by the project and ECN.

6.1. Registration Unit Requirements

A single registration unit will be comprised of a laptop computer, camera, fingerprint scanner, lighting, and photo screen. Each registration unit will be operated by one or two registration staff.

The greater the number of registration units deployed in the field, the shorter the overall data collection time will be. However, increasing the number of registration units greatly increases the management and logistics workload of the project, ECN, and field offices.



The above graph demonstrates the relationship between the number of registration units (laptops), and the overall data collection time (months). Three scenarios are graphed, an average of 20 voters registered each day on each registration unit, an average of 30 voters registered each day on each registration unit, and an average of 40 voters registered each day on each registration unit.

It is anticipated that in Nepal the average number of for voters registered per day by each registration unit will be approximately 30. Far more than 30 may be registered each day in urban areas, but far fewer will be registered per day in remote and hard to reach areas.

To therefore reach an effective balance between collection time and manageability, it is anticipated that approximately 3,000 registration units will be deployed across the country for a period of eight months. These units will be deployed in teams of between 6-10 registration units and ideally operate at Registration Centers for a period of six days in each Polling Location.

6.2. Regional Management

A volume of 3,000+ registration units including associated staff, training, and logistical arrangements is too large and complex a task to be managed from a single operations unit in Kathmandu. For this reason, it is recommended that operational offices be established in each of the Development Regions to coordinate all field activities with the respective District Election Offices.

The following table indicated a preliminary distribution of registration units across each Development Region. The distribution is calculated to provide the necessary resources for each Development Region to complete registration within eight months. The total number of registration days required to complete registration within each geographic zone, and the number of teams required per district are also indicated.

Final deployment plans will be developed in consultations between ECN, Regional Operations Offices, and District Election Offices. These deployment plans will be developed with consideration to the local context such as climate, geography, infrastructure, and the number of voters per Polling Location.

Development Region	Registration Units	Terai (teams/district)	Hills (teams/district)	Mountains (teams/district
Eastern	750	116 days 25 teams	57 days 16 teams	28 days 83 teams
Central	1,000	58 days 33 teams	121 days 15 teams	30 days 111 teams
Western	650	67 days 36 teams	123 days 10 teams	14 days 108 teams
Mid-Western	400	74 days 22 teams	102 days 7 teams	7 days 44 teams
Far Western	300	84 days 25 teams	77 days 10 teams	48 days 33 teams
Total	**3,100**			

6.3. Future Utilization of ICT Equipment

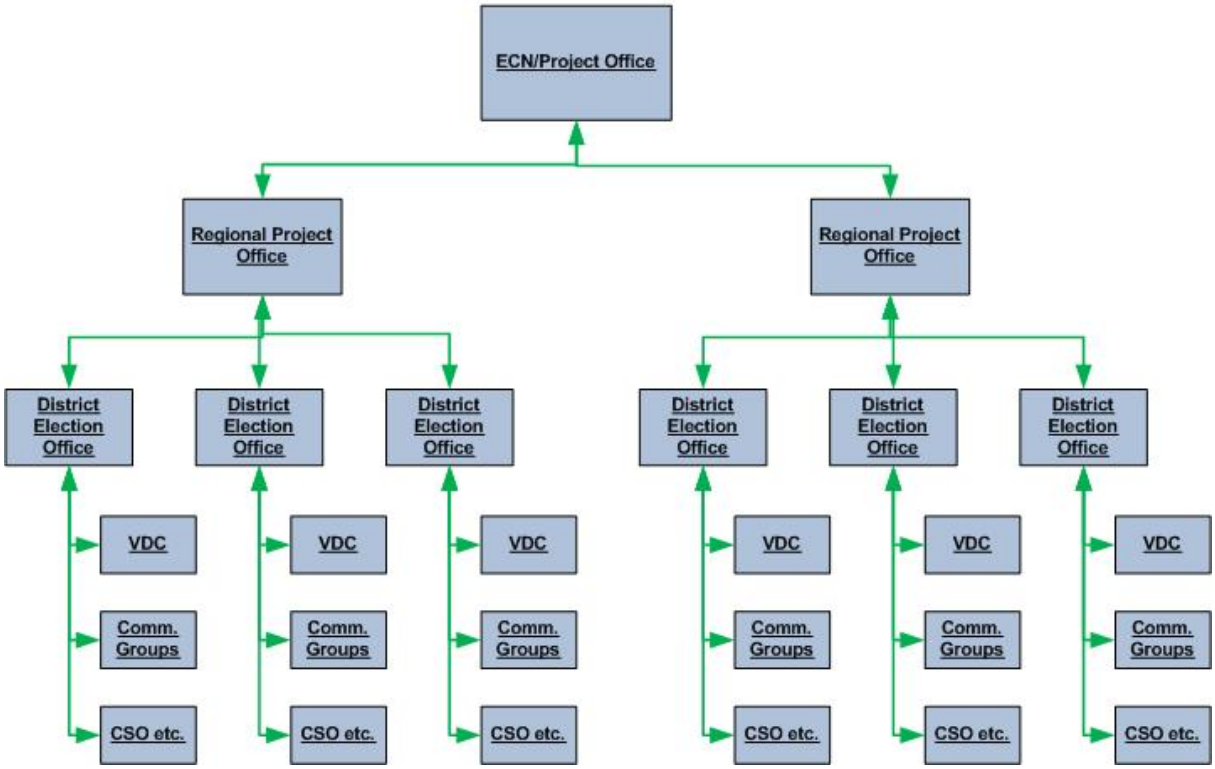
The collection of digital data for all voters in Nepal requires significant investment in data collection technology. This equipment will not be a single use commodity. All equipment being purchased for the project will be of a general specification which can be used for any future automation purpose. The project will develop a handover plan for all equipment to ensure that it can be used to benefit the development of national ICT initiatives. It is likely that some equipment will be retained by ECN for future Voter List maintenance and election management activities, the remaining may be used for civil registration, education, and the promotion of electronic information and services including decentralized service provision.

7. Operational Planning & Management

7.1. Overview

The complexity of the operation to be conducted by ECN should not be underestimated. The development of a Voter List with photographs is a complex operation with very large coordination and logistical challenges.

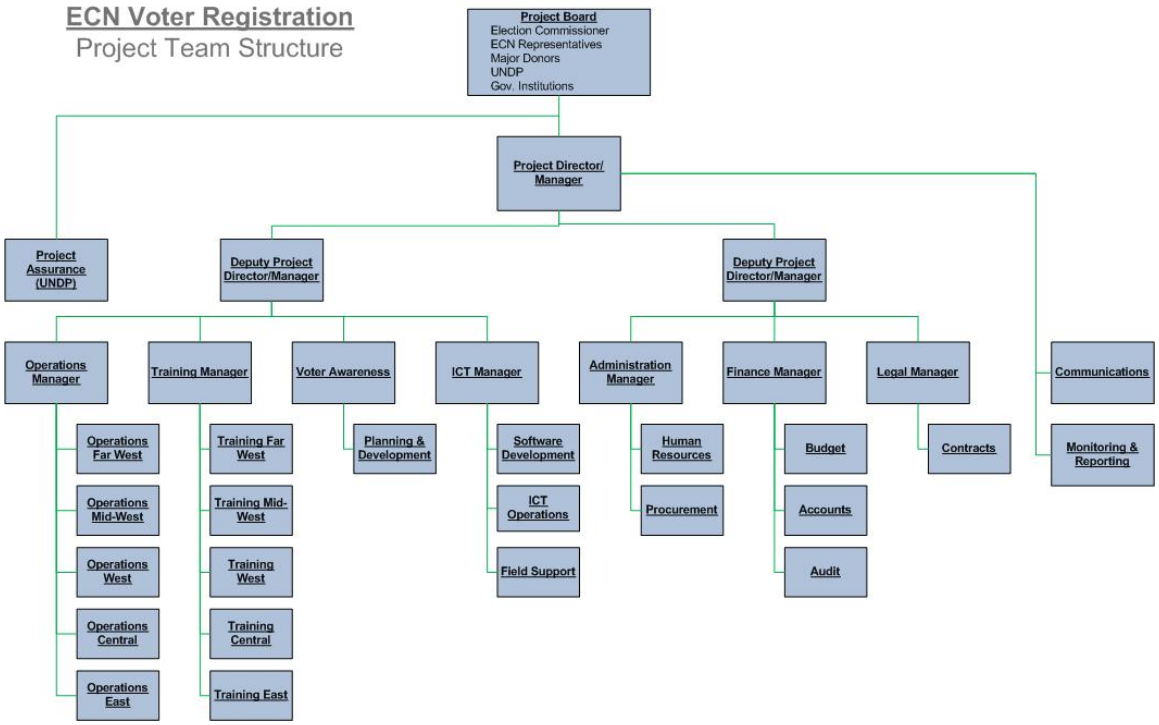
Operational Planning & Consultation Process



To finalize operational planning and deployment strategies a comprehensive consultation process must occur. The consultations must be lead by the ECN and conducted with full involvement of Regional, District, and community level groups. The consultation process will allow the project to incorporate full country, geographic, and local level context into the operational planning, to foresee any potential obstacles, and to foster local level ownership and awareness in the process.

7.2. Project Team

To implement a project of this level of management, technical, and logistical complexity a strong project team must be developed. The greatest priority must be placed on developing a structure that can provide effective field level operational, coordination, training, and technical support.



7.2.1. Operations Unit

A central operations unit will be established that will coordinate operational activities across all regions. A Regional Operations Office will be established within each development region and will coordinate with all District Election Offices within the region.

The functions of the Regional Operations unit will be:

- Coordination with District Election Officers for the development of operational schedules, plans, and programmes for the region.
- Coordination and planning with all local administration organizations including VDC and others.
- Coordination of transportation for staff and equipment.
- Preparation of Registration Centers including furnishing, lighting, power, cabling, utilities, and security.
- Recruitment, management, and payment of field staff.
- Implementation of voter awareness campaigns.
- Management and tracking of field level assets.
- Management of logistics and supplies for all field activities.

7.2.2. Training Unit

A central training unit will be established that will coordinate the training activities across all regions. A Regional Training Office will be established within each development region and will coordinate with all District Election Offices within the region.

The functions of the Regional Training unit will be:

- Coordination with District Election Officers for the development of training schedules, plans, and programmes for the region.
- A team of master trainers will provide training for field level training staff.
- The training unit will oversee the training programmes of all enumerators within the region.
- The training unit will oversee the training programmes of all data entry staff within the region.
- The training unit will oversee the testing and evaluation of all staff trained under the project.

7.2.3. Voter Awareness

The Voter Awareness unit will assist the ECN to develop national voter awareness and education strategies and programmes including the development of standard materials. The unit will take the lead roll in national level coordination with other government and non-government organizations with roles to play in the awareness campaigns.

The Voter Awareness unit will develop tools for the measurement of the success of voter awareness and use these tools to constantly monitor and improve the programmes.

Campaigns will need to be modified and tuned to meet specific contexts throughout the country including hard to reach and ethnic minority areas. The unit will coordinate with Regional and District offices to implement campaigns as required.

7.2.4. ICT Unit

The ECN's current ICT cell will be supplemented to assist in managing the increased complexity and volume of ICT support required by the project.

The functions of the ICT unit will be:

- Provide oversight of the design and development of all new software required for the project.
- Establish a central support team to provide advice and technical backstopping for all field operations including the District Offices.
- Provide on-site technical management for district server operations including the safe management, uploading, and transfer of data.
- Provide training for local staff in all districts to support the ICT aspects of Registration Center activities.
- Conduct the central uploading, management, and processing of all Voter List data.
- Provide ICT support for all Voter List related activities including printing.

7.2.5. Administration

The Administration unit will oversee all personnel management and procurement processes. The team will be responsible for the planning of HR and procurement activities and will ensure that all processes follow required guidelines. The Administration unit will coordinate with Regional Operations Offices and the Finance unit to ensure that all personnel and operational payments are scheduled and made.

7.2.6. Finance

The Finance unit will be responsible for the day to day management of budgetary and payment processing and management. The unit will ensure that all payments follow due process and meet monitoring and audit reporting requirements.

7.2.7. Legal

The Legal unit will operate as a contract administration resource. Many vendors will be involved through the procurement and support of equipment and the provision of services. The Legal unit will ensure that all contract conditions are met and will provide advice to the project team in the event of further contractual requirements or negotiations.

7.2.8. Monitoring & Reporting

The project team comprises a monitoring team who will have responsibility for monitoring and analyzing project progress, and measuring this progress against projected schedules. Information and analysis must be supplied to the Project Manager and Project Board on a regular basis where decisions can be made regarding actions to be taken to ensure timely project delivery.

Measurements should include but not be limited to:

- Polling Locations completed by time period
- Number of voters registered by time period
- Voter areas completed by locality type - urban, rural, hard to reach
- Average elapsed time per voter and per Polling Location
- Enumerators and data entry staff trained
- Retention rate of trained staff
- Consumables utilized and remaining
- Equipment deployed for operations, number of technical failures, and remaining serviceable equipment

7.2.9. Communications

The underlying principle behind the communication strategy for the project is to keep all the stakeholders well informed with regard to project activities, lessons learned, and project targets and achievements.

The project will maintain communication with stakeholders by way of providing status reports, minutes of the meetings/consultation held, progress reports, lessons learned, and other event-based reports and management products.

The project's communications team will assist the ECN to develop a communication strategy, press releases and informative materials relating to project activities. The team will assist the Voter Awareness unit in developing and overseeing activities related to voter education and awareness on the registration process, including coordinating with other organisations that are involved with voter education and awareness initiatives.

The Communications unit will liaise with the ICT unit to ensure that the ECN website is u[dated with current project status and achievements in line with the communications strategy.

7.2.10. Project Assurance

UNDP will conduct project assurance activities in coordination with the project team. The project assurance function is the responsibility of the entire team consisting of project management, donor coordination, and technical assistance resources.

As part of its project assurance role, UNDP will report to the Project Board with regard to:

1. Adherence of the project to the business case
2. Compliance with ECN needs and expectations
3. Review of deliverables via quality reviews
4. Management and implementation of quality assessments of the Voter List
5. The provision of technical guidance and inputs as required.

The Project Assurance team will keep donors informed through Technical Group meetings including representatives from all project donors. Technical Group meetings will be held at least once per quarter to review quarterly progress towards completing the work plan, and on an as-needed basis. A monitoring plan will be developed at the start of the project and the Annual Work Plan Monitoring Tool will be used to record progress.

The Project Assurance team will engage an independent organisation to perform qualitative assessments of the Voter List during the project to assess the application of the implementation methodology. The qualitative assessment will conduct voter to list and list to voter comparisons in sample areas to analyse the effectiveness of the registration process. Outputs from these assessments will be confidential to the project and ECN and will be used to improve project activities.

Annual project audits will be completed following UNDP guidelines.

7.3. Physical Requirements

7.3.1. Project Office

A Project Office must be established to accommodate approximately 30 staff. The office must have sufficient space to provide adequate storage and working space for large amounts of technical equipment and associated consumables.

The total space requirements of the Project Office including storage and workings space is approximately 900 sqm. The space should include the following:

- Sufficient and well lit workings space for 30 staff.
- Meeting and conference room to accommodate 20 persons.
- Easily accessible weather proof storage facilities with secure locking provisions.
- Open working space for configuration and preparation of equipment.
- Open working space for printing and distribution of materials.
- Provision for the establishment of a Local Area Network covering all staff.
- Reliable power infrastructure including generator.
- Reliable telephone communications system including coverage by mobile telephone communication.
- The office should be in relatively close proximity to the ECN. Ideally the office would be co-located with the ECN.

The Project Office will be required until the end of 2011.

7.3.2. Regional Office

Regional Offices must be established in each Development Region to provide operational coordination for the project. The offices must accommodate a minimum of 10 staff with provision for an additional five staff if required.

The total space requirements of the Project including storage and workings space is approximately 250 sqm. The space should include the following:

- Sufficient and well lit workings space for 10-15 staff.
- Common room for meetings and discussions to accommodate 8-10 persons.
- Easily accessible weather proof storage facilities with secure locking provisions.
- Open working space for configuration and preparation of equipment.
- Reliable power infrastructure including generator.
- Reliable telephone communications system including coverage by mobile telephone communication.
- The office should be in relatively close proximity to a District Election Office.

Each Regional Office will be required for a period of two years.

7.3.3. District Office

District Election Offices must be modified to met their designated roles in the new registration process and to provide facilities for the future continuous updating of the Voter List.

The offices must be able to meet the following requirements:

- Adequate accommodation for a new computer server, printer, and UPS dedicated for use in the registration process.
- The room accommodating the registration server must have sufficient space to enable between four and six additional staff to work on laptop computers which will be connected to the server though computer (UTP) cables.
- The room should be well lit to enable staff to work in the evening.
- Sufficient space must be available to allow the convenient filing of registration documents and other papers.
- Easily accessible weather proof storage facilities with secure locking provisions.
- Open working space for configuration and preparation of equipment.
- Reliable power infrastructure including generator.
- Reliable telephone communications system including coverage by mobile telephone communication.
- A dedicated space must be made available to enable members of the public to come to the office for registration, photograph, and fingerprint. The space must be prepared with comfortable working space for the staff member and voter and suitable lighting for the capture of quality photographs.

7.3.4. Registration Center

Registration Centers will predominantly be established in current Polling Locations. It should be recognized that due to the technical and operational requirements of the voter registration process special preparations will be required for each location.

The following requirements must be met for each Registration Center:

- Clear signage must be erected to guide voters to the center and to ensure that voters queue in the correct location.
- Appropriate barriers may need to be established to assist in queue management depending on the number of voters expected at each Registration Center.
- For Registration Centers operating during the monsoon season, appropriate shelter should be provided in the case of rain.
- Arrangements should be made for priority treatment of mothers with small children, the elderly, and disabled.

- A desk must be established for voters to collect their registration form. Sufficient seating must be available at the table for the registration official and local authorities assisting with the verification/authentication of voters as required. Depending on the location and local context separate tables may be provided for male and female voters.
- The Registration Center should be adequately lit to allow a comfortable working environment and to assist with the taking of photographs.
- Tables must be provided for each registration unit. Each table must have sufficient space and chairs for the data entry operator, assistant, and voter. The table must have sufficient workings space for the laptop computer, external keyboard, fingerprint scanner, and working space for form processing.
- An area must be set aside for the voter to sit for photograph at each registration unit. The area for photograph must be well lit with the lighting positioned as not to cast a shadow onto or around the voters face. The voter must be positioned in front of a clean white photo screen.
- Depending on the local context, separate data entry and photograph areas may be set aside for male and female voters.
- Each Registration Center must be prepared with sufficient power cabling to facilitate all laptop computers and lighting.
- Generator backup must be provided for each Registration Center.
- Adequate security must be provided if equipment is to remain in the Registration Center overnight.

7.4. Pilot Projects

It is important that prior to the finalization of operational planning and implementation of the full project that pilot projects be conducted to trial and refine the methodology, coordination mechanisms, equipment, training, and operational processes of the project. The pilot projects should not only serve as an opportunity to fine tune the project modalities, but also as an opportunity to promote awareness of the new registration process through the national and international communities.

Multiple pilot projects should be conducted to cover the various regional and geographic situations in the country. For this reason it is recommended that five pilot projects be conducted, this being one in each Development Region. Through the five pilot projects, at least one should be held in each of the geographic zones of Terai, Hills, and Mountains.

The following recommendations are made regarding the pilot projects:

- Five pilot projects are conducted, one in each of the Development Regions.
- At least one pilot project be conducted in each of the geographic zones, Terai, Hills, and Mountains.
- Pilot projects should target mixed semi-urban, rural, and hard to reach areas.
- Pilot projects be conducted within October and November of 2009.
- Target projects should target areas with voting populations of approximately 12-15,000 voters.
- The duration of each pilot project should be approximately 28 days.
- A minimum of 20 registration units should be allocated to each pilot project, to facilitate four simultaneous registration centers.
- During the first month (October), a single pilot project should be conducted and should be held within the Kathmandu Valley.
    - This will allow for easier logistical support from ECN.
    - Members of the international community and other stakeholders should be invited to witness the project in operation.

  - District Election Officers from other districts, in particular those that will be hosting other pilot projects should be in attendance.
- Following lessons learnt from the initial pilot project, a further four concurrent pilot projects should be held during the month of November.
- If pilot projects are clearly successful, the registration may continue in adjoining voting areas using the staff and equipment from the pilot projects.

7.5. Transportation & Logistics

One of the major challenges for the project is the field level mobilization of staff and equipment. The project will be required to mobilize teams on almost a daily basis to new Polling Locations and to maintain logistical and other supplies.

Currently each District Election Office connected to road facilities has access to an ECN vehicle (pickup). The vehicles are generally in good condition but the annual fuel budget allocation is not sufficient.

A single vehicle per district is not expected to be sufficient for district wide operations. The project has made budgetary allocation to supplement each district with an additional vehicle including driver and fuel allowance. A supplementary fuel allowance is also included for the existing district vehicle.

An allocation has been made to provide additional vehicles for Regional Office and for the Central ECN office. These vehicles will be required for management, coordination, and logistical support.

7.6. Training

Training plans will be developed and coordinated by the Project Office Training Manager and deployed in coordination with training staff located in the respective Regional Offices. The Regional Office training staff will coordinate with District Officers to ensure that enumerators, data entry operators, and supervisors are trained in advance of required registration activities.

The training programmes will be based on the following assumptions and estimates:

- An experienced Training Manager will be appointed to the central Project Team who will finalize training plans and requirements. The Training Manager will coordinate with Regional Office training staff.
- Each Regional Office will have a Training Coordinator and three Master Trainers.
- Master Trainers will train field level trainers as necessary.

<u>Data Entry Training</u>

- Training for data entry staff will be of total duration 7 days, three days theory, three days practical, and one day for examination of all trainees.
- Master Trainers will provide training of the trainers to approximately ten trainers per Region. Exact numbers will be determined based on Regional and District requirements.
- Each trainer will have access to ten registration units (laptop, camera, fingerprint scanner) for training.
- Approximately 9,600 staff will require training in data entry.
- Up to 20 students may be trained in each class.
- Each trainer will be required to deliver up to ten classes (ten training weeks) during the project.

Enumerator Training

- Training for enumerators will be of total duration 3 days, two days training, and one day for examination of all trainees.
- Master Trainers will provide training of the trainers to approximately five trainers per Region. Exact numbers will be determined based on Regional and District requirements.
- Approximately 20,000 enumerators will require training.
- Up to 50 students may be trained in each class, requiring approximately five classes per District.
- Each trainer will be required to deliver up to 20 classes (ten training weeks) during the project.

The training plan to be created by the Training Manager must create a comprehensive and detailed training plan. Some of the factors that will influence this plan are:

- The overall deployment plan for the project including timing and geographic distribution of teams.
- The level of staff retention within the project, in particular the number of data entry staff that stay within the project across collection areas.
- The deployment plan should focus on keeping equipment and teams within a reasonable geographic distance for as long as possible to ensure maximum staff retention, and therefore limited re-training requirements.
- Training facilities must be identified and prepared in each District location.
- It is recommended that dedicated registration units be put aside for training in each Region. Training materials or tutorials may be pre-loaded into each Registration Units for the project duration.

7.7. Voter Awareness

The Voter Awareness unit will assist the ECN to develop national voter awareness and education strategies and programmes including the development of standard materials. The unit will take the lead roll in national level coordination with other government and non-government organizations with roles to play in the awareness campaigns.

Specific campaigns may be developed as required to address specific cultural or other situations that may arise. These campaigns and materials will be developed in consultation with field staff and community leaders to address the specific context and requirements of the situation.

The Voter Awareness unit will develop tools for the measurement of the success of voter awareness and use these tools to constantly monitor and improve the programmes.

The unit will coordinate with Regional and District offices to implement specific campaigns as required.

7.8. Asset Management

The project will procure an extensive range of equipment which will be deployed throughout the country. All equipment must be registered as project assets and records must be maintained as to the whereabouts of each piece of equipment and who is responsible for this equipment.

The proposed project team includes an Asset Manager in the central Project Office and a dedicated Asset Officer in each Regional Office. These staff must oversee a process under which all assets are registered at time of delivery to the ECN. The asset register must then be updated at time of deployment and for all subsequent transfers of the equipment.

It is recommended that the Regional Operations Manager and respective District Election Officers be responsible for all equipment deployed within their areas of responsibility. Therefore the asset register must maintain a record of all equipment deployed under the responsibility of these officers. At the time of transfer of this equipment to another District, or if the equipment is returned to ECN the asset register be updated to reflect the movement of this equipment.

A software application should be developed by the ICT team to assist the asset management team. The system will be updated from paper records as assets are transferred in the field.

7.9. Sustainability

This project will develop an extensive and complex technology and operations network within a relatively short period of time. It is critical that sufficient time and support is provided to the ECN to develop sufficient internal capacity to support, maintain, and continue to develop this infrastructure.

To support the development of internal capacity and therefore to ensure the sustainability of the photo Voter Lists systems and operations the project will take the following initiatives:

- The ICT unit must be involved in the development of ICT software through the design, testing, and implementation process to promote ownership of software systems and develop capacity to support, maintain, and further develop the voter list and other ICT systems.
- The project provides for computer operators and hardware engineers to provide support for the central and field level technology systems until capacity can be built within the ECN.
- The photo voter list project has budgeted for an additional computer operator to be stationed within each District office for a period of 12 months to assist with computer operations and Voter List maintenance.
- A register of all staff trained and utilized under the project including a basic evaluation of their skills should be maintained. This could form the basis of future recruitment processes for further Voter List related processes.
- The Voter List project team has been structured to retain specialist staff under UNDP contracts for a period of 24 months but standard operations staff for 28 months under Government contracts. The retention of some operations staff will facilitate the institutionalization of skills and lessons learnt from the voter registration activities and assist in preparation of the ECN for ongoing voter registration processes.
- The ECM Intranet will be further developed to provide essential infrastructure for the ongoing maintenance of the Voter List and as a tool to further disseminate information throughout the organization and to facilitate training and skills development throughout the organization.

7.10. Communication Strategy

Management of communication will be a critical component to the success of the project. All outgoing information from the project must be consistent, clear, and transparent to ensure an accurate and positive public perception of the ECN as an organization and of the voter registration process.

The project has assigned roles for a communication team. The communication team will work closely with the Project Director, Commissioners, and ECN Secretary to ensure that all information in the public domain is up to date, clear, consistent, and reinforces the agreed core messages of the commission.

The communication strategy should address the following basic questions:

- Who do we want to communicate with?
- What messages (and services) to we want to deliver?
- What actions or behavior do we want to do promote?

- What media and mechanisms will we use to deliver the messages?
- How do we evaluate the results of the strategy?

It is essential that when a communication strategy is developed that all staff be made aware of the key messages so that these messages can be delivered consistently in all news releases, advocacy tools, and in conversations with external parties.

7.11. Web Site Strategy

The ECN web site must be reviewed in the context of being a central tool in the overall advocacy and communication strategy. While internet penetration is still relatively low amongst the general population, this will change rapidly in the coming years. The web site must be seen as a tool to provide information, transparency, and services to the general population, international community, civil society, expatriate Nepali, and media.

8. Information Systems Specification

8.1. Overview

The ECN information system comprise of six distinct parts, divided into the following systems and applications:

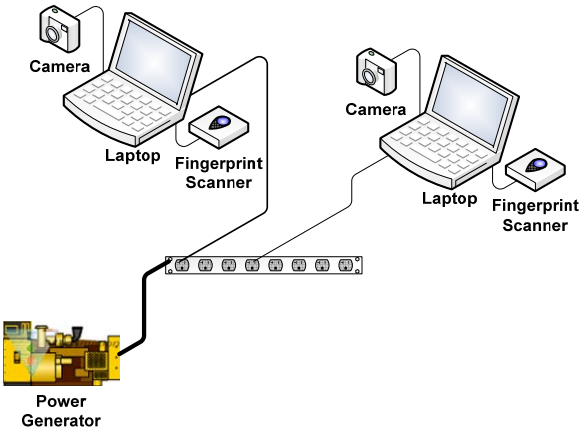
- **Collection system with voter registration application.** Used in the field and at ECN offices to register voters to the voter list.
- **District system with database application**. Used to integrate voter information and update local voter lists.
- **Central system with database, warehouse, and ETL application**. Used to manage and consolidate changes to the national voter list, identify duplicate registrations, and provide data extracts.
- **Storage system**. Used to store all voter registration data.
- **Internet system with Internet applications**. Used to make public information available and enable connectivity among ECN offices.
- **Intranet system with Intranet applications**. Used to facilitate internal applications and data exchange.

8.2. System Requirements and Specifications

The ECN data collection system consists of three parts facilitating collection of data, lookup, and update of data, and central management of data.

8.2.1. Collection System

Registration staff use laptops or desktops equipped with fingerprint scanner and web camera to acquire voter registration data and biometrics in the form of a photo and fingerprints. Collected data is uploaded to a system at district level after a limited time (day(s) or week).



Architecture

Stand-alone laptops with USB connected web camera, fingerprint scanner, external keyboard, and mouse. A portable generator may provide power where and when no normal power source is available.

The local hard disk stores all collected data. Uploading of collected data for transfer to the District Server will most commonly be performed through USB flash drive or DVD/CD. Laptops may be connected to the District Server by a wired network for the uploading and proof reading of voter data. A writable DVD/CD drive provides backup storage space.

Data Protection Requirements

- **Backup** – Backup is performed by uploading voter registration data to the District Server or by saving data to removable media such as USB flash drive for subsequent upload to the District Server.

- **Anti-virus** – No anti-virus protection is necessary as the system is at no time connected to Internet or should have any other software installed other than voter registration application. Should an infection occur, the laptop will be reinstalled from system image.

Installation Requirements

- Drivers for all ECN procured peripherals such as fingerprint scanners and web cameras shall be loaded on each laptop.

- A system image containing operating system, necessary drivers for laptop and peripherals shall be prepared on DVD(s) for system restoration when necessary.

Requirement Specification

The collection system shall meet the following requirements:

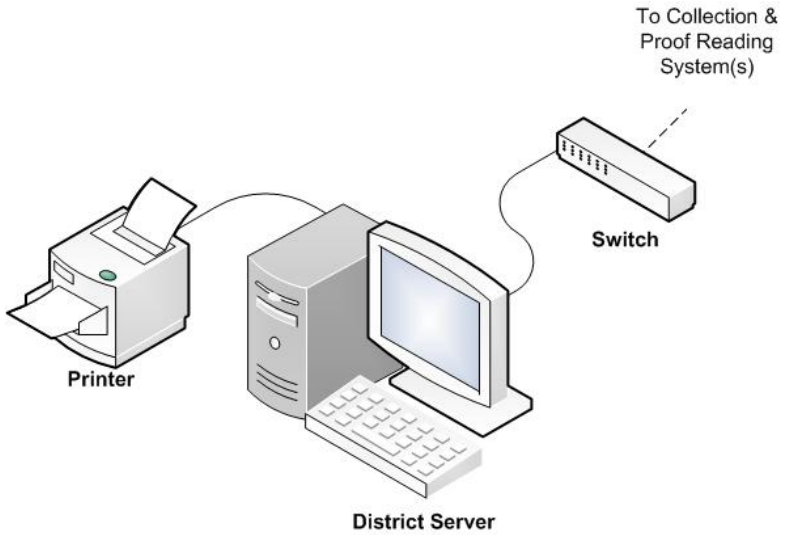
- Processing
    - Low load application use.
- Storage
    - Storage capacity for operating system, database management system, and application as specified in data requirements.
    - Storage of one (1) week of collected data as specified in data requirements.
- Connectivity
    - Interface with web camera and fingerprint scanner and other peripherals.
    - Connect to wireless and wired networks.

- Biometrics
    - Meet NIST and ICAO standards for acquiring fingerprint images.
    - Meet ICAO standards for acquiring photo images.

Category	Minimum requirement
Processor	Dual core
Memory	Minimum 512 MB
Storage	Minimum 80GB HDD, Writable DVD/CD
Display	15 Inch XGA
Network	10/100Mbs Ethernet
Ports	4 USB 1.1 Ports, 1 RJ-45 LAN
Fingerprint Scanner	500dpi, USB, NIST approved
Camera	640x480 True resolution, USB

8.2.2. District Server System

Collection systems upload collected data to the District Server throughout the data collection process. During data upload the system performs facial and fingerprint feature extraction for the collected data. When the voter registration process is complete the system can be used to change and add voter registration data. The system will periodically upload new registrations to the ECN central database and receive updated registration data from the central system.



Architecture

A high-end PC acts as the server for uploading data from collection systems and local Voter List management. A local switch connects the server and voter registration systems when required for data upload and proof reading purposes. The applications on the server print reports to a USB connected printer.

The server connects to the national power grid via a UPS which provide power conditioning and backup power in case of power outage. A backup generator is also available at each District Server location.

Fault tolerant mirrored hard disks stores all data from collection systems. A writable DVD/CD drive provides capability for data backup. Data may be uploaded to USB portable storage or DVD/CD for transfer to the central system.

Data Protection Requirements

- **Backup** – Voter registration data is backed up using the voter registration application on removable media (CD/DVD) on a regular basis. A full image of the district database will also be stored on an existing server at the District office. The central database will contain a copy of all voter registration data and such a copy can be used to recover the complete database should a disaster occur.

- **Fault tolerance** – Data is protected by mirroring all data onto 2 hard disks to protect the system from hard disk failure. Should a hard disk fail it should be replaced as soon as possible.

- **Anti-virus** – Anti-virus protection is necessary and shall be updated regularly. Regular updates should be automatically downloaded from Internet or from ECN Intranet when connectivity is implemented. At minimum, automated weekly full anti-virus scans shall be scheduled and performed.

Installation Requirements

- The system shall have RAID-1 enabled and functioning.

Requirement Specifications

The District system shall meet the following requirements:

- Processing
  - Low to moderate application use.
- Storage
  - Storage of operating system, database management system, and application as specified in data requirements.
  - Storage of the complete database for the designated area as specified in data requirements.
- Connectivity
  - Interface with web camera and fingerprint scanner.
  - Connect to wire network connection.
- Security
  - Fault tolerant storage.
  - Backup to DVD or CD.

Category	Minimum requirement
Processor	64-bit CPU
Memory	4 GB, Upgradeable to 6GB
Storage	RAID-1 2*160GB HDD, Writable DVD/CD
Display	15 Inch XGA
Network	10/100Mbs Ethernet
Ports	4 USB 2.0 Ports, 1 RJ-45 LAN
Printer	Monochrome Laser Printer, 1,200dpi, duplex

8.2.3. Central System

The central system performs several primary tasks; store all data, performs biometric matching, make the voter database available to other systems and processes, facilitate loading and update of voter list data, and to provide backup of all data.

Secondary functions are to provide statistics, aggregate data for Intranet and Internet consumption, and provide database back-end functions for current and future applications which need centralized database facilities or need to interact with Voter List data.

The primary servers are used to run and serve the voter list server applications including biometric matching. The secondary server is normally used to run other applications such as data loading application and analysis and reporting systems for creating reports. In case of single server failures the other servers must be able to continue operations and uninterrupted Voter List application services.

A storage area network (SAN) provides storage for data and a high-capacity tape backup system provide backup.

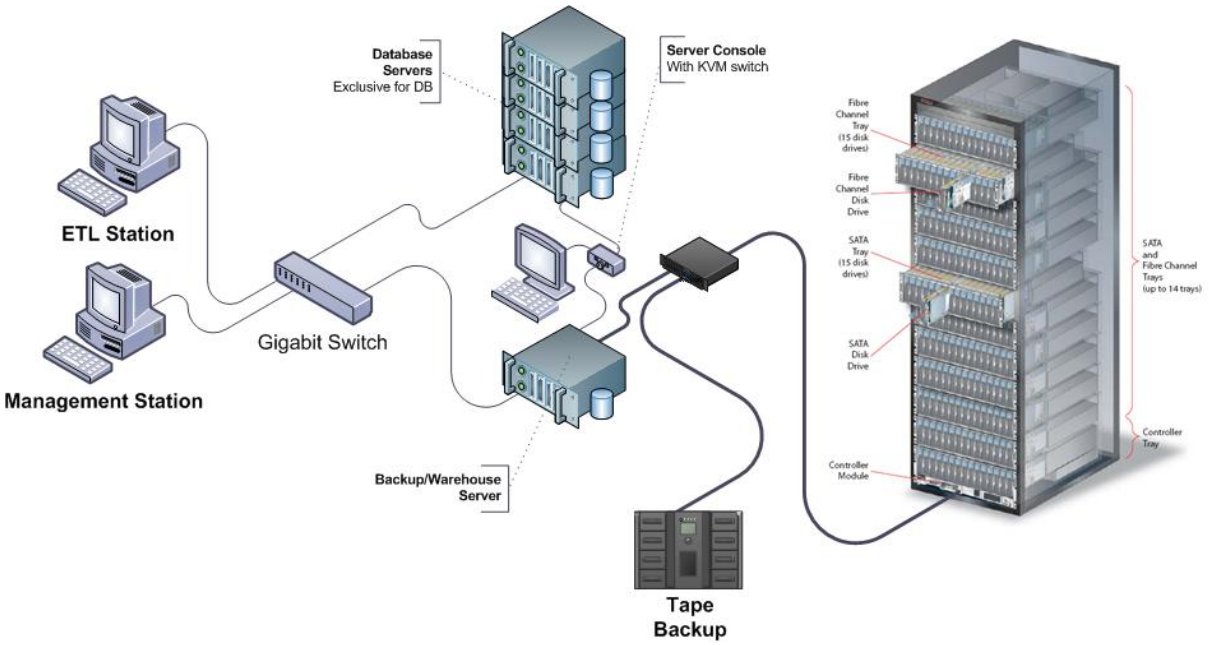


Figure 1 - Central System Overview

Architecture

Four database servers and additional backup servers provide the base for managing collected data. The servers are connected to a local switch which provide connectivity to management workstations and peripherals such as printers.

Local server disks provide storage for operating system and management applications. The servers connect to a storage area network (SAN) via a storage switch for data and application storage. The storage area network consists of an array of SCSI or SATA drives in a fault tolerant configurations. A tape based backup system provides backup of all data on the storage network and servers.

All equipment is installed in standard racks with multiple UPSs providing conditioned power to all equipment from the national power grid and backup power in case of power outage. A power generator may be used to provide backup power during longer periods of outage.

Data Protection Requirements

- **Backup** – A tape backup system shall provide automated backup for both files and databases.
    - o System files shall be fully backed up yearly and monthly with daily incremental backups.

  - Databases shall be backed up yearly and monthly with daily incremental backups.
  - Monthly backups shall be retained for a minimum of 3 months.
  - Election year backups shall be retained for a minimum of 5-10 years other for 2 years.
  - Backups shall be stored off-site as well as on-site.

- **Anti-Virus** – Only central management workstations need anti-virus protection. Anti-virus software shall be updated regularly and workstations shall be fully scanned weekly.

- **Fault tolerance** – Local and SAN storage shall be protected against disk failure and use fault tolerant file systems.

- **Data Encryption** – Sensitive data shall be encrypted by either application or database using strong encryption such as AES.

- **Security** – Systems shall be hardened using SANS, CIS and NSA guidelines.

Installation Requirements

Local Storage

- The servers are equipped with 2 disks and a RAID controller. The disks shall be configured to RAID-1 (disk mirroring).
- The base operating system shall be installed on the local mirrored disk.

Networking

- The servers are equipped with dual Ethernet adapters. The adapters shall be configured as bonded channels which provide double bandwidth and redundancy in case of partial adapter failure or cable failure.
- The servers will be fitted with Fiber Channel HBAs, they shall be installed before installing/configuring operating system and installing servers in appointed equipment racks.
- The central system may not be connected to the intranet or internet.

SAN Disks and File system

- Disks shall be configured using RAID-5 or similar to ensure fault tolerance.
- File system that support large file sizes (up to 1TB) shall be selected.
- File system shall be laid out to provide separate areas for database log files, databases, applications, and shared files.

Database Availability

- The database servers shall be configured in an active/passive configuration with automatic failover between the servers.

Database Servers

Category	Minimum requirement
Form factor	Rack mount
Processor(s)	4 servers of dual Quad core 64-bit processors installed
Cache	2MB Level 2
Memory	16GB expandable to 32GB
I/O Slots	2 Hot-plug PCI Express, 2 PCI-X 2.0 (3.3 and 5 Volt)
Drive Controller(s)	Dual channel SCSI and SATA
RAID Controller	RAID 0, 1, 5
Drive bays	2

Drives	2 Ultra320 SCSI or SATA-II 300GB
Video	16MB XGA
Network Interface	Dual Gigabit Ethernet, RJ-45
Power Supply	1+1 hot-plug redundant
Operating System Support	Windows Server 2003 Linux 2.4 and 2.6 kernel

Backup/Warehouse Server

Category	Minimum requirement
Form factor	Rack mount
Processor(s)	Dual Quad core 64-bit processors installed
Cache	2MB Level 2
Memory	16GB expandable to 32GB
I/O Slots	2 Hot-plug PCI Express, 2 PCI-X 2.0 (3.3 and 5 Volt)
Drive Controller(s)	Dual channel SCSI and SATA
RAID Controller	RAID 0,1
Drive bays	2
Drives	2 Ultra320 SCSI or SATA-II 73GB
Video	16MB XGA
Network Interface	Dual Gigabit Ethernet, RJ-45
Power Supply	1+1 hot-plug redundant
Operating System Support	Windows Server 2003 Linux 2.4 and 2.6 kernel

Datacenter equipment

Category	Minimum requirement
Rack	Standard 42U 19 Inch
Rack UPS	3000VA (or more depending on selected storage and servers) per rack
Rack Power Distribution Unit (PDU)	12 outlets, 16 Amps, 220V
Rack Switch	8-port 10/100/1000 Mbps per rack
Rack Ventilation	Rack ventilation system or rack roof exhaust fans
Rack Trays	Equipment, Keyboard
Rack Patch panels	Cat 6

Management Workstations

Category	Minimum requirement
Processor	Dual Core 32/64-bit
Memory	4 GB
Storage	Minimum 250GB HDD, Writable DVD/CD
Display	17 Inch LCD
Network	10/100/1000 Mbs Ethernet
Ports	4 USB 2.0 Ports, 1 RJ-45 LAN, 1 VGA, 1 DVI

SAN System

SAN Switch

Category	Minimum requirement
Port Speed	4Gbs Full-duplex, auto-negotiating compatible with 2Gbs and 1Gbs devices
Ports	6 (Expandable to 8 or more)
Port Types	E_port, F_port, FL_port
Media Type	Industry standard SFP (short and long wave optical)
Service Classes	Class 2, Class 3, Switch Fabric
Management	10/100 Ethernet and In-band
Fabric Bandwidth	128Gbs
Form Factor	19” Rack mountable

Host Bus Adapter

Category	Minimum requirement
Port Speed	Fiber Channel 4/2/1 Gbs auto-negotiating

Ports	Dual (2)
Port Types	N_port, NL_port, F_port
Media Type	Small form factor
ANSI Fiber Channel	FC-PH, FC-FCP, FC-AL, FC-AL2, FC-PLDA, FC-FLA
Bus Interface	PCI Express or PCI-X 2.0 (3.3V or 5V) [Determined by Server Specification]
Cables and Connectors	2 small form factor (connect to SFP ports)
Operating System Support	Windows Vista, 2003 Server Red Hat Linux 2.4 and 2.6 kernel

Storage

Category	Minimum requirement
Storage Processor(s)	2
Storage capacity	10TB raw storage
Drive Types	SCSI and SATA-II
Spare Disks	1 spare per disk enclosure
RAID	RAID 0/1/3/5 and combinations
Host Connectivity	Fiber Channel, (iSCSI and direct connect)
Port Speed	4Gb/s Full-duplex, auto-negotiating compatible with 2 and 1Gb/s devices
Ports	2 ports per controller/processor
Port Types	E_port, F_port, FL_port
Media Type	Industry standard SFP (short and long wave optical)
Service Classes	Class 2, Class 3, Switch Fabric
Management	Software for storage and backup management
Operating System Support	Windows 2003 Server, Linux 2.4 and 2.6 kernels
Form Factor	19" Rack mountable

Backup System

Category	Minimum requirement
System Type	Automated tape library for SAN backup
Capacity	10TB Native
Interface	4GB/s Fiber Channel SFP
Management	SAN backup software and tape management
Tapes	As required

8.3. Voter List Application Requirements Specifications

8.3.1. Functional Requirements

The following sub-section provides brief descriptions of functional requirements as a guideline to develop a software requirement specification (SRS) document. Final requirements, functionality, and specifications must be developed prior to the start of the project.

8.3.2. Data Collection Application

The collection application facilitates input of data according to the voter registration form. The application closely mimics the voter registration form and provides feedback to the operator on the quality of captured biometric data.

- English and Nepali input in Unicode
- Use form based input with input validation of each field
- Capture of photo, fingerprint(s)m and signature to each record via built in interface
- Record backup/export function in various formats (specifically for import to Oracle, MS SQL, DB2 and MySQL databases with images as BLOBs or separate files, text data only for further processing in Excel, CSV, Text, etc.)
- Encryption of stored data using strong encryption such as AES.
- Maintain and produce a read only log/audit trail for entered records.

- Provide receipt printout of voter information as well as lists of captured information at end of day reports.

Operating system

- The Data Collection Application shall run on Microsoft Windows XP Professional or better.

Database

- Storing and managing a large volume of records >=1GB

Image and Biometric SDKs

- Imaging: Photos in JPEG2000 or JPEG format with max 10:1 compression.
- Imaging/Video: Capture of still images from web camera
- Cryptography: AES

8.3.3. District Voter List Application

A distributed application for managing the vote roll at district level must be created. The application shall be client server based and support a hierarchical setup with user and role based access to functionality and features. The application shall be scalable from a single PC to a multiple server environment. (The application shall be accessible by multiple simultaneous users via a local area network).

This application will be used for various purposes and requires the following functionality:

- Loading of voter information and biometrics into database from CDs/DVDs or other media from collection and central voter list application.
- Capable of synchronizing data with central database with full transaction trail and versioning.
- Loading of photo, signature, and fingerprint images onto file system or into database.
- Registration, edit, and update vote roll records including biometrics.
- Extraction of voter information and photo for vote roll printing.
- Searching of voter information per voter district and polling area.
- Capable of English and Nepali input in Unicode.
- Capable of managing large a large volume of records, 160GB/1,000,000 records at district level.
- Capable of performing WSQ compression, decompression and display of fingerprints
- Capable of compressing, decompressing and displaying images in JPEG, JPEG2000 and PNG format
- Record backup/export function in various formats (specifically for import to Oracle, MS SQL, DB2 and MySQL databases with images as BLOBs or files, text data only for further processing in Excel, CSV, Text, etc.)
- Capable of encrypting stored and exported data using strong encryption such as AES.
- Capable of producing a secure log/audit trail for record changes and additions with date, time, user ID and computer ID and actions taken as well as produce audit reports.
- Capable of rolling back changes.
- Capable of importing and merging changes from Collection station, Districts and Central databases.
- Perform fingerprint and facial minutiae extraction.
- Support standards for fingerprint data exchange (ANSI INCITS 378-2004 (Fingerprint Minutiae), ISO/IEC SC37/19794-2, INCITS 381-2004 (Fingerprint Images), Personal Identity Verification (PIV) as wells as other standards from FBI, ICAO, NIST)

- Creation of 2D Barcodes according to PDF417 standard for printing.
- Capable of storing a minimum of four fingerprint images, one signature image, and one facial image per person.
- Have a user and role based access and security system with configurable access to features such as create, update, read, and delete records, screens, and reports.
- Be able to utilize any selected database backend (Example: ODBC, Oracle, MS SQL, MySQL, DB2, etc.) ranging from Personal/Express editions to Enterprise editions.

Operating System

- The application shall run on Microsoft Windows XP or better.

Database

- Shall be scalable to >1,000,000 records and > 160GB size.
- Transactions capable.

Software Development Kits (SDKs)

- Images: JPEG2000 compliant
- Fingerprints: WSQ compression
- Barcodes: PDF417 compliant
- Biometric feature extraction and matching: NIST compatibility tested
- Biometric data exchange: ANSI and PIV standard compliant
- Cryptography: AES

8.3.4. Central Voter List Application

A backend application for managing the vote roll must be created. The application shall be client server based and support a hierarchical setup with user and role based access to functionality and features. The application shall be scalable from a single server to a multiple server, clustered environment.

This application will be used for various purposes and requires the following functionality:

- Loading of voter information and biometrics into database from CDs/DVDs or other media from Collection system, District systems.
- Capable of synchronizing data with District system with full transaction trail and versioning.
- Loading of photo, signature, and fingerprint images onto file system or into database.
- Registration, edit, and update vote roll records including biometrics.
- Extraction of voter information and photo for vote roll printing.
- Searching of voter information per voter district and polling area.
- Capable of English and Nepali input
- Capable of displaying photo and fingerprint(s) images
- Capable of managing large a large volume of records >10TB, 40 million records.
- Capable of performing WSQ compression and decompression of fingerprints
- Capable of creating JPEG or JPEG2000 images with compression
- Record backup/export function in various formats (specifically for import to Oracle, MS SQL, DB2 and MySQL databases with images as BLOBs or files, text data only for further processing in Excel, CSV, Text, etc.)
- Capable of encrypting stored and exported data using strong encryption such as AES.
- Capable of producing a secure log/audit trail for record changes and additions with date, time, user ID and computer ID and actions taken as well as produce audit reports.
- Capable of rolling back changes.

- Capable of importing and merging changes from Collection station, District and Central databases.
- Perform matching 1:1 or 1:M of biometric templates.
- Perform fingerprint and facial minutiae extraction.
- Support standards for fingerprint data exchange (ANSI INCITS 378-2004 (Fingerprint Minutiae), ISO/IEC SC37/19794-2, INCITS 381-2004 (Fingerprint Images), Personal Identity Verification (PIV) as wells as other standards from FBI, ICAO, NIST)
- Have a user and role based access and security system with configurable access to features such as create, update, read, and delete records, screens, and reports.
- Be able to utilize any selected database backend (Example: ODBC, Oracle, MS SQL, MySQL, DB2, etc.) ranging from Personal/Express editions to Enterprise editions.

Operating System

- The application shall be accessible from Microsoft Windows XP or better workstations.
- Shall run server components on a server class operating system.

Database

- Enterprise class database management system.
- Shall be scalable to 40 million records and multi terabyte size.

Reporting Tools

- Flexible and configurable report definitions
- Ad-hoc reporting capabilities

Software Development Kits (SDKs)

- Images: JPEG2000 compliant
- Fingerprints: WSQ compression capable
- Barcodes: PDF417 compliant
- Biometric feature extraction and matching: NIST compatibility tested
- Biometric data exchange: ANSI and PIV standards compliant
- Cryptographic: AES

8.4. Geographic Information System (GIS)

The establishment of a GIS system at ECN will have a significant impact on the commission's ability to perform qualitative analysis of voter information. The system will also enhance the commission's ability to perform geographic analysis of voter and constituency data as is required for boundary delimitation and polling center placement.

ECN require a GIS system to perform the following tasks:

- Delimitation of electoral boundaries.
- Placement of Polling Centers.
- Qualitative comparison of voter numbers against population.
- Map production.

Mechanisms must be developed to facilitate the exchange of data between the Voter List and GIS systems. These mechanisms must enable the following:

- Boundary Delimitation
- Voter area data to be uploaded to the GIS from the Voter List by Union/Ward

- Voter List population data to be uploaded to the GIS from the voter list by Union/Ward or voter area.
- Revised electoral boundary data to be uploaded to the voter list from the GIS by voter area or Union/Ward. These details are then used to update the Geographic file in the voter list systems.

8.4.1. GIS Technical Requirements

The following requirements and recommendations should be taken only as a guide to the technical requirements. All items must be subject to review during project implementation as part of a detailed requirements analysis and systems design process. The further review will produce a more timely and detailed solution architecture for the project.

A web-based application package needs to be created to allow users to update and report information through popular browsers such as Microsoft Explorer, Mozilla Firefox etc. The system should have:

a) Clear demarcation of all Districts
b) Clear demarcation of all unions/wards (Municipality and City corporations)
c) Clear demarcation of all VDC/Villages/Settlements (depending on availability of digitized spatial data).
d) Clear demarcation of all constituencies
e) Clear demarcation of all voter areas. Demarcation of the voter area/constituencies can be marked with precision within the District/VDC/villages. It can be clearly seen which constituency spans multiple villages/unions or which area falls within a particular voter area. Unions that span multiple voter area can also be clearly marked and adjusted.
f) The system will report the location of all polling locations/centers. Location of all polling center and their density can be graphically mapped with the GIS system along with all administrative details such as VDC office, schools, colleges, hospitals etc.
g) The system will generate statistic reports on population or voter density based on each constituency or polling location/centers. When demographic data like population density are stored in the GIS system, statistics such as number of voters in each constituency or the number of voter allocated for each polling location/center can be found easily. GEOCODE standards should be followed during the process.
h) The system will report statistics on effect of change of demarcation for constituencies. It can be found out immediately what the effect of changing borders or demarcation of the constituencies will have on the population or number of voters.
i) The system will report statistics on effect of adding or removing or reallocating constituencies. It can be found out immediately what effect adding or removing a constituency will have on voting system. Furthermore it can be experimented how relocating constituencies can harmonize the voter density of each constituency.
j) The system will calculate and generate average number of voters on each polling center and their effect if location is changed. Using demographics data and statistics it can find out how many voters are allocated for a particular polling center and any effect if their location is changed.

8.5. Intranet System

A basic network currently exists between ECN and some District Offices providing e-mail and data sharing between these offices. The network utilizes basic dial-up access. This network provides a good starting point and should be expanded to include all field offices.

The implementation of an expanded nationwide ECN intranet system is designed to form a network between all election offices. The intranet system will establish a simple network to link all offices and enable communication and information sharing in the form of e-mail, file sharing, resource sharing, and other standard network functions. The intranet will provide the basis for national participation in other ECN business processes such as continuous Voter List updating, election results processing, and other administrative and election management functions.

The ECN intranet will be based on the existing network in ECN headquarters. The intranet should provide a consistent experience and equal access to information for officers inside headquarters and officers in field offices. This will assist in the standardization of administrative, operational, and training processes and the overall enhancement of inter-office communications.

The intranet will be established across a secure internet link which will facilitate access to a central e-mail service. All field offices will have access to the central intranet web site via password authentication. The intranet web site will provide common access to administrative reference materials, news and information, training materials, and linkage to election management systems.

The following considerations contributed to the conceptual design of the Intranet system:

- The system must be flexible enough to provide connectivity for offices with limited or non-available PSTN phone line connection.
- The system should have the ability to provide connectivity for temporary or mobile office locations.
- The system must provide the same experience to users connected via the ECN LAN and users connecting from field offices.
- The system must provide nation wide e-mail facilities to improve inter-office communication.
- The system must provide access to standard administration resources and forms.
- The system must provide an interface to applications such as the voter list updating systems.
- The system should be expandable to include future utilization of GroupWare functions such as shared calendar, file sharing, and messaging.

The system requires two main servers, a workgroup server providing email, file and print services and an application server providing internal applications and web services. The system provides linkage between the internal system and the internet system to facilitate content publishing to the internet system. A third server, a proxy, provides controlled internet web access for all staff.

A multiport multifunction firewall and remote access VPN devices provide secure connectivity between the internal network, internet, and central database system. District and other networks (extranets) connect via virtual private networks (VPN) to the ECN intranet via the internet server to use intranet services.

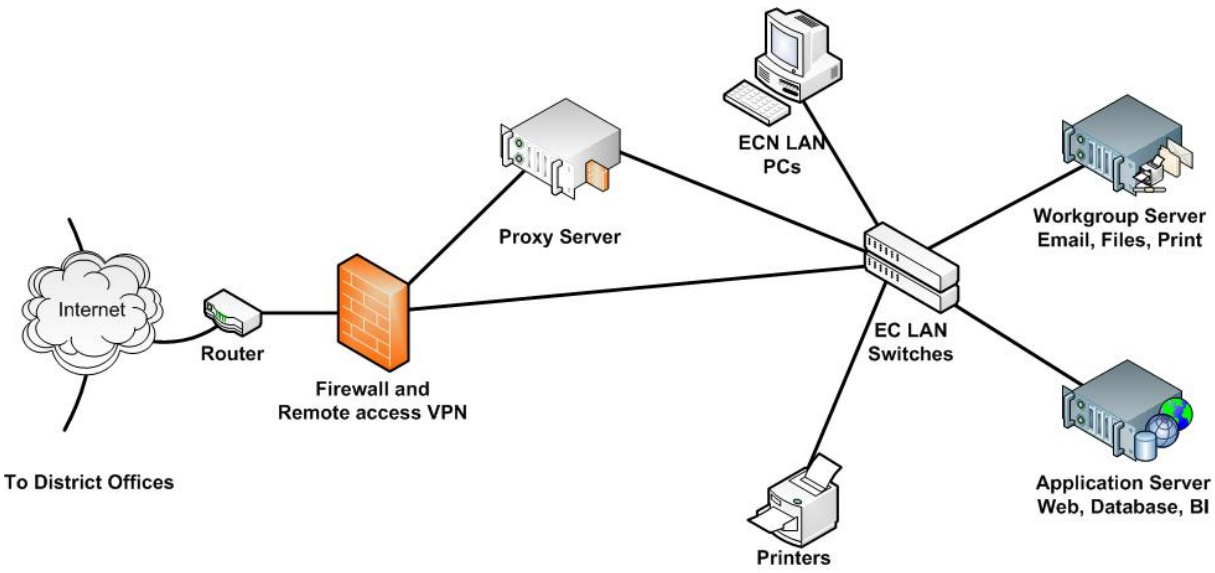


Figure 2 - Intranet system overview

Architecture

One or more routers provide connectivity to the Internet and future extranets. A multiport firewall provides protection and connectivity for the ECN Intranet. The router directs traffic to and from Internet, extranets and the central application server. The firewall provides email and web traffic filtering to protect against spam and malicious software. As a secondary service, the firewall provides virtual private networking (VPN) for remote access to ECN Intranet for district users.

Two servers, a workgroup and an application server, provide intranet services and applications to ECN users. The workgroup server provides the most common services such as email, file sharing, and printing. The application server provides intranet applications and databases, and provide services for extranet and internet applications.

Data Protection Requirements

- **Backup** – The intranet servers are backed using a tape backup system.
- **Anti-virus and Anti-Spam** – Centralized protection shall be implemented on both servers. The system shall provide centralized anti-virus protection updates for all intranet PCs and servers. The server system should be updated daily and all system and shared files including email shall be scanned daily.
- **Network protection** – A firewall and web proxy shall control all access in and out of the intranet. All clients shall use the web proxy to access internet. The firewall shall only allow access to and from the internet to and from authorized systems such as ECN mail server. A VPN between intranet and internet system may be used for sensitive data traffic.
- **Security** – Systems shall be hardened using SANS, CIS and NSA guidelines as per instructions in “Security Management” section.

Requirement specification

The intranet system shall meet the following requirements:

- Processing

  - Low to medium database use.
  - Low to medium application use.
- Storage
  - Local storage of operating system applications and temporary data.
  - External storage capable of storage as specified in data requirements.
- Connectivity
  - Wired network connections.
- Applications and Services
  - E-mail with shared contacts, and mailing lists.
  - Web Server
  - Web Proxy
  - File Sharing
  - Shared applications
  - Anti-virus and updates for PCs
  - Optional – Shared Calendars, Instant Messaging, Bulletin boards
- Security
  - Fault tolerant local server storage and external storage.
  - Automated backup to tape.
  - Backup power supply for 40 minutes.
  - Protected against malicious software (virus and malware) from the internet.
  - Protected against spam email from the internet.
  - Provide controlled access to and from the internet.
  - Provide secured access to and from remote sites.

Firewall and Remote access VPN

Category	Minimum requirement
Certification	ICSA
Ports	4 Ethernet 10/100Mbps RJ-45
Firewall throughput	400 Mbps
VPN throughput (3DES/AES)	100 Mbps
Concurrent sessions	200,000
Users/VPNs	150/700
Features	Intrusion Prevention, Anti-spam, Anti-virus, Web filtering, VLAN, VPN

Recommendations: A multi-port firewall may be used as router for external connections. Intrusion prevention and protection against malicious software is desirable as a first line defense against spam and virus attacks. A VPN capable firewall allows all District offices to connect to the internal network using VPNs.

8.6. Internet System

The internet system provides the public access to ECN information via the internet and provides intranet services to District offices. The public access the ECN website to obtain information, download published material and to access other election specific materials. The server provides other government agencies and other external parties with access to information and applications via access controlled web sites and web services.

The internet system supports ECN intranet system by providing internet e-mail to ECN users.

Requirement specification

The intranet web and mail server must meet the following requirements:

- Processing
  - Low to medium web application usage
  - Low to medium email usage
- Connectivity
  - Low latency connectivity from and to Nepal, particularly to and from ECN datacenter.
- Storage
  - Storage for web, workgroup, and email applications
  - Storage for District email
  - Database storage for applications
- Security
  - Hosted server backup
  - Firewall

Internet Web and Mail Server

Category	Minimum requirement
Operating system	Linux 2.6 kernel
Memory	256 MB
Storage space	10 GB
Traffic	1 GB/month
Expandability	Memory and Storage space must be upgradeable

8.7. Central Server Room Requirements

This section outlines requirements and for ECN datacenter in its current location.

8.7.1. ECN Server Room

The datacenter houses all current and planned IT equipment as outlined in previous sections. The datacenter shall contain an environmentally controlled server room and storage.

The current datacenter shall be refurbished to provide space for new equipment and to provide adequate working and storage space. To support and protect new equipment and critical data improvements to security, power supply, and fire protection are necessary.

Refurbishments Requirements

The following areas shall be refurbished:

- Layout
  - Adequate space for four (4) standard racks shall be provided.
  - Emergency entrance/exit.
  - Space for the temporary placement of equipment when removed from the racks for maintenance and repairs.
- Power Supply
  - Adequate power for equipment and cooling system– approximately 7kW equipment use (>21,000 BTU/h, >14A at 220V).
  - Power generator for equipment and cooling system.
  - Adequate amount of wall outlets for workstations and other equipment.
- Network Infrastructure

  - Category 6 cable and patch panels with RJ-45 connectors for termination of cable shall be used in all new cabling and patch panels.
- Environment
  - Adequate cooling capacity – approximately 30,000 BTU/h.
  - Redundancy in cooling systems – should provide adequate cooling during maintenance.
- Storage Area
  - Shelves for equipment and spare parts in storage room.
- Operations Area
  - Desks for four (4) management workstations.
  - Fire resistant cabinet for storage of documents and backup media.
- Physical Security
  - Security door lock with access card.
  - Logs of access to server room.
- Fire Detection and Suppression.
  - Fire extinguishers shall be placed inside and outside datacenter room.
  - Fire and smoke detection with audible alarm inside and outside ECN building.

8.8. Business Continuity

The levels of disaster recovery or business continuity investment and preparation must be assessed in terms of the levels of insurance required for ongoing IT operations. Therefore it must be determined how critical is each IT function to the key business processes of ECN, what contingency arrangements are available for these processes, and what is the time requirement for the recovery of these IT systems. Against these criteria we can assess the levels of redundancy that should be built into these systems and the level of investment that can be justified.

8.8.1. ECN Server Room

In an ideal scenario a second server room would be available in a separate location, with separate power, network, and telecommunication infrastructure. This would however require duplication of all equipment including LAN termination and the investment could not be justified.

The following basic measures should be taken:

- Remove all equipment from the server room that is not critical to the operation and maintenance of the server platforms.
- Separate the main server and backup servers into separate racks.
- Install and maintain smoke and heat detection systems with audible alarms and fire suppressant systems.
- Data and operating system backup tapes should be stored offsite, or at a minimum in a fireproof safe separately located in the ECN complex.
- Procedures for server recovery must be developed and rehearsed.
- Physical access to the server room must be restricted and a history of access recorded.
- Dedicated backup power systems must be enhanced to meet the power requirements of all technologies in the server room including air conditioning systems.

8.8.2. ECN Intranet

The proposed ECN intranet will be critical to the ongoing operations of ECN as it provides the backbone for all e-mail, file transfer, reference information, and other applications to be developed.

The following recommendations should be implemented:

- A server (and backup) is dedicated for e-mail and GroupWare only.
- A server (and backup) is dedicated for hosting of the intranet site.
- Ensure that a daily back-up process is applied for the e-mail server with back-up data stored in a secure and fireproof location.
- Perform regular rehearsal of a server restoration process.
- Maintain additional redundant communication connections ideally from separate ISPs and/or separate exchanges.
- Investigate spare capacity and available support for the router, firewall, and other network equipment.

8.8.3. Voter List System

The proposed structure of the photo voter list systems provides inherent levels of data redundancy. It must also be noted that the Voter List system is not critical to ECN on a day-to-day basis, but does become extremely critical around the periods of electoral events.

The photo voter list system has been configured with multiple servers to ensure that in the event of server failure other servers can take over for continuous operation. In addition, the SAN storage has been configured with RAID technology enabling automatic restoration and recovery in the event of disk failures.

The data center will be configured with full tape back-up with tapes stored both off-site and in fireproof enclosures. In the event of catastrophic SAN storage system failure the storage facilities must be repaired or replaced before data is restored from the tape backup facilities. During this period the ECN would not be fully disabled as the full photo voter list will remain accessible at the District level.

In the event of data loss at the District Office level, the databases can be reloaded either from backup DVDs, or the central database. In the event of major hardware failure at the District office level a replacement computer could be sent from the central office with the appropriate Voter List database preloaded.

The critical issues for the Voter List are therefore hardware and data upload integrity. The following recommendations should be implemented:

- Central voter list server integrity should be enhanced by implementing the ECN server room recommendations.
- The latest Voter List uploads from field offices and tape backups should be stored in a fireproof container outside of the server room.
- A small number of spare computers should be maintained at ECN during critical election periods. These computers can then be configured, loaded with the relevant copy of the District Voter Lists and dispatched to a District office at short notice.
- District offices should back-up all voter data on a regular and store this data in a safe location away from the computer.

8.9. Future Development Options

The ICT capacity of ECN and field office staff will continue to grow through their exposure to this project. In addition, there will be continued growth in national IT infrastructure which will include initiatives by other Government Ministries and the further development of the national telecommunications network. The ECN should continue to monitor these developments and position itself to take advantage of technology growth to further enhance internal efficiency and service levels to the voting public.

Some of the future initiatives that should be considered include:

- Development of a more comprehensive geographic database within the Voter List and GIS systems such as integration of locality, settlement, and street names. This would standardize and improve the quality of street and locality address information and allow more detailed analysis, sorting, and reporting.

- Following improvement to the national telecommunications networks, ECN may be able to consider performing central “real time” updates to the Voter List system. This would include the ability to match voter details across the national Voter List database at time of data entry.

- Following the establishment of the Civil Register the overall Voter Lists strategy of ECN must be revisited in line with the structure and capabilities of this citizens register.

- Expansion of web site capability including online submission of voter registration forms.

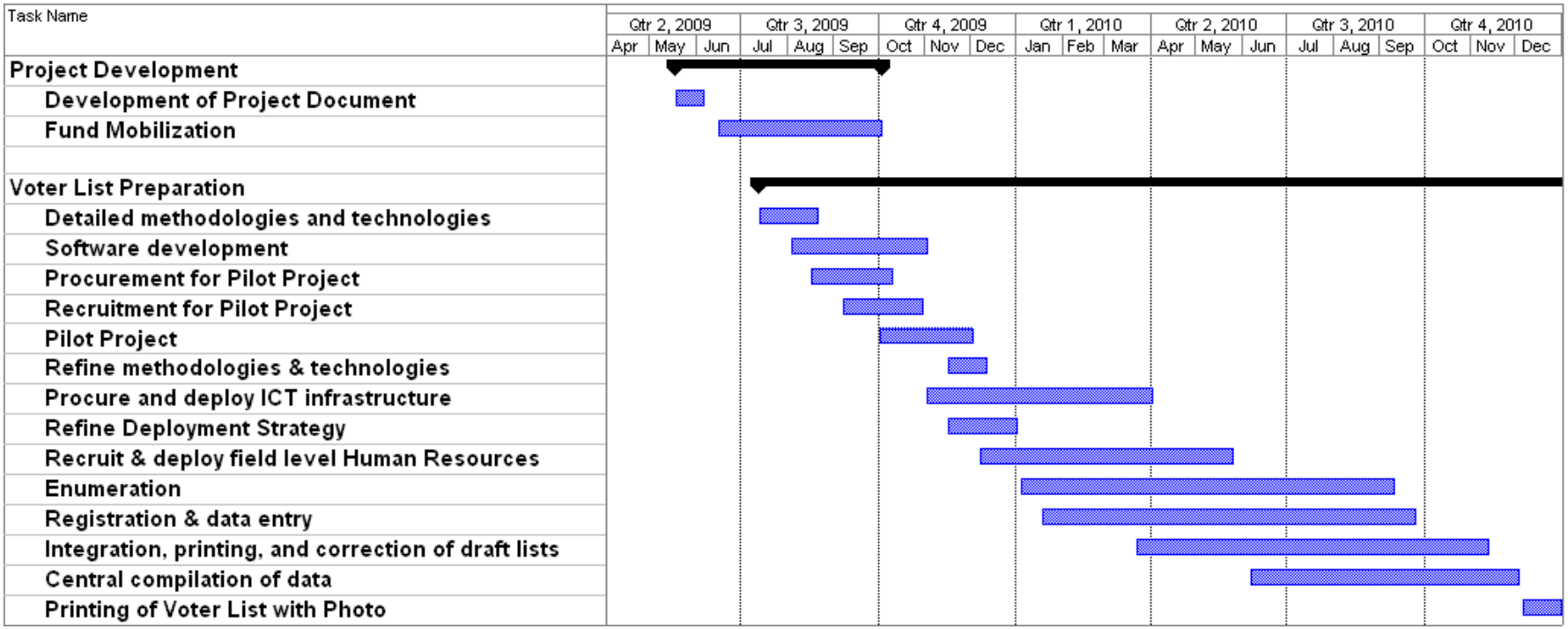
- The provision of computerization to the Polling Location level. This is dependent on finding an affordable technology that could assist with voter and entitlement verification. This technology may work with the implementation of national ID cards or potentially through further development of biometric systems.

- When the national telecommunications networks improve, ECN may consider the provision of interactive training programmes conducted through the ECN intranet. This would provide a mechanism for staff self development.

- The ECN intranet system has the ability to provide full GroupWare functions such as remote access, messaging, calendar, reminders, contacts, notes, and tasking. These features could be considered for implementation as user capacity grows.

9. Implementation and Timeline

The current project timeline is based on the premise of having a new Voter List with photographs completed by the end of 2010.



Intended Outputs	Annual Output Targets	Indicative Activities	Responsible parties	Inputs
The creation of a new Voter List with photograph that can be updated in a continuous manner.	**Target (2009)** **1.** Funds mobilized to support the voter registration project. **2.** Pilot projects conducted to trial the methodology and project design. .	**Activity Result 1:** **1.** Donor meetings conducted and a strategy developed for the mobilization of donor funds for the project. **2.** Discussions held with the Government of Nepal to facilitate agreement and strategies for civil registration and national ID card. **3.** Detailed computer application designs and specifications developed for software for voter registration. **4.** Computer software developed for voter registration data capture and management. **5.** Procurement specifications developed for all equipment and consumables. **6.** Operational and training plans developed for conduct of pilot projects. **7.** Training curriculum developed for pilot projects. **8.** Recruitment and procurement plans completed for pilot projects. **9.** Project budget for conduct of pilot projects completed. **10.** Comprehensive technical evaluation of pilot projects to assess suitability of the methodology, voter awareness campaigns, recruitment, training, operational planning, processing speeds, and utilized technologies. **11.** Procurement specifications, training plans & materials, recruitment & procurement plans, and budgets adjusted from lessons learnt from pilot projects.	Election Commission, UNDP, and other Government stakeholders	- UNDP Staff time - ECN Staff time - Government agencies - International/local consultants - Contracts - Materials - Printing - Miscellaneous

Intended Outputs	Annual Output Targets	Indicative Activities	Responsible parties	Inputs
		12. Procurement for all required equipment and consumables commenced. **13.** Appropriate accommodation located and established for Regional Offices. **14.** GIS system implemented to support voter registration and election planning activities.		
	Target (2010) **1.** All project offices established and fully operational. **2**. National voter registration completed. **3.** Planning completed for the long term institutional requirements to maintain and support the new registration process.	**Activity Result 2:** **1.** Regional workshops conducted with District Election offices, other ministries, and field level administrations to discuss and agree deployment and operational strategies. **2.** All project and field staff recruited, trained, and deployed. **3.** Delivery, configuration, and deployment of all required equipment and consumables. **4.** Computer equipment, networks, and software systems established in all offices including central, project, regional, district, and registration centers. **5.** Voter awareness campaigns developed and successfully implemented throughout the country to bring voters to registration centers. **6.** Registration centers established throughout the country and all eligible voters registered. **7.** Voter List data consolidated and checked at the district level and then transferred to the central office for matching and management. **8.** An organizational assessment of the ECN conducted to plan for the required structures and	Election Commission, UNDP, and other Government stakeholders	- UNDP Staff time - ECN Staff time - Government agencies - International/local consultants - Contracts - Materials - Printing - Miscellaneous

Intended Outputs	Annual Output Targets	Indicative Activities	Responsible parties	Inputs
		budgets to support the new registration process.		
	Target (2011) **1.** All 75 District Offices available for continuous update of the voter list. **2**. New registration processes fully institutionalized into ECN and organizational structures and budgets in place to support the processes.	**Activity Result 3:** **1.** Computer equipment, networks, and software systems established in all central and district offices to support continuous update modality. **2.** Field level staff trained in continuous update modality. **3.** organization change implemented in ECN in support of new registration processes.	Election Commission, UNDP	- UNDP Staff time - ECN Staff time - International/local consultants - Miscellaneous

10. Risks Analysis

The complexity of the operation to be conducted by ECN should not be underestimated. The development of a Voter List with photographs is a complex operation with very large coordination and logistical challenges.

#	Description	Category	Impacts & Probability	Countermeasures/ Mngt. response	Owner	Author	Date Identified	Last Update	Status
1	*The mobilization of funds from donors will potentially be lengthy and complex.*	*Financial*	*High impact, medium probability.*	*Donor meetings have been scheduled for June 2009 to commence discussions and to present the project outline and requirements. The project will be structured to facilitate various donor modalities.*	*ECN/UNDP*				
2	*Field operations are dependent on effective coordination with all relevant Government agencies and stakeholders.*	*Operational*	*High impact, low probability.*	*Discussions have commenced between Government agencies to ensure that all relevant authorities have a good understanding of the project objectives and requirements.* *Modalities already exist between stakeholders for current voter registration and election management activities.*	*ECN*				
3	*Strong logistical coordination and management is required.* *Adequate logistical support required for transportation, printing, supply of consumables, recruitment, training, payments etc. Must have strong operational support team and mechanisms in place.*	*Operational*	*High impact, moderate probability.*	*The project has proposed a strong administrative and logistical support team. The ECN has experience in the logistical support of manual data collection processes so has some internal capacity for this task. Adequate resources have been provided in the project to ensure staff with appropriate technical qualifications are engaged in the project.*	*ECN/UNDP*				

4	Deterioration of security in Nepal could result in reluctance of voters to attend Registration Centres.	Security	Medium impact, low probability.	Registration Centres will be established in localised areas with the support of local agencies.	Government of Nepal				
5	The success of the project depends on the availability and timely procurement and delivery of required equipment.	Operational	Medium impact, low probability.	The ECN has drafted equipment requirements prior to the start of the project and will maintain contact with vendors to ensure equipment availability. Procurement modalities either international or local will be used as most appropriate and efficient for particular items.	ECN/UNDP				
6	Effective voter awareness and education programmes are critical to ensure the mobilization and motivation of voters.		High impact, low probability.	Budget and resources have been included in the project to be dedicated to specific awareness campaigns for voter registration. ECN has previously conducted successful awareness campaigns for other electoral activities.	ECN/UNDP				
7	Recruitment of enough field level staff with appropriate computer skills to work as data entry staff.	Operational	Medium impact, medium probability.	Discussions have been held with DEO staff who feel confident that sufficient staff can be mobilized in their locations. Notices should be posted throughout the country to raise awareness or the requirement for staff to gauge availability.	ECN/UNDP				
8	The project is being conducted through the monsoon season which may disrupt voters' ability to access Registration Centres and the operation of technical	Environment	Medium impact, low probability.	The project will target urban and semi-urban areas during the monsoon season and operate in rural areas during the more favourable seasons.	ECN/UNDP				

	equipment in these centres.								
9	*Fiduciary Risk: Fund may not be used for the intended purpose.*	*Financial*	*Medium impact, low probability.*	*Direct Execution modality may be used on large procurement lines to facilitate expedient procurement process.* *The project will report expenditures regularly to UNDP as part of the monitoring requirements. UNDP will perform annual audits, as well as manage an independent audit after the bulk of the budget has been spent The audit will assess fiduciary requirements.*	*ECN/UNDP*				

11. Project Budget

11.1. Budget

Component	2009	2010	2011	Project Total
Software Development & Licenses (AFIS software, database licenses, PC software, data collection software development)	$127,700	$99,330	$51,600	$278,630
ECN Central Server Room Refurbishment (Preparation for central servers and improved physical security)	$0	$55,000	$10,000	$65,000
ICT Infrastructure (Central, Region, District, & Project Office) (Central servers, GIS systems, ICT equipment for ECN central, Project, Regional, & District Offices.	$587,160	$496,573	$45,188	1,128,921
Office Supplies for Project & Regional Offices (General office consumables)	$12,500	$25,000	$12,500	$50,000
Project Office & Regional Office, Fit-out & Preparation (Physical preparations including refurbishment)	$75,000	$25,000	$0	$100,000
Field Worker training (enumeration & data entry) (Trainers, allowances, materials, room costs, workshops)	$272,850	$2,473,882	$111,696	$2,858,428
Field Worker salaries (Enumerators, data entry operators, supervisors, proof readers, assistants, district office support)	$477,750	$4,289,750	$0	$4,767,500
Voter Awareness campaigns and materials (Preparation & dissemination of campaigns, materials, field support)	$150,000	$600,000	$0	$750,000
Voter Registration equipment (Laptop computers, fingerprint scanners, web cameras, keyboards, generators, hard drives)	$3,717,000	$929,250	$0	$4,646,250
Voter Registration consumables (USB flash drives, paper, toners, stationery, lighting, other preparations)	$243,009	$1,067,081	$0	$1,310,090
Printing (Registration forms, voter lists)	$320,000	$605,000	$175,000	$1,100,000

Project Staff (Project Office, Regional Office, ICT team)	$232,764	$671,760	$434,076	$1,338,600
Local Travel (Domestic travel for evaluation & technical advice)	$5,000	$10,000	$5,000	$20,000
Transportation (District level) (Rental of supplementary vehicles for district logistical support)	$67,500	$540,000	$67,500	$675,000
Project Vehicles (Vehicles for Project Office & Regional Office support)	$262,500	$87,500	$0	$350,000
Rental Office Accommodation (Rent for Project & Regional Offices)	$39,200	$120,400	$120,400	$280,000
Evaluation & Audit (Periodic audit and evaluation)	$0	$105,000	$105,000	$210,000
Fuel (Project & District vehicles, generators for Registration Centers)	$444,600	$1,543,950	$295,200	$2,283,750
Project Assurance (Coordination, technical assistance, reporting, voter list assessment)	$118,000	$578,080	$292,920	$989,000
Contingency (5%)	$357,627	$716,128	$86,304	$1,160,058
Estimated Project Budget	**$7,510,160**	**$15,038,684**	**$1,812,384**	**$ 24,361,227** **1,851,453,286 NRS**

12. Project Linkages

12.1. Civil Registration & Multipurpose ID Card

The Government of Nepal is currently considering nationwide initiatives such as the development of a modern civil register and multi-purpose national ID card mechanism. A series of inter-ministerial meetings are being conducted to discuss this project. These discussions are being conducted to ensure that wherever possible common objectives of the Government of Nepal can be accommodated during the voter registration project.

The civil register and national ID initiatives require the establishment of nationwide infrastructure and coordinated data collection methods and activities. As the ECN will be the first to conduct a nationwide data collection program, the project will be implemented to meet the common requirements of each project.

It is anticipated that during the voter registration project, cooperation and information exchange will continue regarding the formulation of the civil register. Following the establishment of an authority to manage the civil register and the completion of independent ICT structures, ECN will provide baseline data to the to the authority. Data exchanges between the two organizations may then continue based on specific defined requirements.

ANNEX:

BUDGET

VOTER LIST WITH PHOTO

BUDGET ESTIMATE VOTER LIST WITH PHOTO

		Units	Budget	Total	Y1 %	2009	Y2 %	2010	Y3 %	2011
Develop Required Software to Support Photo Voter List										
73300: Sub Contract										
AFIS software expert	3 weeks	21	400	8,400	100%	8,400	0%	-		-
Outsourced SW Dev	Central/Dist/Laptop apps.	1	70,000	70,000	80%	56,000	20%	14,000		-
AFIS software										
AFIS Software Products & Licensing		1	21,730	21,730	0%	-	100%	21,730		-
Other Licenses										
Database License	28 months	1	120,000	120,000	14%	16,800	43%	51,600		51,600
SW License for Central Office Workstations (OpenOffice/Office)		30	300	9,000	50%	4,500	50%	4,500		-
SW License for Project Office Workstations (OpenOffice/Office)		40	300	12,000	100%	12,000	0%	-		-
SW License for Regional Office Workstations (OpenOffice/Office)		50	300	15,000	80%	12,000	20%	3,000		-
SW License for District Office Workstations (OpenOffice/Office)		75	300	22,500	80%	18,000	20%	4,500		-
Subtotal				**$278,630**		**$127,700**		**$99,330**		**$51,600**
Establish ICT Infrastructure & Facilities at Project, Central, and District offices										
73200 Central Data Center Refurbishment										
Data Center Physical security		1	15,000	15,000	0%	-	100%	15,000		-
Data Center Refurbishment		1	50,000	50,000	0%	-	80%	40,000	20%	10,000
Subtotal				**$65,000**		**$0**		**$55,000**		**$10,000**
72200 Equipment for Central Data Center										
VL Matching Servers	each 2*quad core - 16GB memory	4	9,000	36,000	0%	-	100%	36,000		-
Backup/restore server		1	6,500	6,500	0%	-	100%	6,500		-
UPS 3000VA rackmount		5	1,500	7,500	0%	-	100%	7,500		-
OS		5	3,500	17,500	0%	-	100%	17,500		-
Storage Systems 10 TB		1	50,000	50,000	0%	-	100%	50,000		-

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Backup strategy & equipment	Tape based	1	35,000	35,000	0%	-	100%	35,000	-
Data Center miscelaneaous		1	20,000	20,000	0%	-	50%	10,000	10,000
VPN router		1	10,000	10,000	0%	-	100%	10,000	-
Network Security		1	15,000	15,000	0%	-	100%	15,000	-
Internet interfaces									
	Proxy	1	5,000	5,000	0%	-	100%	5,000	-
	e-mail server	1	5,000	5,000	0%	-	100%	5,000	-
	e-mail application server	1	5,000	5,000	0%	-	100%	5,000	-
	Web application server	1	6,500	6,500	0%	-	100%	6,500	-
Power Backup for Data Center		1	20,000	20,000	0%	-	100%	20,000	-
72200: Equipment for Central Office									
PC with OS		30	1,200	36,000	50%	18,000	50%	18,000	-
UPS		30	100	3,000	50%	1,500	50%	1,500	-
Printer	monochome laser	20	800	16,000	50%	8,000	25%	4,000	4,000
toner	5 cartridges per printer	150	110	16,500	20%	3,300	40%	6,600	6,600
72200: Equipment for District Offices									
Server/PC with OS		75	1,200	90,000	80%	72,000	20%	18,000	-
UPS		75	100	7,500	80%	6,000	20%	1,500	-
LAN switch		75	150	11,250	80%	9,000	20%	2,250	-
Printer	monochome laser	75	800	60,000	80%	48,000	20%	12,000	-
Modem		75	350	26,250	40%	10,500	60%	15,750	-
toner	5 cartridges per printer	375	110	41,250	50%	20,625	25%	10,313	10,313
Computer Furniture	Desk & chair	75	400	30,000	80%	24,000	20%	6,000	-
DEO ICT fitout	ICT infra	75	1,000	75,000	80%	60,000	20%	15,000	-
Server room operating cost		75	600	45,000	20%	9,000	60%	27,000	9,000
72200 Equipment for Project Office									
Server/PC with OS		40	1,200	48,000	60%	28,800	40%	19,200	-
UPS		40	100	4,000	60%	2,400	40%	1,600	-
printers	monochome laser	30	800	24,000	60%	14,400	40%	9,600	-
toner	5 cartridges per printer	150	110	16,500	25%	4,125	50%	8,250	4,125
LAN Switch		4	150	600	25%	150	50%	300	150
Furniture		40	800	32,000	60%	19,200	40%	12,800	-
Furniture	conference room	1	6,500	6,500	60%	3,900	40%	2,600	-

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Photocopier		4	1,500	6,000	60%	3,600	40%	2,400	-
water purifier		4	400	1,600	60%	960	40%	640	-
Fax machne		3	435	1,305	60%	783	40%	522	-
Mobile phone		10	100	1,000	60%	600	40%	400	-
Projector, shredder, fax, binder		3	3,000	9,000	60%	5,400	40%	3,600	-
Still Camera		3	500	1,500	60%	900	40%	600	-
Video Camera		1	841	841	60%	505	40%	336	-
Multimedia projector		2	1,500	3,000	60%	1,800	40%	1,200	-
Generator		1	10,000	10,000	100%	10,000		-	-
TV		2	400	800	100%	800	0%	-	-
Fridge		2	400	800	100%	800	0%	-	-
Conference Address System		1	5,000	5,000	0%	-	100%	5,000	-
Other misc.		1	5,000	5,000	40%	2,000	40%	2,000	1,000
72200 Equipment for Regional Office									
Server/PC with OS	10 per office	50	1,200	60,000	100%	60,000		-	-
UPS	10 per office	50	100	5,000	100%	5,000		-	-
printers	5 per office	25	800	20,000	100%	20,000		-	-
Modem		5	350	1,750	40%	700	60%	1,050	-
LAN Switch		5	150	750	40%	300	60%	450	-
toner	5 cartridges per printer	125	110	13,750	25%	3,438	75%	10,313	-
Furniture		50	800	40,000	100%	40,000		-	-
Photocopier	1 per office	5	1,500	7,500	100%	7,500		-	-
Fax machine	1 per office	5	435	2,175	100%	2,175		-	-
Mobile phone	3 per office	15	100	1,500	100%	1,500		-	-
Generator	1 per office	5	1,000	5,000	100%	5,000		-	-
72200 Equipment for GIS									
GIS software & database		1	40,000	40,000	100%	40,000		-	-
Workstation with monitor	PC with LCD 21"	1	2,500	2,500	100%	2,500		-	-
Laser Printer	A3 Color	1	3,000	3,000	100%	3,000		-	-
Plotter	For map printing	1	5,000	5,000	100%	5,000		-	-
GPS units	Handheld units (CO & each DEO)	78	600	46,800	0%	-	100%	46,800	-
Subtotal				**$1,128,921**		**$587,160**		**$496,573**	**$45,188**

BUDGET ESTIMATE VOTER LIST WITH PHOTO

72500: Office Supplies for Project & Regional Office										
Project Office Consumables	30 people, 36 months, $50 per month (o	1	50,000	50,000	25%	12,500	50%	25,000		12,500
Regional Office Consumables	10 people, 24 months, $50 per month (o	1	25,000	25,000	25%	6,250	75%	18,750		-
Subtotal				**$50,000**		**$12,500**		**$25,000**		**$12,500**
73200: Project & Regional Office Fit out										
Project Office fitout	including coolers	1	50,000	50,000	75%	37,500	25%	12,500		-
Regional Office fitout		5	10,000	50,000	75%	37,500	25%	12,500		-
Subtotal				**$100,000**		**$75,000**		**$25,000**		**$0**
Provide Training to Field Workers										
63400 Training (Enumerators & Data Collectors)										
Trainers (data entry)	50 trainers * 10 months * $800/month	500	800	400,000	10%	40,000	90%	360,000		-
Examiners (data entry)	50 examiners * 10 months * $800/month	500	800	400,000	10%	40,000	90%	360,000		-
Trainng costs (data entry)	500 NRe per student/instructor per day (	75,000	6.6	495,000	10%	49,500	90%	445,500		-
Training materials (data entry training)		1	50,000	50,000	10%	5,000	90%	45,000		-
Facilities (data entry)	rooms for courses (6 days)	750	150	112,500	10%	11,250	90%	101,250		-
Master Trainers (enumerator)	15 trainers * 10 months * $800/month	150	1,000	150,000	10%	15,000	90%	135,000		-
Trainers (enumerator)	25 trainers * 6 months * $800/month (60	150	800	120,000	10%	12,000	90%	108,000		-
Trainng costs (enumerator)	500 NRe per student/instructor per day (	60,000	6.6	396,000	10%	39,600	90%	356,400		-
Training materials (enumerator training)		1	50,000	50,000	10%	5,000	90%	45,000		-
Facilities (enumerator)	rooms for courses (200 NRe/day) 3 days	5,000	75	375,000	10%	37,500	90%	337,500		-
Training costs (data integration	Materials and costs (15 NRe/person)	1	150,000	150,000	10%	15,000	90%	135,000		-
Capacity building training for BEC & proj staff		1	144,928	144,928	0%	-	25%	36,232	75%	108,696
Meeting/Workshop		1	15,000	15,000	20%	3,000	60%	9,000		3,000
Subtotal				**$2,858,428**		**$272,850**		**$2,473,882**		**$111,696**

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Data Collection and Integration									
72100 National Professional									
enumerators	5 NRe per voter	18,000,000	0.08	1,350,000	10%	135,000	90%	1,215,000	-
RC Center Manager	assume 8,000 NRe/month/1 per team (5	4,000	120.00	480,000	10%	48,000	90%	432,000	-
data entry helper	1 NRe per voter	18,000,000	0.02	270,000	10%	27,000	90%	243,000	-
data entry staff	5 NRe per voter	18,000,000	0.08	1,350,000	10%	135,000	90%	1,215,000	-
Volunteer allowances	2 per team, 500 RC, 32 weeks (224 day:	224,000	2.00	448,000	10%	44,800	90%	403,200	-
Proof reader manager	1 NRe per voter	18,000,000	0.02	270,000	10%	27,000	90%	243,000	-
Proof readers	1 NRe per voter	18,000,000	0.02	270,000	10%	27,000	90%	243,000	-
Temporary Packers	5 staff, 25 days per month, 12 months, $	1,500	3	4,500	10%	450	90%	4,050	-
Dist Computer Operator	1 per Distr* 12 months	900	150	135,000	10%	13,500	90%	121,500	-
Support at District (help cards e	2 per District (75) * 12 months * $100 mc	1,800	100	180,000	10%	18,000	90%	162,000	-
72100: Subcontract (laptop configuration)									
Initial set up of notebooks	50 staff	50	200	10,000	20%	2,000	80%	8,000	-
Subtotal				**$4,767,500**		**$477,750**		**$4,289,750**	**$0**
72100: Subcontract (Information Dissemination)									
Voter awareness camaigns & n	materials for awareness programmes	1	750,000	750,000	20%	150,000	80%	600,000	-
Subtotal				**$750,000**		**$150,000**		**$600,000**	**$0**
72200: Data Collection Equipment (Field level)									
Notebooks with OS		4,000	900	3,600,000	80%	2,880,000	20%	720,000	-
F-print scanner	20% spare & replacement	4,800	100	480,000	80%	384,000	20%	96,000	-
Web cam	20% spare & replacement	4,800	70	336,000	80%	268,800	20%	67,200	-
keyboard & mouse	20% spare & replacement	4,800	10	48,000	80%	38,400	20%	9,600	-

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Generator - 1 per team of 5		600	300	180,000	80%	144,000	20%	36,000	-
USB HDD		15	150	2,250	80%	1,800	20%	450	-
Subtotal				**$4,646,250**		**$3,717,000**		**$929,250**	**$0**
72500: Equipment (DVD for data storage)									
USB flash drive	4GB - 2 per registration unit	8,000	20	160,000	80%	128,000	20%	32,000	-
72500: Consumables at District Office									
Paper for draft VL - 2 copies of	18 mill - 20 voters page - 2 copies= 1.8 r	3,600	5	18,000	10%	1,800	90%	16,200	-
Paper for signature	6 signatures per sheet = 3 mill sheets - 6	6,000	5	30,000	10%	3,000	90%	27,000	-
toner for draft VL	1.8 million pages, 3,500 per toner	514	110	56,540	10%	5,654	90%	50,886	-
72500: Consumables for data collection teams									
Miscellaneous expenses									
Pens for signature	1 pen per 300 signatures @ 40 NRe eac	60,000	0.6	36,000	10%	3,600	90%	32,400	-
Pens ball point	10 pens per notebook	31,000	0.2	4,650	10%	465	90%	4,185	-
Rulers - Steel	50 per team @ 3 for $1	30,000	0.4	12,000	10%	1,200	90%	10,800	-
Clipboard for signature	20 per team	12,000	3	36,000	10%	3,600	90%	32,400	-
Stapler	1 per notebook	4,000	2	8,000	10%	800	90%	7,200	-
Staples	10 boxes of 1,000 per notebook (15 NRe	4,000	2	8,000	10%	800	90%	7,200	-
Plastic file cover	2 per notebook	6,000	0.5	3,000	10%	300	90%	2,700	-
Binding clip (2" * 1")	2 per notebook (boxes of 10)	600	1.5	900	10%	90	90%	810	-
Photo screen	1 per collector	4,000	4	16,000	10%	1,600	90%	14,400	-
Power boards	1 per notebook	4,000	3	12,000	10%	1,200	90%	10,800	-
Power extension cords	1 per notebook	4,000	6	24,000	10%	2,400	90%	21,600	-
Lighting fixture	1 per notebook	4,000	15	60,000	10%	6,000	90%	54,000	-
Energy bulb	5 per notebook	15,000	5	75,000	10%	7,500	90%	67,500	-
Registration Center fit out (misc	10,000 centres, $75 each.	10,000	75	750,000	10%	75,000	90%	675,000	-
Subtotal				**$1,310,090**		**$243,009**		**$1,067,081**	**$0**

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Printing and Distribution of Registration Forms & Voter List									
74200: Subcontract (printing)									
Enrolment forms printing	20 mill @ 1.5 Nre	1	400,000	400,000	80%	320,000	20%	80,000	-
Printing of Final voter list	based on past costs	1	700,000	700,000	0%	-	75%	525,000	175,000
Subtotal				**$1,100,000**		**$320,000**		**$605,000**	**$175,000**
Project Management & Implementation									
71200: UNDP Quality Assurance									
Quality Assurance function	from below	1	989,000	989,000		118,000		578,080	292,920
Subtotal				**$989,000**		**$118,000**		**$578,080**	**$292,920**
71400: National Professional									
administrative staff cost	From below	1	1,338,600	1,338,600		232,764		671,760	434,076
IT staff cost	From below	1	127,200	127,200		21,624		63,600	41,976
Subtotal				**$1,338,600**		**$232,764**		**$671,760**	**$434,076**
71600: Local Travel									
Internal travel costs	domestic travel	1	20,000	20,000	25%	5,000	50%	10,000	5,000
Subtotal				**$20,000**		**$5,000**		**$10,000**	**$5,000**
72100: Rent for vehicles at District									

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Transport	1 per District for 10 months	60,000 NRe	750	900	675,000	10%	67,500	80%	540,000		67,500
Subtotal					**$675,000**		**$67,500**		**$540,000**		**$67,500**
72200: Purchase and maintenance of vehicles											
Project Vehicles	CO - 5, 1 per Region Office		10	35,000	350,000	75%	262,500	25%	87,500		-
Subtotal					**$350,000**		**$262,500**		**$87,500**		**$0**
73100: Rent for project office											
Project Office Rental	Per month, $10,000/month		28	10,000	280,000	14%	39,200	43%	120,400		120,400
Regional Office Rental	Per month, $1,500/month for 2 years		120	1,500	180,000	17%	30,600	50%	90,000		59,400
Subtotal					**$280,000**		**$39,200**		**$120,400**		**$120,400**
74200: Subcontract (evaluation & audit)											
Project evaluation			1	150,000	150,000	0%	-	50%	75,000		75,000
Project audit			1	60,000	60,000	0%	-	50%	30,000		30,000
Subtotal					**$210,000**		**$0**		**$105,000**		**$105,000**
74500: Fuel											
Fuel for Project vehicles	150km/day = 45,000 km per year= 135,(		168,750	1.2	202,500	14%	28,350	43%	87,075		87,075
Fuel for District Office vehicles	100km/day = 25,000 km per year * 75 Di		234,375	1.2	281,250	20%	56,250	70%	196,875	20%	28,125
Fuel for Generators	10 litre per day * 500 RC = 1.5 million litr		1,500,000	1.2	1,800,000	20%	360,000	70%	1,260,000		180,000
Subtotal					**$2,283,750**		**$444,600**		**$1,543,950**		**$295,200**

BUDGET ESTIMATE VOTER LIST WITH PHOTO

GRAND TOTAL US$				**$23,201,169**		**$7,152,533**		**$14,322,556**	**$1,726,080**
Contingency		5%		1,160,058		357,627		716,128	86,304
GRAND TOTAL US$	**Including Contingency**			**$24,361,227**		**$7,510,160**		**$15,038,684**	**$1,812,383**
			NRP	1,851,453,286					
UNDP Costs									
Donor Coordinator	24 months	24	12,500	300,000	17%	51,000	50%	150,000	99,000
Reporting Manager	24 months	24	12,500	300,000	17%	51,000	50%	150,000	99,000
Programme Associate	36 months	28	2,000	56,000	14%	7,840	43%	24,080	24,080
Procurement & Operations	2 staff * 12 months	24	2,000	48,000	17%	8,160	50%	24,000	15,840
Voter List Assessment	qualitative assessment	1	175,000	175,000	0%	-	100%	175,000	-
International Consultant	100 days year - 2 years	200	550	110,000	0%	-	50%	55,000	55,000
Subtotal				**$989,000**		**$118,000**		**$578,080**	**$292,920**
Project Team/Administration									
Central									
Project Director	2 years	24	-	-	0%	-	0%	-	-
Deputy PD	1 person * 2 years	24	-	-	0%	-	0%	-	-
Deputy PD	1 person * 3 years	28	-	-	0%	-	0%	-	-
Operations Manager	1 persons * 24 months	24	2,500	60,000	17%	10,200	50%	30,000	19,800
Asset Manager	1 persons * 24 months	18	2,500	45,000	22%	9,900	67%	30,150	4,950
Operations Assistant	3 person * 28 months	84	200	16,800	14%	2,352	43%	7,224	7,224
Training manager	1 staff * 24 months	24	2,500	60,000	17%	10,200	50%	30,000	19,800
Training officer	1 staff * 28 months	28	400	11,200	14%	1,568	43%	4,816	4,816
Training Assistant	1 staff * 28 months	28	200	5,600	14%	784	43%	2,408	2,408
Administration Manager	1 persons * 24 months	24	2,500	60,000	17%	10,200	50%	30,000	19,800
Human Resources Officer	1 persons * 28 months	28	400	11,200	14%	1,568	43%	4,816	4,816
Snr. Procurement Officer	1 persons * 12 months	12	1,200	14,400	33%	4,752	67%	9,648	-

BUDGET ESTIMATE VOTER LIST WITH PHOTO

Procurement Officer	1 person * 2 years	24	400	9,600	17%	1,632	50%	4,800	3,168
Adminisration Assistant	3 person * 28 months	84	200	16,800	14%	2,352	43%	7,224	7,224
Finance Manager	1 persons * 24 months	24	2,500	60,000	17%	10,200	50%	30,000	19,800
Finance Assistant	4 persons * 28 months	112	200	22,400	14%	3,136	43%	9,632	9,632
Legal Contract Administrator	1 person * 2 years	24	400	9,600	17%	1,632	50%	4,800	3,168
Legal Contract Assistant	1 staff * 28 months	28	200	5,600	14%	784	43%	2,408	2,408
Communication Manager	1 staff * 24 months	18	2,500	45,000	17%	7,650	50%	22,500	14,850
Communication Officer	1 staff * 28 months	28	400	11,200	14%	1,568	43%	4,816	4,816
Communication Assistant	1 staff * 28 months	28	200	5,600	14%	784	43%	2,408	2,408
Monitoring Manager	1 persons * 18 months	18	2,500	45,000	33%	14,850	67%	30,150	-
Monitoring Assistant	1 person * 28 months	28	200	5,600	14%	784	43%	2,408	2,408
Voter Outreach Oficer	1 staff * 2 years	24	400	9,600	17%	1,632	50%	4,800	3,168
IT Officer	1 staff * 28 months	28	400	11,200	14%	1,568	43%	4,816	4,816
Office Secretary	3 person * 28 months	84	300	25,200	14%	3,528	43%	10,836	10,836
Drivers	10 staff * 28 months	280	250	70,000	14%	9,800	43%	30,100	30,100
Regional Office									
Reg. Operations Manager	5 persons * 24 months	120	2,000	240,000	17%	40,800	50%	120,000	79,200
Operations Assistant	5 person * 2 years	10	200	2,000	17%	340	50%	1,000	660
Adminisration Assistant	5 person * 2 years	10	200	2,000	17%	340	50%	1,000	660
Human Resources Officer	5 persons * 2 years	10	400	4,000	17%	680	50%	2,000	1,320
Asset Management Officer	5 person * 2 years	10	400	4,000	17%	680	50%	2,000	1,320
Reg.Training Coordinator	5 staff * 24 months	120	2,000	240,000	17%	40,800	50%	120,000	79,200
Training officer (Master Trainer	15 staff * 2 year	360	400	144,000	17%	24,480	50%	72,000	47,520
Office Secretary	5 person * 2 years	120	300	36,000	17%	6,120	50%	18,000	11,880
Drivers	5 staff * 2 years	120	250	30,000	17%	5,100	50%	15,000	9,900
Subtotal				**$1,338,600**		**$232,764**		**$671,760**	**$434,076**
IT Team									
Software Support	call support 1*2 years	24	1,000	24,000	17%	4,080	50%	12,000	7,920
Hardware Engineer	1 * 2 years	24	1,500	36,000	17%	6,120	50%	18,000	11,880
Computer Operator	5 * 2 years	120	500	60,000	17%	10,200	50%	30,000	19,800
IT assistant	1 person * 2 years	24	300	7,200	17%	1,224	50%	3,600	2,376
Subtotal				**$127,200**		**$21,624**		**$63,600**	**$41,976**