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| --- | --- | --- | --- | --- | --- | --- |
| **Process** | **System Roles** | | | | | |
| **Human** | **Non-Computing**  **Hardware** | **Computing**  **Hardware** | **Software** | **Database** | **Communication**  **& Network** |
| **Data Entry** | **A. Weather stations** 1. Send data collected from sensors to ministry representative.  **B. Forest Ministry Representative**  1. Collect data from weather station.  2. Send data to forest ministry.  **C. Forest Ministry**  1. Send data to city corporation representative.  **D. City Corporation Representative**  1. Input data to the system.  **D. Internal IT Expert**  1. The IT experts make sure the data is protected in the system.  2. They must make sure the website is always running.  3. They keep a backup ready in case of power failures.  **E. External IT Expert**  1. The internet service providers provides internet connection to the representative to do entry data. | **A. Paper**  1. Data sheet is printed on paper and this is stored as backup.  **B. File Holder**  1. Data sheets are kept in organised file holders.  **C. Cabinets**  1. The files are kept in the cabinets.  **D. Telephone/Cell Phones**  1. If there is need for telecommunication, telephones will be needed. | **A. Sensors**  1. To collect the weather data, these devices are needed. Data is collected by weather stations only.  **B. PC/ Laptop/**  **Other**  **computing**  **device**  1. The data from the sensors are stored on storage devices of computers.  **C. Printers/Copiers**  1. Printers and copiers are used to print and make copies of the data sheet.  **D. Router/ Internet Cables by ISP Providers/ Switch**  1. From networking side, internet cables by the ISP providers or router or switch used by the users of system.  **E. Pen Drives**  1. This is used as another medium by the users of system to pass the data. | **A. Microsoft Excel / Google Sheets**  1. All data collected is stored on computers in .CSV files which can be accessed using Excel/Sheets  **B. Operating System**  1. To operate the computer where data is collected and stored, we need an operating system like Windows/ Linux  **C. Printing software**  1. Printing software needed if data sheet is wanted in physical form or copies are to be made.  **Servers**  1. Database servers used by system for storing data and data entry by city corporation n representative. | **A. Microsoft Excel / Google Sheets**  1. All data collected is stored on computers in .CSV files which can be accessed using Excel/Sheets.  **B. System database**  1. Representative can use the system database in order to input and update data.  **C. Data files/ Log files (physical copies)** 1. Paper copies of data is printed and stored in holders and cabinets. | **A. Telecommunication/phone calls**  1. Representative and ministry can communicate with each other by making phone calls.  **B. Internet**  1. Internet will be needed for representative to entry data into system.  **C. Emails**  1. Representative and ministry can communicate with each other by sending emails. |
| **Data Verification** | **A. City Corporation Representative**  1. After receiving data and before inputting data, representative verifies the data manually. | **A. Pen and Paper**  1. Verifies that data is alright and processed with stamps and signatures. **B. Data Sheet in**  **Printed Version**  1. Data sheet is collected in a printed form.  **C. File Holder**  1. Data sheets are kept in organised file holders  **D. Cabinets**  1. The files are kept in the cabinets  **E. Telephone/Cell Phones**  1. If there is need for telecommunication, telephones will be needed. | **A. Printers/Copiers**  1. Printers and copiers are used to make copies of the verified data sheet. | **A. Printing software**  1. Printing software needed if data is wanted in physical form or copies are to be made. | **A. Data files/ Log files (physical copies)** 1. Paper copies of data is printed and stored in holders and cabinets. | **A. Telecommunication/phone calls**  1. If necessary, representative can communicate with ministry and other stakeholders by making phone calls. |
| **Generate reports** | **A. Forest Ministry**  1. Downloads reports to analyse any changes are needed to the system.  **B. City Corporation**  1. Downloads reports for making decisions and announcing if people of the city should be wary about atmosphere.  **C. Weather stations**  1. Downloads reports as well for making important decisions.  **D. Users**  1. Users are able to generate weather reports and make relevant decisions.  **E. Internal IT Expert**  1. Creates the report template for to be downloaded.  2. Maintains the system so that if there is any problem they can fix that.  **F. External IT Expert**  1. The internet service providers provides internet connection to the representative to access system and download relevant reports. | **A. Paper**  1. Users and other stakeholders have the options to print physical copies of reports.  **B. Telephone/Cell Phones**  1. If there is need for telecommunication, telephones will be needed. | **A. PC/ Laptop/**  **Other**  **computing**  **device**  1. PC is used to access the system and view and print relevant reports.  **B. Printers/Copiers**  1. Printers and copiers are used to print and make copies of the reports.  **C. Router/ Internet Cables by ISP Providers/ Switch**  1. From networking side, internet cables by the ISP providers or router or switch used by the users of system. | **A. Operating System**  1. To operate the computer, we need an operating system like Windows/ Linux  **B. Printing software**  1. Printing software needed if report is wanted in physical form or copies are to be made. | **A. HDD**  1. Soft copies of reports are the data the users and stakeholders have access to at this stage.  **A. Reports (physical copies)** 1. Paper copies of reports are the data the users and stakeholders have access to at this stage. | **A. Internet**  1. Internet will be needed for stakeholders to access the system and the data.  **B. Telecommunication/phone calls**  1. Forest ministry, city corporations and representatives can communicate with each other by making phone calls.  **C. Emails**  1. Forest ministry, city corporations and representatives can communicate with each other through emails. |
| **Propose changes to system** | **A. Forest Ministry**  1. After analysing the report, propose changes to system and send it to city corporation representative.  **B. City Corporation Representative**  1. Receive proposed changes from ministry and passes it along to the city corporation.  **C. City Corporation**  1. Receive proposed changes from representative and implement it.  **D. Internal IT Expert**  1. Apply the proposed changes to the system.  **E. External IT Expert**  1. The internet service providers provides internet connection to the stakeholders’ emails and access to system. | **A. Paper**  1. Document of proposed changes is printed on paper and sent out.  2. A copy of this document is stored as backup.  **B. File Holder**  1. Documents are kept in organised file holders.  **D. Cabinets**  1. The holders are kept in the cabinets.  **D. Telephone/Cell Phones**  1. If there is need for telecommunication, telephones will be needed. | **A. PC/ Laptop/**  **Other**  **computing**  **device**  1. PC is used to access the system and view and print relevant reports.  **B. Printers/Copiers**  1. Printers and copiers are used to print and make copies of the reports.  **C. Router/ Internet Cables by ISP Providers/ Switch**  1. From networking side, internet cables by the ISP providers or router or switch used by the users of system. | **A. Operating System**  1. To operate the computer, we need an operating system like Windows/ Linux  **B. Printing software**  1. Printing software needed if report is wanted in physical form or copies are to be made.  **C. Microsoft Word**  1. The document is drafted on a text editing software and the most used software is Microsoft Word. | **A. Microsoft Word**  1. The document for changes is the only form of data and can be accessed using Word.  **B. Physical copies of document** 1. Paper copies of document is printed and stored in holders and cabinets. | **A. Internet**  1. Internet will be needed for stakeholders to access the system and the data.  **B. Telecommunication/phone calls**  1. If necessary, stakeholders can communicate with each other by making phone calls.  **C. Emails**  1. If necessary, stakeholders can communicate with each other emails. |