STORING TWENTY MILLION PARCELS

Bhoomi: An e-Conveyancing System for Karnataka State India

Bhoomi is one of the largest property-information databases in the world, containing land-administration information on twenty million parcels owned by 6.7 million farmers in 176 sub-districts of Karnataka State, India. As an e-Conveyancing system operating within a secure extranet, it provides public information on any agricultural land-parcel via its Kiosks. The author discusses the background, and implementation strategies and innovations, map issues, interoperability and lessons learnt.

Bhoomi is built, operated and owned by the Revenue Department of Government of Karnataka, India. The National Informatics Centre, a Department of Government of India. The Government of India largely funded the project, with some critical components financed by the Government of Karnataka. The user interface is in the vernacular language (Kannada) and retrieval of information requires just the survey number of the property. Operators in the Kiosks at village and Taluk (sub-district) level help farmers to extract information. Table 1 shows the services offered through Kiosks, and charges made for these.

The Challenges

The accurate delineation and geodatabase storage of twenty million properties is a massive, costly and time-consuming job, while the information is of a highly temporal nature. Therefore from the beginning a step-by-step approach was adopted by focusing on creation of a database of attribute information such as Records of Rights, Tenancy and Crops (RTC) and Mutation Register, using the survey number of each property as primary key. Emphasis was also on warranting automated update, on phased introduction of changes in organisational culture/capability, and on the successful re-engineering of all business structures, processes and operations within the Revenue Department. Development and implementation of Bhoomi could potentially have been impeded by many challenges. For example, the IT capability within the Revenue De-partment was low; the nine thousand village officials who manage the land records were aged and modestly educated, and the district administration was overloaded with problems concerning drought, drinking-water scarcity, elections and so on. To tackle the challenges a detailed implementation strategy was adopted (see textbox). This has paid off; Bhoomi is fully operational and the entire Revenue Department now conducts eConveyancing. Another main reason for success is that land records in the villages have been maintained fairly systematically and are, in contrast to urban areas, up to date. Further, the absence of maps is not a great issue, because the villagers have a mental picture of distribution of land and ownership.

Innovations

The biggest innovation is the automation of attribute information in land records without waiting for the availability of spatial information in digital format. Many years have been wasted debating trivial issues such as accuracy and method of survey. Although the use of hand-written RTCs has been banned, manual RTCs created prior to computerisation will still be valid. The ban on recruitment of new employees in government organisations was overthrown by making use of Government policy to recruit dependants of those employees who died in harness; sufficiently qualified youngsters could be recruited and trained in each Taluk. The Village Account-ant was authorised to sign RTC copies after printing, so that it was not necessary to wait for officials unavailable full-time in Kiosks. The procedure for application of RTC copies was simplified. In the past farmers were discouraged from filing applications by obliging them to provide proof of identity and reason for application. Today only survey number or name, along with village, is requested. All this information has been displayed in all Kiosks and Taluk offices.

Section 128 of the Karnataka Land Revenue Act 1964 has been amended to permit applicants of mutation to get field-sketches, to avoid delay in surveying and to reduce the long list of pending cases. To further smooth the mutation process, the Revenue Department and Department of Survey Settlement and Land Records have been merged into one organisation. To ensure timely provision of information, one node of Bhoomi has been established in the office of the Sub-Registrar of Department of Stamps and Registration. Co-ordination between the office of the Sub-Registrar and Taluk office has been improved so much that an intimation of deed regis-tration reaches the Kiosks next day. The Land Revenue Act has been amended to facilitate Public

Private Partnership in establishing and maintaining Kiosks, and to legalise the storage and transfer of land information in digital form. To support government policy of encouraging land holdings by women, the sex of the owner is registered.

Implementation Strategy

- All officials of the Revenue Department, including 9,000 village officials, had to follow training programmes.
- Private data-entry agencies were employed at district level, often after training.
- In addition to officers of the National Informatics Centre (NIC), every district received support from one private consultant.
- Employees of the Revenue Department should feel themselves owner of the system. To ensure this, and correctness of the database, detailed guidelines were issued.
- Though data entry was started simultaneously in all districts, the progress of a few districts was closely monitored so as to arrive at understanding of implementation issues.
- The manual system of mutation was banned as soon as, following thorough pilot studies, Bhoomi was introduced in each Taluk.
- User charges were fixed for all the services to ensure that Bhoomi would be self-reliant.
- The required number of young, educated, committed villages officials were selected and trained on Bhoomi software; the software was designed to minimise day-to-day data-entry work by others than these village officials.
- While training of village officials began immediately, it was decided to engage the services of data-entry agencies to depute data-entry operators to do day-to-day data-entry work, to compensate for a lack of trained village officials. However, these operators are removed after one year of operations.
- Key requirements include physical, logical and procedural security measures. Further, the security of e-documents has to be protected against loss, corruption and access by unauthorised personnel. Care was taken of all these aspects.
- To ensure Integrity, Authenticity, Non-repudiation, Audit trails and Privacy, a state-of-the-art bio-logon metrics system from Compaq was employed which works on the basis of fingerprints.
- To prevent hacking into the system by imitating other users, and also to ensure non-repudiation, a password-based security system was replaced by fingerprint authentication.
- To ensure non-repudiation, provision was made for scanning original mutation orders of revenue and notices served on interested parties.
- User access is managed and monitored by defining user profiles and user groups, which determines the use of functions and data.
- A system was put in place to achieve routine maintenance and upgrades to minimise any disruption to the service.
- An action plan and sufficient funds were made available for regular upgrades and maintenance of a progressive programme of improvement and development.
- Daily, weekly, monthly and yearly backups stored at other locations secure the databases in Taluk office. Preventive maintenance, along with detailed guidelines on responsibilities and sufficient allocation of funds, prevents lost of valuable information and enables, in the event of disaster, restoration of services without delay.

Map Issues

Cadastral field-sketches in Karnataka have been created on sound surveying principles, using chains and tapes. The relative accuracy of property boundaries meets all requirements, though the absolute positions of properties may be shifted. Since digitising all the sketches of twenty million properties would take years, these should be scanned and linked with the attribute database using Survey Number. Because digital data can be quickly retrieved, it would not only facilitate viewing but also improve consistency between existing sketches and those newly created by authorised private surveyors. Digitising village and sub-division maps belonging to the Director, Survey Settlement and Land Records will result in the creation of a cadastral map of Karnataka without accurate delineation of property boundaries. After geo-referencing, these maps can be linked to the Bhoomi records using Survey Number, so as to be able to visualise properties and verify their completeness. This would also facilitate visualisation of the rich crop information available in Bhoomi, along with many other applications. A dense network of Ground Control Points (GCP) throughout Karnataka should be created with GPS. For this, licensed surveyors should be trained in using modern surveying equipment. To ensure that over the years all properties will be accurately surveyed, all measurements should be done using modern equipment. These accurate measurements would also allow improvement in geo-referencing accuracy.

Broadening Scope

The system can be modified for use in urban areas and some efforts in this direction have already been made. However, in urban areas the issues are more complex than in rural areas; the Property Cards (Record of Rights) and the cadastral maps are almost totally outdated and the deed is the only information available. Relating these deeds to properties on the ground is often impossible. A solution would be a link with Nirmala Nagara, a development initiated by the Directorate of Municipal Administration of Karnataka for collecting urban property tax whereby owner/tenant information of each property is being collected by physically visiting each property. A further extension could be developing Bhoomi into a fully-fledged, paperless eConveyancing solution by bringing all players into Bhoomi. These would include real-estate agents, conveyancers, financiers, the Department of Stamps and Registration, Department of Survey Settlement and Land Records, Department of Town Planning and Directorate of Municipal Administration. By introducing an eCommerce module, instantaneous and automated money transfer on services provided could be achieved. As part of Nirmala Nagara Project an eCommerce module has already been developed which is freely available. The introduction of e-Conveyancing, together with other massive changes, enables the cleaning up of the overall system. This opportunity should be used to review all the regulatory frameworks associated with land administration, about thirty in all, and the seventeen institutions involved.

Interoperability

Duplication of effort in collecting geo-information should be avoided by improving co-ordination between all land-administration organisations. For this, standards, specifications and data-sharing agreements, data models and infrastructures, etc, are required. The services should be provided via the internet, especially in urban areas where web awareness, availability and utilisation is rapidly increasing. To enable access to electronic documents, use should be made of XML (eXtensible Markup Language) and XML schemas, which should be available to all parties and formally published. The infrastructure and legislation required for electronic transfer of documents and their authentication using solutions based on Public Key Cryptography, such as Digital Signature, Certificate-based Authentication, Trusted Third Party (TTP), Public Key Infrastructure (PKI), Cryptographic Hash Function, Encryption, and CryptoServer are presently available in India. They are being practised in the financial and stock markets. These solutions and other access-right control measures can protect the integrity, authenticity, non-repudiation and privacy of data and processes that jointly comprise an e-Conveyancing service.

Lessons Learnt

The tenure security of farmers can be much improved by making information on land more accessible. This is achieved by setting up and managing a system of land-records open to the public. The citizens of India are prepared to pay for government services when of reasonable standard. Increasing the number of government employees would not result in a commensurate improvement in services. However, the introduction of transparency and accountability, together with motivating, training and empowering employees, can do so. Although almost all the mutation processes are retained manually, the improvement in services has proved revolutionary because additional processes have been introduced. The incremental implementation approach has allowed government to build technical and administrative procedures, thus ensuring institutionalisation of the new approaches.

Concluding Remarks

The transition from the present organisational culture, organisational capability, business structure and operations to the sketched e-Conveyancing future should be done in a planned and controlled manner, and on a phased, modular and incremental basis; the transitions should not be a one-off, big-bang affair. Consultation with all stakeholders is indispensable.

Further Reading

- Ministry of C&IT, 2000. The Information Technology Act, 2000, 21 of 2000.
- Revenue Department, 2000. Computerisation of Land Records Guidelines, Volume 1 to 6, Revenue Department, Government of Karnataka.
- Revenue Department, 2005. Bhoomi, Computerisation of Land Records. Revenue, Department, Government of Karnataka.

https://www.gim-international.com/content/article/bhoomi-an-e-conveyancing-system-for-karnataka-state-india