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# Online Delivery of Land Titles to Rural Farmers in Karnataka, India

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# Executive Summary

The Bhoomi (meaning land) project for online delivery of land records in Karnataka, India—one of the country's 26 states—shows that making government services available to citizens in a transparent and efficient manner can empower them to challenge corrupt and arbitrary bureaucratic action. It also illustrates how well designed e-governance projects can be used to take discretion away from civil servants and provide benefits to rural farmers.

## The role of land records

India's system of land records is crucial for proving ownership of one's land. It is also important for land taxes, reforms, and administration. Indeed, creation of an accurate, complete land information system is one of the key challenges for governance today. Although land records can cover a wide variety of information, the most important area involves geological data (such as land shape, size, forms, and soils); economic data related to crops, irrigation, and land use; and information about legal rights, liabilities, and taxation.

Certainty of ownership is an essential prerequisite for development of an efficient land market. A study carried out by Mckenzie in India shows that India loses 1.3 percent of its potential growth because of badly maintained land records. Land records form the basis for assignment and settlement of land titles, and must protect the rights of a land's legal owner. Manual maintenance of land records, however, does not facilitate this objective. It also hinders effective collection and analysis of the data contained in them—data that are crucial for, among other things, increasing bank loans, resolving legal disputes, promoting accurate crop data and insurance, and ensuring efficient land markets. India's central and state governments have long recognized the need to reform the country's system of land records.

## The move away from manual record-keeping

Efforts to computerize land records in Karnataka began in 1991, but not until March 2002 was the task completed in all subdistricts. Karnataka's Department of Revenue has now computerized 20 million records of land ownership covering 6.7 million farmers in the state. Under the manual system, 9,000 village accountants, each serving three or four villages, maintained land records. Farmers had to seek out a village accountant to get a copy of the RTC (record of rights, tenancy, and crops)—a document required for many common tasks, such as obtaining bank loans, apart from proving ownership.

But village accountants were not easily accessible, and it took them 3–30 days to provide such records, depending on the record's importance for the farmer—and the bribe paid to the accountant. Bribes typically ranged from about $2–40, but could exceed $200 if details on the records were to be written in a deliberately ambiguous fashion. Moreover, land records held by village accountants were not subject to public scrutiny.

Mutation requests—to alter land records upon sale or inheritance of land—also had to be filed with village accountants. Accountants were required to issue these notices to interested parties and post them in village offices. But often neither action was carried out, nor was any record of the notices maintained. If no objections were received within 30 days, changes to land records were to be carried out by revenue inspectors. But in practice it could take a year or two for records to be updated. Even where accountants were law-abiding, oversight and accuracy suffered as the number of records multiplied over generations and accountant supervisors were burdened with numerous other regulatory and development tasks.

## Benefits of Bhoomi

Bhoomi has succeeded because it targeted a critical need for farmers and it has delivered significant benefits to them. Among the most important of these benefits is a reduction in the discretion of village accountants, who are now forbidden to issue manual copies of land records. Only computerized records are valid, and they can be obtained online without any formal application for about $0.32 at land record kiosks in 177 *taluk* offices. (Taluks are subunits of subdistricts.) Records are now tamper- proof and are in the public domain open for scrutiny.

In addition, steps have been taken to allow farmers to submit mutation requests at the kiosks. At 20 of the kiosks, farmers can check the status of their requests using touch screens. If a revenue inspector does not complete a request within 50 days, the mutation request automatically gets escalated to a second person in the taluka designated to authorize mutation requests. Moreover, these requests are now handled on a first-come, first-served basis, thus cutting down on favoritism.

All these measures limit opportunities for bribery. In addition, operators of the computerized record system are held accountable for their actions and decisions through a log of all transactions. Bhoomi also makes it easier for many people—particularly the poor, the illiterate, and women—to obtain land records. As a result about 0.8 million farmers obtain their land records every month and more come forward to get data based on the ground reality and changed in their land records.

During the next phase of the project all the taluk databases will be uploaded to a Web-based central database. Land records will then be available at private rural Internet access points. Many other benefits will flow from centralization of the database.

## Future steps

There are plans to open a thousand Bhoomi kiosks statewide through a public-private partnership. In a pilot experiment, 20 telecenters have been established in the Mandya district to view, print, and distribute land records. These centers are allowed to charge a higher fee to cover their costs and earn a small return—an approach that will enable their viability throughout rural Karnataka. These kiosks would work as an efficient digital interface with government at the village level.

In addition, other services, such as downloading of forms used for services and beneficiary schemes, could be added to the content. Departments such as forestry, animal husbandry, and sericulture may create their own content for delivery to rural areas. There are also plans to electronically link the Bhoomi kiosks with the newly computerized Kaveri centers, which register property sales online and can provide cues to Bhoomi to carry out changes. And in the future, Bhoomi kiosks will collect land taxes.

Another innovation involves data from crop surveys, which are currently collected manually and updated in the taluk database three times a year. Under a recent pilot, a locally designed handheld computer was given to 200 village accountants to capture crop data live in the field. The accountants found it easy to learn how to use the handheld computer.

Bhoomi has received positive attention from the media and won several awards. Moreover, independent evaluations have found that the project has significantly reduced corruption and improved service delivery. Accordingly, the Indian government is making efforts to replicate Bhoomi in other states.

# Application Context

## Importance of Land Records in India

The collection of land revenue and the existence of the institutions of the State have been co-terminus. A historical analysis of ancient Indian policy suggests that tax on land played a pivotal part in the evolution and maintenance of the systems of governance.

In ancient times land revenue was possibly the only source from which the entire income of the Government was derived. Further, its incidence was on a large section of the population as a major proportion of the people relied on land for their livelihood and existence. Thus, tax on land proved to be the primary source of the State's wealth. The revenue collected varied among regions and also depended upon the regimes. Broadly speaking it was a share of the produce paid in kind or cash. The mode of assessment and collection underwent a change when the British took over the administration. Lands were measured roughly and village records of lands were gradually built up. Thus, closely linked to the collection of land revenue was the creation of an array of land records wherein collection of revenue could be systematized and recorded.

India's independence ushered in the era of the Welfare state and accordingly 'land revenue' or the tax on the agricultural land also witnessed a reduction. Further, other sources of taxation became the primary sources of income for the Government. However, the importance of land records cannot be undermined due to the decline in the importance of land revenue. The entire structure of land records management that was associated with revenue collection now had to sustain its relevance suo moto. The plan document of the Seventh Five-Year Plan rightly opined:

> 'Land records form the base for all land reforms and therefore regular periodic updating of land records is essential in all states'.

Thus, the concept of collection of revenue necessitated the maintenance of land records, in a rudimentary form in ancient times and a more systematic form during the British administration. Maintenance of land records has now become more vital for administrators and creation of a land information system is one of the key issues facing governance today.

Land records itself is a generic expression and could include, in Karnataka State, records like the Register of lands of Khetwar Patrika, Records of Rights, Tenancy and crop inspection register (RTC)- Form 16, khata register (Form 24), Khirdi (Form 25), Mutation Register (Form 12), Disputed cases Register (Form 8), etc.

However, certain types of information relating to land play a very important role. These may include primary information about land presented in terms of its geological information like the shape, size, land forms, soils; economic information related to land use irrigation and crops; and the information pertaining to the legal rights, registration and taxation. No improvement in

land can be made without acquiring rights to the land. These rights cannot be acquired until ownership is established.

The rationale for maintenance of land records originates from the following issues:

Land records form the basis for assignment and settlement of land titles. These records must stand the test of legal scrutiny. Land is a very precious source and the land Records system must safeguard the rights of the legal owner of the land. Issues of land rights not only raise legal complexities but also have socio-economic dimensions. The State needs to ensure the maintenance of an accurate and genuine land records system to further its policy objectives of land reforms, protection of legal rights over land and efficiency in maintenance and updating of these records. Manual maintenance of land records does hinder effective collation and analysis of the data contained in them.

In Karnataka State, the land records were earlier maintained through a manual system, involving 9,000 Village Accountants, each serving a cluster of 3-4 villages. Eight registers were maintained to record the following types of information:

1) Information on current ownership of each parcel of land, its area and cropping pattern, dispute, mutations and

2) Village maps that reflected the boundaries of each parcel.

Requests to alter land records (upon sale or inheritance of a land parcel) had to be filed with the Village Accountant. However, for various reasons (cases of disputes or to extract speed money) the Village Accountant could afford to ignore these 'mutation' requests. Upon receiving a request, the Village Accountant is required to issue notices to the interested parties and also paste the notice at the village office. Often neither of these actions was carried out, and no record of the notices was maintained. Notices were rarely sent through post. An update to the land records was to be carried out by a Revenue Inspector, if no objections were received within a 30-day period. In practice, however, it could take 1-2 years for the records to be updated.

Landowners found it difficult to access the Village Accountant, as his duties entail traveling. The time taken by Village Accountants to provide RTCs ranged from 3 to 30 days, depending upon the importance of the record for the farmer and the size of the bribe. A typical bribe for a certificate could range from Rs.100 to Rs.2000. If some details were to be written in an ambiguous fashion, out of selfish motives, the bribe could go up to Rs.10, 000. Land records in the custody of Village Accountant were not open for public scrutiny.

Over a period, several inaccuracies crept into the old system through improper manipulation by the Village Accountant, particularly with respect to government land. Even where Accountants were law-abiding, village maps could not remain accurate as the land was parceled into very small lots over generations. The system of physical verification of records by deputy Tehsildars[1] (supervisors of Village Accountants) became weak as the number of records

[1] The chief revenue officer for a Taluk.

multiplied and these functionaries were burdened with a host of other regulatory and developmental work.

# Implementation Process

The central and state governments have long been aware of the need to reform the land record system. The beginning of computerization of land records in Karnataka goes back to 1991 when the first pilot was initiated under the Ministry of Rural Development's Computerization of Land Records (CLR) project, fully funded by the Government of India. By 1996, projects for computerization of land records were sanctioned for all districts in the state of Karnataka. However, no provision was made to install computers at Taluk level where manual records were actually updated.

The breakthrough came when the State Government mandated that 'Bhoomi – Computerization of Land Records' would have to be undertaken & finished in all sub districts by March 2002. It was also decided to fully support development of a citizen centric land records system even if it meant substantial investment by State Government for those components of the project, which were not being funded by federal government. This political mandate was backed by full administration efforts at all levels. The major objectives to be fulfilled by Bhoomi project were:

- Facilitating easy maintenance and prompt updating of land records.
- Making land records tamper proof.
- Allowing farmers easy access to their records.
- Collating the information to construct database regarding land revenue, cropping pattern, land use, etc.
- Utilizing the data for planning and for formulating development programs.
- Enabling usage of this database by courts, banks, private organizations and companies, ISPs.

The Karnataka government's Department of Revenue planned to set up computerized land record kiosks (Bhoomi centres) across 177 taluk offices. These kiosks were to provide farmers with the Record of Rights, Tenancy and Cultivation (RTC) - a document needed for obtaining bank loans, giving proof of ownership, etc. The Bhoomi project was expected to speed up delivery of RTCs, without delays, harassment or bribery.

## Digitization of Legacy Data

The first and most important step to kick-start the Bhoomi system was to capture legacy data records in possession of Village Accountants numbering about 20 million. For this purpose, a comprehensive data entry software 'Bhoomi' was designed after extensive discussions at various

workshops at division, district and state level. The feed back from these workshops helped the department in designing this data entry software.

The manual records were withdrawn from the field in the entire state in a phased manner. A print out of the computerized records was individually signed by Village Accountants (100 percent), Revenue Inspectors (30 percent), Shirasthedar (5 percent), Tahsildar (3 percent), Assistant Commissioners (2 percent), and Deputy Commissioners (1 percent)[2] after comparing with the manual registers to authenticate the data. They also put their seal with the name and designation along with date of verification. The manual and computerized sets of records on the starting day now serve as original records and are kept in safe custody of taluk office. As and when the process of comparison and certification was over in a taluk, a notification was issued by the Deputy Commissioner prescribing use of only computerized RTCs for all legal and other purposes.

## Issue of Copies to Farmers

Land Records Kiosks have been made operational in all 177 taluks. Village Accountants can no more issue copies of the manual records, as only computerized records are valid. In every taluk, one Village Accountant has been designated as the Kiosk Village Accountant. The farmers get the copy of their record on payment of user charges of Rs. 15. Records are generated using the Bhoomi software running on kiosk computers and a back-end server holding the database. The records are signed by the Village Accountant at the kiosk and are provided to the farmers. In case of any small errors on the computerized records, the farmers can lodge a request with taluk office along with the copy of the record available with him. Correction is made in the computerized Bhoomi database if the error is found to be genuine and the corrected copy is then provided to the farmer free of cost.

## Mutation Process in the Field

When a change of ownership takes place through sale or inheritance, farmers can file an application for a mutation of the land record at the Bhoomi center at a separate operator assisted counter that handles mutations. Data from the application is entered into the terminal at the counter and a check list is generated for manual verification of data and documents by a supervisor. Each request is assigned a number. The number can be used by the applicant to check the status of the application on a Touch Screen provided on a pilot basis in some of the computerized kiosks. Once the manual verification is complete, an entry is made in the back end server which automatically generates notices that are to be served to affected parties. Notices are collected by Village Accountants on their visit to the taluk office as per a fixed schedule.

Village Accountant serves these notices to interested parties and gets their acknowledgement on one of the notice copies. If every thing is in order, the Revenue Inspector passes appropriate mutation order in the mutation registers after a prescribed period of 30 days

[2] Figures in bracket indicate the percentage of records signed by different officers.

from the date the notice is issued to the party. The mutation order is then brought to the Bhoomi centre. Notices with acknowledgement of interested parties, mutation order passed in the field are then scanned on to the system. Revenue Inspector who has passed these orders in the field authenticates this data entry. The Deputy Tahsildar verifies that everything typed and scanned is as per physical mutation records. The system then automatically updates the particular land record. Physical records are filed in the record room.

## Crop Updation

Crop updation is a batch process. For this purpose Bhoomi data of concerned crop fields are supposed to be provided to private data entry agency for doing batch updation 3 times a year. Checklists are to be generated after crop updation and should be validated and signed by Village Accountants before updated data is merged with Bhoomi main database.

## Legal Framework

The unamended Karnataka Land Revenue Act did not provide for Computerized system. The Act has now been amended and provides for the storage of data on storage devices and use of Bhoomi software to be notified by Government from time to time.

## Overcoming Implementation Challenges

Maintenance of equipment at 177 centers, many of which are located in far flung rural areas; dealing with isolated incidences of fraudulent certificates being presented at Banks; mitigating problems of farmers that have to travel long distances to reach a Bhoomi kiosk; lack of currency and poor quality of crop survey data; and problems of illiterate farmers in filing mutation forms are some of the challenges that the project team has grappled with.

Many actions have been taken to improve the up time of computers at Bhoomi kiosks. Apart from the 1000 officials that were trained at the district level, 108 village accountants were trained comprehensively in a two month residential training course on hardware and networking in Bangalore. Four of these trained VAs are being placed in each district to serve as resource persons for primary diagnostic and repair. Facility managers with service level agreements carrying stiff penalties have been assigned to each kiosk. The processing of payments to the facility managers has been decentralized so that the facility managers become more responsive to the needs in the field. All these measures have improved the up time to its current level of 98 percent.

The printing process is being made more secure to deal with the problem of fraudulent certificates. Officers continue to enjoy a large amount of discretion in the process of mutation, even as some measures have been put in place to curb corruption. Illiterate farmers may still face difficulties in filling out mutation applications. A key challenge is to create awareness amongst rural population of all the changes that have taken place in processing RTCs and mutation, so that

unscrupulous elements are not able to take advantage of their ignorance. Many of the future plans of Bhoomi are designed to deal with some of the key implementation challenges.

## Future Plans for Bhoomi

The Bhoomi database from all the 177 kiosks are planned to be uploaded on a central database every evening using a VSAT network of another application. Microsoft Corporation and the NIC have developed prototype architecture for the centralized data center and fifteen taluks' data has already been ported on the central platform. Funding support has been sought from the Government of India to establish the central repository in Bangalore. Rural Internet kiosks can access the data after the verification of their password, machine ID and the phone ID. This will provide a robust authentication procedure on the basis of which a rural telecentre will be charged a fee for each transaction.

A Government order decentralizing Bhoomi to village level has been passed. There are plans for opening a thousand kiosks statewide with public private partnership. In a pilot experiment, 20 telecentres have been established in Mandya district by N-logue[3] using the corDECT technology developed by the Indian Institute of Technology, Madras. These private kiosks can connect to the Mandya database through the N-Logue network; and view, print and distribute the land records. The Internet printing model has been made functional. These telecentres will charge a fee of Rs 25 instead of Rs 15, enabling them to retain Rs 10 per RTC to cover their operational costs and provide a small return on the investment[4]. Other services such as download of 100 important forms for services and beneficiary oriented schemes could be added to the content. Departments such as forestry, animal husbandry, sericulture, cottage industries may create content in their own domains for delivery to rural areas. A fee of Rs. 10 per RTC collected by the owner will make a thousand rural kiosks viable in rural Karnataka[5].

In another pilot, around 200 Village Accountants have been given Simputers (locally developed hand held computers) costing about Rs. 3.5 million. One round of crop updation for 600 villages was done using the Simputers. The second round of crop updation is expected to be done in last quarter of 2003. Teething problems such as Simputer maintenance, software bugs have been manageable. However, a further expansion has to wait until the cost of such handheld devices reduces appreciably. Bhoomi is currently experimenting with hand held computers designed by Media Lab Asia.

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[3] N-Logue Communications Pvt. Ltd. Is a private company promoted by the Telecommunications and Computer Networking Group of Indian Institute of Technology, Madras.

[4] Most of the users spend Rs 25-50/- in travelling to a taluk kiosk. Some of the users when questioned about the additional fee indicated that an additional charge of Rs 10/- would be totally acceptable to the farmer community if the RTC could be delivered through a rural telecenter. To make sure that farmers are not overcharged, the stationery used by the telecentres to print RTC would be stamped with the maximum price that can be charged for a RTC just like the Maximum Retail Price stamp on product packages sold in India.

[5] User fee being collected by Bhoomi is approximately Rs. 100 million in a year. If 50 percent of the RTCs are issued from one thousand rural kiosks that are proposed to be set up, each kiosk will earn an average annual revenue of Rs. 50,000. Accounting for variability across kiosks, the floor earning could be in the range of Rs. 30,000. At this level of earning a kiosk can be viable.

The scope of Bhoomi is limited to maintenance of land records, and issue of RTCs. Departmnets of Stamps and Registration is responsible for registration of deeds in case of a change in ownership takes place through buying/selling or inheritance. The department has recently computerized the registration of such deeds in a project tiled Kaveri (Karnataka Valuation and e-Registration). There are plans to link up the Bhoomi centers with the newly computerized Kaveri centers to provide the cue to Bhoomi to carry out a mutation. Earlier Kaveri offices sent this information in a paper document. Now it is sent in a digital form using a storage media. Once the state wide area network is established, this information will flow over the wire.

The total land revenue collected by village accountants in Karnataka is Rs 100 million. In future Bhoomi centers will be asked to collect land revenue. However, the issue of RTC may still not be made contingent on payment of land revenue as such a procedure is deemed coercive by the citizens and is politically unacceptable.

# Impact Analysis

Improving the land record delivery system has a significant social and economic impact in rural areas. Nearly 2500 bank branches in Karnataka loan approximately Rs 40 billion to farmers as working capital every year. A copy of the RTC is absolutely essential for the farmer to procure the loan. Effective land record management can help Banks in recovery. In the long run, Bhoomi will help improve the investment climate of Karnataka by maintaining clean records of land ownership in urban and rural areas. A Mckenzie report noted that India looses 1.3 percent of potential investments because of its poor land record system[6].

More than 70 percent disputes in courts are land based. Adjudication of disputes can be faster if access to land records is made efficient. Many mutations in land records are challenged in the courts. Such challenges are often upheld on technical counts when defenders fail to produce copies of notice that were served to the affected parties. Since a million notices are served in a year, a manual storage and retrieval system makes it difficult to retrieve old notices for submission to the courts. In the Bhoomi system every notice that is issued is scanned and a copy is easily retrievable from the Bhoomi kiosks. This facility in itself will create a huge impact on the resolution time of disputes. It will also reduce petty corruption for facilitating or hindering the process of retrieval of manual notices. The number of disputes will also come down because of the open access to data and the transparent and traceable mutation process.

Crop insurance has been made compulsory for those who take farm loans in Karnataka. In the year 200-2001 only 0.38 million farmers had insured the crop, paying Rs. 112 million as premium and collected Rs 40 million in damages. However, in 2002-2003 nearly one million farmers (15 percent of the farming community) insured their crops paying Rs 420 million as premium and collected Rs2960 million in damages. There has been a substantial increase in the number insurers amongst framers who have not taken a loan. Earlier farmers could obtain

[6] Mckenzie Report, India the growth Imperative.

falsified crop records from village accountants. Since droughts usually destroy the entire crop, there was no way of verifying such records. Often such favors are done for the rich farmers who can afford to pay bribes. Since insurance is a zero-sum game, the poor would suffer in future as premiums would go up. With the implementation of Bhoomi, crop data on the back of the RTC is the only document that can be used to back a claim. Since efforts are on to make the crop data more current (and accurate) and the VA accountable for the data, corruption in pay out of insurance claims is likely to be reduced. At a later stage insurance companies will be able to seek cropping data from a central computerized database. This will make the insurance pay out more equitable.

Bhoomi as a transparent land record system is a vast improvement over the manual system that it has replaced. The system is likely to facilitate the land sale and rental markets in Karnataka by reducing a part of the transaction costs. Many researchers have noted that any reallocation of land in favor of landless and small farmers will increase their income as well as over all agricultural productivity[7].

There is lack of data to isolate and assess the direct impact of the Bhoomi system on reduction in poverty levels. Total annual savings for farmers on the costs of obtaining an RTC are discussed later as a part of the cost and benefit analysis. These savings are particularly important for the small and marginal farmers.

For a fee of Rs.15, a printed copy of the RTC is obtained online in 5-30 minutes at computerized Bhoomi kiosks in 177 Taluk offices. The land records are in the public domain. Copies of RTC can be obtained for any land parcel in the taluk by providing the name of the owner or the plot (survey) number and any record can be viewed through a touch screen at a few kiosks.

Farmers can apply for mutation and expedite the process by reviewing the status of their request online, presenting documentary evidence to supervisors in the event that their request is not processed within the stipulated time period. With the computerized system, administrators can quickly determine the number of approved and overdue mutation orders. After computerization, there is a 85 percent jump in the number of mutation requests. In the last one year Bhoomi has carried out nearly one million mutations whereas in the previous two years, the average number of mutations carried out in the manual system were at the rate of 0.55 million per year. This change would seem to indicate a level of approval of the new system by the population, and willingness to update changes in land ownership that were previously left undocumented.

By the end of April 2004, the total revenue generated through issuance of RTCs was Rs. 270 million, and the monthly collection had stabilized to about Rs.8 million. It is estimated that between Rs. 90 and Rs. 100 million would be collected each year from charges for RTCs. Nearly 78.3 percent of all Bhoomi users take an RTC whereas 17.2 percent apply for a modified RTC (involving mutation) and 4.5 percent collect a copy of the mutation order. The users of Bhoomi collect these documents for a variety of reasons. The largest proportion of users (51 percent)

[7] Tim Hanstand, How are rural land sale markets in Karnataka impacting the poor's access to land?, Discussion paper, Rural Development Institute, University of Washington, School of Law, October 2001.

collect the RTCs for applying for loan from a Bank. Nearly 14 percent use an RTC to verify the outcome of a mutation request. About 16 percent use the documents in courts or to verify details of adjoining property.

Bhoomi is one of the few e-Government applications that have been evaluated by an independent agency using a systematic methodology. An evaluation conducted by the Public Affairs Council, Bangalore in July 2002, showed significant impact on efficiency in delivery and corruption[8]:

- Ease in use of the Bhoomi kiosks: Many users (66 percent) were able to utilize the Bhoomi kiosks with no help, in contrast with 25 percent, in the case of the manual system. Most users of the Bhoomi system (78 percent) found the system to be very simple. Many of the Bhoomi users (68 percent) had also made use of the manual system in the past; a majority of users (78 percent) who had past experience with the manual system found the Bhoomi system simpler.
- Complexity of procedures: Most users (79 percent) of the Bhoomi kiosks did so without having to meet any official except the counter staff, in contrast with 19 percent who had to meet one official, in the case of the manual system. The extent of complexity is reflected in the fact that 61 percent of the users of the manual system had to meet two to four officials for their work. Legacies of the manual system have not completely faded away. About 18 percent of Bhoomi users reported that their document was not signed by the appointed Village Accountant operating the kiosk, 6 percent reported that they filled out an application form for issue of an RTC.
- Errors in documents received: Users indicated that the Bhoomi kiosks provided error free documents to more users (74 percent), in contrast with 63 percent, in the case of the manual system. Among those reporting errors, wrongly spelt names were the most frequent error (81 percent in case of manual system, and 53 percent in the Bhoomi system). However, major errors in land details were noticed by 31 percent of those who reported errors in the manual system, in contrast with 4 percent in case of Bhoomi users.
- Rectification of errors: Given that errors are not unusual at this stage of development of the Bhoomi system, how efficient are the response systems? Almost all users of the Bhoomi system had confidence to complain and sought rectification (93 percent) as compared to less than half (49 percent) in the manual system. Half the complainants (58 percent) got timely

[8] The Report Card on the Bhoomi initiative sought to assess benefits derived by users of Bhoomi Centres in relation to improved quality of service and satisfaction. A sample survey was carried out with citizens who have used Bhoomi kiosks as well as a control sample of those who have used non-computerised land record providers. Quality of service and user satisfaction was compared across these two groups, to derive conclusions on the impact and benefit from the Bhoomi initiative. Data was collected from six districts reflecting geographic regions of Karnataka, and two Bhoomi kiosks were selected through sampling (weighted by intensity of use) among the kiosks operating in each district. A total of 198 respondents were interviewed across the Bhoomi kiosks. For the non-computerised facility user sample, four taluks were selected and 59 respondents interviewed. A team from AC Nielsen – ORG – MARG carried out the field survey and preliminary analysis.

response in case of Bhoomi, while such response was reported by only 4 percent of those using the manual system.

- Cost of service: All users of the Bhoomi facility who wish to receive a hard copy of the RTC are to pay a fee of Rs. 15/- each and receive a receipt for the same. A large segment of users (66 percent) reported that they did not get a receipt for the payment they made.
- Hidden costs: Citizens also incur hidden costs of time and effort to secure these certificates. Most Bhoomi users (79 percent) reported a minimal waiting time in the queue of 10 minutes or less, in contrast with 27 percent who could meet the concerned official in such short time. The bigger issue is the number of times a citizen had to visit these offices to get the certificate. While most users got the RTC (72 percent) with one visit to the Bhoomi kiosk, only 5 percent got it that fast in the manual system.
- Reduced corruption: The most serious issue is that of corruption and bribery. Two thirds of the users of the manual system paid a bribe – 66 percent of them reported having to do so very often. In contrast, only 3 percent of the users of the Bhoomi system reported paying bribes.
- Staff behavior: While technical capacity of the system plays an important role in its success, the approach of people who handle the task is of critical significance too. Most Bhoomi users (85 percent) rated staff behavior at the Bhoomi kiosks as 'good'; none of the users of the manual system rated staff behavior as 'good'.

Armed with genuine certificates farmers can raise loans for a variety of purposes and can not be easily harassed by Bank staff. Mutations became an instrument for rural corruption, exploitation and oppression. Landowners simply bribed the VA to change the titles of poor farmer's lands to their own name. Small farmers, mostly illiterate, could do little to change this state of affairs, either because they did not know of it or because they could not afford the VA's bribes. Media report quoting a farmer makes it evident that after Bhoomi, such practices would become difficult. "In one district in north Karnataka where feudalism still prevails, 32 farmers' lands had been recorded in the VA's name prior to computerization," Nagaraj says. "The man immediately sold the lot before Bhoomi began. I know of hundreds of such cases". Many reports in the print media have portrayed Bhoomi very favorably.

However, some early reports (based on small-sample interviews and anecdotal evidence) also pointed to problems and other limitations. For example Hanstand and Lokesh[9] interviewed 23 users of the Bhoomi system in January 2001 in one center and reported that 20 of the 23 farmers favored the old system. Teething problems (the kiosk had been working for 6 months) like power outage for 5-6 hours at the kiosk seemed to be the main reason for the dissatisfaction with the new system. Many of these teething problems were overcome subsequently. One interesting aspect of Bhoomi is the constant improvements that have been made in the application in response to the feedback received from various stakeholders. For example, the project has

[9] Tim Hamstand and Lokesh S.B., Computerization of Land Records in Karnataka: Observations form a Simple Field study.

already decided to redefine the role of tehsildar and the deputy tehsildar in the process of mutation because the feedback suggests that their intervention causes delay (a problem mentioned by Hanstand and Lokesh). Some of the reports indicate that there could be a lack of awareness about how the Bhoomi system works. For example, even though there are no forms to be filled in Bhoomi to get a RTC, some reports in media quote complaints in this regard.

### Impediments at the Grassroots

Ironically, while Bhoomi aims to help the poor, in regions like Bijapur in Karnataka, which has the highest demand for RTCs, it is the poor who appear to be struggling most with the new system. "We spend Rs 10 ($0.2) as bus fare to reach the town from our villages and pay Rs 15 ($0.3) for an RTC. Sometimes it takes two days because the queue is so long. The VA was better," complains Mehboob Modi Patel. Another farmer, Amsidda Irrappa Karnal, says, "I am illiterate. Who will help me fill up the application form [for the RTC] here?"

The project should help address gender inequality. Land ownership has long been a male bastion in India - in Karnataka women own just 12 percent of the land - and this is reflected in Bhoomi. Women in Dharwad district do not know of the new system. Those from Kalakawatagi village in northern Karnataka say they have not seen their computerized RTC, issued free by the revenue department in 2001 for personal verification. In Kolar Dsitrict, about 100 km from Bangalore, 42-year-old Pappamma, a feisty leader of some 200 women's groups, says she has visited the local e-kiosk several times to help women obtain RTCs. "But taluk officials themselves know little of the system and are in no position to even begin helping the women. They need training." she comments.

Based on 'Flaws in Bhoomi: India's model e-governance project' by Keya Acharya. Received via e-mail.

## Elements of Empowerment

#### Access to Information

Bhoomi empowers the small rural farmer in many ways. Their relationship with lower rungs of civil servants can be on a more equal footing[10]. In the manual system land records were maintained in registers to which citizens had no access. The records of land ownership in Bhoomi can be collected by anyone. Similarly, the status of mutation requests can be tracked on line. The process has become transparent to the extent that the clients can observe the stored image of their land records through a second monitor screen facing them. Farmers have access to complete documentation of notices and mutation orders in case of a legal dispute.

Bhoomi will eventually make it possible for a thousand rural telecenters to be established and be economically viable in Karnataka. These telecenters will help empower large segments of rural populations by enhancing access to information and services that will be delivered through the tele centers.

[10] When the delegates of a workshop in Bangalore in February 2004 held in preparation for the Shanghai conference visited a rural kiosk issuing RTCs in Mandya, Karnataka, an old farmer protested that data be corrected in Bhoomi records as the print out in his RTC had mis spelt his name.

### Social Accountability

There are many elements in the system that enhance accountability. The bio log in procedure and the use of encryption and public private key ensures that the issue of RTCs and changes in data records can be traced back to the operators who were on duty and supervisors that gave the go ahead. By specifying a first come first serve basis for processing mutations and allowing Deputy Tehsildar to pass mutation orders in case the RI does not pass the orders in 50 days, the power to harass has been taken away. If an application is pushed down in the priority order, reasons need to be assigned for keeping it in abeyance.

### Inclusion and Participation

A number of people, particularly the poor, illiterate and women may have found it difficult to obtain land records due to corruption, inefficiency, and cumbersome procedures in the earlier system. The Bhoomi system does not require an application to be filed in. Data is available to indicate that more people collect RTCs and also come forward to get data corrected when errors are found.

Often, farmers go to Bank branches in groups to process crop loans in the hope that corrupt officers will find it harder to demand bribes in presence of other people. The convenience with which RTCs can be collected, facilitates this group approach.

## Costs and Benefits

The expenditure on data entry operations for about 2 million RTCs in 27 districts was Rs.80 million. The unit cost of providing hardware, construction of computer rooms and kiosks was of the order of Rs.0.64 million for each taluk. Thus, the total out-of-pocket expenditure on the project was Rs.185 million. This does not include the cost of software development (nearly 100 person months of effort) done gratis by the National Informatics Center[11]. The cost of processing an RTC has been roughly estimated at Rs.13, assuming a life of 5 years for the hardware and an activity level of 2 million RTCs issued from all the kiosks (10 percent of all holdings). This cost includes an assumed operational expenditure of Rs.2 for stationery, cartridges and electricity. The current user fee of Rs.15 seems sufficient to cover these costs.

The benefit in terms of mandays saved is approximately 1.32 million mandays per annum, leading to savings of Rs. 66 million per annum in wages. The weighted average value of bribe paid in the manual system was Rs. 152.46 per person, while that in Bhoomi was Rs. 3.09. Even if we reduce the saving by the fee that they have to pay, of Rs. 15, the net saving is Rs. 134.37, and translates to a saving of over Rs. 806 million annually.

[11] Natinal Informatics Center is a Central Government department with offices in state capitals and districts to provide technical assistance in developing ICT applications.

### Potential Future Benefits

The system generates various types of reports on land ownership by size, type of soil, crops, owner's sex, etc, which would be useful for planning poverty alleviation programs, and supplying agricultural inputs.

Many other benefits will flow from centralization of the database. The application has been PKI enabled so that computer-generated records can be digitally signed. In future banks will be persuaded to access land record data of farmers to whom loans are to be issued directly from the central data bases. Since authenticated data would be available there would be no need for farmers to actually collect the RTC and carry it physically to the bank. This would require that the banks change their business process for providing crop loans to farmers. This will also help the Banks in advance planning on the quantum of lending required. Similarly, high court, district and taluk courts could access the database for resolving legal disputes surrounding land.

The system could also lead to better administration of Land Reforms Act, such as enforcing a ceiling on land holdings, etc. Bhoomi makes it possible to identify and aggregate all land of different types belonging to an individual in a given village. This identification is based on a *khata* number that links all such records. Bhoomi project is making efforts to clean up the data on *khatas.* A citizen ID will be needed to link records across taluks and districts. An analysis of ownership by gender has indicated a large divide. Such analysis can be made public and can lead to reforms that will correct the situation.

## Driving Factors

Computerization of land records in India has had a checkered history. In 1985, a Conference of Revenue Ministers of States resolved to computerize land records on a pilot basis. In 1988-89 a centrally sponsored scheme on Computerization of Land Records (CLR) funded pilot project in eight districts. The projects were to computerize core data contained in land records, so as to assist development planning and to make records accessible to people / planners / administrators.[12] By 1991-92, the scheme had been extended to 24 districts in different states. However, a review in 1993-94 indicated that states were finding it difficult to sustain the project due to non-availability of skilled manpower, hardware maintenance, etc.[13]

In 1998, a comprehensive evaluation study conducted in eight districts of different states found that progress had not accomplished much. Some of the bottlenecks were:

- Delay in transfer of funds to implementing authority by the state governments,
- Delay in construction of telecentres and installation of computers and other equipment,
- Delay in development of appropriate software as per the requirement of the state government,

[12] Source URL: http://www.expresscomputeronline.com/20030324/focus3.shtml

[13] Source URL: http://www.expresscomputeronline.com/20030324/focus3.shtml

- Delay in supply and installation of the hardware by the National Informatics Center
- Lack of adequate training to revenue officials to handle the computers, and
- Absence of good vendors for taking up the job of data-entry work

By 1998 it was realized that a district was not the appropriate administrative level to computerize land records. In 1997-98, a decision was taken to operationalize the scheme at the taluk level for delivery of computerized land records to public at large. Under this program, Central Government earmarked Rs. 0.4 million for the purchase of hardware, software and other peripherals for each taluk. Nearly 2500 taluks out of a total of 6000 were to be covered. During the 9th Five-Year Plan (1997-2002), Central Government released a sum of Rs. 1545 Million. By the end of 2002, the scheme was under implementation in 569 out of 599 districts in India. Since inception of CLR, Central Government has released Rs. 21894 Million (up to 31.12.2001) out of which the States/Union Territories have utilized around 53 percent.[14]

In spite of such a large expenditure, there are only a few scattered taluks where computerized land records are being issued. Karnataka is the sole exception where the system is working in the entire state.

Given the variability in the land record systems across India, a single system or software was unlikely to be usable at all places. The federal government did not have the clarity about strategy to be adopted for implementation of the scheme. Nor did they insist on a detailed system design and implementation plan from States before funding. This was one project where a thousand flowers should not have been allowed to bloom. Each state should have had a well-coordinated strategy as in the case of Karnataka.

In most projects there was lack of involvement of the Revenue Department officers and district administration in the project. At most places the quality of manual records was poor and therefore data entry systems had to be designed with great care. Data entry was done offline by private agencies but due to poor work culture, the process was very slow and error prone.[15] Lack of training of field functionaries on data entry process led to wrong and defective database. The printed records were distributed to the farmers without proper validation. The one time distribution was itself regarded as Computerization of Land Records. The pilots in Dungarpur district took 14 years to complete its first stage. There was confusion about roles among the staff, and a lack of institutionalization of project by state government. It largely remained a district level initiative. In a period of rapidly changing technology the pilot could not emerge as a standard to be followed across other districts.[16]

[14] Rs. 1.1635 billion [up to 31.12.2001]

[15] Islam, Dr K M Baharul, Information Age Government: Success Stories of Online Land Records & Revenue Governance from India, Executive Summary, Third Meeting of the Committee on Development Information (CODI), Economic Commission for Africa, United Nations Economic and Social Council, Ethiopia, 10-17 May 2003.

[16] Gupta, Vivek [Indian Institute of Management, Ahmedabad], E-governance: Lessons from District Computerization, IFIP Newsletter, Volume 12, No. 1, International Federation for Information Processing, April 2002.

Some of the reasons why the CLR scheme has succeeded in Karnataka and not in a large number of States are discussed below.

## Commitment and Political Economy for Change

Unlike the neighboring Andhra Pradesh where E-Government is seen to be driven by the Chief minister, in Karnataka egovernment implementation has largely been bottom up through departmental initiatives primarily driven by civil servants. Yet it is to the credit of the drivers of Bhoomi that they were able to harness a significant level of political support for Bhoomi. The political executive was completely involved in the computerization project. The State Chief Minister and Revenue Minister highlighted the importance of the project in many public forums. The Chief Minister wrote regularly to all District Deputy Commissioners, exhorting them to get fully involved in the computerization, and inaugurated a large number of land record kiosks[17]. Meanwhile, the Revenue Minister regularly reviewed the computerization process and also inaugurated large number of kiosks. A committee of Members of the Legislative Assembly (MLAs) visited the kiosks and Deputy Commissioners invited MLAs of their districts to witness the functioning of kiosks. All this helped demonstrate that there was a strong political will for computerization of land records. Perhaps a desire to project a pro poor image of the Government led the politicians to lend full support to the project.

## Institutional Innovation

Resistance from field staff was anticipated and conscious steps were taken to lessen the resistance. To allay the fears of field officials that their job descriptions will change in a major way, twelve state level information seminars were organized for 1,200 senior and mid-level officers. And four division level workshops were organized to train 800 officials. These seminars emphasized that maintenance of land records was only one of their many functions and that computerization will remove the drudgery of maintaining these records manually. Revenue officials would continue to be responsible for field enquiry. Reducing corruption was not a key message at these gatherings.

Selected field level personnel were invited to participate in the software development process for various Bhoomi modules through a formal state level Bhoomi committee. Meetings were held with participation from various levels in the Department to elicit suggestions for improvement; and decisions taken at these meetings were incorporated into the software design. Nearly 125 man-months were spent on software development. (Bhoomi has already been migrated to Version-3 and all taluks are now using the latest version).

Field supervision is critical to rollout of any new system. The project leader in-charge preferred to appoint four independent consultants who could tour sites randomly in each division and report problems and progress of Bhoomi. Appointing consultants needed special effort, as the

[17] One example in which he demonstrated his commitment was that he signed letters to revenue collectors regarding Bhoomi while he was sick in a hospital.

central government project did not permit such a line item of expenditure. The expected cost was Rs.1.5 million.

The Village Accountants who would be in charge of the new kiosks were chosen very carefully. Young persons fresh out of college were recruited and trained at the headquarters. These officials had not experienced the power that a Village Accountant could exercise over rural farmers. The project leader (additional secretary of the department) personally participated in the training given to every batch of Accountants to ensure that they felt complete ownership and a sense of importance in being assigned to this new initiative. Accountants were encouraged to talk to the project leader either at his home or at his office. Nearly 900 officials, including all Deputy Tahsildars, were trained in the state headquarters, and more than 1,000 officials were trained by the Bhoomi consultants at the district level.

Partnerships were forged with many different agencies. Agencies like the NIC and private data entry agencies played a pivotal role during various phases of implementation. Since the departmental staff was reluctant to enter data, private data entry agencies were used. An elaborate mechanism was designed for validating the data to make sure that it mirrored the manual records that had legal sanctity. Every district was provided with a consultant to act as a bridge between the data entry agency and the district administration. After the system was operational, the consultant trained the taluk staff and helped the district administration in daily work at the Bhoomi kiosk.

Moreover, private operators had been provided for one year to handle online data entry at the Bhoomi kiosks to enable the Village Accountants to get completely trained. Village Accountants took over the work from these operators after a year. A comprehensive training module was designed jointly by the department and NIC to train the Accountants. Training lasted 7 days, 11 hours each day, followed by a paperless test on the last day.

## Learning and Experimentation

Rollout of the application to 177 locations has been a challenge due to the poor quality of manual records and the enormity of the data entry task. In the first phase, the project was implemented on a pilot basis in a controlled environment at four taluks. After gaining experience in data entry operations and implementation of the software, the scheme was extended to one pilot taluk in each of the 27 districts. In the third phase the project was rolled out simultaneously to all the remaining 146 taluks.

Based on early feedback on unacceptable levels of down time at certain kiosks, a Facility Manager with stiff service level agreements was appointed to maintain the computers system. This has resulted in centers' satisfactory working. The minimum expected configuration (server, kiosk machines, power supply) in every center is expected to be up and functional all the time.

National Informatics Centre (NIC), Bangalore, had created the data entry software for the earlier phase starting in 1992. Even though considerable effort was involved, the software was unable to handle all the variations in land titles. Further, the data-entry by a private agency had several errors due to lack of data validation.

In 1998, workshops were organized at both the division and the state level to understand and correct software problems. At the division level, workshops lasted 4 days and involved about 800 people. At the state level, workshops lasted 12 days and involved about 1,200 mid-level and senior officials. These workshops came up with guidelines and requirements for the new Bhoomi system.

Following the workshops, the state government worked closely with NIC to fix the data-entry software and to develop the back-end Bhoomi software.[18] NIC set up a team of four people to work full-time on Bhoomi. The technical director also devoted about 10-15 percent of his time towards the management of the team. The end product was a system that has now become a model to be replicated in all states.

Incidence of a forged RTC in one of the Taluks prompted experimentation in making the printing process secure so that forging a document would become difficult. Various options such as use of holograms and bar codes were evaluated. More sophisticated solutions that encode and print the key contents of the land title as an image (like bar codes) on the RTC are being tried. Decoders supplied to key users will be able to decode the image to authenticate the RTC[19].

The system has been responsive to feed back from the clients. The system of charging of mutation fee for every survey number in a farmer's total holding was seen to be hurting farmers with very fragmented small holdings. A new algorithm is now used to calculate the fee on the basis of total holding and the number of parcels.

## External Catalysts

The State Government would not have taken up a project of this magnitude involving an upfront investment of Rs. 200 million. Central Government funding was the key catalyst that enabled the project champion to sell the idea within the State. Healthy competition with the neighboring State of Andhra Pradesh, which seemed to have moved much faster with reforms and electronic Government, was another reason that spurred the State of Karnataka into action.

World Bank, which has provided a Structured Adjustment Loan to Karnataka, has also been quietly supportive of Karnataka's e-government program. The Bank has been providing technical assistance in the form of periodic review of major egovernment initiatives. The project leaders have been open to feedback from the Bank's team. Some of the new initiatives like connectivity to rural kiosks have a strong Bank endorsement. A bank-funded evaluation conducted by an independent agency was seen as a very useful exercise for establishing the credibility of a fledgling system.

[18] The data-entry software should not be confused with the back-end Bhoomi software, also developed by NIC, which operates on data, create reports, handles mutations and tracks applications.

[19] Based on a propriety software developed by HP Labs India. The image is printed using the private key of the kiosk operator. The public key is attached to the decoder, enabling it to decode the contents of the image and authenticate the source as the kiosk operator.

External recognition in the form of awards and positive feedback has been a major motivator for the Bhoomi team.

# Lessons Learned

Success of Bhoomi flies against the traditional wisdom of improving service delivery to the poor which emphasizes more investments to create a greater reach of delivery points. Bhoomi has reduced service delivery points from 9000 to 177 and is now in the process of providing a 1000 points, but consumer satisfaction has increased. Bhoomi reinforces some of the ideas put forth by WDR 2004 for improving services for the poor[20]. Often large number of delivery points can not be monitored centrally. Unless there are ways in which monitoring can be done by the community (presuming that an equal voice can be created for all groups) such large systems become inefficient.

Implementation of land record computerization has been difficult in India. Bhoomi succeeded with the efforts of the project champion (the departmental head) who worked a 15-hour day for over 12 months, devoting 80 percent of his time to the project. The fact that the project champion has had a tenure exceeding 6 years (is still continuing) has been a very important factor in stabilizing the system. Minimizing resistance from staff by harnessing political support was an important contributory factor. Extensive training coupled with a participatory style also helped to diminish resistance.

Project managers need to balance the potential benefits against the risk of implementation failure in deciding how much reform (re-engineering) to tackle at any one time. In Bhoomi significant benefits are delivered in issuing RTCs, but much of the old mutation process remains unaltered. There is no change in the role of Revenue Inspector in passing the mutation order. Some other changes in process may impact corruption in the mutation process. Bhoomi has reduced the discretion of public officials by introducing provisions for recording a mutation request online. Requests are processed on a first come first serve basis. Another officer can pass a mutation order if the Revenue Inspector delays it beyond a limit. Farmers can now access the database and are empowered to follow up. They can also detect fraudulent mutations. Reports on overdue mutations can point to errant behavior. Still, supervisors must examine the reports and take appropriate action. In remote areas, operators may turn away citizens by telling that the system offering online service is down. Strict field supervision is needed (through empowered citizens committees and NGOs) to curb such behavior. Ultimately, the only recourse that a citizen has against such practices is to lodge a complaint. The process for lodging a complaint should be facilitated through the Web. The backend has to be geared up to handle complaints received electronically.

As an implementation strategy, manually written RTCs were declared illegal from the day on which the computerized system became operational in a taluk. The notification was issued

[20] World Bank, The World Development Report 2004.

on a taluk-by-taluk basis as and when the scheme became operational there. This forced the department and the farmers to completely rely on the new system. The strategy worked because the application design was robust and did not falter.

There was some concern in Karnataka about raising the user fee to Rs.15 from Rs.2 in the manual system. Often these fears about user fees are exaggerated, particularly if services have genuinely been improved. The response of the farmers at taluk level has been overwhelming.

Soon after the initial success, elected representatives, district officials and farmers made demands that Bhoomi be extended to sub-taluk level. Presumably, the project was considered an unqualified success. However, this expansion would have increased the costs without necessarily increasing the number of RTCs that would have been issued. The department did well to resist the temptation as it would not have been able to monitor and support a geographically spread out operation. In any case, systems should be allowed to stabilize and prove their sustainability over a 2-year period before attempting any replication. In the 80s, a DRDA computerization project called CRISP was replicated in 500 districts in a hurried manner. The expansion turned out to be a failure.

The department did well to explore other possibilities, short of direct expansion, that could make RTCs available at sub-taluk level. Plans to allow private rural kiosks to issue copies signed through the territorial village accountants may never have come about if a hurried expansion of the Bhoomi system had been made. If such copies can be accepted by Banks and verified by accessing the departmental database, the need for signed copies will be reduced. A solution may emerge through wider consultations with the ultimate consumers of these documents.

Bhoomi succeeded because its design is robust and it targeted a critical need for farmers and delivered significant benefits by re-engineering land record processes.

Projects that are intended to benefit rural populations need to recognize the high level of effort that is needed to make rural population aware of the reforms that have been instituted. There is some feedback that in spite of considerable publicity of Bhoomi, farmers may still not understand the implication of all the reforms that have been carried out. The farmers need to be made aware that there is no need to pay bribes because the functionaries would no more be able to misuse their authority to benefit or wrongly penalize any one.

# Replication of Bhoomi in India and Other Countries

The potential of information and communication technologies in impacting the lives of rural poor has been recognized but harnessing it has been a challenge. By its ability to serve as a *killer application* that can make a large number of privately owned rural Internet kiosks economically viable, Bhoomi has shown the way to bridge the digital divide in poorer countries.

Although, the direct impact of Bhoomi on rural poverty can not be easily measured, there are many ways in which Bhoomi helps the poor farmers, as was discussed earlier. Recognizing the importance of accurate land records, the Ministry of Rural Development, Government of India, funded many projects including Bhoomi to computerize land records in different states in India. After the success of Bhoomi, the Ministry of Communication and Information Technology (MIT) has also taken up the replication of Bhoomi in other states under a special program titled "Roll Out of Successful E-government Initiatives." Under this program Bhoomi is one of the three e-government initiatives identified for a countrywide roll out. MIT is providing funds for pilot implementation of Bhoomi in one district of each of the 13 states that have volunteered to implement Bhoomi. Leading management-consulting companies have been chosen to support the roll out effort. MIT is providing the funding for these consulting agencies.

The consultants are expected to capture knowledge and experience from successful projects and transfer such knowledge to the agencies involved in pilot implementations. The project recognizes that the replication need not necessarily involve the use of the same software as was implemented in the successful application. It is more important to capture the processes that lead to successful implementation such as digitization of manual data, reengineering of processes, involvement of all stakeholders and management of change. The consultants will prepare a report outlining the implementation plan, which defines the scope, outcomes, and the technology and business model for the proposed pilot implementation.

One of the key problems in replicating the Bhoomi system is the fact that the documentation of procedures that govern the mutation of land is poor across all states. In addition to legal provisions which are documented, there are several procedures developed on the basis of conventions that have evolved over many years. It requires significant effort to understand and document such procedures for designing a computerized mutation process. The computerized system needs to have the ability to handle different ways in which a mutation can arise. It took almost seven years for the Bhoomi project to understand and document these procedures. In most other states the tenure of project managers is very short to allow them to undertake such an exercise.

In considering Bhoomi for replication it should be noted that Bhoomi does not lead to security of land tenancy for the farmers who till the land of other owners. During the land reforms in 70s and 80s in India, tenancy system was scrapped and land was granted to the tiller. However, in terms of ground reality there could be a large number of tenants still tilling land of other farmers without having any legal rights. The reforms needed to establish tenancy rights are more fundamental in nature. Clearly Bhoomi has little impact on securing such rights.

It must also be emphasized that Bhoomi does not provide a title. The RTC issued by Bhoomi has only a presumptive value. In the titling system the accuracy of the data base such as that maintained by Bhoomi will be guaranteed by the state. In case an owner looses the ownership of a land because of legal process or otherwise, the state would be required to compensate such owners. A land titling system can only be built upon records that are clean and maintained in a manner so that they cannot be tempered with. Given the poor quality of land records in many states of India there is no state (in fact there are few countries) which has moved to a title system.

Encouraged by the fact that Bhoomi will further clean up the data because of constant usage and openness of the land records, Karnataka has now embarked on this journey to move to a land titling system in the next few years.

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