Enhancing Rural Development in Tamilnadu through ICT: An Evaluation of Latest Technologies in the scheme MGNREGS

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ABSTRACT

When e-governance indicates better governance, naturally, rural development becomes an essential part of it. It is so because developing countries like India depend on the villages and their welfare. Keeping this in mind, the government of India is launching many schemes towards the betterment of rural areas and their people. In this paper, we will see the outline on the major schemes of the government of India on rural development and how ICT is involved in them. In addition to this, the paper will focus on the rural development schemes in Tamil nadu in general and then in particular it tries to focus on the 'Mahatma Gandhi National Rural Employment Guarantee Scheme'(MGNREGS) which is otherwise known as '100 Days Work Scheme' in the rural areas of the state. ATM pilot project and Bio-metric based ICT solutions are the major contributions of ICT in the programme MGNREGS. ATM pilot project is being used in the distribution of wages to individual workers by using their finger-print authentication. Biometrics helps in capturing all the processes right from the registration, demand of work, issue of dated receipt, allocation of work and attendance at worksite with GPS co-ordinates, measurement of work and wage payments.

Key words: MGNREGS, ICT, E-governance, ATM, Biometrics etc.,

1. Introduction

Since poverty is considered as the first enemy to the country, the Ministry of Rural Development is concerned much with the efforts to reduce poverty in the villages. We can generally divide the duties of the department as follows:

1. Department of Rural Development,
2. Department of Land Resources,

3. Department of Drinking water and Sanitation. Though there are many issues concerned with the poor in the v illages, the main objective of the department is to eradicate poverty among the people and to restore improved living atmosphere to them. Committed to this stand point, the department, with the help of the government of India, is implementing many welfare programmes targeting various aspects of rural life and its variety of activities. Without fail, all the schemes have the intention of improving the income generation and environmental perfection. One of the most important programme among them is 'Mahatma Gandhi National Rural Employment Guarantee Scheme'(MGNREGS). It deals with developing the under-productive lands, water resources, farmlands and forests. It mainly looks for lump sum investments in varieties of work for the conservation of water and soil so that the causes of acute poverty and disparities among people in the name of money can be avoided. The MGNREGS Act which manages these aims is more worried about the productivity enhancement and maintenance of the rural resources which has the potential to safeguard the millions of people who strongly trust them in continuing their lives. MGNREGA was notified on 2nd February 2006 in 200 districts, extended to additional 130 districts in April 2007 and thereafter notified in the remaining rural areas of the country in April 2008. The Act spans 619 districts, 6400 Blocks, 6 lakh villages and around 2.35 lakh village Panchayats.

The Mahatma Gandhi National Rural Employment Guarantee Act(MGNREGA) is a significant legislation that upholds the basic right to employment on demand. It assures a minimum of 100 Days of guaranteed wage employment in a year to every family in rural areas. It underlines the importance of the right of every citizen 'to live with dignity' in the country and thereby assuring a kind of safety in the social set up for the downtrodden. The adult members in a house who are willing to go for a 100 days of guaranteed wage employment in a financial year develop into a trustworthy group among the members of the family. This is the basic goal of the act which is expected to produce employment and productive assets. The process of implementation of such a great task naturally demands the role of ICT to quicken a strong decentralization of governance with democracy at its core, increase the level of equity, empowering the rural people, transparency and public accountability. Further it strongly believes that if the exercise of rights by the poor and marginalized is established in a country, the life style of the underprivileged will improve. The success of the scheme depends on the decent living of the workers in villages who are able to shift from wage employment to sustainable livelihood. What is behind it is an attempt to restore ecological balance and socio economic dynamics in the rural areas. Nationally reputed organizations make studies on the results of this act and they come to know that it has resulted in enhancing wage rates and wage bargaining power of the labourers, increasing the purchasing power of the poor. To achieve all those discussed ICT plays a major role by transforming MIS to people information system, by introducing pilot

projects and also through bio-metric based ICT solutions.

2. Transparent Maintenance of Data in MGNREGS:

Management Information System(MIS) is a system or process that provides information needed to all stakeholders to manage processes effectively and in a transparent manner. Of all the measures, the most effective so far has been the web enabled MIS (MGNREGA MIS) which places all relevant transaction data in the public domain.

For any scheme a lot of details including the men and the agency involved in it have to be maintained. In the case of MGNREGS, the MGNREGA MIS does the work quickly and accurately. It is a data base that records all details of employment demand, work done, amount of money earned, days worked for all households which have registered for the scheme. Allotment and usage of the fund can be tracked from the time Centre approves the payments till the disbursement. The balance available at different levels, the break up of expenditure as wages, material and works is ready for checking. Job cards, muster rolls and asset registers are given on the website. The website architecture is based on the processes prescribed in the act and so it is always possible to track a particular Job card number through the muster roll, to check the bank account through which wages have been paid. The MIS is designed so as to provide data on defaults, aberrations, delays and breach of guarantees. For example, it can provide for every village, what are the names of persons who have (a) registered but not received Job cards (b) applied for works but not received work allocations within fifteen days and (c) worked but not received payments within fifteen days. It also has inbuilt checks, for example, to validate whether muster roll names are of those who have Job cards.

The construction of web based MIS is based on a sound participatory approach and has been continuously evolving through user feed back.

2.1 MIS Serving People to Provide Information

A good practice to facilitate transparency is to separate worker's demand process and their access to information. A local language enabled audio visual ICT kiosk model has been developed for workers to use the system and exercise their rights. Workers need to authenticate registration through a biometric process by recording their fingerprints on the biometric reader in the kiosk. The worker also records his attendance at the site in the same manner. The kiosk then provides the worker details such as work allotment, attendance, muster report, wages calculation as on date, in the regional language. Workers acquire agency through simple ICT methods. This separates the agency that guarantees work, from the application receiving entity.

This transforms the MIS into a "People Information System" that is expected to enable the use of ICT at the last mile by the target group of workers, to access information, verify its authenticity and also to directly demand services and rights guaranteed to them.

3. Distribution of Wages through ATM

Installation of Bio-metric ATM in Periyakankananankuppam village:

The ATM Pilot Project has implemented low cost ATMs with finger-print authentication and regional language interface in the selected implemented areas with 'always on' internet connectivity. Each of these ATMs is linked to a partner bank (SBI).

Accounts of all the people offered work in MGNREGS are maintained in the partner bank and the local government transferred wages electronically to the bank accounts of individuals. Payments to the individuals are made through ATMs in the village using biometrics.

This project has been implemented in Cuddalore District in Tamil nadu in the following villages: Periakankanakuppam, Pathirikuppam, Pachiankuppam and Thiruvanthipuram. The key features of the pilot projects are as follows:

* The project is focused at financial inclusion and ensures leak proof delivery of wages to the beneficiaries. The local people derive the benefit of the ATM with the help of the kiosk operator. Because of this, the financial literacy in the villages improves and the people get to understand the benefit of banking services.

* This project further helps to open chances to rural entrepreneurs using the kiosk platform. It also helps for a self-sustainable business model in which the kiosk operator generates revenues to continue the operations and when scaled up, leads to growth of the rural economy.

An NREGS worker withdrawing her salary using bio-metric sensor ATM at Periyakankananankuppam village in Cuddalore district

This bio-metric ATM is equipped with bio-metric sensor which has finger print authentications as a standard feature and it is possible for the illiterate or semi-literate people to use just thumb impression on a touch screen to withdraw their week's wages. The ATM accepts finger prints as the means of authentication instead of PIN numbers. This ensures that bio-metric ATM is very easy to use.

4. Strengthening the Delivery of Real time Services

ICT is a major tool to leverage the scheme for ensuring access to the target group of beneficiaries. The use of ICT devices and biometrics can strengthen MGNREGA delivery manifold, geared towards real time capture of the processes involved in MGNREGS such as registration, demand of work, issue of dated receipt, allocation of work, attendance at worksite with GPS coordinates, measurement of work, wage payments, etc. It would be instrumental in ensuring transparency and

accountability, strengthen MIS, reporting and tracking and reducing delays in measurement and payments.

5. Evaluation of Biometric technologies

The future objective to use ICT methodologies like using biometrics is to improve the present overall delivery system in the implementation of the MGNREGA to the welfare of the common public. It is done by capturing all the processes right from registration, demand of work, issue of dated receipt, allocation of work, attendance at worksite with GPS coordinates, measurement of work and wage payments. This will not only capture details of the workers, work and wages as in current MIS but will help in moving toward real time capturing of MGNREGA transactions.

Based on the feedback from the pilots, a detailed strategy is formulated for the nationwide rollout as follows:

The introduction of Biometric database and the use of ICT devices for improving the overall delivery system is envisaged. Primary objective of this effort is ensuring through use of biometric and GPS enabled ICT devices on worksites, biometric attendance to eliminate fake workers and the problem of the local leadership appropriating the job cards. In the long term, integrating MIS with the biometric data will create an integrated process of capturing demand in real time the generation of date receipt, allocation of work and reducing delays in measurement and payments.

5.1 Future Enhancement

The use of biometric technologies in the schemes for rural development has its own advantages and disadvantages. In addition to the biometric technologies that are currently in use, we shall go for certain new technologies in the future to upgrade the usage of biometric systems. Some of them are:

1. Signature recognition
2. Voice recognition
3. Facial recognition
4. Retinal scanning
5. Iris recognition
6. DNA
7. Hand Geometry

For the success of any system of evaluation, its accuracy, expenditure and social acceptability are important features to be executed. A comparison of some of the biometric systems used recently and in future can be tabulated as follows:

Biometric technology	**Accuracy**	**Expenditure**	**Requirements**	**Social acceptability**
Signature recognition	Low	Medium	Optic pen, touch panel	High
Voice recognition	Medium	Medium	Microphone, telephone	High
Facial recognition	Medium- low	Medium	Camera	High
Retinal scan	High	High	Camera	Low

Iris recognition	High	High	Camera	Medium- low
DNA	High	High	Test Equipment	Low
Finger print	High	Medium	Scanner	Medium
Hand Geometry	Medium- low	Low	Scanner	High

Now, the advantages and disadvantages of the biometric technologies can be analyzed for a better application of ICT in the field of rural development:

Signature recognition

Advantage	Disadvantage
1. Non intrusive	1. Signature verification is designed to verify subjects based on the traits of their unique signature. As a result, individuals who do not sign their names in a consistent manner may have difficulty in enrolling and verifying during signature verification.
2. Less time for verification (about five seconds)	2. Error rate: 1 in 50.
3. Cheap technology	

DNA

Advantage	Disadvantage
1. Very high accuracy	1. Very expensive
2. Impossible for the system to make mistakes	2. Extremely intrusive
3. It is standardized	

Retinal scanning

Advantage	Disadvantage
1. Very high accuracy	1. Very expensive
2. There is no known way to replicate a retina	2. Very intrusive
	3. Comparisons of template records can take

	upwards of 10 seconds, depending on the size of the database.

Iris recognition

Advantage	Disadvantage
1. Very high accuracy	1. Very expensive
2. Very low verification time(less than 5 seconds)	2. Intrusive
3. Stable - the unique pattern in the human iris is formed by 10 months of age and remains unchanged throughout one's life time.	3. A lot of memory for the data to be stored
4. Unique – The probability of two rises producing the same code is nearly impossible.	
5. Flexible – iris recognition technology easily integrates into existing security systems or operates as a standalone.	
6. Reliable – a distinctive iris pattern is not susceptible to theft, loss or compromise.	
7. Non- invasive – unlike retinal screening, iris recognition is non-contact and quick, offering unmatched accuracy when compared to any other security alternative, from distances as far as 3" to 10".	

Fingerprint

Advantage	Disadvantage
1. Possibility of high accuracy	1. It can make mistakes with the dryness or dirt of the finger's skin as well as with the age.
2. It is one of the most developed biometrics	2. For some people it is very intrusive, because is still related to criminal identification.
3. Easy to use	3. Image captured at 500 dots per inch. Resolution: 8 bits per pixel. A 500 dpi fingerprint image at 8 bits per pixel demands a large memory space.
4. Only small storage space is required	
5. It is standardized	

Hand Geometry

Advantage	Disadvantage
1. It needs a special hardware for use but it can be easily integrated into other devices or systems	1. Very expensive
2. It has no public attitude problems as it is associated most commonly with authorized access	2. Considerable size
	3. It is not valid for arthritic person, since they cannot put the hand on the scanner properly

5.3 Iris recognition as better option in future

Many findings and studies prove that the most adequate methodology in biometrics is the Iris Recognition. Iris recognition is not retinal scanning but it involves taking a picture of the iris. This picture is used solely for the purpose of authentication or identity. Though Dr. Leoonard Flam and Dr. Aron Sofir paved the way for iris recognition in 1980s the utility of it as an authentic way of human identity method came to be widely understood after Dr. John Daugman came to the scene. He developed algorithms to generate digital representation of the iris pattern and he provided the ability to match one iris against another found in a database. In the case of user acceptance which is an important issue in using a biometric system for employees, iris recognition remains the better option.[1] Even for activating the security alarm at our home and withdrawing money from an ATM machine, the use of iris recognition technology on a regular basis is better; there is no need for putting finger which should not suffer even a small scratch. and inserting a card or entering a PIN. We will be easily gaining our access to everything we are authorized to by presenting ourselves as our identity.[2]Very soon there will be no necessity of using passwords and PIN numbers to prove the identity of individuals. The demand for finding new ways for processing people, information and delivering increased levels of security is on the rise. From the discussions made above, we can assess that the future of iris recognition technology looks bright.

6. Conclusion

The scheme MGNREGS as a part of rural development programmes in the state of Tamil nadu has been successfully implemented showing the significance of egovernance. For the further development of usage of ICT in this particular MGNREGA scheme, we have to adopt certain strategies like the following:

a. Collect Biometric data(UID compliant) of all MGNREGA workers and create a State Data Warehouse
b. Verify the attendance for MGNREGA workers at the place of work through hand held devices and transmit this data through GPRS, CDMA, PSTN or internet connectivity that is available to update muster roll records and MGNREGA web based MIS
c. Assisting bank's business correspondent with micro- mobile ATM devices to

deliver wage payments at the house of the workers

When these strategies are followed, it is sure, the ICT enabled system would result in the following:

a. Promoting transparency and accountability
b. Help in reducing the delays in
   i. measurement
   ii. payments
c. In addition to this, the data so created could also be used by
   i. UIDAI for generating the UID number
   ii. Banks and Post offices for the purpose of servicing MGNREGA accounts through the Business Correspondent model

This project MGNREGS can be implemented through a combined work strategies between the MoRD, state governments and the service provider. Thus the appropriate application of latest biometric technologies will bring out the scheme MGNREGS more and more successful and powerful.

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