

Service Quality

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Service Quality



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Information for Contributors

About the Journal

Service Quality is a half yearly journal focusing on best practices and quality innovations in various government departments as well as the private sector. It receives articles from ministries, departments, public sector organizations, civil society organizations and the private sector. Contributors are requested to send quality related experiences to shkh@lbsnaa.ernet.in or tqmccl@lbsnaa.ernet.in in the following format:

- **The Context** : Brief details of the institution and its activities
- **Opportunity/problem** : Pre-initiative status of the area/ domain in which quality initiative was undertaken; reason(s) for taking the decision to start a quality initiative; persons involved in the decision-making process etc.
- **Aim, Goal(s) and Objective(s)** : What was the initiative all about? What did it set out to achieve?
- **Setting the Scene** : Pre-initiative activities, e.g. engaging a consultant, training of personnel, constitution of quality teams/ task forces, deciding quality/ success measures and instruments etc.
- **The Experience** : How did the institution go about it? What did it actually do?
- **Outcome and Impact** : What was the result? How did it affect/improve the area of activity chosen for improvement?
- **Lessons Learnt** : Do's and don'ts. Conceptualisation of good practices and pitfalls to be avoided.
- **Future Plans** : How are the lessons learnt going to be taken care of in the future?

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Transformation of Primary Education in Tamil Nadu Challenges and Solutions-ABL experiment

M. P. Vijayakumar

INTRODUCTION

India is making steady progress ensuring that every child has access to primary schooling. But access is no guarantee of quality and the fact that majority of children in school are failing to learn as they should, is a matter of serious concern. The majority of India's learners emerging from elementary and secondary schools are unprepared for what life has in store for them in respect to college, profession and being a good citizen. The challenge of improving the quality of elementary education is therefore a major focus of the Government of India and 35 State Governments and Union Territories. But how does one reform the entire education system, improve its quality and raise student learning level? One such State which has shown how the quality of primary education can be addressed in a holistic and comprehensive way is Tamil Nadu. Here the State's primary school classrooms have been transformed through the introduction of a new teaching and learning methodology called Activity Based Learning (ABL). While ABL may not be the panacea for all the shortcomings that affect primary education in India, there is no doubt that the State's success in transforming the way teachers teach and children learn shows that a positive system-wide change is possible in India's government schools.

Are the children learning in our schools?

Practically all the children aged 6 to 11 years old in Tamil Nadu are enrolled in primary school. The State has relatively good primary education infrastructure, a healthy pupil-teacher ratio and adequate

materials to support learning in every classroom. An overwhelming majority of Tamil Nadu's teachers are well qualified and trained to teach, they are well rewarded for their work as teachers and attend school regularly. People of Tamil Nadu value education and want their children to do well in school which in turn ensures that students attend classes regularly. A recent survey of student attendance showed that 95% of enrolled students attend school regularly, therefore Tamil Nadu should ideally be a State reaching new heights in terms of academic achievement.

But unfortunately, this is not so, far from reaching heights, the State Government was appalled when a few years ago the National Assessment Surveys carried out by the National Council of Educational Research and Training (NCERT) revealed that learning levels among Tamil Nadu's primary school students were low and actually deteriorating. The table below shows the trend between two nationally representative sample surveys of learning levels (2002 & 2006) at Standard 5 carried out by NCERT across the country. The survey shows that learning levels in Tamil Nadu, while higher than many other states, had actually declined over the last few years.

Table 1: Comparisons of NAS 1 (2002) & NAS 2 (2006) Results (median scores of Standard 5 Students in Maths and Language) in 11 states

State	Maths		Language	
	2002 %	2006 %	2002 %	2006 %
Andhra	43.53	47.44	54.83	58.61
Delhi	48.20	45.33	63.15	67.32
Gujarat	48.36	56.98	56.18	63.30
Himachal	34.41	47.61	49.99	63.88
Karnataka	46.03	57.48	58.63	64.56
Kerala	35.09	42.33	54.99	67.34
Madhya	49.03	46.52	58.25	58.82
Maharashtra	44.32	48.28	62.12	65.64
TN	58.37	50.49	71.09	59.79
UP	37.81	52.39	50.20	61.77
WB	60.11	61.02	70.67	69.27
India	46.51	48.46	58.87	60.31

Source: NCERT NAS, 2002 and 2006

A further assessment of student learning achievement carried out jointly by SSA and the State's Director of Elementary Education in 2006 showed that a large proportion of the Class V students included in the survey were not demonstrating basic learning levels in Tamil, Maths and English. These surveys indicated that even after five years of schooling children in the State had failed to secure skills in Language and Maths. Mastering basic academic skills in the early years of schooling is the foundation on which learners can build higher levels of knowledge and understanding, secure emotional and social development.

The results of these various assessments caused the State Department of Education to question what was going on in their schools and classrooms and to enquire as to how students learn, or fail to learn in formal classroom situation. The solution to the problem of low level of learning calls for a clear understanding of how children learn. Of particular interest is whether the class room is conducive for children's learning. In order to find out what impedes children's learning and understand who or what is responsible for poor learning of children in the schools, an insight in to the learning process is critical.

How do children learn?

The principles of Child Psychology and theories of learning clearly indicate that children mainly learn most effectively by doing and experiencing. The feeling part through experience is a critical input for learning, without experiencing the world and its environment children learning will be constrained and whatever knowledge they do acquire is unlikely to be retained.

Learning comes mainly through experience. Learning is not what parents and teachers do for the children nor is it something they can impart to children. True knowledge means understanding, which cannot be given like food or medicine; it is the result of a child's own experience, perception and thinking. The child can only really learn through experiencing a process, event or occasion and making sense

of this for him/herself. This is the essence of a commonly used phrase “learning by doing”.

In India we often speak about knowledge as a gift from the teacher, but it comes mostly through the learner's own experience of learning, as a result of his or her own effort, attention and intellectual activity. Learning cannot be imposed from outside, the teacher can facilitate learning, or not, to the extent that he or she can control the learning experience; thus giving a critical role of a teacher to play in the learning process. But such things as making decisions, cooperating and controlling the expression of strong emotions can only be learned by children through facing situations in which they must take their own decision, cooperate or control their emotions, certainly not by simple advice or through reading about it.

Yet another principle in the process of learning which is too obvious to deserve discussion is that we learn to swim by immersing ourselves in water and practicing strokes until we are proficient; we learn to sing by opening our mouth and letting sounds come out; and we learn to write by picking up a pen and making marks on a page. In all these examples a teacher, an instructor or guide is necessary to facilitate learning, but it would be impossible to make a child learn to swim only by telling him/her about what he/she needs to do when they are in water! Similarly, it is not possible for a student to understand, for example multiplication and division by sitting through endless hours of a teacher's lecturing, coaxing, preaching and exhorting. Unless opportunities for doing and repeating things are afforded to children it is futile to expect them to learn.

The Status, malady and Solution

International research indicates that after two weeks children retain only 5 % of what they listen to. But in Tamil Nadu's students were made to sit passively in regimented rows and made to listen to their teachers' voice for seven hours each day, six days a week for five years, .

- Traditionally teaching and learning methods in the State's

schools has been dominated by the teacher's interaction with the students based on lectures and rote learning. The teacher would lead students as one body from lesson to lesson with no allowances being made for slow learners or students who take time off due to illness or are absent. The teacher would spend considerable amount of time and energy on maintaining discipline and keeping order and waste their breath in loud and continuous discourses, lecturing students from the beginning to the end of each school day. The main features of the teacher-centered classroom have been recently described by NCERT in its Source Books on Assessment for Classes I-V and are as follows:

- Teacher gives instructions and expects children to obey and be disciplined;
- Children listen while the teacher teaches;
- Teacher reads the textbook or writes questions and answers on the blackboard and learner copies these. At times one child reads the textbook aloud while others listen;
- Learners memorize facts given in the textbook or as told by the teacher;
- Teacher controls what happens in the classroom, children's participation is minimal;
- All children generally learn individually;
- Timetable is fixed;
- Seating arrangements are fixed, usually regimented rows and columns;
- Materials are only for display, not used by students;
- Children look bored and disinterested;
- Assessment is undertaken as a separate activity;
- Children are assessed through tests and exams;
- Report cards are used to convey the learners' achievement;
- Children's performance is reported in terms of marks for subject areas.

Source Book on Assessment for Classes I-V, NCERT: 2008:page 5

Children begin to acquire language from the age of 1 ½ to 2 years and become fluent speakers in their mother tongue at the age of 5 or 6. Children have an inherent capacity to learn and we can know for a fact that they learn many things outside the classroom, particularly from their peers and older siblings. When they can learn so many things outside the class room without the assistance of a teacher, why should children fail to learn in a classroom situation? **The Government of Tamil Nadu concluded that it was because the prevailing teacher-centred pedagogy and the classroom atmosphere itself presented barriers to children learning.**

More than 45 years ago John Holt had observed:

- › If the situations, the materials, the problems before a child do not interest him, his attention will slip off to what does interest him, and no amount of exhortation or threats will bring it back.

The State's teachers, although all had been trained to teach, had seemingly not learned the art of teaching. It was not just one or two teachers who were failing in the classroom but the entire teaching community of the State, which included some 120,000 teachers. For the managers of the education system in Tamil Nadu, it indicated that the prevailing dispensation had failed to prepare the State's teachers to be effective and, most disconcertingly, there had been a system failure. The overall conclusion being there was something basically wrong in the class room process and what was needed was nothing short of comprehensive holistic pedagogic and curriculum renewal.

The Intervention

The State therefore took up in a systematic way under SSA a major quality improving initiative for primary education called Activity Based Learning, or ABL for short. ABL involves comprehensive changes in curriculum, learning assessment, teaching and learning materials, teacher training and professional support, school organisation, classroom organisation, pedagogy, teaching and

learning processes and education methodology. ABL is an extremely well thought out and high quality intervention that is attracting considerable attention. At the heart of the reform is the view that the problem of low student learning achievement could best be tackled through a curriculum and pedagogic renewal to transform classroom transactions. The aims of the reform harked back to earlier efforts at renewing the education enterprise:

- › we should make schoolrooms and schoolwork as interesting and exciting as possible, not just so that school will be a pleasant place, but so that children in school will act intelligently and get into *the habit* of acting intelligently.

(Ref: John Holt: How Children Fail, 1964: page 265)

What is ABL?

Activity-based-learning in India as well as across the world has been found to be an effective pedagogical method, particularly for early years of schooling, when the child begins his/her adventure of learning in a formal environment. As early as 1912, Maria Montessori was extolling the virtues of activity based learning and experimentation by students in the classroom. However, in India, activity-based-learning has been successfully tried in small, alternate schools, born of the dream of visionary educationists such as Rishi Valley Schools in Andhra Pradesh (An NGO that has been pioneering child-centred learning in India for several decades).

ABL in Tamil Nadu has been developed on the pattern of The Rishi Valley experience and adapted specially for Tamil Nadu's schools by the State Department of Education with the support of SSA. In line with multi-grade situation that exists in majority of Tamil Nadu's schools, ABL emphasizes on teaching and learning process that both individualizes and democratizes classroom transactions.

An ABL class room, Where is the teacher?



This child-centred, learner-guided approach is facilitated through specially designed learning cards and material, including Montessori Mathematics equipment, that reflect the content and competencies in prescribed textbooks a major development in education. The curriculum is arranged in the form of learning ladders which are clearly defined and sequentially organized. These learning milestones and units of work comprise of tasks that have to be completed in order to progress from first to forth standard the learning ladders for each subject and standard is displayed in every classroom and the learners are guided by this tool towards appropriate learning material

Transformation of Primary Education in Tamil Nadu Challenges and Solutions-ABL experiment Satisfied with the progress



Further on, each learning card is coded with easy to follow symbols and reflect a stage in developmental path of learning. An Achievement Chart is displayed in the classroom from which the learner as well as the teacher can monitor their progress.

In summary, the three key aspects of ABL are specially designed materials that facilitate self-guided learning; secondly, child-centred teaching and learning methodology; and last but not the least classroom organization and management that facilitates group working. These three aspects together form a challenge for teachers and teacher training.

Impact of ABL:-

The impact of ABL on schools and classrooms has been extremely positive. The classrooms have been completely re-organised which gives teachers and students more time to spend on tasks. The quality of time spent on doing a task has also improved considerably.

The latest assessments of student learning in Standard III carried out by the National Council for Educational Research and Training (NCERT) revealed significant gains in Tamil and Maths.

Maths

State	2003	2007	Difference
Gujarat	64.24	67.03	2.79
Karnataka	68.45	61.48	-6.97
Kerala	51.36	61.43	10.07
Punjab	53.91	58.08	4.17
TN	53.48	75.20	21.72
India	58.25	61.89	3.64

Language

Gujarat	58.54	72.56	14.02
Karnataka	69.96	69.19	0.77
Kerala	63.31	70.14	6.83
Punjab	54.29	67.16	12.87
TN	66.51	79.74	13.23
India	63.12	67.84	4.74

Success is breeding success; teachers enjoy working with the new methodology, while children enjoy the freedom to work at their own pace with attractive learning materials with their peers. The multi-grade situation (where children of different grades come together in the same class) affects 78% of Tamil Nadu's schools which has today been transformed from a problem into an opportunity to maximize peer supported learning.

The mingling of various age groups in each class promotes flexibility in the system and evenly spreads the burden of coping with Standard 1 students across all the teachers present in the school. The ABL system allows children to learn at their own pace, cutting across grades. This is also beneficial for students with siblings in the same school as the ABL system facilitates the placement of new Standard 1 students in the classes of their older siblings.

With children performing activities one by one and learning the system offers scope for acquisition of skills by all students. Even if children are absent for few days, they can resume work from where

they left and therefore not miss out on any skill. Besides, it gives the student a sense of accomplishment as they master skill step by step which acts as a big motivation for the child to pursue learning more vigorously. Acquisition of skills gives a tremendous boost to student's confidence and self esteem, while inter mingling of all age group in the class room provides stimulation for development of social attributes as well.

Tamil Nadu's and SSA's achievement

The methodology was developed in 2003 by about 100 teachers from Chennai Municipal Corporation absorbing the philosophy from Rishi Valley Schools and by incorporating certain principles and materials from Montessori methodology. They initially tried the system in 13 schools of Chennai Municipal corporation, which was later extended to all 264 schools in Chennai Municipal corporation during 2005-06. By the year 2007-08 all 37,486 schools in the state of Tamil Nadu were incorporated within the system.

Up-scaling of ABL to cover 7 million children, studying in more than 37,000 schools in an entire State is a remarkable achievement. The system of progressive and effective education that has, to date, been confined to a few elite private schools in the country, is now made available to all the children of Tamil Nadu, particularly those from the lower economic strata of the community.

In implementing ABL on such a scale and in such a short period, the Government of Tamil Nadu is to be commended for its bold decision and for its achievements in implementing the reform. The key factors in the successful introduction of ABL have been, the adoption of a holistic and comprehensive approach with successful combination of administrative and academic functions of the system focused on one single reform: ABL. Secondly, the logistics that underline the reform such as the printing of work cards and delivery to schools on time, installation of shelves and trays to support ABL, training etcetera - have been given priority. Thirdly, there has been a strategic use of available resources and the media for getting parents and teachers onboard, working with the grain of the system (not threatening some of the key interests at work). Fourthly, the State has

taken a careful approach to scaling from: 13 schools to 264 and then 4000 schools. As part of this, the State has further made excellent use of working models to demonstrate the approach these model schools are places where teachers could go to see for themselves how ABL worked. The State has made excellent use of process indicators to monitor how well the schools are implementing ABL most importantly, a review of learning outcomes was consciously discouraged until the reforms had bedded in.

Further on, the decision to opt for a competitive recruitment of Block Resource Teacher Educators (BRTE) has paid significant dividends in terms of a fresh cadre of young, energetic and enthusiastic teachers who fully committed to the reform. In addition, the BRTE: school ratio of 6-8 enables BRTEs to spend an entire day in one school. Well managed induction and training of BRTEs and support for them in the field has resulted in closer support and supervision in schools. Teacher training has been mostly on-site and hands on, 80% of the training has been practical and a new school approach has been taken (i.e., all teachers in a school are trained together). Perhaps the most important has been political commitment as well as the managers of education in the State have prioritized the reform.

No other reform has got so much support, and an intensively supervised programme where they are constantly touring districts and schools, interacting with teachers and motivating them all the teachers have the SSA SPD's telephone number to use. In addition, the Assistant Education Officers have been sensitised about what to look for in class rooms not just attendance and notesthus bridging the gap between inspectors and teachers. Key policy decisions in respect of ABL have been made quickly, such as the abolishing of the common-examination and the system has shown itself to be flexible there is a willingness to respond and to accommodate suggestions (combination of age groups, to dispense with conduct of common exam for the whole class or school, home work etc)

The parents and learners in the State have welcomed the change, especially when they see the results: success breeds success. Most importantly, the State has trusted its teachers and children.

In ABL, the focus of teaching and learning process is the learner and his/her interaction with materials, teacher and other fellow learners. Under ABL the teacher sits with the children acting as a facilitator of learning rather than being the single font of all knowledge.

Children totally engaged and enjoying. Table and Chair for teacher?



The challenge for teacher training was therefore enormous as it entailed changing the system from teacher-centred to child-centred, the main features of the same are as follows:

- Teacher provides learning opportunities and guides a range of meaningful learners.
- Teacher provides learning situations that give children an opportunity to observe, explore, question, experience and develop their own understanding of various concepts.
- All children participate actively in different activities/tasks.
- All children construct knowledge on their own, based on their experiences inside and outside the school.
- All children work individually and in groups, discussing, sharing, co-operating and respecting others' viewpoints.
- Timetable is more flexible, depending to a large extent on the stages children have reached.
- Seating arrangement changes according to the activity being organized.
- A variety of material, aid and equipment are available and used by children.

- All children are engrossed in whatever task they are doing.
- Self-assessment by the learners as part of the teaching-learning process.
- All children are assessed informally by teachers while doing activities/tasks, primarily through the teachers monitoring of progress on the learning ladders the children are not aware of this assessment.
- A report conveys the learning and progress of the child.
- Children's progress on the learning ladders are reported in qualitative terms and on all aspects of development some children move faster than others and all types of learners are accommodated in the teaching and learning process.

The real key to ABL's success has been the way in which teachers have been transformed from lecturers to facilitators of child-centred learning. How has this significant transformation been effected in over 37,486 schools? The answer lies in further transformation the transformation of organizational culture, managerial style, in-service training and academic support to schools.

ABL and Teacher Training

During the implementation phase of ABL, teacher's training did not go the traditional way. The classroom methodology in 37,486 schools underwent a major shift and there has been an overwhelming and positive response from nearly 120,000 teachers. All major changes brought about by ABL during 2007 happened within a span of six months. Invariably training sessions had full attendance with a positive attitude of teachers. What was special about it? The training session was hands on with more than 80% time being spent on demo classes. The whole school used to be trained together and not in isolation. Invariably the head teacher would be the first person to undergo training. Since the system was developed by teachers, hence teachers acted as master resources and therefore acceptance was better. Onsite support was a significant factor in the whole process. Moreover, trainers believed in what they taught as they trained what they had already practiced. Managerial intervention too played an important role.

Managerial Direction

The Project management team including political executives spoke unanimously about commitment and seriousness of the whole experience. Every member in the managerial and supervisory team facilitated the process with the highest level of sensitivity and coordination. There was neither departmental barriers nor personal issues or egos impeding the process. The administrative wing and the academic wing of the education system pulled came together under one objective and that was to transform classrooms through the introduction of ABL.

The project managers were accessible to all the members in the organization, approachable all the time for resolution of any issue. In fact feed back from field functionaries over the 'phone was encouraged by the project management team. During the period of implementation the management team was always in the field covering as many schools as possible articulating and interacting with teachers and field staff about their experiences.

The way ahead

- ABL has helped to bring about a change in Education Management culture and organisational change, but the reform is not yet finished processes of annual review, renewal and improvement are on-going;
- Realisation of participants that change is possible but requires continued sustainable focus, education project is never completed;
- Handling of Teachers associations and their grievances is an on-going concern; but if handled with care, it is possible to make them commit to reform process.
- Formative participatory evaluation (Subir Shukla) is under process and will feed into further development of ABL;
- NCERT led and internationally supported (SSA TCF) major evaluation of ABL is being planned and will be carried out over the next 6-12 months;
- Tamil Nadu is becoming an education tourist destination with a

constant stream of visitors from other states and countries these visitors help to enrich ABL with their feedback and suggestions;

- Curriculum reform is planned for 2010 which should feed into a new generation of learning materials the end of textbooks for primary education?
- What to do about standard 5? A mixture of ABL and ALM.
- How to strengthen the teaching of reading in ABL? Strengthen Reading development cell.
- Active Learning Methodology (ALM) being implemented in upper primary education, a similar process of annual review, renewal and improvement is planned;
- ALM being taken up in secondary schooling together with project based learning (PBL) the first generation of ABL students will reach Standard 6 in 2012/13 the future change agents...

CONCLUSION

Effective teacher training and on-site support to teachers has been critical to the success of ABL in Tamil Nadu. The State has been able to transform the teaching and learning process in its classrooms through a renewal of materials, pedagogy and the adoption of a new model of in-service teacher training support.

This new model of teacher training has the use of demonstration model schools where un-trained teachers are able to experience the changed practice first-hand; they can observe the practice, talk to practicing teachers and students and use materials in a real classroom setting as opposed to being trained in theory in a lecture hall. The on-site training in model schools is then followed up with months and months of on-site support in the teachers' own schools to ensure that the changed practice is secured, both for teachers and students.

Tamil Nadu experience with ABL offers an obvious alternative, as it is evident that in-service teacher training in India has been far from satisfactory and has not produced any impact in terms of sustained and changed classroom practice. Rhetoric, platitudes, lectures, instructions, guidelines and workshops for teachers have not and will not produce results in the class room. We need action on the ground, solid and productive support for teachers in their

workplaces, clear demonstrations of what quality education looks like so that teachers can experience and replicate in their own classrooms. Above all a management that is both responsive and supportive is crucial to success of ABL.

Message from Tamil Nadu

What Tamil Nadu has demonstrated is that a paradigm shift in government system is possible and if the change is properly nurtured like draining excess water from a growing plant and the system will respond. The most immediate and imminent need is to transform primary education system and redeem the lives of millions of poor children. We, in the system are paid for this work. **First and foremost thing is for teachers to stop the blame game.** We need to demonstrate to them with a working model of a real child-centered learning and support them with enabling managerial system which will motivate them to replicate. Teachers respond overwhelmingly and better than anybody else. What can motivate a teacher better than seeing children learning in his class room? With this approach in the backdrop, change will take place like magic. Let us have faith in the system and if change is possible, let us do so immediately as Time is running out.

REFERENCES

Montessori M. (1912): The Montessori Method. Barnes and Noble, New York.

Source Book on Assessment for Classes I-V, NCERT: 2008

M. P. Vijayakumar
 Honorary Advisor, SSA, Tamil Nadu

Making Medicines Affordable: Reaching the unreached

Dr. Samit Sharma

Initiative

An innovation to devise mechanisms to bring down prices of medicines and surgical items to its minimum, so that even the poor can afford them. Medicines are procured by generic name using transparent open tender system and dispensed through government controlled Medical Stores. It is basically a district wide chain of fair price medicine shops which serve OPD and Indoor patients of Government Hospitals and also the general public. These low cost drug and surgical item sale outlets are not subsidised. They are self sustainable as they generate enough revenues and no external aid is required. Unlike, fair price PDS shops their scope is universal and not limited to a restricted number of card holders.

BACKGROUND

World over about two billion people lack access to essential medicines mainly due to their high cost. This deprivation causes immense suffering, pain, fear and loss of life. As a result thousands of people die daily among them the vast majority are children below five years of age. Their avoidable deaths are a tragic shame for humanity.

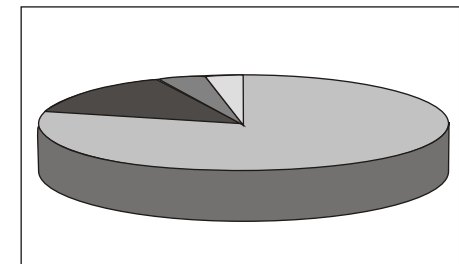
With a population of over 120 crores, India accounts for 16 per cent of the global population. Recently the Suresh Tendulkar panel has reported that 37.2% of Indian population live below poverty line (BPL). Thus, India accounts for huge morbidity & mortality burden due to large number of deprived & extremely poor people. WHO says that 65% of the population still lacks regular access to essential medicines, with the rise in health care cost, over 23% of the sick don't seek treatment because they don't have enough money to spend.

A study by World Bank shows that as a result of single hospitalization 30% of people fall below poverty line. Over 40% of those hospitalized, need to borrow money or sell their assets to get themselves treated.

Expenditure on drugs constitutes about 50 % of the health care cost which increases up to 80% in rural areas. In fact expenditure on health care is the second most common cause for rural indebtedness in India and is also responsible for APL to BPL shifting of families.

Where does the money for health expenditure (in India) come from?

Private out of pocket expenditure	79%
State govt.	14%
Central govt.	4%
Private investment	3%
Private insurance	0-1%



Drugs are not Costly, they are Overpriced

India has one of the best developed pharmaceutical industry and produce about 20% of the world's drugs. Over 60 manufacturing plants in India have US FDA approval which is second only to US. Currently a dozen top Indian companies are major exporters (especially generic drugs) to US and European markets.

But, on the other hand drugs are beyond the reach of people, especially the poor because their prices are very high. It is not that the cost of manufacturing is high, but because the profit margins are exorbitant and in many cases exploitative. The fact is that number of active pharmacological ingredients is about 550 and these are manufactured by about 20,000 drug companies in form of over 1 lakh different formulations, still drugs are eluding people. The large scale drug production and steady increase in sales of pharma companies has not had any significant improvement in the availability and accessibility of drugs to meet the nation's health needs.

It is said that in a free market economy price competition and other market forces keeps the prices in check, but in case of drugs it is not true. In fact the same drug (salt) is manufactured by dozens of different companies by different brand name and they still manage to peg the prices high. This is failure of market and the reason is that drugs are different from other consumer items. Because, instead of the patient it is decided by the doctor which brand is to be purchased. Branding creates “artificial monopoly” and enable drug companies to put very high MRP despite existence of competitors. Moreover, drug consumers are highly vulnerable and their requirement is urgent, hence they are not in a position to compare prices, bargain or choose.

The pharmaceutical companies are operating in a manner which keeps prices of drugs (including the essential drugs) very high so that profitability is maximised. This is possible because there is no control over prices of most of the drugs. In 1979, 347 essential drugs were under price control. Subsequently, drug companies have succeeded in reducing the basket of price controlled drugs to 142 drugs in 1987. In 1995, this came down to 76 and at present only 74 out of about 550 commonly used drugs are under statutory price control. It means for the remaining drugs there is no ceiling on drug prices and the companies are free to fix MRP of their choice, which could be 5 to 10 time the actual production cost.

For example a strip of 10 tabs. of Cetrizine 10 mg costs just Rs. 1.20 (f.o.r.) but MRP of most brands ranges from Rs. 20 to 37.50.

Reasons for Project Initiatives

Despite the abysmal health status and poor paying capacity of our people, it is unfortunate that medicines are priced exorbitantly. WHO, WB, NFHS & other studies show that there are inadequate access and supply of even essential drugs to the poor despite adequate drug production. Adding to this misery is the poorly functioning public health system. While the sales of branded drugs is increasing steadily, drugs are beyond the reach of the poor. Share of

drugs to total treatment costs can vary from 50 to 80 percent depending on rural / urban locations and inpatient / outpatient treatment. All-India figures for per capita annual drugs and other medical expenditure (rural) is Rs. 294 out of Rs. 380 for health as a whole.

In the pharmaceuticals sector, the cost of manufacturing a drug is relatively low, compared to the price it is sold at. The actual drug prices are usually 2%-20% of the prevalent maximum retail prices (MRP). If medicines can be made available at low cost, the cost of treatment for most illnesses could be reduced many times. Thus, there is a scope to provide drugs much below the prevalent market rates and there is a need to provide medicines at affordable prices, especially for the poor.

Purpose of the initiative:

- To reach the unreached that is **to make medicines affordable to the poor.** (For example - A pneumonia patient who has got only Rs. 10 is not able to purchase an injection Amikacin 500 mg, as it is sold in the market at about Rs.70 (MRP) and therefore many poor patients die for want of this medicines.)
- **To reduce out of pocket expenses** of people on health care by making them available low cost generic medicines through Low Cost Drug Shops.
- **To increase the accessibility of drugs** specially in the remote areas.
- **To decrease expenditure from the state exchequer** by bringing down the government employees health care reimbursement bill and also the Rajasthan pensioners medical fund expenses.
- To promote rational use of drugs by minimising prescription of unnecessary drugs by adopting Essential Drugs List and Standard Treatment Guidelines.

Strategies Adopted / Mode of Transformation

The district administration knew that the actual cost of most of the drugs is very low. But, these were not available to patients at low rates because of three obstacles:

1. The doctors prescribe medicines by brand name of a particular drug company. This prevents competition and creates monopoly in the drug market and enables the drug company to put a very high MRP.
2. As very high MRP is printed on the drugs, the chemists charge the same amount from the patient.
3. Consumers are not aware that the actual cost of production of most of the drugs is very low. Moreover, once a doctor has prescribed a particular brand, the patient has no option, but to buy it, even when other low cost brands are available in the market. For example if doctor has prescribed a brand Glivec to a patient of blood cancer, a months course will cost Rs.1,14,400/-. Whereas, the same anti-cancer drug, but with a different brand name Veenet costs just Rs.11,400/-, while Cipla supplies the generic equivalent of this drug (a-imitib) at Rs.8,000/- & Glenmark supplies it for Rs. 5,720/-!!!!

We broke the monopoly of drug manufacturers by pursuing doctors to prescribe by the generic (salt) name and we made arrangements to sell medicines below the MRP at govt. drug counters and made consumer aware that generic medicines are on an average 5 times less than the cost of branded medicines. This was done in three steps: -

1. **Doctors - prescribe drugs by generic (salt) name.** The state govt. has issued various circulars/ orders, which directs all govt. doctors to use generic names, instead of brand names. Code of medical ethics advocates prescription by generic name. Doctors were sensitized about the plight of the poor. They were shown a documentary depicting how poor children die as their parents are unable to afford expensive medicines.

The following issues were addressed before the project could take off-

Q. What about Quality of drugs that are procured?

Ans: Prescribers were told that Quality standards have been set out in Second Schedule to the Drugs & Cosmetics Act 1940. The pharmacopoeias (I.P., B.P., U.S.P. etc.) specify the standards of identity, purity and strengths and various tests to ascertain the same. These standards are same for generic as well as branded drugs through out the world. There are no two quality standards. A technical committee of doctors was constituted to suggest the companies, which they believe, produce good quality drugs. Only these drugs were to be procured and supplied at low cost shops.

The generic drugs are regularly monitored by sample testing from govt. authorized testing laboratories and they are found to have same quality, strength, purity, stability and effect. Out of 104 sample reports received, no sample was found to be sub-standard.

Q. Chemists will give brand of his choice and will charge the printed MRP?

Ans: If the patient is advised by the doctor / nurse to buy low cost drugs from govt. store, the problem is solved. Once, patients understand that the same drugs are available at a govt. store at much lower rate; market competition ensures that the chemists also sell at fair rates. Finally the patient benefits.

Q. Govt. can put a ceiling on MRP?

Ans: This cannot be done at the State govt. level but the Central govt. can do so using the provisions of Essential Commodities Act and Drug Price Control Order. Doctors were convinced that by the time a ceiling on MRP is put by the central government they should not wait and start helping their patients, especially the poor.

Once convinced that the initiative is helpful to the patients they

took a joint pledge to prescribe drugs by salt name and persuade the patient to purchase it from low cost drug shop.

2. Govt. Medical shops - provide low cost medicines

- Medicines which are commonly used by the patients and prescribed by Doctors were **listed** after discussions with various medical specialists.



- Technical Committee of eminent doctors approved reputed drug companies based on their past clinical experiences, good manufacturing practices (GMP) certification and goodwill. The companies were Cipla, Cadila, Ranbaxy, German Remedies, Alembic, etc. (Initially 22 and now 57).

- A purchase committee having officers of Medical & Health deptt., Coop. deptt., District administration & Accounts department was formed to formulate the tender terms & conditions.
- Finally, **tenders** was floated for these medicines. It included 564 generic medicines and more than 100 surgicals and I.V. fluids. Cooperative stores invited bids to purchase the drugs of these companies from the local stockists at competitive prices, after preparing

SER. NO.	SALT NAME / GENERIC NAME	PKG.	PRINTED M.P.	SALE PRICE
1	ACECLOFENAC 100 mg + PARACETAMOL 500 mg Tab	10 Tab	25.30	6.75
2	ACECLOFENAC 100 mg Tab	10 Tab	21.90	4.38
3	ACECLOFENAC SUST. RELEASE- 200 mg Tab	10 Tab	39.50	16.75
4	ALPHA BETA ARTERIOLESTER 2 ML Inj	1	89.00	10.81
5	ALPRAZOLAM 0.25 mg Tab	10 Tab	18.00	1.38
6	ALPRAZOLAM 0.5 mg Tab	10 Tab	14.00	1.75
7	AMIKACIN 500 mg Inj	1 vial	38.00	7.06
8	AMIKACIN 500 mg Inj	1 vial	75.00	8.63
9	AMLODIPINE BESILATE 5 mg Tab	10 Tab	22.00	2.75
10	ANTICID Rapid (MAGALY + ALLUM. HY.)	170 ml	30.00	12.50
11	ANTI-SNAKE VENOM Inj	1 Vial	492.00	267.50
12	ATORVASTATIN 10 mg Tab	10 Tab	65.00	11.00
13	ATORVASTATIN 20 mg Tab	10 Tab	175.00	21.68
14	AZITHROMYCIN 500 mg Tab	3 Tab	233.33	25.99
15	B-COM VITAMINS Syrup	200 ml	27.00	13.69
16	BETANASTINE 10 mg Tab	10 Tab	56.00	21.00
17	BETANASTINE 8 mg Tab	10 Tab	31.50	10.63
18	BISACODYL 5 mg Tab	10 Tab	10.00	3.98
19	CALAMINE lotion	50 ml	27.00	12.28
20	CEFADEXIL 500 mg Tab	10 Tab	36.41	31.13
21	CEFDOME 100 mg DISP. Tab	10 Tab	113.40	31.88
22	CEFDOME 200 mg DISP. Tab	10 Tab	294.75	48.75
23	CEFTOXIME 1gm Inj	1	38.00	17.75
24	CEFTOXIME 200MG Inj	1 vial	12.42	11.13
25	CEFTOXIME 500MG Inj	1 vial	18.50	14.99
26	CEFDOME PRONETEL 200 mg Tab	10 Tab	255.00	85.63
27	CEFDOME PRONETEL DISPENSABLE 100 mg Tab	10 Tab	140.00	13.63
28	CEFTAZIDIME 1 gm Inj	1	370.00	56.25
29	CEFTAZIDIME 1 gm + TACROCTAM 125 mg Inj	1	120.00	58.75
30	CEFTAZIDIME 1 gm Inj With DW	1	95.00	18.75
31	CEFTAZIDIME 250 mg Inj	1	20.00	10.61
32	CEFTAZIDIME 500 mg Inj	1	60.00	14.31
33	CEFTUROXIME AXETIL 500 mg Tab	10 Tab	255.00	165.63
34	CEFTUROXIME 10 mg Tab (Oval)	10 Tab	27.50	1.50
35	CINAZOLINE 20 mg Tab	10 Tab	14.00	7.31
36	CIPROFLOXACIN 250 mg Tab	10 Tab	31.20	7.50
37	CIPROFLOXACIN 500 mg Tab	10 Tab	65.54	12.00
38	CIPROFLOXACIN Eye drops	10 ml	20.00	6.63
39	CLAVULANATE POT. + AMOXICILLIN Inj. 1.2 gm	1 vial	155.00	51.24
40	CLOPIDOGREL 75 mg + ASPIRIN 75 mg Tab	10 Tab	27.24	21.63
41	CLOPIDOGREL 75 mg Tab	10 Tab	40.00	13.00
42	DEXAMETHASONE Inj	2 ml	9.53	4.80
43	DIAZEPAM 5 mg Tab	10 Tab	18.00	1.75
44	DIAZEPAM Inj 10 mg 2 ml	2 ml	11.80	2.35
45	DICLOFENAC SOD. 100 mg Tab	10 Tab	25.00	2.75
46	DICLOFENEC Gel	30 gm	38.00	8.85
47	DILTIAZEM 30 mg Tab	10 Tab	30.00	7.25
48	DILTIAZEM 60 mg Tab	10 Tab	49.00	11.75
49	DOMPERIDONE 10 mg DISP. Tab	10 Tab	21.80	2.25
50	ENALAPRIL 5 mg Tab	10 Tab	25.00	2.88

उपरोक्त दवाइयों में से कोई भी दवा खरीदने पर ध्यान देना है।

comparative statement and finding out the most economical company (L1).

- The medicines are then sold at **20% profit** margin to the patients. This money goes to the Cooperative Department which will make the project self sustainable.
- Thus, medicines of reputed drug manufacturers (which are very cheap) were made available at government Cooperative Medical Shops for sale.
- Pricelists are displayed** outside the shops to advertise the rates and educate the patients.
- Computerized bills must be issued to every customer.
- Once choice of low cost drugs is available to the consumer, market competition will ensure that private medical shops also reduce their prices.
- Private doctors/practitioners switched over to generic prescribing on patient demand.

3. Patients – made aware

The consumers were made aware by displaying boards showing comparative price lists. Local electronic & print media were positively capitalized to highlight the price difference between generic and branded drugs. Hoardings were displayed outside the hospitals and important locations. Pamphlets were also distributed to patients & their attendants and to the general populace mass as well.

जैनेरिक दवाइयों क्या है ?

जैनेरिक दवा ब्राण्ड दवा का ही समरूप है, जो कि मात्रा, सुरक्षा, ताकत, गुणवत्ता, उपयोगिता में ब्राण्ड दवा के समान है तथा ब्राण्ड दवा के समान ही इसकी खुराक ली जाती है एवं यह उसी के समान असर करती है।

जैनेरिक दवाइयों रासायनिक रूप में भी ब्राण्ड दवा के समान ही है परन्तु सस्ती है।

प्रश्न : क्या जैनेरिक दवाइयों ब्राण्ड दवाइयों के समान सुरक्षित है ?

उत्तर : हाँ, जैनेरिक दवाइयों में उपयोग होने वाले साल्ट वही है जो ब्राण्ड दवाइयों में उपयोग में होते हैं एवं उनकी कार्यक्षमता तथा सुरक्षा भी वही है।

प्रश्न : क्या जैनेरिक दवाइयों ब्राण्ड दवाइयों के समान ही असरकारक है ?

उत्तर : हाँ, जैनेरिक दवाइयों की गुणवत्ता, शक्ति, शुद्धता, स्थिरता ब्राण्ड दवाइयों के समान ही है। फार्माकोपाईज के अनुसार गुणवत्ता के मानक ब्राण्ड और जैनेरिक दवाइयों के समान है।

प्रश्न : क्या जैनेरिक दवाइयों देर से असर करती है ?

उत्तर : नहीं, जैनेरिक दवाइयों ब्राण्ड दवाइयों की तरह ही असरदार है तथा ब्राण्ड दवाइयों के समान समय में ही असर करती है।

प्रश्न : जैनेरिक दवाइयों सस्ती क्यों है ?

उत्तर : निर्माता द्वारा इनके पेटेंट, अनुसंधान, विकास, प्रचार-प्रसार व मार्केटिंग पर कोई खर्च नहीं किया जाता है, साथ ही जैनेरिक दवाओं की बाजार में प्रतिस्पर्धा होने के कारण भी देर के समान है।

प्रश्न : क्या जैनेरिक दवाइयों प्रतिष्ठित कम्पनियों से खरीदी जाती है ?

उत्तर : हाँ, जैनेरिक दवाइयों चिकित्सकों की कमेटी द्वारा अनुमोदित प्रतिष्ठित कम्पनियों जैसे सिल्ला, रेन्बेक्सी, कोडिला आदि से ही खरीदी जाती है।

जिला स्वास्थ्य समिति, नागौर
राष्ट्रीय ग्रामीण स्वास्थ्य मिशन
जैनेरिक दवाइयों - सस्ती एवं गुणवत्तायुक्त

OUTCOME: Lacs of Patients can now Afford Treatment & Thousands of Human Lives are saved

1. Increased affordability due to low prices-

a. **Medicines and Surgical items are available at unbelievably low prices**, at govt. run shops, much below the printed market rate ie. MRP. See the (illustrative) list.

Generic Name of Drug	Chittorgarh Bhandar Rate* (Rs.)	Unit	MRP Printed on pack/strip (Rs.)
Albendazole Tab IP 400 mg	1.37	1 tablet	25.00
Alprazolam Tab IP 0.5 mg	1.75	10 tablets	14.00
Arteether 2 ml Inj	11.72	1 Injection	99.00
Amlodipine Tab 5 mg	3.12	10 tablets	22.00
Cetirizine 10 mg	1.50	10 tablets	35.00
Ceftazidime 1000 mg	64.90	1 Injection	370.00
Atorvastatin Tab 20 mg	22.59	10 tablets	170.00
Diclofenac Tab IP 100 mg	2.75	10 tablets	25.00
Diazepam Tab IP 5 mg	1.90	10 tablets	29.40
Amikacin 500 mg	8.67	1 Injection	70.00

S.N.	Name of Surgical item	Printed MRP	Rate to the Patient
1	Blood Administration Set	43.00	12.30
2	I.V. Cannula 18	63.00	7.48
3	I.V. Set	50.00	6.61
4	Surgical Gloves	40.00	7.30

b. **Treatment cost of most illnesses falls sharply.** For example see the cost difference in treatment of **Common cold** (5 days).

When medicines are prescribed by brand name and purchased from chemist shop			
No.	Name of drug	Rate per 10 tabs	Cost (no. x rate)
10 tab	Ciprofloxacin 500	60.54/-	60.54/-
10 tab	Nimesulide	25/-	25/-
5 Tab.	Cetirizine	35/-	17.5/-
Total			103.04/-

When medicines are prescribed by Generic name and purchased from Coop. Store			
No.	Name of drug	Rate per 10 tabs	Cost (no. x rate)
10 tab	Ciprofloxacin 500	12.85/-	12.85/-
10 tab	Nimesulide	2.12/-	2.12/-
5 Tab.	Cetirizine	1.50/-	0.75/-
Total			15.72/-

This leads to a significant fall in out of pocket expenditure of public due to availability of generic medicines much below the printed MRP. The selling price of low cost drugs / surgical items ranges from 5-50% of the printed MRP of branded medicine. It can be presumed that on an average the low cost drug is about one fourth the prices of the drugs available at private medical shops. The cooperative store has sold generic medicine worth Rs. 153 lacs. In the absence of this system people would have purchased medicines at printed MRP which would have cost approx. Rs 612 lakh but now the public have saved approx. 459 lakh in just 11 months (Sep. 08 to July 09).

2. Increased Accessibility of medicines

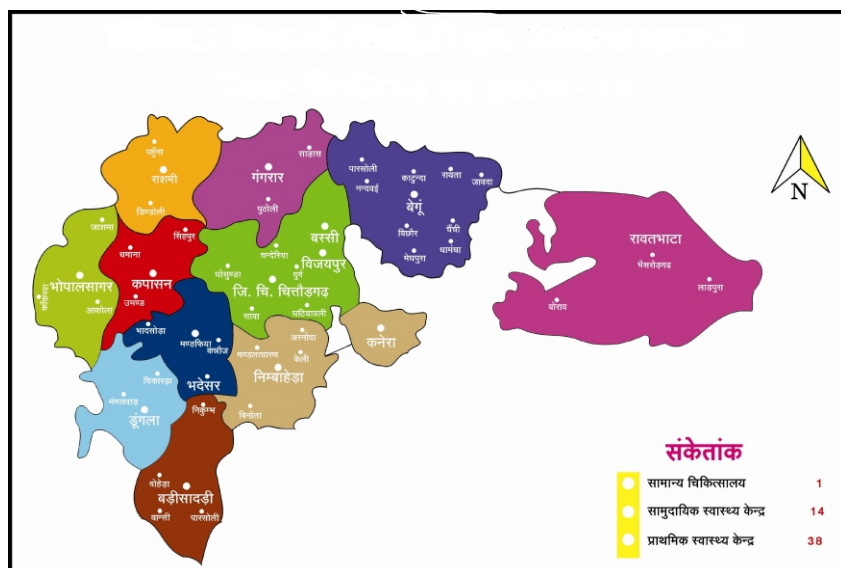
a. **Chain of 23 low cost drugs shops** have been established in entire district where low cost drugs are available to the

patients coming to government hospitals for treatment and for general public.

b. Generic drugs for 53 BPL Drug Counters

Low cost drugs are supplied to a chain of 53 BPL drug dispensing counters from cooperative department. These drugs are given free of cost to BPL card holders.

c. Drug supplies to 17 other districts The medical & health



department has authorised hospitals to procure medicines at Chittorgarh bhandar rates. Some districts are procuring drugs & surgicals from the bhandar.

3. **Huge number of patients getting low cost medicines** - 6.53 lakhs patients purchased generic drugs.
4. **Decrease in expenditure from Rajasthan Pensioners Medical Fund (RPMF)** - So more patients can now be benefited in the same amount.

Month	Year 2007-08	Year 2008-09	Savings
September	1095018	870292	224726
October	1112480	1013390	99090
November	1195787	1049037	146750
December	1261704	982778	278926
January	1360284	859767	500517
February	1431829	1136780	295049
March	2305094	2145344	159750
April	1008816	716523	292293
May	1292687	884084	408603
June	1272948	927984	344964
July	1520000	985000	535000
Total	14856647	11570979	3285668

1. **Decrease in government employee health care reimbursement expenditure** has also taken place because medicines are available at lower prices so less money is to be reimbursed to the employee by the state government. Amount of money saved is being calculated.
2. **Rational prescription behaviour.** Doctors have stopped prescribing unnecessary drugs which has resulted in cost savings. Decrease in side effects and fall in antibiotic resistance is a natural outcome.
3. **Private chemists decrease drug prices** - Private chemist association has voluntarily offered to sell certain medicines below MRP. Many chemists have started doing so due to stiff competition and fall in sales.



Highlights/features of the Initiative

Transparency

- A technical committee of doctors of different specialities was entrusted with the task of identifying reputed companies which were capable of supplying quality drugs. So selection of companies was transparent.
- A purchase committee having officers of medical & health dept., coop. dept., district administration & accounts dept was formed to formulate the tender terms & conditions.
- Drugs were purchased by generic names using open tender system. The tender document was posted on the district website www.chittorgarh.nic.in
- The lowest tender rates (L1) have been made public & also circulated among the doctors. It is also available on website.
- The selling price of low cost drugs and their comparison with printed MRP has been displayed outside the shops for the common man to verify.
- Bills are to be issued compulsorily to every patient.

Innovativeness & stake holder participation

Efforts have been made to persuade doctors to prescribe medicines by generic names but this does not help because the chemists dispense drugs at MRP which is very high compared to the

manufacturing cost of the drug. Similarly, if the low cost drugs are made available for sale the patient is not benefitted because the doctors do not prescribe these.

At present over 600 different formulations of generic drugs are available and about 300 low cost alternatives (most economical one) of ethical drugs are available. 54 IV fluids and 142 surgical items which include articles like spectacles, contact lenses are also available. Thus a wide range of products which includes almost all commonly prescribed drugs are available under one roof. Uninterrupted supply is being maintained as demand is honoured even on phone calls, faxes and e-mails within three days in the district and within seven days for orders outside the district.

Replicability

- Existing govt. hospital pharmacy counters, life line drug stores, cooperative stores etc. may adopt this model without any extra cost. It simply requires procurement by open tender and the low cost drugs so procured are made available for sale below MRP.
- New stores can be opened in CHCs and PHCs via Medicare Relief Societies. It just requires a vacant room, a pharmacist, a drug license and of course, an intention to serve the poor.
- The innovation is very easy to replicate as Govt. of Rajasthan has issued orders to open generic drug stores in all districts of the state. Moreover, the drug prices of Chittorgarh bhandar have been approved by the state govt. for purchases by the govt. hospitals elsewhere in the state.

Sustainability

- This is a nominal capital cost, zero subsidy, non-aided and self sustainable initiative to save lives. It simply requires an unused 120 sq. feet room (which is surprisingly easy to find) in the hospital and / or adoption of transparent drug procurement procedure in the existing govt. medical shops.

- The bulk procured drugs are sold after adding 20% administrative & handling charges to the L1 (Lowest tender price) hence, sufficient revenue is generated to meet out pharmacist salary, electricity charges and other logistics expenses.
- The project is not only self sustainable but also generates enough profit which is being ploughed back to increase the number of low cost outlets
- Affordability of medicines has also been included in the national common minimum program of UPA govt. and also forms a part of Millennium Development Goals - 8E and in target no. 8.13.
- Chain of Jan Aushadhi Kendra at CHCs & BPL Stores upto PHC level are being opened up across the state that is linked with generic drugs.
- High public acceptance because of its direct relation with their household economy. Saved out-of-pocket expenditure on health would improve their quality of life.
- Affordable cost of medicines helps the poorest to complete their treatment. It would have a positive impact whenever they need treatment again.
- Saving of public exchequer to the tune of Rs. 39.79 lakhs from RPMF expenditures and similar trends also observed in working employee health care reimbursements.

THE SOLUTION: Statutory price control for all essential drugs

It is the government, which can provide medicines at an affordable cost and improve medicine accessibility. In India, an effective price control mechanism is a must, failing which the access to medicines will become less and lesser as most of the people pay for medicines from their own pocket. The need is that Central Government should introduce a more effective drug pricing policy that would bring down the high profit margins for the pharmaceutical trade and make medicines more affordable for the common man.

Liberalisation has nothing to do with a price protective mechanism in

a sector as vital as healthcare. The medicines under national list of essential drugs must be kept under price control domain and the provision to control prices of newer necessary medicines useful in public health should be made.

Supreme Court in its interim order dated, March 10, 2003 in Gopi Nath case has directed the central government to ensure that essential and life saving drugs are kept under price control. The fact that Karnataka High Court and subsequently Supreme Court stayed the implementation of pharmaceutical policy 2002 questioning the stand of Government over the exclusion of many essential drugs under the ambit of price control speaks the importance of price controlled essential drugs in India. This has yet to be complied with.

At present only 74 drugs have ceiling prices. If SC orders of 10 Mar.03 are complied with, it would result in control on ceiling prices (ie control on MRP) of about 350 Essential Drugs and many other life saving drugs as well. Even if these drugs could be provided at affordable prices many more human lives would be saved.

REFERENCES

- District website www.chittorgarh.nic.in & www.nagaur.nic.in
- Outlook magazine dated 27 july 2009, "There is a cure- Why drug prices are lower in Chittorgarh"
- Booklet published on the occasion of conference on "Making Medicines Affordable"
- Short documentary film titled "Kya Dava Hakikat Mein Mehangi Hai?"
- Power point presentation for doctors "Exploitation by pharma industry"
- Power point presentation on "Making Medicines Affordable" in LBSNAA, Mussoorie by Collector Hanumangarh in phase III of IAS officers on 27th July 2009.
- Orders issued by the Government of Rajasthan endorsing the Chittorgarh Generic Model.
- Visits of Mr. Samuel Mawungandze, State Chief, UNICEF

Rajasthan Office

Visits of Mr. Sunil Thomas Jacob, State Coordinator, UNFPA Rajasthan

Visits of Dr. N.C. Saxena, Senior Policy Advisor, UNICEF and Mr. T.S. Sandhu, Chief District Support, UNICEF New Delhi Office

Visit of Ms. Sarah Fox, Consultant Poverty & Social Protection, Oxford Policy Management UK

Visit of Mr. Vibhu Prasad Mohapatra, Fellow, India Development Foundation, New Delhi

Visit of Dr. Anna Marriott, Health Policy Advisor and Ms. Emma Ferry, Oxfam International, UK

Case control Study conducted by NGO "PRAYAS".

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MRP Printed on the pack
Cipla
Stockist Price

PRODUCT	PACK	MRP	PRICE-RETAIL VAT-EXTRA	PRICE-STK VAT-EXTRA	CASE
1st Aid Surgical Tape	1/2x9.1m	390.00	184.31	165.30	24
1st Aid Brand/Tape 0.5"	24inch	390.00	177.84	159.50	30
1st Aid Brand/Tape 1"	12 Inch	390.00	177.84	159.50	30
1st Aid Plasters (new)	300	600.00	205.44	184.25	32
Acigene Mint/Orange tab	10's	6.20	3.46	3.10	
Actiflu tab	20x10	12.00	5.37	4.82	64
Actiflu Plus tab	10x10	18.00	7.76	6.96	56
Amiclip 100 Inj(Amikacin 100mg+Methylparaben 0.08%)	2ml Vial	20.00	4.29	3.85	900
Amiclip 250 Inj	2ml vial	42.00	6.13	5.50	900
Amiclip 500 Inj	2ml Vial	72.00	8.27	7.42	1125
Ampysin 500 Inj(Ampicillin Sodium 500mg injn)	500mg	9.00	5.21	4.67	1200
Apenorm Syrup(Cyproheptadine Hyd2mg)	200ml	55.00	24.57	22.04	30
Apenorm Tab(Cyproheptadine 4mg)	10x5x10	10.00	3.90	3.50	81
ACES Caps (Anti-oxidant)	10	33.00	9.70	8.70	90
Azimax 250 tab (Azithromycin Andh250m)	10x6	60.00	35.59	31.92	90
Azimax 500 tab	10x3	60.00	35.59	31.92	60
Burnheal cream (Silver Sulpha+Chlorhexid)	15gms	28.00	9.53	8.55	600
Casonova Condoms (Black)	3+1	12.00	6.75	6.05	720
Casonova Condoms (Purple)	3+1	12.00	6.75	6.05	720
Cefasyn 250 tab (Cefuroxime Axetil 250)	10x4	150.00	61.05	54.75	48
Cefasyn 500 tab	10x4	285.00	117.08	105.00	27
Cefix 100 tab(Cefixime 100mg tablets)	10's	180.00	51.74	46.40	18
Cefix 200 tab(Cefixime 200mg tablets)	10x4	120.00	39.42	35.35	80
Cefix Ds (Cefixime Dry Syrup/50mg/5ml)	30ml	65.00	28.43	25.50	60
Ceftaz 1000 Inj (ceftazidime 1gm)	15ml bot	355.00	73.59	66.00	400
Cephalex 125 DT (Cephalexin 125mg)	20x10	39.90	9.92	8.90	45
Cephalex 250 Capsules	10x10	69.90	17.54	15.73	144
Cephalex 250 DT Tab	20x10	79.95	20.35	18.25	36
Cephalex 500 Caps	10x10	129.95	31.78	28.50	60
Cephalex Dry Syrup	30ml	27.90	10.93	9.80	120
Cephalex Drop.	10ml	35.90	12.71	11.40	120
Cetclip Tab(Cetrizine Hydro 10mg)	10x5x10	33.65	2.10	1.88	42
CETCIP-L (Levocetirizine 5mg)	10x10	32.00	7.63	6.84	150
Cetclip Syrup	30ml	18.00	7.37	6.61	120
Cheston Cold Syp(Cetrizine2mg+Para125 +Pseudoephedrine 15mg)	60ml	25.00	11.44	10.26	80
Cheston Cold tab(Ceter5mg+Para500+Phenylprop25	10x10	20.00	6.22	5.58	60
Cipladine Dustong Powder(Povidone 5% Powder	10gm Con	31.55	8.41	7.54	600
Cipladine Ointment 20gms	20gm tub	35.00	10.17	9.12	400
Cipladine Ointment 125gm	125gms	82.00	43.99	39.45	30
Cipladine Ointment 250gms	250 g Jar	240.00	57.20	51.30	30
Cipladine Solution	100ml Bot	86.15	16.90	15.16	50
Cipladine Solution	500ml Bot	180.00	56.62	50.78	20
Cipladine Solution	2 Ltr	450.00	216.09	193.80	6
Cipcorlin Inj(Hydrocortisone Sodium succinate equ 10	2ml	46.00	14.10	12.65	30
Ciplacef 250m Inj(Ceftriaxone 250mg)	250mg vial	40.00	10.11	9.07	320
Ciplacef 1gm Inj(Ceftriaxone 1gm)	1gm vial	135.00	23.92	21.45	320
Ciplacef 500mg Inj	500mg via	75.00	15.45	13.86	320
CIPLOX IV 100ML	100ml Bot	32.00	16.07	14.41	60
Cipmox 250 caps(Amoxycillin Trihydrate 250mg	15x2x10	40.00	9.20	8.25	40

Sustainability of Public Transport: BMTC

Mr. Syed Zameer Pasha, Mr. Upendra Tripathy, Dr. K.N. Ingalagi

Transport is an important infrastructure in the overall development of society. It is the *de facto* barometer of socio-economic progress. It plays a decisive role in production, distribution and price determination. Transport issues for Bangalore were discussed in the Mysore Representative Assembly as early as 1932. The rulers of princely state of Mysore envisioned the establishment of public transport for the people of Bangalore. Bangalore Metropolitan Transport Corporation which caters to the traveling needs of Bangalore was built on the plinth of Bangalore Transport (joint stock) Company Ltd. established in 1940. This company was purchased by the Mysore Government Road Transport Department in the year 1956 and was retained as Bangalore Transport Service till 1961. This became an operating division of Mysore State Road Transport Corporation in the year 1961. The present Bangalore Metropolitan Transport Corporation came into existence on August 1997 with the sole aim of providing public transportation to the city and sub-urban areas of Bangalore. The mission of the organization is to provide safe, reliable, clean and affordable travel to the public.

BMTC leads by example in being the only Bus Corporation within the city of Bangalore to ferry more than 4.2 million commuters every day. The organization comprises a fleet of over 6000 buses covering an area encompassed with a radius of 40.4 kilometers from the city centre. In a day BMTC operates on 583 city and 1785 sub urban routes, running 1.3 million kilometers and

making 78,750 trips. BMTC has a 31,183 strong labour force to carry out different aspects of BMTC bus operations.

BMTC services the transport needs of the urban and sub-urban population in and around Bangalore. And, despite the differentiated base of the commuting population, BMTC reaches far and wide, in every nook and corner of the city making public transport an attractive travel choice for everyone. BMTC's strong hold in the area of public transportation in Bangalore is a testimony to its adoption of sound Quality Management, HR and Environmental policies.

The corporation also strives to bring about increased passenger comfort by integrating Intelligent Transport Systems (ITS) and Passenger Information system (PIS) in its daily operations. This helps to monitor its services better and provide quality services. Public feedback is also an important input in BMTC operations; a state of the art control centre is envisioned for the near future which will be a one point contact for addressing customer queries and feedback.

VISION

To provide world-class transport services to the citizens of Bangalore Metropolitan Area

MISSION

To provide safe, affordable, eco-friendly efficient bus services through:

- Benchmarking & improving management efficiency.
- Enhancing its Technical & Operational efficiency.
- Developing, testing and adopting new processes to achieve efficiency in bus services.
- Fostering skill development and attitudinal changes among its employees.
- Valuing public feedback as an important input in improving operations to serve the commuters better.

Discharging its social responsibilities by:

- Connecting all villages around the City with red board buses
- Plying services to the city core to ease congestion with black board buses
- Running limited stop buses to save time of the commuters
- Providing comfortable & fast moving 'Pushpak' buses
- Chartered services to various industries, schools and colleges
- Offering subsidized travel to the deserving sections of the society
- Issuing passes to various segments of the society
- Providing Eco-friendly Parisara Vahini buses
- Running Vestibule buses to carry more passengers
- Plying Mini buses to provide transport to remote sub urban areas
- Upgrading Transport services by operating High End Volvo buses in the city
- Operating Vayu Vajra services to BIAL for airport commuting
- Providing City sight seeing Curitiba buses
- Special services to cater to the needs of ladies, and sick people

Why Introduction of Quality Practices

The last decade of twentieth century witnessed revolutionary changes in the ideology of managing the public sector undertakings. Privatization, liberalizations and globalization prevailed upon every sphere of economic activity. The Central Government which followed the monopoly of the state and controlled economy conceded for Market economy and private competition. This sudden change was a big blow to the public sector undertakings, since public transport is one among them; it had to face the competition. In addition to this, the public sectors had to face the problems of old technology, financial crunch, insufficient internal resources and labour activism and increased demand for passenger satisfaction. The situation became grim and questioned the very existence of the public transport. Bangalore Metropolitan Transport Corporation

(BMTC) had more severe problems. These problems/risks are identified through stakeholder's perspectives. The Karnataka Government, BMTC Management, Employee, and Passengers & public constitute the stake holders of BMTC. Each stakeholder's problems are categorized as follows.

Government: Karnataka State Government being the owner of this corporation, stopped financial support, issued private permits to carry passengers by tempos, did not revised the passenger fare to meet the increasing cost of operation, no capital grants, no reimbursement of cost on subsidies like student, police, home guards, and further demanded to fulfill the travel demand of the peoples representatives.

Management: BMTC management constitutes the Corporation Board, Managing Director & Chief Executive Officer, Functional Directors, and Heads of the departments, officers and supervisory staff. The concern of non-official members on the board policies, government servants mind of the officers & supervisory staff, resistance to expansion of fleet & change, fear of taking up new initiatives, risk aversion and pro-status quo mindset, delay in project completion, lack of finance, hesitation in adopting the advanced technology were a few among them.

Employees: The drivers, conductors, mechanics and ministerial staff constitute the labour force of BMTC. The low morale & motivation prevailed because of fear of privatization, non payment of employee due, and postponement of wage revision, absence of skill development programs, lack of belongingness, frequent strikes and demonstrations for trivial issues, assaulting of higher authorities at workplace. It was total indiscipline and chaotic situation.

Commuters and Public: High level commuter dissatisfaction, inadequate fleet, demand for more quality buses, aging fleet, low

punctuality and accessibility of services, low frequency of services, high accident and breakdown rates, demand for hassle free ticketing, lack of mechanism to address public grievances and declining rider ship numbers.

The major product of public transport is production of the passenger seating kilometers. This product is highly volatile in nature. The sustainability of public transport is striking the balance between cost of operation and revenue realization. BMTC as an operating division of Karnataka State Road Transport Corporation has continuously incurred losses and is known for the rude behavior of its crew.

The newly born BMTC had to make both ends meet in the context new of economic policy of the state. In any part of the world operation of public transport is a losing proposition; hence no multinational companies venture to invest in the operation of public transport. The Indian scenario is no different from other parts of the world. In India, there are eight urban bus transport systems including BMTC. All are losers except BMTC.

SETTING THE SCENE

Government: BMTC under the able leadership of Chief Executive officers convinced the government and persuaded the policy makers to spare BMTC from privatization and to give time for improvement where labour unions were violent, going on stoppage of operation of buses over trivial issues. Government declared the passenger transport as public utility services and invoked the provisions of Essential Services Maintenance Act 1982. The Government didn't make frequent change of the Chief Executives and the functional directors; the Judiciary appreciated the concern of government in providing public transport. The arrogant, litigant, lazy workers were transferred out of BMTC to KSRTC, NWKRTC and NEKRTC, the high court of Karnataka upheld the order, and this brought complete discipline.

Further, the government stood as guarantee to obtain loan, sanctioned one time grant for new projects, reimbursed adequately for subsidized services on a scientific basis, sanctioned infrastructure grant for purchases of land and rolling stock, made timely revision of passenger fare.

The Government approved the proposals of BMTC on revising the fares, amendment in the service conditions, extension of passenger services and amenities, development of transport infrastructure & posting of efficient civil servants.

Management: The Corporation board is the legislature of BMTC it agreed for operational re engineering. The reengineering carried out in managing the fields of Money, Material, Method and Man. The input-output ratio was fixed. The fuel, staff and depreciation constitute 80% of cost of operation, the economic use of these inputs increased the productivity. The staff bus ratio was brought down to 5.2 by introduction of multi skilled jobs like, driver-cum-conductors, Junior Assistants cum- typist, merging of mechanic trades. The staff bus ratio in urban transport elsewhere in the country ranged from 9 to 12. The fuel & material cost more than 40% cost of operation hence saving of fuel i.e, diesel was important input which must be used economically. The fuel efficiency measures were adopted in consultation with Petroleum Conservation Research Association, and the vehicle manufacturers like Leyland, Tata and equipment manufacturers like Mico Bosch. Drivers were trained to improve their driving habits, speed lock was introduced at higher efficiency level thereby fuel efficiency increasing.

The passenger buses constitute major chunk of transport infrastructure. When BMTC was part of KSRTC old vehicles were operated in the city area due to which breakdown rate was very high the passengers lost confidence as the services became unreliable. The board approved the fleet expansion, Depot (maintenance workshop) expansion and staff to operate the fleet expansion. The colour of the bus was red and cream this colour was not pleasant to the eyes of

people. BMTC introduced new blue and white buses with improved seats in Green, navy blue, white, purple and three colours. The ergonomically designed seats were fitted to improve quality and designs.

A blue print was prepared to make operational profit, maximize revenue and minimize cost of operation. The highest cost of operation in public transport is the stores and fuel, transparent method of procurement these certainly reduce the cost of operation. The initiatives were taken to get the goods and services at competitive rate and so the chassis, diesel, security services, house keeping, software & hardware services were procured through tendering. The public-private partnership was the order of the day; buses were hired on kilometer basis; bus body building was outsourced; transparency prevailed and the introduction of prompt payment discount expedited the payment for vendors and savings for the BMTC.

BMTC introduced IT solutions, computerization of depot activities and procurement of goods and services through E-tendering. On line vehicle tracking system, E-Ticketing, passenger information system and hosting of user friendly website and usage of IT in recruitment and call centers.

Financial initiatives included innovative borrowing at low interest rates, swapping of high cost loans, mega city funding and access to government projects and infrastructure funds. Interest was earned on deposits, utilization of empty space in maintenance depots during day time for coaching and training earned more money. BMTC became consultant in recruitment; augmentation of commercial revenue on many fronts.

Employees: A transparent recruitment policy was introduced and the employees were recruited on the basis of academic merit and government reservation policy. No pressures influenced this process. IT was extensively used to make transparent, accurate, accountable & fast recruitments.

The Chief Executive Officer / MD introduced “employee darshan” programme. The employees could meet the CEO at 3.00PM daily, his cell phone number was available to all employees or they could send an e-mail. The grievance procedure was strengthened with officers attended to the grievance of employees. A Policy of empathy without compromising discipline was cherished and unions were consulted as per Law.

Extensive employee welfare programmes like MOU with 35 super specialty hospitals helped employee to just walk into the hospital without any payment and got treatment. BMTC made payments, creation of medical incapacitation & welfare fund through which employees incapacitated while in service availed the benefits, Janatha insurance scheme, introduction of de-addiction programme with technical & financial support from International Labour Organization, posting of homeopathic doctors at depots and continuous medical checkup camps were conducted.

Comprehensive labour welfare schemes like marriage advance, interest free educational loan. Bonus & ex-gratia payments, exclusive marriage hall for employees & strengthening of consumer, credit and housing societies and financial assistance for higher education are a few initiatives.

Employee skill development programme through establishment of HRD department, involvement of NGO, RTO, police and judiciary in skill development, organizing of music and magic nights in depots to improve unity of purpose, strengthening existing talents of employees, HRD through inclusion of family members, free tuition for deceased employee dependents, publication of in-house magazine, summer camps for employees children and the spouse, job fairs for unemployed dependents of employees, free legal assistance for family problems, creation of “peer groups” in depots for grievance resolution and to check corruption. Professionals for family counseling and deal with sexual harassment at workplace were appointed.

Initiatives on handling challenges of commuters and the public: Introduction of commuter friendly initiatives helped BMTC to contain the passengers like, expansion of suburban services to help rural population to access to urban centers for children education and market for agriculture products, enhanced access to slum dwellers through change in bus routes and providing bus-stops near slums, more night services to help call centre workers and floating travellers. Introduction of monthly weekly, daily passes with rainbow (seven) benefits on monthly passes (any bus, anytime, any language, hassle free) constitution of commuter task force to interact with traveling public and residents associations for timely feedback, establishment of call centre, publication of Citizen Charter, time tables, and service pamphlets, hosting of BMTC website are prominent. The introduction of sarathy patrolling vehicles for ensuring operating discipline and help passenger during emergencies gained the confidence of the public. Introduction of night services ensured the safety of passengers coming from outside Bangalore. Introduction of direction oriented services, Metro Bus services, BIG-10 (Trunk services) Ring Road services, hub & spoke routes to cut down travel time and improve accessibility to commuters. Enhanced distribution network of passes through post offices, banks and private agents helped the passengers for easy accessibility of services. The Bangalore International Airport was connected through through Vayu Vajra (Airport Services) to central business district of Bangalore. A publicity campaign to persuade people to use bus mode to reduce congestion and improve environmental quality through celebration of “Busday” on 4th of every month was started.

OUTCOME AND IMPACT OF INITIATIVE

The Government is happy that, its policies of concession travels to the weaker sections of the society are implemented. The objectives like safe, reliable, economic and punctual public transport envisaged

in the Road Transport Corporation Act 1950 were fulfilled. It made BMTC as the best managed public sector undertaking.

There was revolutionary change in the nature of management as more professional approaches began. The morale of the officers of the corporation improved as officers excelled in their work. The BMTC became financially sustainable. The net worth increased from INR 319 mn to INR 9511 mn. BMTC wiped out all loss and have accumulated profit of INR 6251mn. The staff bus ratio decreased from 6.7 to 5.2. BMTC continuously posted profits from the past twelve years. The important outcomes of the initiatives are development of transport infrastructure, prevalence of system than the individual, transparency, accountability, responsibility in managing the corporation. Because of these initiatives BMTC got awards and recognition at national and International level. Encouragement to public private partnership helped minimize the cost.

Even in economic recession, there was a continuous generation of employment in the organization. Employee morale and productivity rose as profits were shared with employees. The employee was given all dues on the date of his retirement. There was industrial peace as the strikes and demonstrations were avoided. Employee felt proud of being the workers of BMTC. Commuters with passes preferred to go by bus. New vajra (Volvo type A/c vehicles) and Vayu Vajra(Airport services) signaled class and style in Bus traveling in 71% of these commuters giving up two wheelers and cars. Such type of vehicles is 434 in Bangalore. The rate of breakdown for every ten thousand KMs came down from .55 to .05, the rate of accidents for every one lakh KMs came down from .32 to .12. The public complaints from .22 to .02 per one lakh passengers. The number of passengers traveling increased from 12 lakh to 42 lakh per day.

Passengers were happy as they had various choice of selecting services. The introduction of daily and monthly passes enabled

commuters to travel in any bus anytime without having problems with conductors and crowded buses. The commuters not knowing Kannada language didn't have problems of interacting with the conductor. Performance of Indices is as follows :

General: BMTC as part of KSRTC was continuously making losses

Particulars	1998 -99*	1998 -99	2005 -06	2006 -07	2007 -08	2008 -09	2009 -10	2010-11 (As on 31.7.10)
No. of Depots	13	16	25	28	30	30	33	33
No. of Schedules	1934	2030	3957	4326	4773	5344	5758	5897
No. of buses	2098	2149	4106	4606	4891	5542	6093	6097
Kms. Operated (in crores)	9.19	15.02	31.63	33.34	37.67	40.62	44.18	15.19
Total Revenue (Rs in crore)	117.61	195.27	703.40	887.59	939.80	1000.63	1131.71	426.58
Margin (Rs in crore)	-7.82	+3.97	+114.88	+224.32	+140.23	+55.18	+65.13	+21.44
Staff ratio per schedule	6.8	5.5	4.8	4.8	5.4	5.2	5.3	4.6

* *Became Financially Independent from 01-04-1998*

started making profits, by 2010 it had wiped out all loss and is making continuous profits for the past twelve years without budgetary support from state or central government. The profit was not the only motto it is with giving satisfactory services. The Public Affairs Centre a NGO involved in consumer movement conducted consumer satisfaction survey among the service providers in Bangalore. In this survey the consumers rated BMTC number one with 96% consumer satisfaction. National papers and magazines reported the best performance of BMTC compared with the other urban State Transport Undertakings in India. The International Association of Public Transport (UITP) came forward to establish its regional offices in BMTC premises (India UITP liaison office). BMTC organized 9th

UITP Asia Pacific Assembly during the year 2008 in Bangalore. BMTC contributed INR 15 mn to Kannada Sahitya Parishat and established a Kannada literary trust which is the biggest trust to confer the Kannada literary award known as “BMTC Nrupatung Sahitya prasasti” which carries INR 5,00,001.00 (one more than Jnana Peetha Award) and a citation. It is highest literary award in Kannada literature. In addition to the above ten upcoming young writers are awarded with Aralu Mallige (blooming jasmine). BMTC was instrumental in establishment of a research centre known as CiSTUP (Centre for Infrastructure, Sustainable Transport and urban Planning) by contributing INR 150 mn. This centre has started functioning in the premises of Indian Institute of Science Bangalore since 2008.

The activities of BMTC were closely and regularly watched by the Central Government, and hence approved the implementation of national pilot project under JNNURM funding for construction of ten passenger amenities centers popularly known as Traffic Transit Management Centers. These centers are established to meet some of the objectives of National Urban Transport Policy (NUTP). Under this scheme ten centers are taken up for construction at the cost of INR 4790.00mn. Two centers at Kengeri and Jayanagar started functioning and the remaining will start by end of 2010.

AWARDS & ACCOLADES**Awards for BMTC**

Sl. No.	Year	Awards
1	1997-98	Second best performance for National Productivity Council Award 1997-98 by ASRTU
2	1999-00	Road Safety Award 2000 by ASRTU
3	1999-00	Maximum improvement in Engine Oil KMPL Award 2000 by ASRTU
4	1999-00	Minimum Operational Cost Award 2000 by ASRTU
5	2000-01	Oil Conservation fortnight 2001 Runner up Trophy for maximum improvement in KMPL Award 2000-2001
6	2000-01	Award for Minimum Operational Cost (City Service)
7	2000-01	Transport Minister Award for Road Safety (City Service)
8	2001-02	Road Safety Award 2001 by ASRTU
9	2001-02	Minimum Operational Cost Award 2001 by ASRTU
10	2002-03	UITP Asia Pacific Award for outstanding achievements in the field of affordable public transport.
11	2002-03	Transport Road Safety Award (City Service)
12	2002-03	Award for Fuel Efficiency (City & Hill Service)
13	2002-03	Award for Minimum Operational Cost
14	2002-03	Award for Performance of Lubricant Oil
15	2003-04	Award for Lowest Operational Cost (Urban)- Winner
16	2003-04	Transport Minister Trophy for the State Road Transport Undertakings with Lowest Accident Record for the period 1999-2002
17	2003-04	Vehicle Productivity Award for maximum improvement (Winner-City Services)
18	2003-04	Tyre Performance Award for Highest Performance (Winner-City Services)
19	2005-06	Golden Peacock special commendation certificate for the year 2005

20	2005-06	Transport Minister Trophy for the State Road Transport Undertakings with Lowest Accident Rate for the period 2003-04(Winner-Urban category)
21	2005-06	Vehicle Productivity Award for maximum improvement (Winner-City Services) for the year 2003-04
22	2005-06	Award for Highest Performance in Tyre Kms (Winner-City Services) for the year 2003-04
23	2006-07	Transport Minister Trophy for the State Road Transport Undertakings with Lowest Accident Rate for the period 2004-05(Winner-Urban category)
24	2006-07	Award for Highest Performance in Tyre (Winner-City Services) for the year 2004-05
25	2006-07	International Gold Star Millennium Award, Bangkok
26	2007-08	Award for vehicle productivity (Urban Services) for the year 2005-06
27	2007-08	Award for Fuel Efficiency (Urban Services) for the year 2005-06
28	2007-08	Citizen Extraordinaire Award 2008
29	2008-09	Transport Minister Trophy for the State Road Transport Undertakings with Lowest Accident Rate for the year 2005-06 (Winner-Urban category)
30	2008-09	Transport Minister Trophy for the State Road Transport Undertakings with Lowest Accident Rate for the year 2006-07(Winner-Urban category)
31	2008-09	Winner of Minimum Operational Cost Award for 2006-07 by ASRTU
32	2008-09	Prime Minister Civil Service Excellence Award 2009
33	2009-10	Winner of Minimum Operational Cost (Without the Element of Tax) Award for 2007-08 by ASRTU
34	2009-10	Karnataka Chief Minister's Annual Ratna Award
35	2010-11	International UITP-ITF award for outstanding innovations in Public Transport for the year 2009-10

THE LESSONS LEARNT

- Best Quality practices yield best sustainability results
- Political will is must for sustainability of public transport.
- Government (Legislature, Executive & judiciary) have greater role to play in the sustainability of public transport
- Government regulated Corporate driven policy is the secret of sustainability
- Apply advanced technology or perish
- Health of the employee is the wealth of the organization
- Motivated workman is the asset of the organization
- Harness management development programmes
- Passengers are the paying masters of the organization keep their demand fulfilled
- Transparency, Accountability and delegation are the fundamentals of sustainability

CONCLUSION

BMTC a public transport system has emerged as the best performing organization in entire Asia. The best quality practices are the strength of sustainability. The stakeholders have a greater role to play in harnessing the public sector in general and transport sector in particular. The CEO and his team adopting quality practices can bring revolutionary change for which BMTC is a living example and ultimately “Practice quality Emerge excellent”

Mr Syed Zameer Pasha, IAS: Managing Director & CEO

Mr Upendra Tripathy, IAS: Former M D, BMTC & present Jt Secy, Ministry of Minority Affairs, GOI, Paryavaran Bhavan, New Delhi

Dr K.N.Ingalagi: Chief Manager MIS, BMTC

Computerization of Decentralized Paddy Procurement and Public Distribution System in Chhattisgarh

Gaurav Dwivedi, Dr. Alok Shukla, A. K. Somasekhar

SUMMARY

This paper discusses the strategy adopted for successfully applying ICT and quality management techniques to ensure food security in the state of Chhattisgarh by checking diversion and leakage in the subsidized food-grain delivery mechanism. This was done by instituting a streamlined supply chain and inventory management system involving process computerization of paddy procurement from farmers, processing of paddy into rice using private millers and the food-grain warehousing and distribution network in Chhattisgarh.

In 2007-08, the Government of Chhattisgarh computerized the entire food grain supply chain. This involved the computerization of paddy procurement at 1532 purchase centers at one end and the distribution of rice and other PDS (Public Distribution System) commodities to 3.6 million ration card holders through 10427 Fair Price Shops (FPS), involving 6 different organizations.

As an outcome of the project, same-day payment is being ensured to over 0.8 Million farmers through computer generated cheques every year, for the paddy procured from them under the Minimum Support Price Scheme. Citizen participation in monitoring the Public Distribution System (PDS) has been ensured through sharing of inventory and distribution related information in the public domain. This paper discusses the project design, challenges, strategy and the outcome of the project.

KEYWORDS

Public Distribution System, diversion, paddy, Custom Milled Rice, Chhattisgarh, quality management, fair price shop, minimum support price

INTRODUCTION

A major challenge for India is ensuring food security to the population below the poverty line (BPL) through managing the availability and efficient distribution of food grains through the PDS. Two important schemes of the Government of India - procurement of food grains from farmers at Minimum Support Price (MSP) and Targeted Public Distribution System (TPDS) - cover the food grain supply chain.

This paper discusses the strategy adopted in using ICT and quality management principles to control diversion and leakage in the procurement and delivery mechanism and successful computerization of the food grain supply chain in the state of Chhattisgarh in 2007-08. The project involved process reforms and computerization of procurement of paddy at 1532 procurement (purchase) centers, its storage and milling into rice and its distribution, along with other PDS commodities (wheat, sugar and salt), to 3.6 million ration card holders through 10427 Fair Price Shops (FPS).

The paper is presented as a case study for management of food security and welfare in conditions of inequality in both urban and rural areas using Total Quality Management (TQM) techniques. The case study will discuss the challenges of the situation, the strategies adopted for meeting the challenge and the scope of replication and upscaling the initiative.

Procurement of Paddy at Minimum Support Price (MSP)

70% of population of India subsists on agriculture. Majority of the farmers are medium and low income group who sell a substantial portion of their produce immediately after harvesting because of two reasons:

- i. Lack of adequate storage facilities to store the produce, and
- ii. Need for money to repay the loans taken for purchasing seeds, fertilizers etc.

Due to these reasons, market forces often exploit these farmers. At the time of arrival of agricultural produce, the market does not come forward to purchase the same and thus rates of the produce come down due to surplus availability in the market. Farmers are forced to sell their produce at lower rates, sometimes even below cost price. As soon as the produce is transferred to the hands of middlemen and traders from farmers, an artificial scarcity is created by storing the produce for later use and market rates ride high, the consequent benefit is cornered by the middle-men and traders.

To check this practice and to ensure that farmers get proper price for their produce the Government of India operates a scheme to purchase farmer's produce in the season at MSP.

In Chhattisgarh, paddy is the main agricultural produce. Nearly 2.97 million families depend on farming out of which 1.522 million families are small farmers¹ (having less than 4 hectares of land). The Government of Chhattisgarh procures paddy in Chhattisgarh on behalf of Government of India under a policy called De-centralized Procurement (DCP). This scheme annually benefits about 1 million farmer families by protecting them against exploitation and distress sale by guaranteeing MSP for their produce.

The procurement is carried out by the Chhattisgarh State Cooperative Marketing Federation Limited (Markfed) through 1333 Primary Agricultural Cooperative Societies in the whole state, spending about 24000 Billion Indian Rupees (600 Million US Dollars). The overall cost of the whole exercise, including storage and milling costs, warehousing, internal transfers (from surplus to deficit areas) comes to nearly \$ 1 billion annually.

The paddy procured is converted into rice by millers executing agreements with Markfed through a process called custom-milling; the resultant rice is then handed over to Chhattisgarh State Civil Supplies Corporation (CGSCSC), which distributes it to the eligible ration card holders at a subsidized price.

Targeted Public Distribution System (TPDS)

TPDS is a Government of India scheme to provide food security in the country. Under this scheme every Below Poverty Line (BPL) family gets 35 KG food grain at subsidized rates. Chhattisgarh being primarily a rice-consuming state, PDS mainly involves the provision of 35 KG rice per month at a subsidized rate of Rs 6.25 per Kg. There are 1.16 million identified BPL families in Chhattisgarh. Another 0.719 million Families get rice at Rs 3 per Kg under a scheme called Antyodaya.

The Government of Chhattisgarh further augmented this scheme to give 35 Kg rice at the rate of Rs 2 (Rs 1 for Antyodaya) to about 3.6 million families. The Government of India (GoI) and Government of Chhattisgarh spend about 18000 million Indian Rupees annually as subsidy to operate this scheme to benefit 3.6 million BPL and other poor families.

Leakage and Diversion

PDS is widely criticized for diversion and leakages in the delivery mechanism. PDS is ranked third in corruption among the 5 basic services (Hospitals, Electricity, PDS, Water Supply and Schooling) according to the India Corruption study 2005 carried out by the Centre for Media Studies². It is estimated that 36% diversion takes place before the ration reaches the beneficiaries³.

The main objective of total food grain supply chain computerization in Chhattisgarh is to check this diversion through efficient and transparent inventory management. The diversion takes place in four main areas.

- Diversion during the procurement itself.
- Diversion in the movement of commodities between warehouses.
- Diversion while transporting commodities to FPS from warehouses.
- Diversion at the FPS level.

Strategy for use of ICT and TQM to Check Corruption

ICT and TQM are advised to be used in systems to streamline processes and reduce discretion thereby minimizing corruption and raising performance standards. The question arises 'Can technology and management theories stop corruption?' The answer is obviously a big 'no'. Technology and theories cannot counter corruption and vested interests. But transparency can stop corruption. Technology and process reforms can increase transparency in the delivery system and this leads to accountability, demand for better performance and this institutes a check on corrupt practices.

A three-step-strategy was adopted in Chhattisgarh using ICT and quality management to check diversion and leakage in the delivery mechanism of PDS as described below. Even though an independent survey has not been done, it is visible from the system that diversion and leakage has been reduced after computerization. However, a nation-wide story carried by the Outlook weekly magazine⁴ states that the consumer satisfaction with the PDS system in Chhattisgarh after the reforms is 92%. This strategy can be adopted in many e-Governance applications where one of the main objectives is to check corruption. The strategy is described below.

1. *Streamline operations and create transparency in operations so that every citizen can easily know what is happening and compare it with what is supposed to happen.*

Transparency is the basic requirement to check corruption. Without providing adequate transparency no controls or inspections can reduce corruption. Excessive control on the other hand increases corruption. Transparency has been created by computerizing all operations involved in MSP procurement and PDS and providing all information on web and some vital information to the public through SMS (short message service)

2. *Provide the citizens with a convenient way to give feedback or lodge complaint so that one can lodge a complaint whenever some discrepancy is found.*

Transparency will allow citizens to identify malpractices. It

allows them to know their rights and entitlements. But unless there is a convenient way for the citizens to report their grievances such knowledge is of no use to the citizen. On the contrary, it will create further disaffection from the system. Hence there should also be a mechanism to register complaints and / or offer suggestions to the authorities regarding malpractices or shortcomings in the system. The system to lodge a complaint should be easy so that any one can use the system without much effort. Most people will not be ready to spend time or money to lodge complaints even if they find some corruption in the public delivery mechanism. So, the complaint mechanism should be as cheap, intuitive and effortless as possible.

A Call Centre with a toll-free number has been operational in Chhattisgarh to provide a convenient way to lodge a complaint. Citizens can lodge a complaint through web also.

3. Build confidence in public that complaints lodged through the system will be attended.

If the complaints lodged through a system are unattended citizens slowly will lose confidence in the system and stop using the same. Hence complaints lodged through the system (call centre) should be monitored so that they are acted upon in a timely manner. A Complaint Monitoring System is being used to monitor complaint redress mechanism so that confidence in the system is fostered in the public

Computerization of the entire Food-Grain Supply Chain

The case study details the complete process reforms and computerization of the food grain supply chain in Chhattisgarh from paddy procurement from farmers, its storage, milling and distribution of rice and other commodities to 3.6 million ration card holders through 10,427 Fair Price Shops.

As a part of this project, 1532 paddy procurement centers, 50 paddy storage centers, district offices of all participating organizations in all 16 districts of the state, 99 Chhattisgarh State Civil Supplies Corporation (CGSCSC) distribution centers and 35 FCI (Food Corporation of India) Custom Milled Rice (CMR)

receiving centers have been computerized covering six different organizations involved in food grain management viz.

- Department of Food of the state government
- Markfed
- CGSCSC
- FCI
- District Central Cooperative Banks (DCCBs) and
- Primary Agricultural Cooperative Societies (PACS)

The purchase of paddy at the procurement centers has been computerized. This also includes same-day payment to the farmers whose produce is purchased. The processes of registration of millers, execution of agreements with millers and the release of paddy to the millers have also been computerized.

A central database of all 3.6 million ration card holders has been prepared and released in the public domain through the internet. The calculation of monthly allotment to each FPS has been automated using the per-card entitlement of each beneficiary family using standard entitlement parameters. Other initiatives for transparency and community participation such as establishment of an in-house Call Centre (with a toll-free number) and a citizen interface portal will also be discussed in the paper.

THE PROBLEM

As mentioned above, the foodgrain supply chain is a complex system involving several organizations. Two important components of the system were executed by different organizations. The paddy procurement, storage and milling were carried out by Markfed (through PACS). The receipt of milled rice, storage of rice (and other commodities like wheat and salt) and distribution of commodities to FPS was carried out by CGSCSC (also involving FCI, State Warehousing Corporation).

Additionally, the creation of ration cards and periodic (monthly) allotment of PDS commodities was the domain of the Department of Food and Civil Supplies in the State Government, which carried out

these activities through the District Collectors (including the Food Controller / Food Officer placed under the Collector in each district) who were also responsible for the licensing of FPS and periodic inspections.

There were also cross-cutting responsibilities, for instance, the Collector (through Food dept officials) was responsible for identifying millers and issuing milling permissions while the actual execution of the milling agreement was the responsibility of the District Marketing Officer of Markfed. The milled rice was however, not received by Markfed but by the receipt centers of CGSCSC or FCI, which subsequently sent paper receipts to Markfed for verification. The PACS reported to Markfed for the procurement related activities, but their controlling District Central Cooperative Banks also came into the picture because Markfed released funds to the PACS through the DCCBs. The DCCBs also tried to recover the short-term crop loans granted to the farmers from the payments for procurement but in the absence of timely and easily available information regarding outstanding loans of farmers this exercise was usually not very successful.

The entire process involved about 2000 nodes of operation, including the PACS, the storage centers and warehouses, the district offices of the various organizations and their state headquarters. The paddy procurement activity was carried out in a short span of about three and a half months (November to mid-February) while the milling took as long as 18 months in some procurement seasons. The losses on account of drying of grain, rain or insect and rodent induced damages were as high as Rs 2000 million in some years.

The usual quantity of paddy released to millers was in multiples of 400 metric tons, while the total amount procured from nearly 1 million farmers was between 3-3.5 million tons. Due to the large number of action nodes, and the relatively small quantities involved in each transaction it was a herculean task to reconcile each paper and to create an audit trail to ensure no grain was pilfered.

There were also cases of forgery where falsified papers were used to transport grain from the procurement centers and warehouses and

the forgery came to light after several months when the papers were reconciled. There were also local variations in the processes followed by the local offices in different districts leading to mismatch in the information sought by the headquarters and the information provided.

The opacity in the system provided an incentive to persons with bad intentions to take advantage of the system's shortcomings and obtain personal benefit through forgery, misappropriation and defalcation. The people of the state also regarded procurement and PDS as dens of wrongdoing as was seen from newspaper articles and the complaints that were raised repeatedly in the state legislature. Since the accounts of transactions were not prepared in time, it was also difficult to finalize the accounts of the organizations, thereby leading to further losses since the subsidies could not be claimed from Government of India.

THE SOLUTION

The team led by Dr Alok Shukla, Secretary (Food and Civil Supplies) in the State Government and Mr. Gaurav Dwivedi, Managing Director (CGSCSC and Markfed) took up the challenge of addressing these issues head-on. It was evident that the system needed a total reform of processes, management, supervision, training, and focus through modernization, process reengineering, leadership and quality improvement.

After intensive discussions and deliberations, the team decided on the following action agenda

- Create a system flow diagram which incorporated every process from the preparations for procurement at the PACS till the delivery and sale of commodity at the FPS
- Review and analyze each process at each level to identify pitfalls and reengineer the processes to eliminate discretion and allow systematic decision-making based on facts
- Create an end-to-end supply chain computerization software thereby streamlining the supply chain and to enable

identification and elimination of bottlenecks

- Standardize processes across various levels throughout the state, thereby reducing the possibility of errors
- Seamless flow of data and information in the system to enable informed decision making, forecasting and inventory management, also to enable accounting and record-keeping in consonance with actual stocks and inventory
- Procure and install computers and related equipment at all levels
- Training of staff on the software and processes
- Allow automatic reconciliation of data to throw up red-flags wherever discrepancies were noted
- Freeing staff from paperwork and allowing them to concentrate on active and fact-based supervision at all levels
- Focusing on customers and clients by ensuring smooth procurement and payment to farmers and timely and adequate stocking of FPS for the foodgrain consumers
- Allowing customers to have detailed knowledge and information about the system functions thereby bringing in transparency and accountability
- Imposing performance targets on the system and making the system open to public scrutiny, such as same day payments to farmers and stocking of FPS before a certain date every month (chawal utsav)
- Reducing dependence on inspection of outcomes, concentrating on better performance through efficiency and improvement in processes
- Providing a channel for feedback from customers to enable redressing grievances, prompt and time-bound enquiry and action on complaints and as a means for continuous improvement in performance and processes

Paddy Procurement and Milling

Chhattisgarh state is spread across about 135,000 square kilometers and has about 20,000 villages. Paddy is procured from about 1 Million farmers of Chhattisgarh at MSP at 1532 procurement centers spread throughout the state. Paddy Procurement Centers are mainly located at village panchayat level (local self-governments, usually including between 1 to 3 revenue villages). Many of the procurement centers are located in remote areas and internet connectivity is not available at most of these centers.

A form-based stand-alone software module (PACS module) was developed for the purchase of paddy at MSP from farmers and the issuing of the purchased paddy to millers, storage centers and FCI. Information like names of all farmers in the jurisdiction of the PACS, details of their landholding, outstanding loans from DCCB etc were fed into the system before the commencement of the procurement season (typically between 1st November and 15th February) and each farmer was given a unique identification number. Cheques for payment to farmers and delivery memos for movement of paddy to different places are printed on computer in real time. The papers (delivery memos) issued to the various parties were compared to the electronic copies provided to the offices at state / district / procurement center levels to eliminate the possibilities of forgery, errors and deliberate acts of malfeasance.

Special importance has been given to on-the-spot generation of cheques on computers as it reduces the delay in payment to about one million farmers every year and builds faith in the new system. Prior to the implementation of this system, the preparation and release of cheque to the farmers took up to 7-10 days from the date his paddy was accepted at the procurement centre while after the project, the farmers were assured same day payment. Details of quantity of paddy procured from each farmer at each procurement location and of payments made to each farmer were displayed on the website.

Advance information regarding outstanding loans of the farmer allowed the system to match it against the payment being made to him / her, and the farmer was allowed the right to exercise the option

of choosing to settle part or whole of the loan outstanding in his name. This process is locally known as linking. It was seen that most farmers were only too willing to settle substantial part of their loans from the money due to them. In the 2009-2010 season, the amount so recovered by DCCBs was about Rs 5000 million.

Allotting a unique identification number also allowed the system to check how much grain was sold by each farmer. Comparison of this figure with his landholding, and simple calculation of his productivity by dividing the quantum of grain sold by the landholding and comparing it with the average productivity in the area could show if any person was attempting to sell grain he or she could not have grown. This eliminated the problem of middlemen cornering the benefits that were actually due to the farmers, and allowed the farmers to receive the money for which they were eligible. This process was further strengthened by issuing only crossed bank cheques so that only the intended beneficiary received the money through a bank transfer.

1532 data entry operators, who were local citizens with basic knowledge of computers, were recruited and trained on the operation of PACS Module. An interesting innovation of data transmission through motorcycle riders/runners has been introduced for data transmission from purchase centers to the central server and vice versa. V-SAT based NICNET connectivity is available in Chhattisgarh at block headquarters in the offices of Janpad Panchayats (Community Development Blocks, comprising between 50 - 100 village panchayats). About 250 Motorcycle riders were hired to carry data on removable / portable drives everyday from procurement centre computers to block headquarters, where they upload the data on the central server through the internet. The data was encrypted and de-encrypted at each end to prevent tampering with the data. Similarly any new version of software and delivery order details are downloaded from the server at the block level by these motorcycle riders, and carried to the procurement centers for installing in the local machines. This ensures near real-time availability of data at the central server even in the absence of internet connectivity.

All operations carried out by the district level offices such as District Collector office, Office of District Marketing Officer (DMO) of Markfed and Office of District Manager (DM) of CGSCSC as well as the state headquarters of these organizations were also computerized through web based applications.

At all the 50 storage centers of MARKFED, 2 computers each were installed with a form-based module to receive paddy from the procurement centers and to issue it to millers or to transfer it to FCI.

70 Custom Milled Rice (CMR) receiving centers of CGSCSC (subset of the 99 distribution centers) and 35 CMR receiving centers of FCI were provided a web-based module to generate sample slips, analysis reports and acknowledgement reports.

Figure1 describes the data flow and interdependencies in the system.

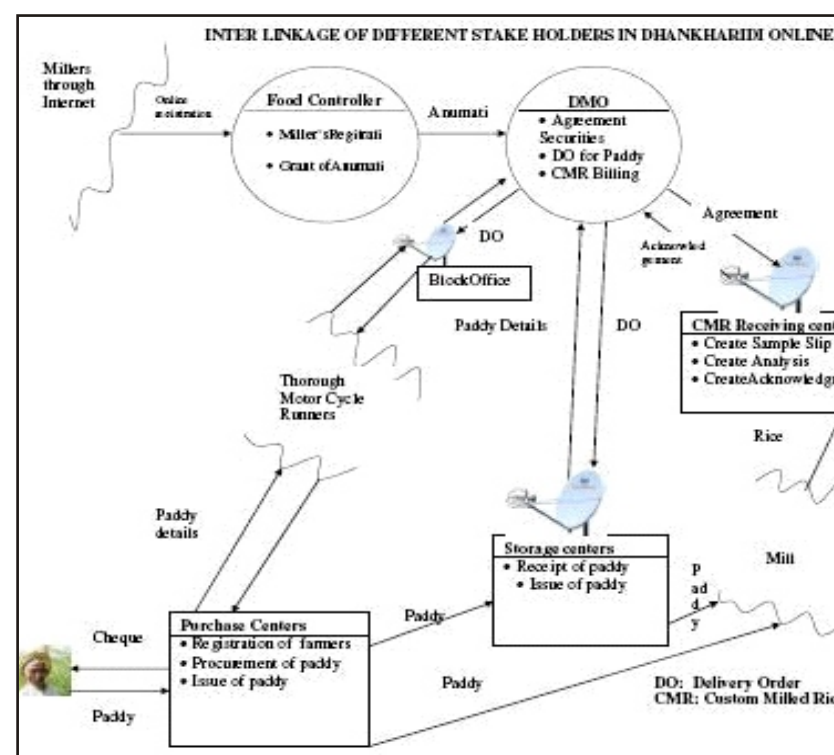


Figure-1: Data flow and inter dependencies in paddy procurement

Unified Ration Card Database and Issue of PDS Commodities To FPS

A Unified Ration Card database has been prepared for the entire state. The ration cards are printed centrally using the database. Each ration card is also linked to a defined FPS within the database. The database, including details of entitlement parameters, has been released in the public domain for ensuring transparency. Only ration cards having a unique number and a barcode printed through the database are valid now in Chhattisgarh. The ration-cards were prepared using the BPL lists as base-data, and through an intensive process of de-duplication and verification of beneficiaries after publicity through public-meetings over 300,000 fake or bogus ration cards were eliminated. This led to substantial savings since the fake cards were used to divert the foodgrain from the legitimate beneficiaries.

Since the entire ration cards database has been computerized shop-wise allocations have now been automated. Per-card allocations are fed into the computer server at the State capital. Shop-wise allocations are calculated by the software using the number of the cardholders for each shop as the base data. This has removed discretion at all levels. Prior to the implementation of this system, the allocations were released from the State Food Department to the districts, where the Collector issued sub-allocations to the Sub-Divisions and the Sub-Divisional Officer released the allocations to individual FPS. This process took over two weeks, and created an opportunity for favoritism in allocating excess commodities to certain FPS for monetary or other benefits. The National Institute for Smart Governance has commented that the process of releasing allocations has been reduced from 14 days to one hour after the implementation of the system.

All Fair Price Shops are required to give declaration of their stocks and sales in the previous month before issue of PDS commodities. A new self-declaration form has been instituted for this purpose under the provisions of the Essential Commodities Act.

Instead of attempting to carry out large number of inspections, which often do not serve the purpose, the self-declarations given by the FPS owners are assumed to be correct and verified through random checks. This has created a participation in the system for the FPS owners.

The figures made available in the declaration are entered in the web application at the CGSCSC warehouses. Based on allocation, stock and sales figures of FPS, the actual amount of PDS commodities to be issued to the FPS is calculated by the software, and a delivery order is issued using the web application. After the issue of the delivery order a truck challan is issued indicating the truck number, driver's name, quantity dispatched etc. The truck challan is also generated using the web application. Thus information regarding allocations, stocks, issue and sales for each FPS is now available on the central server. At least 10% of this data is physically verified by the field staff of the Food and Civil Supplies Department every month, and criminal action is instituted against any FPS giving false declarations. Fig 3.0 shows the data flow and interdependencies in the system.

Citizen Participation Website

Citizen awareness and participation in the public delivery system is a major check against diversion and leakage. Hence a citizen interface website has been created where citizens can lodge complaints or give suggestions. This web-site also provides a method of citizen participation to check diversion of trucks carrying PDS commodities to the FPS from the warehouse. Citizens can register their mobile numbers or email addresses on this web-site by selecting one or more FPS of their interest, for participation in the monitoring of PDS.

Each time PDS commodities are dispatched to the FPS from the warehouse a system-generated SMS / email is automatically sent to the registered mobile numbers / email addresses using the data from the truck challans available in the server. This message includes the truck number, the quantities of PDS commodities being sent by that

truck, and the date and time of dispatch (Fig 2.0). Thus any citizen can know the exact date and time of truck dispatch with quantities of commodities. Citizens participating in monitoring of PDS can then check whether that truck arrived at the FPS and whether it carried the entire quantity dispatched. They can even get PDS commodities unloaded and stored in the FPS in their presence. If the commodities do not arrive at the FPS in full quantity within reasonable time, citizens can register their complaint at the website or through call centre. These complaints are monitored and details of the action taken are also informed to the complainant as well as displayed on the website as described below.

Shop 442003100/Baktara Truck CG04/1439, Rice 87.91 Qtl,
Wheat 1.25 Qtl, Sugar 0.0 Qtl, Salt 1.0 Qtl Date 210 Jan 10 11:00.

Figure 2 - SMS sample

Call Centre and Complaint Monitoring System

A call centre with a toll free number 1-800-233-3663 is operational in the CGSCSC headquarters. The complaints received by the call centre are immediately entered into a Complaint Monitoring System software and the complaint number is given to the complainant for further use. This software has also been developed in-house. All District Collector offices and all district offices of the CGSCSC and Markfed are linked to the call centre online in real-time.

These complaints are sent electronically to the concerned officer for time-bound enquiry and action. All the registered complaints received either through call centre or through internet are seen in the concerned officer's inbox. The officer conducts necessary enquiries and takes necessary action within the time period specified. Subsequently he / she enters the details of enquiry report and action taken on complaints which are found to be correct. The status of the complaint is informed to the complainant on demand. Complaint redress is monitored at Directorate and Secretariat level for speedy disposal of complaints.

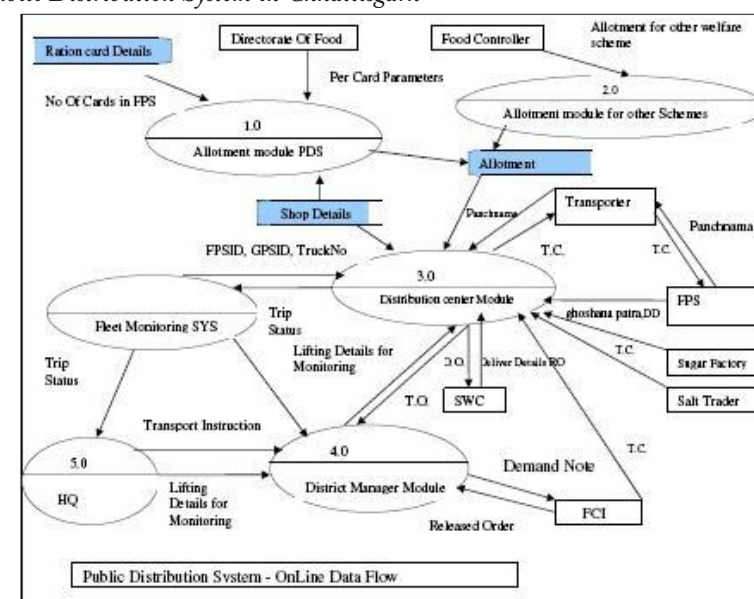


Figure-3 : Public Distribution System data flow

Innovative Ideas Adopted in the Project

1. Adopting Motor Cycle Riders for data transmission

Procurement Centers are generally located in remote locations where internet connectivity is not available. The data transfer from web to purchase centers and vice versa is an essential requirement of the system. An innovation of hiring motor cycle riders who carry the data in removable hard drives and upload / download information between the department's portal and the procurement centers has ensured near real-time data transmission to the central server without having internet connectivity.

2. Truck Dispatch Information to Citizens through SMS

Diversion of trucks carrying PDS commodities to FPS by the Shop-licensees and some department staff acting in collusion is a major problem area which can only be addressed through Community monitoring. To encourage community participation in the monitoring of FPS stocks citizens have been given the

facility to register their mobile numbers on the web-site. Whenever PDS commodities are dispatched to an FPS from the warehouse, an SMS is automatically sent to all the mobile numbers registered for that FPS. This message has the truck number, the quantities of PDS commodities being sent by that truck, and the date and time of dispatch to enable residents to monitor the time taken for the commodities to reach the FPS as well as examine the quantities that have actually been delivered to the FPS. This discourages the diversion and complaints, if any, are immediately acted upon. Over 100,000 SMSs have been sent to registered users in the last 3 years.

3. Rice Festival (Chaval Utsav)

On a fixed, pre-announced day in a month, PDS commodities are distributed in the village market in presence of the public and nominated government officials. Other benefits to BPL families like old age pension etc. are also distributed on this day along with PDS commodities. This concept has increased transparency and citizen participation. It has been seen that over 40% of the monthly sales of the FPS take place on this one day. Since a robust community monitoring system has been established, the possibility of diversion and malfeasance on part of the shop owner has been substantially eliminated. This also imposes a pressure on the departments involved in the system to ensure that each FPS is stocked before the day for the chawal utsav. The annual performance appraisal of officials involved in PDS operations substantially depends on their ability to ensure timely stocking of FPS within their jurisdictions.

4. Truck Photograph to Server with Latitude and Longitude of Truck Position

An application in J2ME has been developed and loaded in GPS enabled mobile phones with camera to be used at warehouse. When a truck with rice and other commodities reaches the warehouse for delivery, the truck is photographed using the application and sent to the server. The truck and receiver's

photograph along with latitude and longitude reaches the server. Server side program compares the latitude and longitude of truck with latitude and longitude of the warehouse (already available in the master list of the central server) to ensure that the truck actually reaches the specified warehouse premises by the said date and time. This innovation is helping to check claims made by receiving centers regarding receipt of commodities transferred from other locations.



Figure 4 Truck photograph

OUTCOMES OF THE INITIATIVE

- The time period involved in giving cheques as payment for the paddy procured from farmers is reduced to one day from 7-10 days delay in earlier years. Farmers get direct benefit through crossed cheques, and monitoring of sales per farmer led to elimination of middlemen
- The DCCBs are able to recover much higher amounts of outstanding loans due to effective implementation of the linking scheme
- A centralized miller data base has been created by allowing millers to register their units / mills through an online application process. Inspections of each mill premises ensure that no grain is purported to be lifted by any non-functional unit, thereby eliminating chances of fraudulent lifting

- Uniform operational procedures / processes have been instituted and ensured throughout the state through a standard web based application in all offices
- The standard application uses common software platforms across all participating organizations, with task specific modules for each participant organization, thereby ensuring sharing of information in common standard formats and elimination of delays in reconciliation of information
- Web application led to micromanagement of inventory, resulting in quicker milling, less damage to rice and paddy due to reduced storage times and faster turn-around of inventory and substantial resultant savings. In 2007-08, the year in which the project was introduced, the entire procured paddy (about 3.1 million tons) was milled and disposed by April, i.e. within 2 months of the end of the procurement in February
- Automatic Calculation of monthly allotments eliminated delays, irregularities and mal-practices in granting allotments to FPS. Now it is calculated automatically based on the number of cards in the shop.
- Computerized receipt and issue of PDS commodities at distribution centers resulted in effective monitoring of lifting and increased transparency.
- On-line availability of available inventory at each distribution centre and accurate forecasting of demand has enable timely inventory management by advance shifting / transportation of commodities from surplus to deficit areas thereby ensuring that there are no delays in timely stocking of FPS in any district
- The SMS alert system and citizen interface web site is encouraging citizen participation in monitoring PDS.
- Complaint monitoring system increased the speed of action on different complaints due to close monitoring.
- The Call centre has many success stories in controlling diversion.
- Computerization helped increase transparency by providing all details on the internet in the public domain.

Challenges Faced in Execution of the Project

1. Lack of connectivity at paddy procurement centres

Paddy procurement is done in 1532 procurement centres at remote places of the state. Connectivity is not available at these places and daily procurement details are required to be available at state level. The challenge was addressed by hiring motor cycle riders.

2. Unreliable Power Supply at procurement centres

Anticipating irregular power supply at procurement centres, generators were made available at each centre. Proper earthing and UPS have been provided for computers for voltage stabilization.

3. Massive data entry of beneficiary details in Ration card database

About 3.6 Million ration card holder's details were entered in the central database for creating computerized ration cards. Since the data was enormous the only option was a decentralized data entry. A Windows based form was developed for data entry. At the front end, Microsoft Access was used for data entry and transporting data to the State Headquarters for convenience. The windows data entry software had elaborate validation checks to minimize mistakes in data entry.

In addition, a data-checking software was developed to check the data for mistakes such as duplication of records when it was received at the State Headquarters. Once checked the data was imported into Microsoft SQL Server 2005 which was used to generate and print ration cards.

4. Font compatibility for Hindi data

The administrative language in Chhattisgarh is Hindi. The common problem in storing Hindi data is its compatibility as different people tend to store the data in different fonts which are mutually incompatible. From the very beginning, it was decided to use only Unicode fonts for storing data in all modules. Thus compatibility of data was achieved across the state.

This standardization also had the advantage that the Unicode data can be sorted and searching is easier, thereby making the data usable for queries and deriving subsidiary information from the primary data available in the server.

5. Lack of trained manpower

More than 2500 man days of training and workshops were conducted to meet the challenge. Trainings were conducted at the state headquarters using computers, presentations and hands-on training on the online software.

The staff of all departments and corporations involved in the project was trained along with the temporary staff hired by each PACS. The training process also provided feedback in the design of the software and served as a valuable input for continuous improvement in the proposed design and implementation strategy.

Discussions were held not only with the headquarters office staff, but also with the warehouse managers, storage centre clerks and the PACS managers to ensure that each process was thoroughly analyzed and the proposed process reengineering captured the job-requirements and did not themselves turn into bottlenecks.

6. Coordination between different departments

Six different organizations are using a number of interdependent modules of the system. Coordination between these organizations is a major challenge. The Secretary, Department of Food and the Managing Director of CGSCSC & Markfed took personal interest and coordinated with almost daily meetings and monitoring, as well as regular video-conferences with the district officials, thereby ensuring close monitoring while saving time and money by reducing travel times.

Execution Strategy

The project was conceived and crystallized in June-July 2007. The procurement season was scheduled to commence on 1st November 2007.

The entire process of consultations, obtaining formal approvals and sanctions from the appropriate authorities (state government / governing bodies and boards of Markfed and CGSCSC), system design, software development, preparation of training material, conducting training, hardware procurement (over 2000 computers / over 3000 printers / nearly 2000 UPS and generators / invertors) and its installation, procurement of nearly 200 VSATs, design of the system management instructions and internal rules, advance preparation of master-lists (farmer database etc.), recruitment of data-entry operators and motorcycle riders (runners) was completed in merely 3 months by 20th October 2007.

The system was tested through a dummy run between 20th-27th October 2007 and the full-fledged system was rolled out on 1st November 2007.

The software was prepared by the State Unit of NIC (National Informatics Centre) under the close supervision of the Secretary and MD. Both the Secretary and MD conducted at least one video conference every week with all District Collectors, Food Controllers/Food Officers, District Managers of CGSCSC and District Marketing Officers of Markfed to ensure continuous dissemination of information in both directions, and relevant staff members were attached to NIC to explain clearly the details of each process in the system.

The project was implemented using internal resources of the CGSCSC and Markfed, and no funds were demanded from the State Government.

CONCLUSION

Successful computerization* has established that the technology and properly designed systems can definitely reduce corruption and increase public participation and accountability in government programs as effectively as in the private sector. Use of technology and principles of quality management should be used to create transparency combined with a convenient system for a citizen to lodge complaints with confidence that the complaint will be attended.

Focus on products and output may work in the short term, but long-term success of systems depends on a focus on streamlining processes. Data should be captured as and when they are generated instead of developing MIS applications for entry of data after manual processes are followed. Effectively addressing issues of fair procurement from farmers, inventory management, database management of the target consumers and transportation through use of technology, simplifying & reengineering processes and people's participation can ensure food security even in remote and under-served areas.

The case study captures the factors leading to the success of the project and derives learning points which can be shared with other government programs targeted at providing food security to the poor.

* The project has received 7 national Awards including 2 National e-Governance awards from the Government of India. The reforms in TPDS in Chhattisgarh have been identified as a best practice by the Cabinet Secretary of India in 2009. The initiative has also been shared with representatives of SAARC countries in a workshop organized by GoI on 16.02.2010. The team involved in the project implementation has received Prime Minister Award for Excellence in Public Administration.

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REFERENCES

URL: Official web site of Department of Agriculture, Government of Chhattisgarh. Available at <http://agridept.cg.gov.in/agriculture/statistics.htm>. Accessed on April 2, 2010

Book: India Corruption study 2005 done by centre for media studies. (Transparency International India)

Book: Performance Evaluation of Targeted Public Distribution System by Program Evaluation Committee.

Article, Grains For All: How It Can Work, Outlook Magazine, 12th April 2010 issue. Available at <http://www.outlookindia.com/article.aspx? 264899>

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E-Swasthya: Use of IT in Health Management in West Kameng District

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BRIEF PROFILE

The West Kameng District of Arunachal Pradesh State is located approximately between 91° 30' to 92°40' East Longitudes and 26° 54' to 28° 01' North Latitudes. It is surrounded by Tibet to the North, Bhutan to the West, Tawang District to the Northwest and East Kameng District to the East and its Southern boundary adjoins Sonitpur District of Assam.

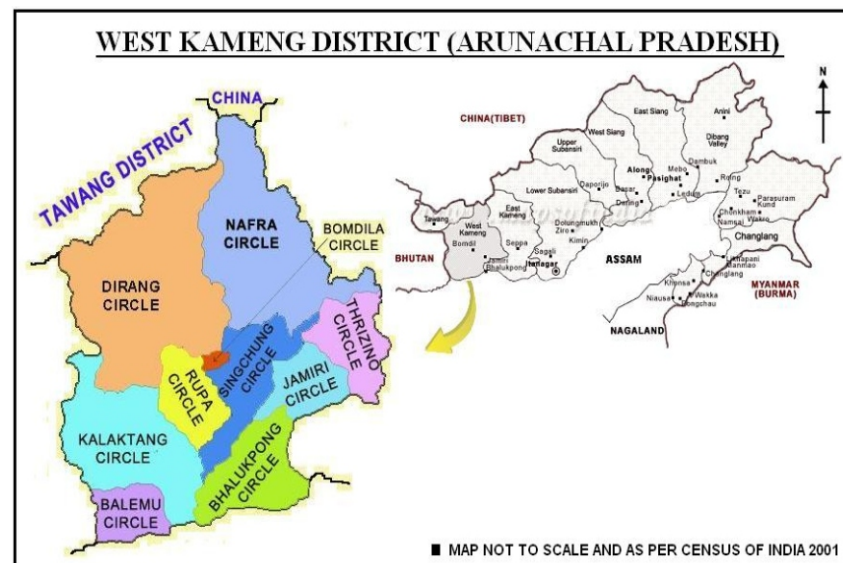


Fig 1 : West Kameng District in Arunachal Pradesh

S. No	Name of District/Circle	Name of District/Circle Headquarters	Urban/Rural	Distance from Tehsil Hqrs to District Hqrs by road (Kms)
	West Kameng	Bomdila	Urban	0
1.	Dirang	Dirang	Rural	42
2.	Nafra	Nafra	Rural	55
3.	Bomdila	Bomdila	Urban	0
4.	Jamiri	Jamiri	Rural	40
5.	Thrizino	Thrizino	Rural	126
6.	Singchung	Singchung	Rural	100
7.	Bhalukpong	Bhalukpong	Rural	36
8.	Kalaktang	Kalaktang	Rural	96
9.	Rupa	Rupa	Rural	16
10.	Balem	Balem	Rural	160

It can be easily seen from the table that people had to tread long distances, spend time, money and energy to reach the First Referral Unit (FRU) i.e the District Hospital, Bomdila.

Health management here required monitoring of the health status of the

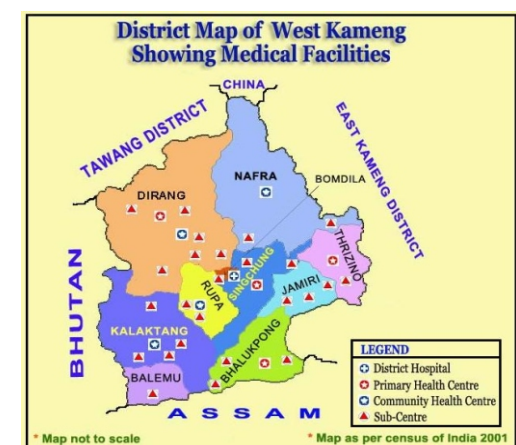


Fig 2 : West Kameng Map showing CHCs, PHCs, SCs and District hospital

people. This involved the coverage, utility, drugs stocks, consumption patterns, equipment status and finance on a regular basis. Timely, accurate and up-to-date information was needed to ensure timely health services.

On the outbreak of diseases etc. like cholera, chicken pox etc. in remote villages, information took time to reach the District Hospital, so timely intervention was delayed. As availability of adequate infrastructure and staff is a bottleneck at the Sub Centres (located far from the District Headquarters), the immediate need for a Health Management Information System was felt. Against this background the idea of *E-Swasthya* (for Computerized OPD Registration in Hospitals of the District) was conceived. *E-Swasthya* was designed to receive, store, process information and utilize it for decision making to ensure timely and efficient health care facilities.



Fig 3 : The *E-Swasthya* Centre at District Hospital, Bomdila

Designing Process

User friendly software ensured that details of patients' registrations, diagnosis, illness history, identifications of diseases and drug management were considered. Accounting of revenue generated on fee charged (nominal like OPD Registration fee Re. 1 only) was kept in sight. This ensured that the system became sustainable. The entire process an in-house one, hence National Informatics Centre, West

Use of IT in Health Management in West Kameng District

Kameng District Unit Bomdila was roped in along with the staff of District Hospital, Bomdila. *E-Swasthya* was designed and developed to deliver real benefits to hospitals and patients.

Databases were evolved for effective health service delivery in *E-Swasthya* which meant reduction in delays and made the system more reliable. The old method of writing and storing of records of patients was done away with to simplify procedures. Manual storing of records made it impossible to identify any specific patterns in the occurrence of diseases.

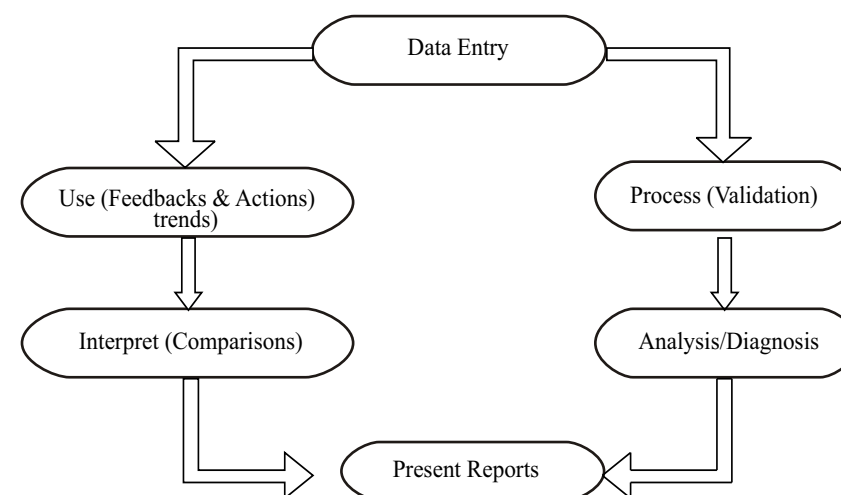


Fig 4 : The Information Cycle

***E-Swasthya* supports different aspects of the Information Cycle including:**

- Collecting data.
- Running quality checks (validation).
- Diagnosis and Analysis.
- Reporting.
- Enabling comparison across time (for example, previous months) and space (for example, across facilities and hospitals).
- See trends for necessary actions.

OVERVIEW OF *E-Swasthya*

Briefly, this software registered a walk-in patient [OPD], delivered him a prescription, the doctor diagnosed him and recommended him for tests and after paying a nominal fee, the patient then had tests and related treatment.

E-Swasthya is based on a modular approach of design with four modules for functions such as for Administrator, Data entry, Doctor Diagnosis and Hospital Store.

The screen shot below shows the list of these modules.

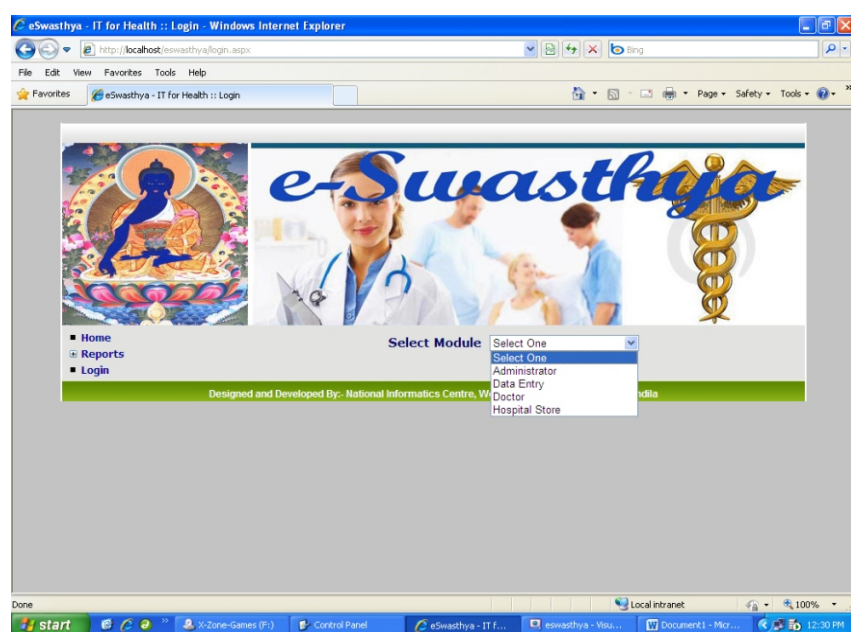


Fig 5 : Modules in *E-Swasthya*

a) The Administrator Module

This module includes User Management and Master Settings for the software. The data backup can be done through this module.



Fig 6 : Administrator Module showing option for Backup and Restore

b) Data Entry Module

This module includes the following:

- i) **Patient Registration**-This component captures complete and relevant patient information. It registers the patient as an OPD or Emergency Patient. It records subsequent visits to maintain an Illness history which helps the doctor in efficient diagnosis of the patient.

e-Swasthya - IT for Health :: New Patient Registration

Registration No: Date:

Name: Age: Yrs

Sex: ☒ Male ☐ Female

Care of: Relation: Circle:

Address:

☐ Fee Paid

Fig 7 : Data Entry Module showing Patient Registration Form

e-Swasthya - IT for Health :: Register Old Patient

Registration No: Name:

Age: Gender:

Address: Village:

Block: District:

Illness History: Date:

Chief Complaint:

☐ Fee Paid

Fig 8 : Data Entry Module showing Old Patient Registration form

- ii) **Billing** - This component generates bills for expenses done on Investigations/tests/surgery by the patient as and when advised by the Doctor on the prescription slip.

e-Swasthya - IT for Health :: Service Billing

Enter Registration No: Enter Date:

RegNo	Date	Name	Address	Village	Block	District	Age	Gender
R201000001	4/9/2010 12:00:00 AM	XYZ	jhdshd	Bomdila Urban	Bomdila	West Kameng	15.00	Male

Advised By: * Advised by field cannot be empty

Select Services

☐ OPD Registration ☐ Occul blood ☐ X-Ray Neck AP/Lat

☐ EMN Registration ☐ Seeman analysis ☐ X-ray Toe AP

☐ Blood RE ☐ R-Ray Chest PA/AP ☐ DO Lat

☐ Hb% ☐ DO LAT ☐ Extraction Child Primary Teeth

☐ RBS ☐ X-Ray KUB ☐ Extraction Minor

☐ Fasting ☐ X-Ray Ankle AP ☐ Extraction Major

☐ PP ☐ DO LAT ☐ Temporary filling

☐ Urine acid ☐ X-Ray Knee AP ☐ Permanent Filling

☐ V.D.R.L ☐ DO Lat ☐ Composite

☐ Blood Grouping ☐ X-Ray Fumer AP/Lat ☐ G.I

☐ Widet Test ☐ X-Ray forearm AP ☐ Bleaching

☐ HbSaG ☐ DO LAT ☐ RCT (Single Sitting)

☐ BTCT ☐ X-Ray Elbow AP ☐ RCT Multiple sitting

☐ Serum Billirubin ☐ DO Lat ☐ Surgical Endodontial/ Apisectomy

☐ Prothrombin time ☐ X-Ray Hip AP/LAT ☐ Scalling/Oral Prophylaxis-Light

☐ Urine RE ☐ X-Ray soldier ☐ Scalling/Oral Prophylaxis-Heavy

☐ HCG ☐ X-Ray cervical spine AP/LAT ☐ Periodontal curettage

☐ Suger ☐ X-Ray dorso lumber AP/LAT ☐ Surgical Cyst Drainage

☐ R.A.Factor ☐ X-Ray Plain abdomen ☐ Splinting

☐ ASO Titer ☐ X-Ray hand AP ☐ Cabin Per Day

Fig 9 : Data Entry Module showing Investigation Billing of a patient.

In addition, this module deals with other basic data entries like addition/updation of Villages, Blocks, Doctors, Investigation/ Services Details available, etc.



Fig 10 : Data Entry Module showing Add Service form

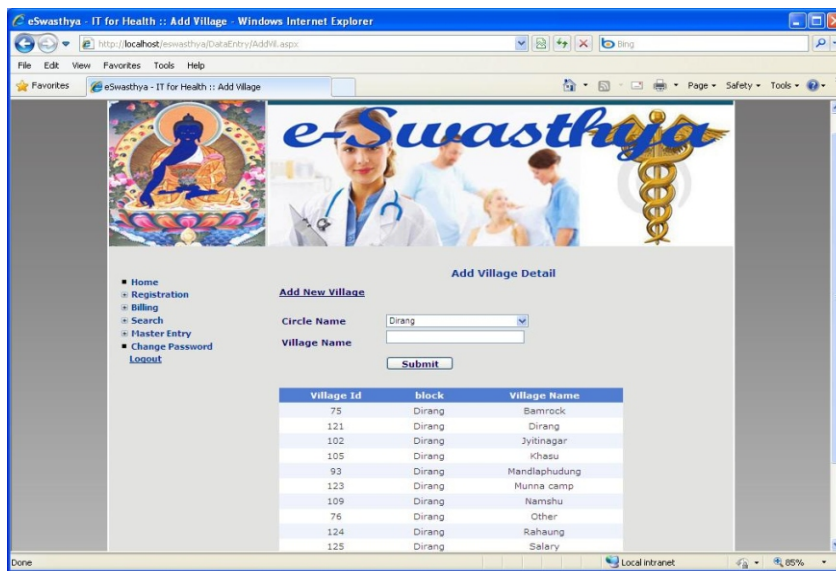


Fig 11 : Data Entry Module showing Add Village form

c) The Doctor Module

This module for doctors enables them to enter provisional diagnosis along with tests for a patient after registration. The

results help identify the disease which is entered into the system. When a doctor logs into this module, it displays the entire list of registered patients from which a doctor can select the patient to be diagnosed.



Fig 12 : Doctor Module showing Patient Diagnosis Form.



Fig 13 : Doctor Module showing list of Registered Undiagnosed Patients

d) Hospital Store Module

This module provides inventory management facility to the hospital with Stock Entry of medicines, reagents and other items.



Fig 14 : Hospital Store Module showing form for issuing medicines to patient.

Apart from these, E-Swasthya generates reports for:-

- Tracking the number of patients visiting the hospital everyday to study the occurrence of any particular disease in the district.
- Details of diagnosis done by doctors.
- Account statements on daily basis.
- Stock report for medicines.
- Details of medicines issued to patients.

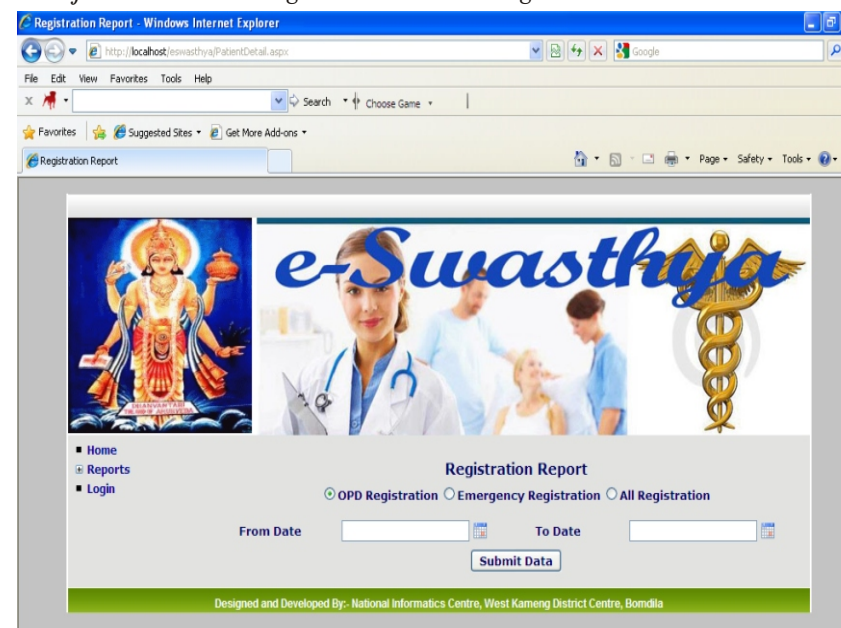


Fig 15 : Form to generate Registration Report for a period.

OUTCOMES

- Transparency in the system ensured that each patient was registered and the fee charged from them was accounted for. This received an overwhelming response from the people.
- Within first three months, the number of registered patients at the OPD was 5147. Earlier there were no record of patients coming for follow up.
- Within three months, the system gained the confidence of the people so much that more and more patients started getting registered in the District Hospital.
- The District Medical Officer as also the Disease Surveillance Officer could now keep an eye on any abnormal increase in the number of patients suffering from a particular disease so that timely remedial measures could be taken.

- The minimal registration fee of Re.1 and the very nominal fee for various tests performed in the District Hospital allowed even very poor patients to get quality treatment. There is a provision for free treatment of very poor patients.
- In three months of its launch, it generated Rs. 1,05,814/- for various services. This made the immediate purchases of reagents, stationery etc. internally by the Medical Superintendent, District Hospital possible.
- Earlier, there was no record of old patients as they approached the Doctors directly. The hospital records never kept the history of patients coming for check-ups but now with the old cases getting registered, it was easy for the hospital to keep a track of old patients.
- E-Swasthya saved the time and energy which meant doctors got more time to see more patients.
- This in house project was developed by the District Unit of NIC, Bomdila, West Kameng under the direct supervision of the Deputy Commissioner, without any burden to the Government.

LESSONS LEARNT

It is challenging to motivate staff to shift to new arenas where the software makes functioning more effective. Manual operations meant a waste of time but initially, there was reluctance to switch over to a computerized system. To make a system operational requires a highly motivated team, as an in-house project is reliable and cost effective, only when the team works with shared enthusiasm. This is what the district gained in the process - A motivated team of NIC officials, Doctors and staff of District Hospital and the Deputy Commissioner. Stress was therefore, not on how much we can spend but what can be achieved.

FUTURE PLANS

Evolving a dynamic software so that patients can upload their test results online and let the doctors can decide the course of action. Appointments with doctors could be online. Ultimately, this would make the district administration enhance its image as a citizen friendly one.

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Yamuna River Sustainable Pollution Control Project: Challenges and Achievements

Dr. A.A. Khan*

CONTEXT

Viewing the urgency of adopting pollution mitigation measures, a five-year program called “Ganga Action Plan (GAP)” was launched by the Government of India in 1985 aimed at cleaning the river Ganga. The 'Central Ganga Authority' was formed under the chairmanship of the Prime Minister to develop policy as well as monitor the plan. An organization called “Ganga Project Directorate” was established in the Ministry of Environment and Forest (MoEF) by the Central Ganga Authority to deal with the program under the GAP. In 1991 while the GAP was in progress, it was felt necessary to increase the scope of GAP by encompassing the Ganga's tributaries like the Yamuna, Gomati and Damodar Rivers. By this time, the National River Conservation Plan (NRCP) was formulated and the Ganga Project Directorate was transformed into the present body i.e. “National River Conservation Directorate (NRCD)”. The NRCD functions under Ministry of Environment and Forests, Govt of India, New Delhi which is headed by a senior IAS officer of the rank of Additional Secretary, Govt of India. The implementation arrangements are shown in figure 1.

The author of this paper has been involved in the implementation of Yamuna Action Plan-1 and II as nodal officer, Delhi Govt. He has had a chance to critically examine the merits and demerits of both phases of Yamuna Action Plan as a planner as well as

an appraiser while working with NGO's and different organisations. This paper establishes how synchronisation of engineering and non-engineering work can together promote a common approach to meet social, economical, technological and institutional needs for infrastructure development. These directly impart the sustainability of the intended project.

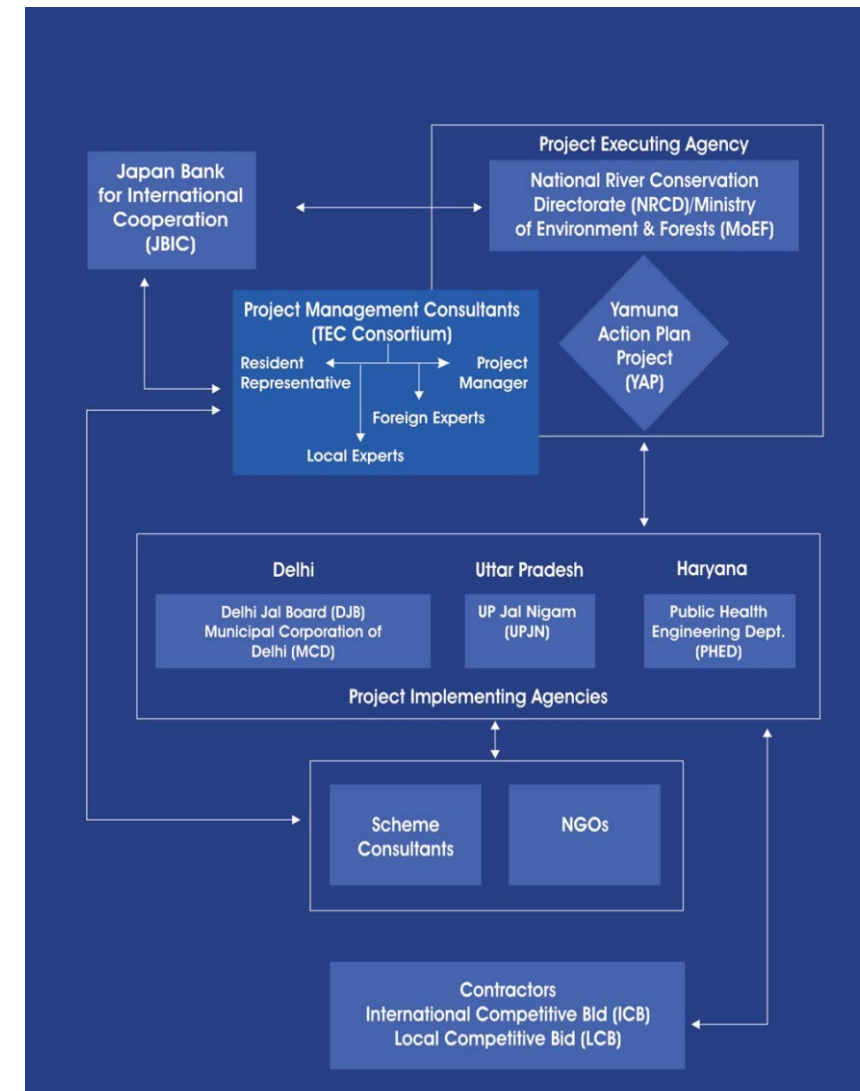


Figure1: Implementation Arrangements for YAP

THE OPPORTUNITY/THE PROBLEM : In Hindu mythology, the Yamuna is considered a sacred river, after the Ganga. Many mythological stories and folklore are woven around it. The river springs from the Yamontri glacier in the inner Himalayas and is a major tributary of the Ganga. Its total length up to the confluence with the Ganga is 1370 km. The catchment area is spread over 366,220 sq. km. as it meanders through six states: Himachal Pradesh, Uttar Pradesh, Haryana, Delhi, Rajasthan and Madhya Pradesh. In the Himalayas, it has four main tributaries: Rishi Ganga, Hanuman Ganga, Tons, and Giri, while in the plains, the Hindon, Chambal, Sind, Betwa and Ken mingle in its waters.

As shown in **Figure 2**.

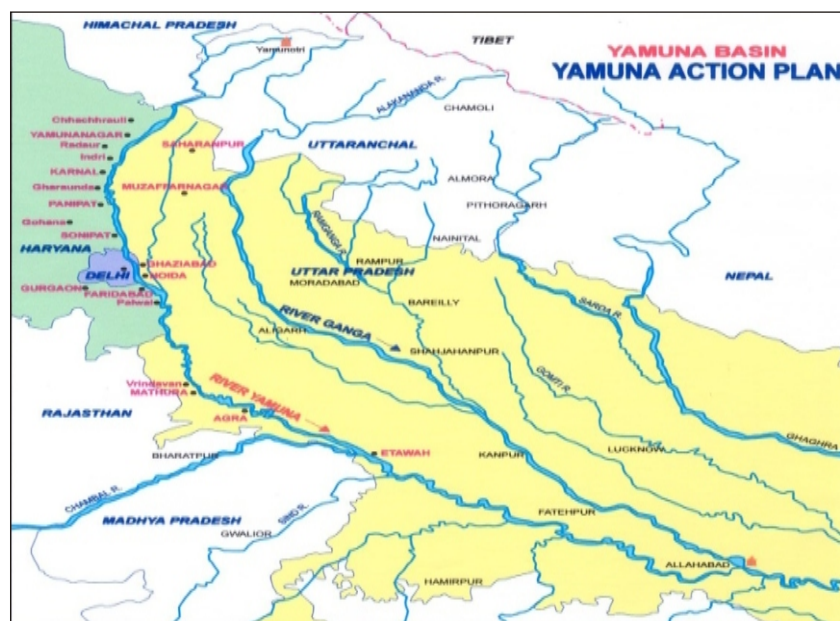


Figure 2: Yamuna Basin Covering Northern Part Of India

Allocation of Water Resources

The Yamuna's water is shared by the four riparian states and two basin states under an agreement signed in 1993. Based on the available flow, a sharing mechanism evolved. Three main barrages have been constructed to give effect to this sharing arrangement as shown in Table 1.

**TABLE 1: REACHES OF YAMUNA RIVER AND
OUTCOME OF WATER RESOURCES
MANAGEMENT**

No	Reach	Stage	Length (Km)	Description
I	From origin to Tajewala	Himalayan Source	172	Turbulent stream of almost pristine water quality. Barrage at Tajewala blocks the entire dry weather flow (DWF). Canals on both banks withdraw water for various uses.
II	Tajewala to Wazirabad (U/S of Delhi)	Upper	224	Dry Weather Flow (DWF) is comprised of wastewater from urban and rural settlements in the catchment. The Barrage at Wazirabad stores water for meeting the demand of Delhi.
III	Wazirabad to Okhla (Delhi)	Critically Polluted	22	No water is released from the Wazirabad barrage. The DWF is comprised of wastewater originating in Delhi. The Barrage at Okhla diverts water to the States of Haryana & UP for irrigation.

IV	Okhla to confluence with Chambal	Critically Polluted	490	No water is released from the Okhla barrage. The DWF is comprised of wastewater from urban settlements
V	Chambal to confluence with Ganges	Diluted	460	The river gets a fresh injection of life after dilution from the Chambal waters. Other tributaries coming from Rajasthan and Madhya Pradesh join in this stretch.

The Tajewala barrage enables diversion of almost 98% of Yamuna water to Haryana and Uttar Pradesh for irrigation and other uses (SAPROF, 1992). The remaining 2%, i.e. about 432 MLD (5 m³/s) of flow is released for maintaining minimum flow in Stage II. The barrage at Wazirabad (upstream of Delhi) enables withdrawal of 950 MLD (11 m³/s) of water for domestic and industrial water requirements of Delhi. Downstream of Delhi, the Okhla barrage enables large storage, where almost the entire flow i.e., 5080 MLD (59 m³/s) of diluted wastewater is diverted into the Agra canal for meeting irrigation demands in Haryana and Uttar Pradesh. The flow downstream of the Okhla barrage is minimal. Unavoidably, about 328 MLD (3.8 m³/s) of water (essentially diluted wastewater) is withdrawn from Stage IV of the river for meeting the drinking water requirements of the town of Gokul and the city of Agra.

River Water Quality

In Tajewala (Stage I) Yamuna water is in pristine condition, average BOD and DO levels found here are 1 mg/l and 10 mg/l respectively. Downstream Tajewala, in Stage II domestic and industrial wastewaters from urban and rural areas of Yamunanagar, Karnal, Panipat, Sonipat, Saharanpur, Meerut etc. are discharged into the

river. Wastewater from livestock rearing activity and surface run-off from agricultural farms too enters the river. However, in this 224 km reach a certain extent of self-purification occurs and therefore, the water quality upstream of Wazirabad barrage (Delhi) is reasonable i.e. average BOD observed within the range of 1.5 - 2.5 mg/l. But, the level of Coliforms, contamination from pesticides and industries is of great concern

Stages III and IV are essentially carrying wastewater. The Delhi reach (III) falls in a unique situation, being located between two barrages with no fresh water flow from either upstream or lateral connections, which makes this stretch extremely critical from water quality and public health standpoint. The 490 km stretch downstream of Okhla barrage up to the Chambal River confluence is characterised as an “open sewer line”. It is only downstream of Etawah in Stage V that the Yamuna receives dilution water from tributaries bringing it back to a reasonable condition. Figure 3 graphically portrays the severity of the problem.

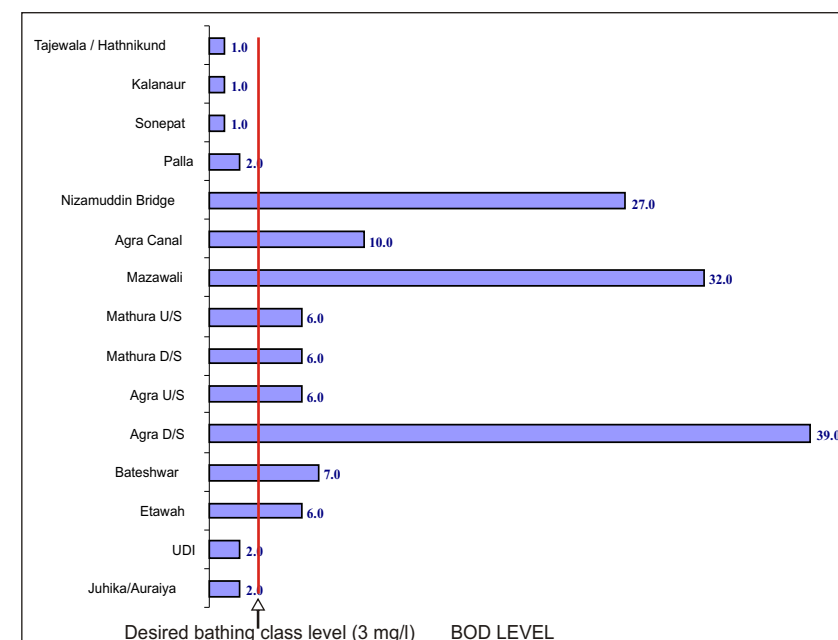


Figure 3: Current Status of Yamuna River Water Quality

In view of the rapid growth of urban population, industrialization and inadequate infrastructure, the river water quality across the country has been found to be deteriorating. Recognizing the gravity, the Government of India launched a massive plan for sustainable pollution control of rivers across the country. In 1985 the Ganga, was identified for priority intervention. Later, the Yamuna was selected for undertaking sustainable pollution control measures as it is one of the major tributaries of the Ganga which passes through major urban centres including Delhi.

The combined affects of modified flow regime due to water holding structures and cumulative discharge of domestic, industrial and agricultural wastewaters has converted Yamuna into an open sewer. The Yamuna Action Plan Phase I Project (YAP-I) funded through the Japan Bank for International Cooperation (JBIC) was formulated for carrying out sustainable pollution control measures in major urban centres to reduce the level of pollution.

Introduced in 1993, the plan included sewage treatment plants constructed in 15 cities with emphasis on abatement of pollution load and energy efficient treatment processes such as the Upflow Anaerobic Sludge Blanket (UASB) process and waste stabilization ponds (WSP). A number of pilot projects on innovative technologies for decentralised sewage treatment and coliform removal were also implemented. Also, the plan emphasised the creation of low cost sanitation facilities for low-income communities, sanitation, awareness and improved crematoria, since these were non-point sources of pollution and threats to the sustainability of the Yamuna.

Initially, the plan has been successful in the reducing the pollution entering the Yamuna. However, a number of constraining factors have emerged such as a shorter design horizon and focus on 'end of the pipe' solutions has led to under-utilisation of the Sewage Treatment Plant (STP) capacity. There was a need to augment the capacity of the upstream delivery infrastructure as well as widen the geographical and demographical coverage. Delhi, the main contributor of organic pollutants required special focus and renewed

efforts to improve the river water quality. Lastly, YAP-I did not address the sustainability of treatment plants and capacity building of local bodies that would eventually be responsible for operation and maintenance of the sewage treatment plants. In view of the scale of the problem and to capitalise on the existing infrastructure assets under the original programme, there was a strong demand for continuation of the initial efforts through formulation of the next phase, YAP-II.

In 2003 the Government of India and JBIC executed a second Loan Agreement and the second phase of YAP began in 2004. Wastewater Works will soon be implemented in Delhi and Agra. It includes the design and construction of a 765 MLD capacity STP at Okhla; rehabilitation of three plant module of 324 MLD capacity at Keshopur; complete rehabilitation of Ring Road Trunk sewer by replacing, capacity upgrading and reconstruction over a major portion of its length by adopting state of the art trenchless technologies; new construction of the Bela Road and Wazirabad Trunk Sewers utilizing trenchless technology in congested areas; and development of new wastewater infrastructure in the Western and Northern Sewerage Districts of Agra.

In addition, preparation of Master Plans (MP), Feasibility Studies (FS), Detailed Project Reports (DPR) and Pilot Plant implementation of wastewater and non wastewater schemes are planned for Decentralized Wastewater Collection and Treatment Facilities, Dhobi Ghats, Dairy Farm Waste Management, Slum Rehabilitation, Slaughterhouse and Crematoria improvements in Delhi. To complement all these sub-projects, major activities will be implemented for the States of Haryana and Uttar Pradesh. Schemes such as Engineering Technology Transfer to Urban Local Bodies in Haryana; MP/FS/DPR Preparation for YAP-III in Uttar Pradesh and Haryana; Public Participation and Awareness; Institutional Strengthening Capacity Building; Water Quality Monitoring; and an Operation and Maintenance Optimization Assessment of YAP-I assets will also be implemented for sustainable pollution control of the Yamuna River under YAP-II.

Evaluation of Yamuna Action Plan

YAP-I was launched by the Ministry of Environment and Forest (and implemented by NRCD) in 1993 with the objective of improving the water quality of Yamuna to at least the bathing class level with financial assistance of Japanese Yen 17.77 billion from JBIC. At the State level, the project is being implemented by Project Implementing Agencies (PIA) namely Uttar Pradesh Jal Nigam (UPJN) in Uttar Pradesh, Public Health Engineering Department (PHED) in Haryana and the Municipal Corporation of Delhi (MCD) and Delhi Jal Board (DJB) in NCT of Delhi. There is an active involvement of Urban Local Bodies (ULBs) in all the project towns/cities. A Project Monitoring Unit (PMU) has been established in all PIAs for programme coordination and monitoring the planned activities in order to accomplish the various components of the project. At the apex level, NRCD has appointed a Project Management Consultant (PMC) for overall coordination, guidance, monitoring and technical advisory services for smooth implementation of the project.

Under the Yamuna Action Plan, pollution from domestic sector was considered to be a major concern and given high priority. It was ignored by municipal bodies and found to be most feasible. Thus any strategy aimed at improving water quality in the Yamuna River had to target the domestic sector as a priority and develop interventions accordingly. At the time of project formulation it was estimated that by 1997 (the design year) the total population in 15 Class-I towns along the river would be 34.75 million. The corresponding sewage generation and BOD load were estimated to be 2953 MLD (SAPROF, 1992). However, excluding Delhi, none of these towns had any sewage treatment arrangements. Sewage treatment capacity had to be prioritized to eventually lead to improving the water quality. In this regard a balance had to be achieved for allocation of available resources in towns along the river bank and those away from the river in the larger basin. Control of water pollution from industrial sector was addressed under the existing Environmental Protection Act, 1985 and a separate agency, the State Pollution

Control Board was responsible to enforce a cleanup in polluting industries. Thus, the industrial sector was excluded from the scope of activities under the Yamuna Action Plan program.

Under the JBIC loan, a total of 15 fifteen towns including six from Haryana (Yamuna nagar Jagadhri, Karnal, Panipat, Sonapat, Gurgaon and Faridabad), eight from Uttar Pradesh State (Saharanpur, Muzaffarnagar, Ghaziabad, Noida, Vrindavan, Mathura, Agra, and Etawah) and Delhi were covered. Later, by a Supreme Court order six more towns of Haryana (Chhachharauli, Indri, Radaur, Gharaunda, Gohana and Palwal) were included in the funding. Initially the project duration of YAP-I was five years (1993-1998) but was then later extended until March 2003.

Initiated a year ago YAP-III will run for five years and address urgent requirements of Delhi and Agra. It also targets completion of planning and design activities for 16 YAP towns in Haryana and Uttar Pradesh. YAP-III will be the next stage of implementation and will involve development of wastewater infrastructure in 8 towns each in Haryana and Uttar Pradesh, as well as a number of initiatives in Delhi.

Project Outcome and Impacts Achievements Under YAP-I Under YAP-I, 15 cities were identified along the river for priority intervention. These interventions were primarily tailored for creation of new infrastructure to prevent raw sewage pouring into the river. The components involved construction of drain interceptors, pumping stations, diversion lines, renovation and construction of sewage treatment plants (STP).

The focus of YAP-I was on towns along II and IV of the river. In these towns, 26 STPs were constructed, an aggregate sewage treatment capacity of around 700 MLD was created. A listing of various engineering works implemented in Haryana, Delhi and Uttar Pradesh is provided in Table 2.

TABLE 2: Works and Activities carried out under YAP-I

Components	State Governments			
	Unit	Haryana	Delhi	UP
Sewerage/wastewater interventions:				
A. Interception and diversion of open drains	km	172	-	42
B. Sewage pumping stations	Nos.	21	-	28
C. Sewage treatment plants				
Installations	Nos.	11	-	15
Capacity creation	MLD	303	-	399
D. Low cost sanitation				
Community toilet complexes	Nos.	75	958	561
Squatting seats	Nos.	1160	27000	2910
E. Pilot projects				
Decentralised sewage treatment				
Mini STPs (3 and 2 MLD)	Nos.	-	4	-
Micro STPs (0.15 MLD)	Nos.	-	10	-
Decentralised STPs on drains (10 MLD)	Nos.	-	2	-
Disinfection of STP effluent (0.5 MLD, various technologies)	Nos.	3	2	1
Non - sewerage interventions				
F. Improved wood based crematoria		24	4	70
G. River front development (Construction of bathing facilities)		2	-	7
H. Public participation workshops	Nos.	726	5382	915

Total Investment in YAP-I

YAP loan disbursement took place in two stages:- from 1993 to 2000 and unutilised money was then disbursed during extended phase from 2000 to 2003. Total expenditure on various components has been Rs. 6759 million, which is equivalent to USD 141 million (exchange rate in March 2003 1USD = Rs. 48). The breakdown of expenditures over the two time periods for three States is presented in Table 3.

While the NCT of Delhi accounted for only 2.6 % of the total expenditure during the first 7 years in the original programme, it contributed almost 70 % of the wastewater to the river. During the extended period, this was increased to 23%, which was directed on construction of community toilets, pilot STPs and community participation.

Table 3: Distribution of Expenditure Incurred During YAP

Programme phase	Investment in Rs Million				
	Haryana	Delhi	UP	Total	%
Original programme (1993-2000)	1957	175	2515	4647	69
Extended programme (2000-2003)	251	1541	320	2113	31
Total (1993-2003)	2208	1716	2835	6759	100
% distribution	33	25	42	100	

(Source: TEC-DCL, January 2003)

Experience of YAP-1

Key factors which affected the attainment of the ultimate objective of YAP-I are related to original strategy on geographical and demographical coverage, end of pipe approach, technology and a limited time horizon. Briefly described below:

- Delhi alone contributed 70% of the total wastewater load from 15 urban towns. The city-state's involvement was proportionally

low under the sewerage component of YAP. Moreover, STP capacity created by the city government concurrently with YAP remains under-utilised to the extent of 25-45% because of severe limitations in the collection system. As a result, untreated sewage continues to flow into the river through a series of storm water drains.

- Similarly STPs in reaches II and IV are under-utilised due to a combination of limitations in the collection system and power availability. Municipalities and line agencies responsible for operation and maintenance of sewerage infrastructure are constrained to maximise the operational efficiency of the system due to combination of factors related to skill, management and upstream sewerage infrastructure.
- Initial estimate for BOD load generation from livestock activities in the study area was as much as 63%. Even if half of this load were assumed to be reaching the river, it constitutes 46% of the total BOD load on the river system. However, the strategy in YAP-I did not adequately address non-point sources of pollution.
- To a certain extent community toilet complexes prevented the practice of open defecation. It yielded consequent benefits in terms of improved hygiene and sanitary conditions in target communities. But this has not led to a proportionate reduction in the organic load flowing into the river.
- There was strong emphasis on public participation and community awareness in Delhi during the latter stages of the project with special reference to reduction in pollution loads by low-income communities. There was a clear need to refine the strategy for increasing the acceptability of low-cost sanitation.
- From a bacteriological water quality standpoint it was noted that when YAP schemes were designed, the Indian wastewater discharge standards did not mandate STP effluents. Standards for Coliform reduction were more recent as a result STPs did not include disinfection treatment.
- Lastly, aspect of sewage treatment capacity available along the river needed further assessment. In YAP-I the major

consideration was to target and control immediate pollution loads from domestic sector. The limited budget was a major constraining factor in deciding on shorter design periods. Accordingly, whatever sewage treatment capacity was created, it was designed for 1997 population loads. For instance YAP-I was able to create 3.5 million Population Equivalent (PE) of net STP capacity in 14 towns in Haryana and Uttar Pradesh. However by 2002 the total population of these towns was close to 6.7 million creating a shortfall of 3.2 million PE. When Delhi is included, the gross available STP capacity is around 14.7 million PE while the current population equivalent load exceeds 21 million, indicating another shortfall. Further, when all the 33 major, medium and smaller towns along the river are considered, the corresponding numbers was 15 million PE versus 23.3 million and the shortfall in STP capacity about 8.3 million PE.

YAP-II: The Project Continuation and Enhancement Phase

Building on the success and lessons learnt from YAP-I, JBIC signed a new Loan Agreement on March 31, 2003 for the current YAP II Project as a continuation and expansion of the earlier program. The JBIC Loan Agreement provided financial assistance of JPY 13.33 Billion or approximately 85 percent of the overall project budget.

Specific value added components included in YAP-II that were not included in YAP-I or needed strengthening were as follows:

- Intensive PP & A Programs on public involvement in decision making process utilizing numerous NGOs.
- Public Relations / Information Program in Delhi
- Intensive Institutional Capacity Building of the ULBs to ensure future Management and Financial Sustainability
- Capacity Building for NRCD
- Fund Flow Monitoring
- Water Quality Monitoring Program
- O & M Study on YAP-I Assets .
- Engineering Technology Transfer to ULBs in Haryana

Table 4 summarizes the diversified and enhanced scope of programs and included budget in YAP-II. With Delhi as the major polluter receiving a proportionally higher share which was not the case in YAP-I.

Table 4: State Wise Distribution of Budget for YAP-II

No.	NAME OF STATE/SCHEME	EST COST Rs in Cr.	%
I	DELHI		
1	• Trunk Sewer Rehabilitation/Construction-Bela/Ring/Wazirabad Road Sewers (DJB)		
2	• Okhla Sewage Treatment Plant Expansion (DJB) (765MLD)		
3	• Keshopur Sewage Treatment Plant Complex Rehabilitation (DJB) (324 MLD)		
4	• Public Relations (DJB)		
5	• Master Plan (MP), Feasibility Study (FS) and Detailed Project Report (DPR) Preparation for YAP-III (MCD): 1) Decentralized Wastewater Treatment; 2) Dairy Farm Waste Management; 3) Dhobi Ghat Improvement; 4) Slaughter House Modernization & Waste Management; 5) Crematoria Improvement; and 6) Slum Rehabilitation Study). Pilot Plant Implementation is included for components 1-3.		
6	• Public Participation and Awareness with NGOs (MCD):1) Socio-economic & Environmental Upgrading of CTC Neighbourhood Community; 2) School Health & Hygiene Program; and 3) Town Specific Innovative Program. In addition there will be another program: 4) Clean Yamuna Manch focussed on the major polluters Delhi and Agra. All remaining Towns in UP and Haryana will benefit from the mass media and networking included in this component.		
7	• Institutional Capacity Building (MCD): 1) GIS Base Mapping & Database Updating using High Resolution Satellite Imagery; and 2) Reform Action Plan		
	Total of Delhi Components	387.17	62
II	UTTAR PRADESH		
1	• Northern Zone of Agra (Sewers, SPSs, and STPs 14 MLD)		
2	• Western Zone of Agra (Sewers, SPSs, and STPs 40 MLD)		
3	• MP/FS/DPR Preparation for YAP-III in 8 Towns		

4	• Public Participation and Awareness with NGOs in 8 Towns (3 programs as above)		
5	• Institutional Capacity Building in 8 Towns (Reform Action Plans)		
	Total of Uttar Pradesh Components	124.12	20
III	HARYANA		
1	• Engineering Technology Transfer to Urban Local Bodies(ULBs) in 6 Towns		
2	• MP/FS/DPR Preparation for YAP-III in 8 Towns		
3	• Public Participation and Awareness with NGOs in 6 Towns (3 programs as above)		
4	• Institutional Capacity Building in 6 Towns (Reform Action Plans)		
	Total for Haryana	62.50	10
IV	NRCD		
1	• Institutional, MIS and Accounting Capacity Building; Water Quality Monitoring; O&M Study of YAP-I Constructed Facilities, Overseas Training, etc		
	Total for NRCD	50.20	8
	GRAND TOTAL	624.00	100

Innovations and Sustainable Initiatives under YAP-II

Delhi Trunk Sewers Adopting Trenchless Technology

For many years the conventional method for construction sanitary sewers to collect wastewater has been trenching or open-cut excavation. Recently, especially due to the recognition of the high 'social costs' attributed to trenching methods, alternate technologies have been developed around the world to mitigate these impacts. Social costs due to surface construction include traffic disruption; damage to roadways, underground utilities, nearby structures and heritage sites; noise and dust pollution; pedestrian and public safety; business loss and environmental impacts.

New methods of obtaining geotechnical data and the development of new equipment has resulted in the adoption of innovative trenchless (no-dig) approaches involving earth boring, pipe jacking or micro-tunneling techniques with a minimum or no surface excavation. These construction methods result in social costs being reduced to nominal amounts compared to the open-cut

methods where social costs often matched or exceeded actual construction costs. Such technology is being applied in the Delhi Trunk Sewer Program under YAP-II.

Existing and vital Ring Road Trunk Sewer in Delhi is suffering from major settlements, leaking joints, ground water infiltration, siltation and structural deterioration which will now be totally rehabilitated adopting trenchless technology:

- Restore the sunken stretches of the sewer and improve the hydraulic gradient
- Restore leaking joints and make them water tight to withstand high ground water table and arrest the loss of soil supporting the pipe.
- Enhance the structural capacity of the deteriorated sewer and extend its life span by at least 50 years
- Protect the sewer from further hydrogen sulphide (H₂S) related corrosion attack.
- Provide abrasion resistance to withstand sewer from damage due to silt and debris.
- Improve the overall hydraulic flow in the sewer lines (by improving the gradients and reducing frictional resistance.)

Also the new trunk sewer alignments on Bela and Wazirabad Roads in Delhi pass through congested areas in close proximity to both elevated and underground Delhi metro ways, buried utilities and busy roads where a major portion of the sewers will be constructed by microtunnelling, a trenchless technology technique.

On December 14, 2005 an event was held in Delhi involving several internationally renowned speakers organized by NRCD and the PMC on the subject of “YAP-II and Beyond: A Workshop on Dissemination of Trenchless Technology in India”.

Public Relations in Delhi

As part of YAP-II, Public Relations (PR) activities will mainly focus upon operations of the Delhi Jal Board with the overall aim of improving visibility, brand image and public acceptability of YAP II

infrastructure schemes for abating pollution in the Yamuna River Basin. Mainly, PR activities will be confined to areas of centralized trunk sewer and STP schemes. The following objectives are expected to be achieved through the PR activities:

- Create public awareness and educate citizens throughout the country on the Yamuna being Delhi's lifeline.
- Influence people's perception, attitude and practices to involve stakeholder groups in caring for the Yamuna.
- Bridge perception gaps.
- Disseminate information to stakeholders about constraints under which the Delhi Jal Board is trying to accomplish tasks and seek their cooperation.
- Create public awareness about river pollution abatement measures.

DJB will focus on sending consistently positive messages through media outlets as given below:

- Local Electronic media (Television, Cable TV, Cinema halls and Radio).
- Advertising in Print.
- Editorial coverage, Press conference, placed articles and press releases.
- Grass root initiatives (street plays, cleaning drives etc).
- IEC (Inform, Educate & Communicate) using publicity material: kiosks, posters, mobile vans, stickers, etc.
- School programmes, using multimedia presentations, collaterals and schools visits to STPs.
- Participation in trade fairs and other public events.

Capacity Building Reform Action Plans in 3 States

The Agra Municipal Reform Project, undertaken as a pilot demonstration initiative in YAP-I, has shown the way as how through consensus among the key stakeholders, systematic initiatives could be undertaken to bring about reforms in a local body. A 'Reform Team' headed by the Mayor and senior councillors brought about a common sense approach among different stakeholders. Intensive

workshops were held with elected representatives from Agra Nagar Nigam to create awareness and understanding about municipal reforms. In order to highlight the “Voice of Citizens” a citizen survey was conducted throughout the city covering resident households, commercial establishments, slum dwellers, etc. Inputs from the citizen survey was used for preparation of an action plan for municipal reform.

Based on the success of the Agra experiment, a larger component on institutional strengthening and capacity building of ULBs is included as an integral part of YAP-II. This component is to be implemented through a Reform Fund available for utilization by all 15 towns covered under YAP-I to undertake municipal reform initiatives.

The objectives of the component on institutional strengthening and capacity building of ULBs are;

- To enhance institutional, financial and human resource capacities of ULBs so that they can undertake the responsibility of O&M of assets created under YAP-I in a sustainable manner
- To adopt a demand-driven approach, wherein the ULBs assess the reform initiatives required, and seek funds available under the Reform Fund, for implementing those initiatives
- To adopt an approach that balances disbursement of reform funds on the basis of equity-principle (i.e. on the basis of level of investments under YAP-I) and incentive-principle (i.e. re-allocation of unutilized funds to those ULBs that demonstrate more reform orientation)

Public Participation and Awareness in 3 States

Public Participation and Awareness (PP&A) has been an integral component in the Yamuna Action Plan. However the PP&A components were introduced in the latter stages of YAP-I on the basis of recommendations of the Special Assistance for Project Implementation (SAPI). It was realised that awareness and subsequent appreciation of the facilities by the public was crucial for the success of the project. PP&A in YAP-II is proposed as a pivotal component, realizing its significance in making the project a success

by involving the communities as well as various relevant stakeholders at all levels. In Phase II, the budget was substantially increased and the programs streamlined. The specific objectives of PP&A include: promoting different prevention and management measures which are being undertaken in Phase-II; strengthening effective co-ordination between PIAs/ PMUs, ULBs and NGOs/ CBOs and communities; supporting innovative initiatives towards prevention and management of river pollution. The four specific programmes under the public participation and awareness component of YAP-II are: Clean Yamuna Manch in Delhi and Agra; Socio-Economic and Environment Up-gradation of Community Toilet Complexes (CTC) Neighbourhood Community Programme; School Health and Hygiene Programme; and Town/ Region Specific Innovative Programme. All these programmes are being implemented through numerous partner NGOs in all select towns. The process is currently underway for selecting the NGOs in all three states.

Engineering Technology Transfer to Urban Local Bodies in Haryana

Under YAP-I, sewerage facilities were created in six (6) towns of Haryana: Yamunanagar, Karnal, Panipat, Sonipat, Faridabad and Gurgaon. In each town, the responsibility for O&M is vested with its respective Urban Local Body (ULB) to maintain & operate assets appropriately created under YAP-I, the techno-managerial resources / capacity of such ULBs needed to be enhanced. With this in mind, YAP-II enhanced activity of “Engineering Technology Transfer to Urban Local Bodies”.

Under YAP-II, to enhance the process of Engineering Technology Transfer to ULBs, there will be a field training programme to train ULBs' engineers and technical staff on technical parameters, on site management etc. as required for developing any new sewerage system. To facilitate wide exposure of different components of sewerage systems, construction of new systems with sewers of varied diameter & length, ancillary structures like pumping stations, and up-gradation of electro-mechanical systems have tentatively been proposed to be included in the training.

This is the most effective means of knowledge/skill transfer through on-the-job training and practical applications. It is essentially learning by doing and enables day-to-day association, interaction and communication with PHED Engineers and the consultants who will soon be appointed.

Operation and Maintenance Study of Facilities Constructed Under YAP-I

Started this week, the objective of the O&M study will be to raise the capability and efficiency of YAP-I towns to better operate, manage and maintain their wastewater systems. The improvements identified through the O&M study are intended to increase operations and maintenance efficiency, ensure better health and safety of the staff involved and to develop capacity for sustainable O&M. When the project is completed, the reduced risk of adverse environmental impact will benefit all residents in the YAP project areas.

The YAP-I project completed in 2003, resulted in the development of new wastewater infrastructure in 15 Class I towns along the Yamuna River in the states of New Delhi, Haryana and Uttar Pradesh. A total of 28 STPs were constructed with a capacity of treating 722 MLD of wastewater, in addition 214 kms of new interceptor sewers and diversion lines including 49 new pumping stations were built.

As significant investments were made in the development of the wastewater infrastructure and much more is proposed under YAP-II, it is appropriate that a review of the O&M activities be conducted to ascertain maximum potential project benefits and lessons learned from the O&M review of YAP-I infrastructure can be incorporated into the development of YAP II infrastructure and preparation of DPR's for YAP-III.

LESSON LEARNT

It is futile to spend money on state-sponsored programs of river conservation, unless the common man realizes its importance. Mere dependency on our political system will not yield result so every action plan should promote the concept of building understanding

and capacity of the common man to handle increasing challenges posed to holy rivers in India. If everyone contributes their bit as responsible citizens then drying rivers can be saved. It is emphasized that if engineering designs create the skeleton, then non-engineering components provide life and body to it.

In summary, YAP-II focuses on the need to think beyond engineering aspects to achieve intended objectives of infrastructure development and sustainable maintenance.

FUTURE PLANS

Following completion of the Yamuna Action Plan Phase II Project in 2010, and subject to a new JBIC/GOI Loan Agreement being executed, a third phase program will be formulated to be implemented over another five year cycle. It is envisaged that the III phase of the project will incorporate good practices and lessons learnt from previous phases and give substantial importance to the implementation of urban sector reforms in the right spirit of 74th Constitutional Amendment Act.

REFERENCES

- TEC. River Pollution Study on Yamuna Action Plan Phase II, Draft final report. December 2002.
- Engineering Consulting Firms Association (ECFA), Japan. Pre-feasibility study on rehabilitation of damaged sewer system of Delhi. February 2000.
- TEC-DCL Consortium. Yamuna Action Plan - Narrative progress report. January 2003.
- SAPROF team for OECF, Japan. Special assistance for project formulation for the Yamuna Action Plan final report. March, 1992.
- PMC Consortium Inception Report for the Yamuna Action Plan Phase II Project, May 2005.