Compendium of Best Practices for Rural Development

National Institute of Rural Development and Panchayati Raj

Ministry of Rural Development, Government of India

Rajendranagar, Hyderabad - 500 030, India

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FOREWORD

The National Institute of Rural Development and Panchayati Raj (NIRDPR) under the Ministry of Rural Development builds the capacities of rural functionaries, elected representatives of Panchayati Raj Institutions, bankers, NGOs, and other stakeholders inter-related to the rural development through training and research.

Promotion of innovations and spread of technologies play a vital role in enhancing income and improving livelihoods in rural areas. In the transfer of technologies or adoption of modified practices, stakeholder participation is very important. Active stakeholder participation from the Gram Panchayat level to the policy formulation level is needed for the success of any scheme, project or technology adoption. Within the existing institutional infrastructure, working towards specified goals of technology transfer and adoption is challenging. There is a need for more awareness and capacity building programmes targeted towards farmers, government agencies and policymakers.

The best practices or successful technologies would bridge the gap in enhancing the rate of adoption at the policy and implementation levels. In order to highlight the success, create awareness and adopt best practices, NIRDPR is bringing out the present book on the compendium of best practices brought in a few case studies. We hope this publication will guide a wide range of stakeholders involved in Rural Development and Panchayati Raj, to understand and to adopt the different aspects of success stories for holistic rural development.

Hyderabad,

March, 2022

Dr. G. Narendra Kumar, IAS

Director General,

NIRDPR, Hyderabad

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CASE STUDIES ON BEST PRACTICES OF RURAL DEVELOPMENT

Background:

The nation has undergone various phases of transformation since independence. In the initial phase, the Government of India has focused on infrastructure and resource development. During 1947-1980, the government has concentrated on resource and infrastructure development to achieve food self-sufficiency through Green Revolution. During 1981-2000, attention was given to technological innovation through research and development. In the post-2000 phase, the participatory/ community management approach was found to be beneficial. In the process, various institutions and technologies suitable to local needs were developed. All these efforts resulted in successfully lifting people out of multidimensional poverty.

Given the diversity of rural India, a wide range of development challenges remain, which needs to be addressed for achieving the sustainable development goals. Government of India has taken initiatives to address these challenges through various Acts, Schemes and Programmes (Mahatma Gandhi National Rural Employment Guarantee Act, National Food Security Act, National Rural Livelihoods Mission, Pradhan Mantri Jan Dhan Yojana, Pradhan Mantri Krishi Sinchayee Yojana, Pradhan Mantri Awas Yojana, Pradhan Mantri Gram Sadak Yojana, Skill India, Swachh Bharat Abhiyan, Beti Bacho Beti Padhao Yojana, National Rurban Mission, etc.) that align with the Sustainable Development Goals (SDGs) framework.

The strategy of sustainable rural development is vital for achieving the targets laid out under SDGs. The economic, social and environmental goals can be achieved only through an integrated approach of decentralised institutions, financial and social inclusion, improved and transparent governance mechanisms, gender empowerment, strengthening the education system, agricultural development and promotion of entrepreneurship.

In India, agriculture is the major source of livelihood for the rural community. The Food and Agricultural Organisation (FAO) estimates that farmers have to produce twice as much as they do today to feed the 9.2 billion global population by 2050. Farmers need to intensify the agricultural production in the face of declining availability of labour, water and agricultural land, lower productivity and changing

consumer patterns. The challenge on this front will be to intensify production in a sustainable way while meeting the demand for food at present and in future. The risks of climate variability and market distortions are making many of the farmers migrants from rural areas to the nearby cities and towns. Hence, the Government of India has launched various programmes and schemes such as Rashtriya Krishi Vikas Yojana (RKVY), Pradhan Mantri Kisan Samman Nidhi, Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), Mahila Kisan Sashaktikaran Pariyojana (MKSP), Pradhan Mantri Fasal Bhima Yojana (PMFBY), National Initiative on Climate Resilience Agriculture (NICRA), etc., to support the farming communities and livelihoods in the rural areas.

The National Rural Livelihoods Mission was launched in the country to alleviate rural poverty through building sustainable community institutions for the poor. The rural livelihoods can be enhanced through the effective participation of rural people and communities with the objective of empowering the rural areas, particularly women and youth. The job creation for rural women and youth can be achieved not only through farming and agro-processing but also by building rural infrastructure, sustainable management of natural resources and promotion of entrepreneurship. Investments in rural health and education also play an important role in sustainable rural development.

The solid waste management strategies towards providing a clean environment in the rural areas are very important for achieving sustainable development. Swachh Bharat Abhiyan or Clean India Mission is a countrywide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management. This mission aims to provide basic sanitation facilities like toilets, solid and liquid waste disposal systems, village cleanliness, and safe and adequate drinking water supply to every person, which, in turn, play a major role in improving the health of the households. The Gram Panchayats are creating facilities for the collection of waste generated by households and making it as manure through vermicomposting.

Remote sensing technology was also widely used to monitor the assets and infrastructure created through the schemes and have become very effective in land-use planning and management of the resources and integrated development. The satellite data and imageries are helping in better decision-making and participatory management at the Gram Panchayat level as well.

The introduction of Panchayati Raj Act and transfer of powers related to 29 subjects under the 11th Schedule have led to the devolution of powers to PRIs. The PRIs now play a major role in the formulation of GPDP that takes into account locally available resources and development needs of the community. This will contribute to the formulation of inclusive development strategies that ensure participation at the grassroots level and effective implementation of rural development programmes. The decentralised planning process will help in improving the processes and protocols for delivering services to the citizens ensuring participatory decision-making, transparency, and accountability contributing to social inclusion.

The success stories and case studies of these activities would help in dissemination of information and taking up the practices at different levels. The National Institute of Rural Development and Panchayati Raj (NIRDPR) under the Ministry of Rural Development has carried out various case studies in bringing in the best practices in rural development. A compendium of best practices is presented through this book in the following chapters.

ZERO ENERGY BASED WATER CONSERVATION THROUGH STREAM-BASED IRRIGATION: A CASE STUDY IN KORAPUT DISTRICT OF ODISHA

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Backdrop

Koraput district is located in the State of Odisha in India. The district is located in the Eastern Ghat mountain ranges and is known for its hilly terrain, rich and diverse mineral deposits and tribal culture.

In the year 2006, the Ministry of Panchayati Raj, Government of India had placed Koraput district in the list of 250 backward districts in the country. The economy of Koraput district is dependent on rain-fed agriculture. Out of the total cropping area of 2,96,000 ha in Koraput, the irrigation potential in kharif and rabi is 30.71 per cent and 21.51 per cent, respectively. (District at a Glance-2020, Koraput District, Directorate of Economics & Statistics, Government of Odisha)

About the Project Village

Putsil is a remote tribal village in Dudhari Gram Panchayat of Semiliguda block in Koraput district of Odisha. The village is dominated by Kandh tribe, which is one of the ethnic tribal groups among 62 tribes of Odisha. Nestled amidst hillocks and thick forest cover, over 75 per cent of Putsil residents, mostly tribal people, depend on agriculture to eke out a living.

However, given the geographical location of the area, which is surrounded by hills and forests, the villagers are left with a limited area for agriculture. Hence, most of the villagers encroach upon forest land and grow crops like ragi, suan, etc., during the monsoon. Due to the absence of irrigation facility, villagers depend upon the rain for growing crops. A major portion of the land in Putsil village remains barren during the post-monsoon period. This situation forces people to migrate to cities in search of employment.

Though a perennial source of water is flowing from the Deomali hill range to Putsil village, the lack of storage mechanism is a limiting factor for sustainable agriculture. Two medium-size perennial streams are flowing from a hillock of Deomali hill range towards to Putsil nullah, which is the catchment of Kolab River. The absence of any mechanism to manage the water properly had resulted in high run-off, which eventually led to wastage of water and loss of soil fertility in low-lying areas.
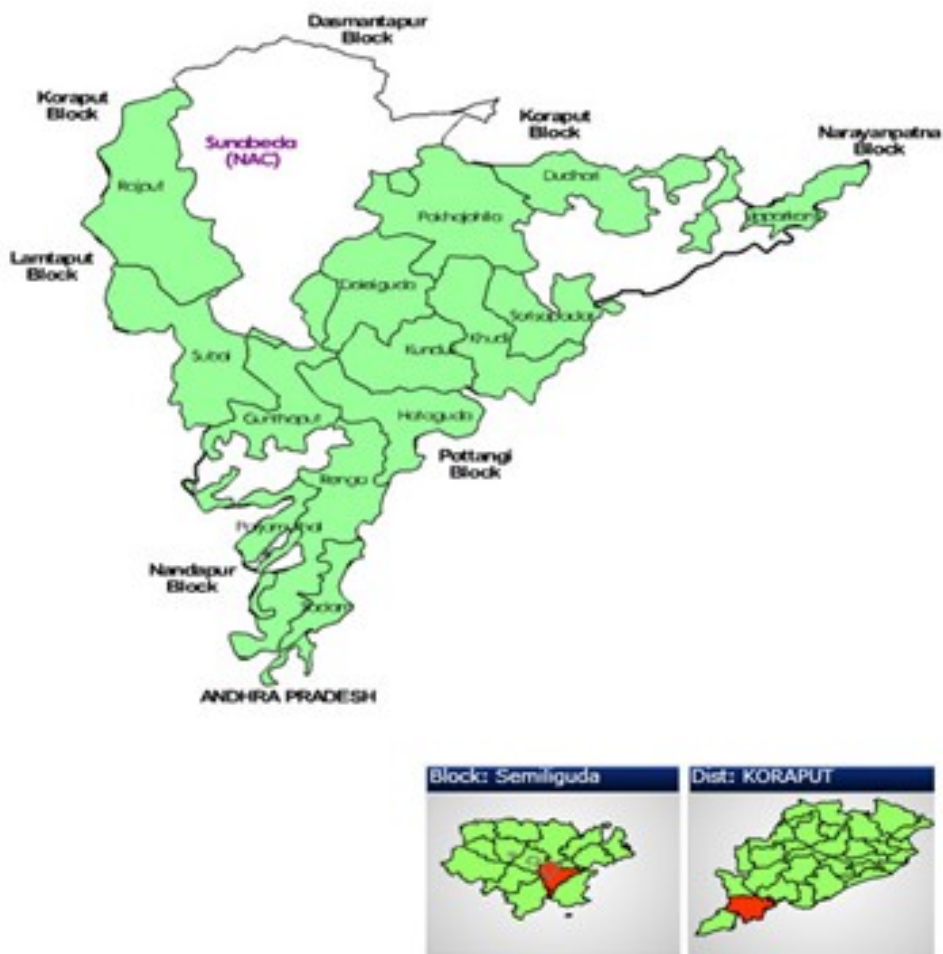
Figure 1: Map of Seiliguda Block, Koraput District, Odisha

Innovative Project on Zero Energy Irrigation

The innovative project "spring-based irrigation system" was implemented in Putsil village by the District Watershed Mission of Koraput district to cater to the drinking water and irrigation needs of the village. The project 'Stream Diversion Based Irrigation' based on zero energy utilisation was implemented with an estimated budget of Rs. 26 lakh. The project was funded under the District Mineral Fund (DMF) of Koraput in the year 2018-19.

Following were the objectives of the initiative:

- To conserve water based on a zero energy consumption water management system.

- To prevent soil erosion, provide life-saving irrigation and secure the livelihood of villagers by diversifying the cropping pattern.

Based on the local condition, the design of the project was innovative. Zero energy consumed gravity field spring-based irrigation system was adopted as a methodology to provide water from the origin of the spring to the agricultural field of the villagers.

Work on spring-based irrigation in progress at Putsil village, Koraput district, Odisha

The system consists of a few components mentioned below:

- Collection-cum-filter chamber/Spring Box – The collection-cum-filter chamber has been constructed to collect and filter the water from the spring. Since it has been constructed at the point of higher elevation, it adds pressure to the flow of water due to the gravitational force.

- Storage Tank – The storage tank having capacity to store 15,540 litres of water has been constructed with Reinforced Cement Concrete (RCC) to support the weight of tank filled with water. This has also been strong enough to withstand high-speed wind.

- Pipe Lining- Polyvinyl chloride (PVC) pipe has been used to feed the water from the collection chamber to the storage tank in contour line using gravity. PVC pipes have been used as it could be cut into any size.

- Junction Chamber- To distribute the water to the crop field, different junction chambers have been constructed. The irrigation point to each farmer's field has been connected by this junction chamber.

- Valves- The storage tank and junction chambers have been provided with an on/off valve having a lock system between the irrigation pipelines for judicious water management. The pressure valve has also been fixed for pressure regulation.

Since the origin of the spring happens to be the perennial source of water, a collection-cum-filter chamber of size 3.0m X 2.50m X 1.20m has been constructed to collect and filter the water. The collected water was brought to the storage tank of size 3.70m X 2.80m X1.5m having a capacity to store 15,540 litres of water by laying PVC pipes along the contour line.

Design Specification of the Project	
Diameter of the Pipe	9 inches
Total Length	2.5 kilometres
Size of Collection Chamber	3.0 X 2.5 X 1.2 metres
Size of Storage Tank	3.7 X 2.8 X 1.5 metres
Capacity of Storage Tank	15540 litres
Number of Junction Chambers	12 nos.
Estimated Cost	Rs. 26 lakh
Ayacut Area	47 acres
Beneficiaries	63 families
Funding Support	District Mineral Fund, DRDA, Koraput

Source: Soil Conservation Sub-Divisional Office, Koraput district, Odisha.

The spring water was brought down from its origin to the field through the adaption of an innovative design. Once the water reaches the collection chamber, separate PVC lines were laid from the storage tank to the agricultural field of the beneficiaries. As many as 12 junction chambers have been constructed for the supply of water to each farmer's land.

Impact of the Project:

This innovative initiative on 'Zero Energy Based Water Conservation through Stream Based Irrigation' has created additional irrigation potential of 47 acres in the Putsil village. A total of 63 persons have been benefited due to the project with the generation of additional 3714 man-days of wage employment. The village also experienced diversifying its cropping pattern from cereals to other vegetables as well as cash crops due to the availability of water for irrigation.

The agricultural activities at Putsil witnessed perceptible change since the commissioning of the spring-based irrigation system, which converted the barren land to vegetative cover. The project also immensely benefitted the tribal families of Putsil in terms of increase in cropping intensity, enhanced man-days of employment and reduction in distress migration.

"At one point, it was difficult to arrange two square meals for five members of my family. Now, I am earning Rs. 80,000 to 1.20 lakh per year from cultivation by availing the irrigation facility."

-Shri Ram Dulari, a resident of Putsil village, Koraput District, Odisha

Maize cultivation in Putsil village

The intensive agriculture methodology adopted in the Ayacut area by the villagers of Putsil through spring-based irrigation facilitated in doubling the farmer's income. The farmers are now using organic manure for crop production. Judicious adoption of various farming techniques by utilising low duration and high-value cash crops such as coriander, cabbage, cauliflowers, etc., has helped the farmers to have marketable surplus.

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IRRIGATION BY SOLAR PUMP: A CASE STUDY FROM MANDLA DISTRICT, MADHYA PRADESH, INDIA

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Introduction

Presently, diesel and grid-based electricity pumps are the dominant sources of irrigation in Madhya Pradesh, irrigating about 73 per cent of the total agricultural land of 154.55 lakh hectres. Owing to the problems of water scarcity, shortage of electricity and high cost of cultivation associated with diesel and electric pumps, farmers in Mandla district of MP are attracted to solar irrigation pumps. A solar-powered pump works on electricity generated by capturing the radiated thermal energy of sunrays by cells known as photovoltaic cells. Solar pump irrigation can be a better option in areas of water and electricity shortage as it provides improved access to water around the year. Accordingly, approximately 25 solar pumps (with a capacity of 5 HP each) have been installed in the Mandla district under the Sustainable Livelihoods and Adaptation to Climate Change (SLACC). Details of these solar pumps are summarised in Table 1.

In Mandla district, two types of solar irrigation systems, namely community irrigation (Gubri and Urdali villages of Bichiya block) and individual irrigation (Junamandla village of Mandla block) have been adopted. A door-to-door survey was carried out to select the target population of small and marginal farmers following their willingness to adopt the climate-resilient SLACC intervention and possession of some minimal land to install the intervention.

Table 1: Details of Intervention

S. No.	Attributes	Bichiya Block		Mandla Block
		Gubri village	Urdali village	Juna Mandla village
1	Water lifting capacity (Ft)	400	400	250
2	Establishment cost (after 90 % subsidy)	72100	72100	36150

Contd...

S. No.	Attributes	Bichiya Block		Mandla Block
		Gubri village	Urdali village	Juna Mandla village
3	Annual Maintenance cost, including operating cost (in Rs.)	2000	2000	2000
4	Operating or management system	Community (own by VO)	Community (own by VO)	Individual
5	Number of beneficiaries	15	10	1
6	Beneficial throughout the year or seasonal (kharif/rabi/zaid)	Throughout the year	Throughout the year	Throughout the year
7	Power capacity (HP)	5 HP	5 HP	5 HP
8	Average Water level (Ft)	180	150	150
9	Motor installation depth (Ft)	250	250	200
10	Number of solar panels	16	16	10

Output/Results

Production: In Gubri village, 15 households are now capable of growing vegetables independently with the help of a community solar pump by paying Rs. 50 per hour to village organisation (VO). Farmers like Jamuna Bai Marawi of Gubri village have started cultivating vegetables in her 0.20 ha of land using solar pump and selling in the nearby market on her own. Likewise, in Urdali village, farmers (10) are irrigating approximately 9.2 ha land to grow wheat (1.1 ha), pea (4.2 ha), gram (2.1 ha), lentil (1.4 ha) and mustard (0.4 ha). Therefore, after the installation of solar pump, farmers of Urdali village have been cultivating double crops which have improved their annual income. Urdali village organisation has adapted two sets of solar pumps each having capacity of 5 HP and is charging Rs. 100 as service charge for two days.

Technology: Solar pump can be installed at a highly subsidised rate of 90 per cent under SLACC; therefore, the risk of high investment is reduced by the government. The operational input cost has been abridged. In rainfed areas, crops generally wither

in 3-4 weeks due to dry spell (without water). But nowadays, crops can be saved by assuring timely and continuous irrigational facilities by solar pumps. The payment for supply of irrigation water is made either on hourly basis, daily basis or landholding basis. The life span of a solar panel is about 25 years whereas maintenance is typically minimal as compared to grid power motors.

Financial benefit: SLACC farmers from Gubri village are cultivating vegetables in the kitchen garden and saving at least Rs. 7,800 per year (approximately Rs. 150 in a week). Some farmers are earning money through sale of vegetables in the market.

Socio-cultural benefit: Every beneficiary is actively taking part to maintain the solar pump, which in turn, is increasing the unity and social attachment among all the beneficiaries. Besides ensuring timely and adequate irrigation, the solar pump intervention has increased the availability of drinking water during the summer season. SLACC beneficiaries from Gubri village have decided to supply drinking water (40 litres/day) to every household in the summer season (four months) at the rate of Rs.30 per household per month. Solar pump intervention has not only increased social cohesion among the people by providing them clean drinking water but also brought down the number of water-borne diseases caused by polluted water, thereby creating a happy and healthy society.

Ecological benefit: Besides having economic and social benefits, the operation of the solar-powered water pump is free of Green House Gas (GHG) emissions. In general, there is a potential reduction in GHG emissions per unit of energy used for water pumping (CO2-eq/kWh) of 95 to 97 per cent as compared to pumps operated with grid electricity, and 97 to 98 per cent as compared to diesel pumps (considering the emissions from the production of solar PV panels). In addition to the prevention of GHG emission, which is a significant advantage, the solar-powered water pump reduces pollution, and helps in more targeted fertiliser use, more precise irrigation and more benign water extraction. Solar PV constitutes a reliable source of energy for pumping irrigation water in remote areas, particularly in areas that are not connected to the electricity grid or where regular supply of liquid fuels is limited.

This system, while relying on groundwater, provide access to water that can be used to stabilise yields and avoid crop failure during drought, a condition caused by climate change, is expected to occur more frequently and with greater intensity in many regions of the country. The sustainability of this resilient strategy would depend on the sustainable management of the supporting water resources.

Key challenges and way forward

1. Solar pump can be used during daytime - from 9 AM to 5 PM.

2. Less power generation in winter and cloudy conditions.

3. Dust and tree shade affect the intensity of solar radiation, hence pumps need to be installed in open spaces.

4. It needs more power in undulating topography.

Key suggestions for further improvement

1. Cleaning of solar plates should be done properly and regularly.

2. Installation of lightning conductor is highly desirable in solar pumps.

3. Need for fencing is also mandatory for safety.

4. Additional water storage structures can also be prepared for additional and emergency usage.

Shri Rajesh Singh Pandre, a SLACC farmer of Gubri village narrated the story of solar pump installation. He says that when public borewell of the village got damaged, all villagers were facing water shortage for irrigation, drinking and other household works. "Fortunately, they came to know about the benefits of the solar pump installed in Urdalli village under SLACC and decided to initiate the process of installing one in Gurbi village. In the beginning, the Gubri villagers faced problems while procuring and installing the pump, but now they are taking full advantage of it. Before the installation of solar pump, it was difficult to raise even a single crop in kharif season. Now, in addition to kharif crops, they are cultivating rabi and zaid crops like wheat, gram, lentil, mustard crops and vegetables," he said.

Scale-up opportunities of the intervention

The solar pump installed at Mandla

SLACC project appreciates its potential to improve water access for multiple use at the community level, including more intensive and resilient crop production as well as health and hygiene. SHG members are eager for opportunities to introduce new crops and expand the net sown area, production and annual income by using solar-powered pumps. This appears to be the case in other places, where the government (Centre and State) is developing and promoting various approaches to solar-powered irrigation. For the marginal and small farmers who generally grow rain-fed crops, solar -powered pumps system ensures irrigation water so that they can increase the number of crops per year as well as their annual income. It is also very useful in hilly and undulating terrains where grid power is generally unreachable. Solar-based water pumps are easily installable in such landscapes. The departments of renewable energy, agriculture, horticulture and fisheries can scale up solar pumps for their beneficiaries.

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CLIMATIC RISK REDUCTION IN FARM OPERATIONS THROUGH CUSTOM HIRING CENTRES: A CASE STUDY FROM MADHYA PRADESH

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Introduction

Agriculture-based farming activities are climate-centric, and crop production and its productivity are greatly influenced by climatic factors like rainfall, temperature, etc. In order to get appropriate yield, the climatic factors should be ideal throughout the crop cycle from sowing to harvesting. As we know, climatic factors cannot be altered by humans, but they can be predicted and efforts can be made to save the crops and minimise the yield loss. Mandla and Sheopur districts of Madhya Pradesh are affected, respectively, by flood and drought, where there is a need for manpower to reduce climatic risk at the farm level, But nowadays, it is very challenging to act on the basis of manpower only given the lack of human labour and its low efficiency. Now, the farmers have an option to implement farm operations using latest equipment, but not all are able to acquire the latest farming technology. For this reason, beneficiaries from the Sustainable Livelihoods and Adaptation to Climate Change (SLACC) villages of Mandla and Sheopur districts have established the custom hiring centre by village organisation.

The CHC established at Bhawamal village of Mandla district

The Madhya Pradesh State Rural Livelihoods Mission, commonly known as MP-DAY SRLM, is a Ministry of Rural Development initiative that has been supporting the Sustainable Livelihoods and Adaptation to Climate Change (SLACC) project since 2016. The project is reaching out to the self-help groups to form and operate the concept of 'Custom Hiring Centres', as part of achieving the objective of reducing climate change risk through farm equipment. The concept of Custom Hiring Centers is also gaining rapid popularity as farm-based agricultural practices are moving from being labour intensive to mechanised.

Custom Hiring Centres (CHCs) for community farm implements were established in 75 SLACC villages, which could successfully empower women farmers to tide over the shortage of labour and improve the efficiency of agricultural operations. There are more than 15 types of farm machinery kept in 75 CHCs; the most popular are reaper, zero tillage drill, drum seeder, cultivator, rotavator, irrigation implements, brush cutter, power weeder and sprayers. Emulating the CHC model of Bhawamal village of Mandla district, the CHCs were established in such a way that a CHC can cover the demands within the 5-km radius and it can be used by all the farmers in the area. In order to mobilise the farmers, a door-to-door survey was done initially. The small and marginal farmers, who have the willingness to share equipment, have been linked with CHC. In each SLACC village, approximately 40 farmers have been identified. In total, 4488 SLACC farmers have been benefited in the whole of Madhya Pradesh, who are taking advantage through establishing and operating custom hiring centres.

Before the establishment of CHC, videos of agricultural implements were shared with beneficiaries in village meetings and their requirements were sought. Subsequently, the Executive Committee members of the Village Organisation and the members of the committee procured the equipment according to their requirements in all SLACC villages. A total of Rs. 3.5 lakh was invested for CHC; likewise Rs. 3.7 lakh was invested to set up a CHC in Bhavamal village, Rs. 3.74 lakh was invested for CHC in Barhadha Khurd in Mandla district. Obviously, there was convergence with other government schemes as SLACC project funding alone was not sufficient to cater to the needs.

Operating and Management System

Stage 1: Procedure for Purchasing Machine

The selection of required equipment for the CHC installation was done in the meeting of the Village Organisations, the estimated cost of the equipment was

calculated and the procurement and monitoring committee was formed. Procurement Committee went for the market survey to know the individual prices of the implements and received quotations from different firms (Quotations from at least three firms are required). The procurement committee prepared the comparative statement of the prices, services and utility of the equipment, made entry into the VO register and prepared the ranking for the purchase of the equipment through the purchase order. Once the machine is delivered, the VO released the payments. The VO takes the decision on the establishment of CHC either in government-owned land or private land through CRP/committee members.

Stage 2: Procedure for Hiring Machines from CHC

After installing CHC, the rate for hiring the machine was decided by the committee. Wide publicity was made to make the villagers aware of the available facility. In this way, a farmer willing to rent a machine fills a requisition form, in which his/her full requirement and time of requirement are entered. The monitoring committee allots the machine to the farmers on a first-come, first-served basis, depending on the availability of the desired machine in the CHC. The farmer is allotted the machine with a machine operator, and the machine is returned by the farmer in presence of at least one of the members of the monitoring committee. According to the hours used, money is collected on the basis of the rates fixed by the committee. Oiling and maintenance of the machine are done by the Village Organisation in advance, and for its longevity, an operator is appointed, who is either paid on hourly basis or lump sum money. In Mandla district, about Rs. 7,85,642 and in Sheopur, Rs. 4,97,421 was collected from CHC in the form of rent. In SLACC districts of Madhya Pradesh, VOs have earned Rs. 12.83 lakh through renting out the machines.

Benefits for small and marginal women farmers:

- Farmers of Bhawamal village in Mandla faced the problem of shallow sowing through hand broadcasting, which caused improper germination in wheat. The demonstration of seed drill in an area of five acres covering nine farmers resulted in increase of 1.5-2 quintals of wheat yield per acre.

- In the last few years, heavy loss was seen in cultivation of gram due to frost.

- Bhansingh Kuswah, a SLACC farmer tried intercropping of lentil, gram and coriander using CHC implement 'multipurpose seed drill.' He lost gram crop due to inclement weather conditions, but due to intercropping with lentil and coriander, was able to recover the loss and earned Rs. 20,000 from 1.5 acres.

- Under the CHC, there is a motor and pipe for irrigation in SLACC villages which has been used almost everywhere. In a very commendable initiative by the Maharani Laxmi Bai Mahila Ajeevika Gram Sangathan in Patparamal village of Mandla district, the irrigation pump at CHC was instrumental in drawing water for 3 km from the Narmada River through the pipes to the village, wherein 40 acres of 35 farmers could be provided irrigation to rabi crops of wheat and peas. Due to the availability of water with the help of implements in CHC, the annual income of the farmers increased substantially.

- With the help of seed drill and transplanter, 40 farmers from Khudiya village were encouraged to plant in line. The production was more than the hand broadcasting method. Due to good distances, insects and diseases also reduced and there was ease in harvesting.

- A CHC has been established in Bhawajhar village of Mandla district in which the reaper was used by 200 farmers on 320 acres. Earlier, the service of 10 labourers was needed for two days for harvesting one acre and the cost incurred was around Rs. 1400 to 1500. But now one acre is harvested in an hour through reaper which saves both time and money.

- CHC established in Ameth village of Sheopur district had benefited the farmers in various ways. Forty farmers used Thresher machine that saved time and money of farmers. Rotavator is used by 15 farmers in vegetable field, which reduced ploughing on two occasions.

- Power sprayer is widely used in Silpuribanar village in Sheopur. More than 50 farmers used the battery-operated power sprayer in various crops. Farmers saved time and reduced drudgery for controlling insects and diseases.

Ecological benefits of CHCs

- Equipment such as MB Plough in CHC proved to be very effective for the

environment, which was used in a very large area in the village of Kalitlai and Tulsef, Sheopur district and Bhawajhar district Mandla, in the SLACC project. MB plough is used in summer ploughing so that it increases the water holding capacity of soil whereas harmful pests and their eggs are pushed to the upper layer of soil and they perish due to the heat.

- In SLACC, farmers are encouraged through CRPs to use botanical extracts in power sprayers, the machine being procured in CHCs, which are lighter and hence women-friendly.

- Zero tillage is promoted in SLACC village through seed drill that reduces at least one irrigation in wheat. More than 50 female farmers like Sunita Bharti from Panar and Piparani in Sheopur district have used seed drill in zero tillage and reduced their input costs.

Knowledge Development

The reaper introduced in Model CHC Bhavamal was used in 10 surrounding villages. Keeping in view the efficiency and utility of the reaper, 200 farmers used it and four of them bought it with their own money. Every farmer knows that technology adoption in agriculture can reduce drudgery, time and money, and they are understanding and appreciating the production technologies. For instance, Ms. Rajeshree of Bhawajhar, who used seed drill and reaper, could achieve a 100 per cent increase in wheat production - from one quintal to two quintals from an acre.

Social-Cultural Benefits

Social cohesion among nearby villages due to the CHC has been increased. All the village organisations work in the same protocol so that the required machines are transparently made available to the members and non-members. Five-six villages around Khudiya village of Mandla block are being benefitted by the CHC of the village. The Village Organisation helps each other and has become a model for the residents in the nearby villages. Many villages are getting well water supplied from Ahmednagar village through the motor and pipes of CHC for drinking purpose. This initiative has been applauded by the people in the surrounding villages.

Key Challenges of the Interventions

- Shed and security of CHCs are necessary. In Mandla, the villagers themselves took the initiative and put up sheds, however, challenges were observed in the villages of Sheopur.

- Bhawamal village CHC faced the issue of machine failure due to its inappropriate operation by the farmers. As a corrective measure, they decided to deploy a trained operator along with the machine, for which the users have to pay a nominal charge.

- Many a time, small parts of machines need to be replaced due to improper use and maintenance. More often, the spare parts are not easily available in local marketplaces. Hence, while procuring the machines, conditions of after-sales services need to be ensured by the VOs so as to swiftly fix any minor issues hindering its operation.

CHCs of Umadwada, Bichiya, Mandla (right) and Patparamal, Mandla

Key Suggestions for Scale-up

The manual of the machine operation should be understood by all the members of the VO so as to enable proper sustainable functioning of the machines.

The expansion of the CHC has already done by the Agriculture Department but if it is established in collaboration with the Village Organisation of Ajeevika, it can be useful. The Rural Livelihoods Mission can work with the Mahila Kisan Sashaktikaran Pariyojana (MKSP) and Sustainable Agriculture. Besides, Horticulture and forest departments, and NABARD can also be roped in through linkages with their programmes.

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SOLID WASTE MANAGEMENT SYSTEM IN MUDICHUR GRAM PANCHAYAT, KANCHEEPURAM DISTRICT, TAMIL NADU: A MODEL FOR REPLICATION

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Centre for Rural Infrastructure (CRI)

The Changing Face of Rural India

The type of waste generated in Indian villages - about a score ago - was mostly of organic in nature, such as kitchen refuses, agricultural wastes, and cow dung. They were never considered as *household refuse or domestic refuse*, although there was no use for them inside a house. People had their own ways of composting them, for use as manure in their farms. In fact, the excess [compost domestic-refuse] used to be sold for money to farmers in need for their farm use. So, they were never considered 'waste'. They were used for rejuvenating the nutrients the soil might have lost due to erosion or repetitive farming. There was no concept of 'household waste management' especially in villages, until a decade ago. It was a concept applicable only to Indian towns and cities.

Waste generation is more to do with the culture of living, i.e., it is to do with the way people choose to live in a progressive society like India. Exposure to urban ways of living, consumerist culture introduced by TV commercials even in the villages, and the demonstrative styles of living people have increasingly come to adore, have multiplied the amount of waste generated even in villages. All these, necessarily, have made solid waste management a subject of significance at Gram Panchayat level as well. For almost a decade now, household solid waste management has become one of the serious issues to address in Indian villages. This is inevitable or inescapable when the economy of a country moves more in the direction of marketisation.

Domestic Refuse in Rural Areas

The concern is about responsible handling of domestic-refuse. Inconsiderate littering leads to poor environmental sanitation resulting in unhealthy living or poor quality of living which amount to retrograde in a society. In order to manage waste in

the desirable way, there should be a functional waste management system in place. Without a functioning waste collection and disposal system at the Panchayat level, it is unreasonable to hold individual households responsible, or blame them for irresponsibility. It can be a centralised system put in place by the State government; it can be a decentralised system to do with Village Panchayats at grassroots level; it can be a market-based or private sector based system; it can be a system primarily of the local bodies in association with some CBOs, or NGOs, etc. Since rural sanitation in Indian context is in the purview of Gram Panchayats, the government can play facilitator's role and can fund to whatever extent is feasible. But, the onus of putting a system in place to make it functional on a day-to-day basis is with the Gram Panchayats – and rightly so. Therefore, the Government of India (GoI) as well as many State governments are looking up to Gram Panchayats to come up with such a system (a model), which can be replicated, and spread across Indian States as a model for domestic refuse management in Gram Panchayats.

Considering the heterogeneity of the nature of Indian villages, one model to become applicable in all conditions and situations is most unlikely to emerge. Therefore, what we can look forward to is, *a sensible model to work with, alter and improvise.* This one model that is proposed must be from practical experience of not less than a period of five years. Interestingly, Mudichur Village Panchayat in Kancheepuram district, Tamil Nadu has such a model. Mudichur has been successfully implementing a household solid waste management system since 2007. It has evolved over the years, and since 2010-11, it is reported to be operational in a successful way.

- What constitutes Mudichur Model?

- How is this model being implemented in a sustainable manner?

- What makes it tick, while in many other places such models fade after a brief stint?

- What lessons Mudichur can give for replicability in other parts of the country?

This is the purpose of this case study in brief. The Profile of Mudichur village is given in Box 1.

Scenario Prior to this Initiative

Mudichur being very close to Chennai, the influence of city culture of keeping one's house clean, and remaining unconcerned of the filth on the street was common. *Litter anywhere irresponsibly and accuse the neighbours of their irresponsibility was the culture.* The massive campaign run by the State government to stop open defecation made the Panchayat functionaries to work towards making the Panchayat open defecation free (ODF). Mudichur Panchayat got Nirmal Gram Award in the year 2007 for facilitating every household to own and use individual household latrines (IHHL). Cent per cent toilet coverage was achieved. A niggling doubt that aroused in the mind of the Panchayat President at the time of receiving the award was, '*Does being ODF mean clean village at all - before addressing the issue of domestic waste being thrown around in all corners of the village is addressed sufficiently*'?

Issues and Challenges

When the Panchayat decided that something solid must be done to manage the domestic refuse, Hand-in-Hand (an NGO from Kancheepuram primarily known for micro credit, and micro finance activities) pitched in for help. But initially Hand-in-Hand had to grapple with several problems due to lack of awareness of people, and the

casual attitude of '*why ponder over a non-existent problem, i.e., they found no problem with the existing practice of throwing garbage in vacant places and street corners*. People found no problem throwing domestic wastes in street corners and vacant places. They had got used to the habit of getting 'garbage out' – rid garbage out – out of my kitchen – out of my house. That's considered the end of it. It's for the Panchayats (or the stray dogs!) to take care of them once it is out on the streets. That was the widespread attitude and customary practice.

The two major challenges that the Gram Panchayat and Hand-in-Hand faced were:

i)   Awakening the people from their slumber to make them see the problems of inconsiderate throwing of domestic waste at street corners;

ii) Putting in place a *domestic waste collection and disposal system*, and aligning people's attitude to fall in line with the arrangement so that the practice becomes regular and the system becomes functional.

Strategies Adopted

Incidentally, the Additional Collector, DRDA Kancheepuram called for a meeting of an array of stakeholders, including Panchayat functionaries and NGOs, to discuss solid waste management in villages. This supportive signal from the State government gave the impetus for Hand-in-Hand to confidently lend a helping hand to Mudichur Panchayat to develop a solid waste management system. Thus, Mudichur Panchayat took Hand-in-Hand and the DRDA into partnership to create a solid waste management system. This partnership model is presented in Figure 1.

Figure 1: The Mudichur Model
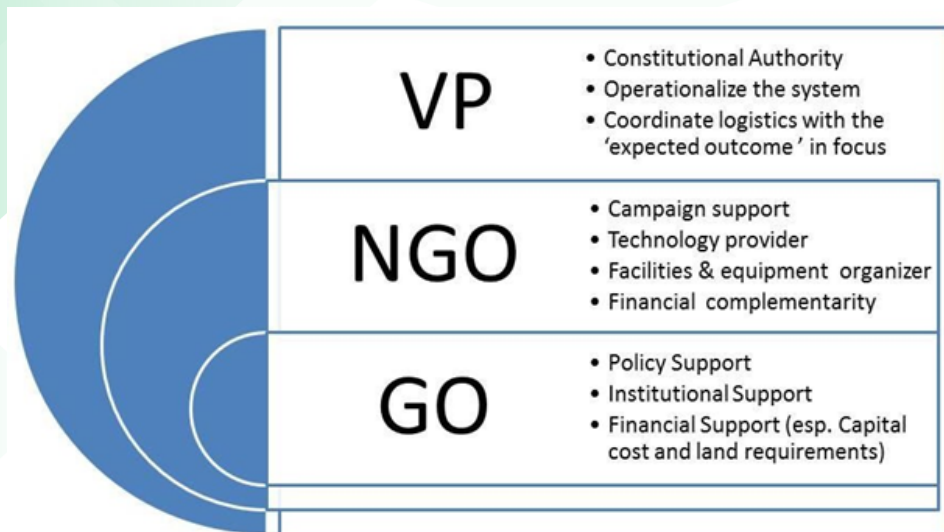
Figure 2: The Institutional Partnership and Their Roles

What constitutes Mudichur model (what elements went into making this model) can be explained as follows.

- **POLICY:** There is a clear policy goal to establish a waste collection, transport, and treatment and disposal system within the Panchayat. The waste collected should be segregated into biodegradable and non-biodegradable wastes at the source. The biodegradable wastes go into making biocompost and vermicompost, while the other types of wastes are sold to recyclers or sent to landfill as the case may be. Thus, the policy was to keep the village clean, and considerably reduce the amount of waste that ends up in the landfill.

- **TECHNOLOGY:** Hand-in-Hand brought in the treatment technologies, other equipment and tools required for daily collection and treatment; the government machinery has given the required land to construct a treatment plant and the capital cost that was required to construct the vermin-compost bed, shed, etc.

- **INSTITUTIONS:** As shown in Figure 1, it was a tri-patriate partnership among the Village Panchayat, DRDA, Kancheepuram and Hand-in-Hand. These institutions have their clear-cut roles to play, as presented in Figure 2. The Panchayat has ensured community cooperation and support, and has approved in the Gram Sabha for the entire operation to get grounded, besides supporting Hand-in-Hand to make the model functional by implementing the arrangement on a day-to-day basis. Hand-in-Hand has recruited and trained a team of youth,

locally known as Green Friends (GF), who do the entire operation - starting from collection at the doorsteps of households to secondary segregation to composting to sending the non-biodegradable to the landfill.

- **FUNDS:** The funds for operation are brought in through user fees – initially fixed at Rs.20 per month per household (pmph), later revised to Rs.30 pmph and currently it stands at Rs.50 pmph. The Green Friends are paid a monthly salary of Rs.4500 – Rs.6000. This is paid partly from the user fees collected and partly from the funds made available by Hand-in-Hand. As an incentive, the GFs are allowed to take away and sell recyclable wastes such as bottles, plastics, iron pieces, etc. The maintenance of equipment and tools such as tricycles used for collection, and tools such as broomsticks are met out of the sale proceeds of vermicompost.
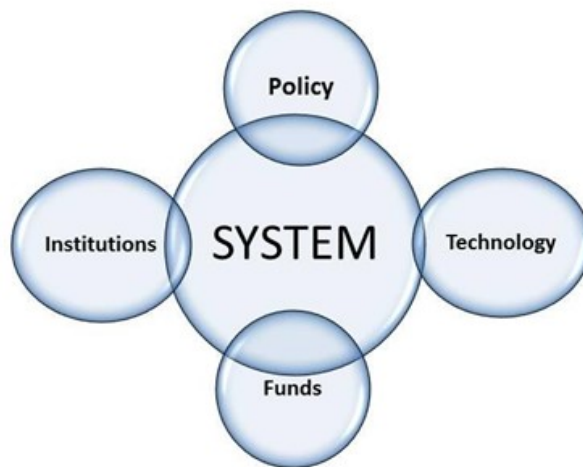
Figure 3: What Constitutes Mudhichur Model?

As a connective summary, what constitutes Mudiuchur Model can be presented as given in Figure 3. There are aspects like technical management, financial management and institutional management of the system. Putting them together and making it functional is done with the efforts of the Panchayat and active support by this NGO, Hand-in-Hand. That they have been able to sustain it for more than five years from the year 2010 makes it out of the ordinary, and appealing to study it for replication. Before, we take a look at the financial sustainability arrangement it will be in order, if we come to know the steps involved in implementation.

Steps Involved in the Process of Implementation

1) **Awareness Campaigns:** Preparing the households (i.e., the community) to understand, appreciate and agree to go with the arrangement was thought the first and foremost thing to be done. A series of awareness campaigns were organised in all the streets of the Panchayat to fix this arrangement in the mind of the local community. It included stakeholder meeting, mass awareness campaigns, door-to-door campaigns, auto-rickshaw campaigns, tricycle campaigns, special campaigns for SHGs, youth, school teachers and school children, campaigns at temple entrance; litter picking campaigns, mass cleaning campaigns and so on.

2) **Appoint and Train Green Friends:** Recruitment and training of Green Friends on various aspects of waste collection, segregation, treatment, etc., were done. They have also been trained on sanitation as part of preventive healthcare in a community. Their job as Green Friends was described to them during the training. Each Green Friend is provided with two sets of uniforms, one cap, footwear, ID card, a whistle, a pair of gloves, rain coat, and soap. They also undergo periodical health checks to guard themselves against any possible personal infections.

3) **Get Started in a Small way:** It was started only in four of the 12 wards to start with, for two reasons. One was to learn from experience and gain confidence from practice in order to be able to expand it further to the entire Panchayat; and the other reason was the facilities the Panchayat and Hand-in-Hand could mobilise at that point of time were considered inadequate to cover all 200 and odd streets in the Panchayat.

4) **Segregation at Household Level:** Each household has been provided with two garbage bins – green one for kitchen wastes, and red one for other types of wastes. About 70–75per cent of the households are reported to be giving waste segregated at household level. Yet, for the remaining people, the GFs do the segregation themselves.

5) **Secondary Segregation:** Whatever awareness and education community members are given, there are households that mix-up wastes. Necessarily, the GFs have to do a secondary segregation for which the Panchayat has allotted a small piece of land. In order to reduce the time spent on secondary segregation,

the GFs, while receiving waste from households, segregate waste at their doorsteps, which also helps in gradually educating the people on waste segregation. The GFs have been trained in thorough combing of wastes for bottles, plastics, papers, cardboards, iron pieces, batteries degradable waste, etc., during secondary segregation. This stage helps a clear-cut segregation to take place so that what should go to land fill does not get into vermin-compost beds, which might upset the process.

6) **Waste Processing:** Bio-composting and vermin-composting are the two processing activities done. The rest of the unusable garbage ends up in the landfill, after shifting for recyclables. Discussing the biochemical technicalities involved in composting is beyond the scope of this study. However, the physical facilities needed for setting up a 'waste processing shed' is presented in Box 2.

7) **User Fees Collection:** The households who wish to pay user charges at the Panchayat Office can pay. The GFs have also been authorised to collect user fees at doorsteps, issue a receipt, and remit the amount collected at the Panchayat the same day.

8) **Expand the Facilities and Coverage:** The Panchayat functionaries, with the support of Hand-in-Hand, started implementing this model in 2007 in a small way in four wards. People in other uncovered streets started urging the Panchayat President to expand coverage to their streets as well, volunteering to pay the monthly user fees regularly. In 2010-11, facilities were expanded with a new shed constructed in a place provided by the government, and the whole operation was expanded to cover all the 12 wards of the Panchayat. Since, then Mudichur keeps getting visitors (development tourists) to learn from this model.

9) **Review Meeting for GFs:** There is monthly review meeting conducted for the GFs to air their views for making the system function better, and also to express the difficulties they faced, if any. The Panchayat and Hand-in-Hand together address the issues raised by GFs so that the system sustains, and goes on.

10) **Feedback from Households:** The GFs carry a register for the households to putdown community views on the system as well as to provide for lodging complaints, if any. This register is reviewed during monthly review meeting of GFs.

Box 2: The Physical Facilities Required for Compost Park

- Land to construct the segregation shed plus composting yard or the vermi-beds
- Setting-up a compost shed/segregation yard
  ◊ Containers for households–2 per household
  ◊ Tri-cycles for every 300 households–1
  ◊ Green Friends for every 300 households–2
- Uniforms, tools and equipment (broomsticks, bins, tin, sheets, etc.)

The institutional arrangement looks well-built to sustain the system, given the strong Panchayat in place with a gifted leader. Yet, there are other questions that remain to be answered, for instance:

i) How about the financial sustainability of the system?

ii) Given the situation now, does it financially breakeven with the user fees collected and from the sale proceeds of the vermin-compost?

These are some of the questions that linger in the mind of an enthusiast who tries to recommend this model for replication.

Does the Income Breakeven? To our question 'on the adequacy of income generated through user fees plus sale proceeds of vermi-compost to be able to meet the expenditure incurred on the operational expenses', the reply from the Panchayat President, Mudichur was an unequivocal: 'No; Not sufficient at all.' As such, the Panchayat is not able to breakeven, given the income sources and the items of expenditure, they have to meet out.

Box–3: Income and Expenditure for a Solid Waste Management Project	
(It is worked out assuming that this project is for 300 households)	
Items of Expenditure	**Possible Income Sources**
A. *One-time Expenditure (Capital Cost)*	1.User fees
1.Containers(600numbers)	2.Sale of compost items
2.Tricycles-3	3.Sales of recyclables
3.Compost pit, segregation shed	4.Fine and penalties
4.Uniforms + accessories	
5.Tools & equipment	
B. *Recurring Expenditure (Operational)*	
1.Supervisor Salary	
2.Sanitary Workers Salary (Green Friends)	
3.Consumables/bleaching powder	
4.Repair and maintenance	

In the case of Mudichur, the funds required for the construction and purchase of tricycle, equipment and tools are provided as 'capital cost' through a project from the State government, and partly met out by Hand-in-Hand. The Panchayat President puts it categorically that it is impossible to meet the operational expenses, i.e., the expenditure to meet the day-to-day running of the system, out of the income earned locally. Besides, there are other expenses like awareness creation campaigns, uniform and salaries to the Green Friends, tricycle maintenance, etc. All these cannot be met out of the local income generated as user fees, and from the sale of compost. He holds a view that the expression of 'wealth from waste', especially in rural context, is only a made-up humbug. Those who implement realises that they are only motivational phrases used in training programmes with little truth in it. If one calculated the items of expenditure and sources of income to meet the expenses, it can be understood why many solid waste management projects fail.

If a sustainable source of fund for meeting out the operational expenses month after month can be figured out, one can be confident of being successful in running a solid waste management project. Finding funds for meeting out the capital cost requirement (i.e., non-recurrent one-time investment) must be possible either through a government programme, or as one-time grant from an NGO or INGO. But, daily operation and sustainability depend on being able to meet the operational expenses daily. This is a matter for serious consideration.

Sustainability Plan: From the foregoing statements of the Panchayat President, Mudichur, one tends to ask: then how are they are being successful? In fact, this is a pertinent question. The success of Mudichur must be put across in two stages.

- Stage - 1: Hand-in-Hand (NGO) has been bearing the operational expenses of the solid waste management system in Mudichur bearing a monthly expenditure of nearly Rs.40,000 through a special project. Sustainability of this arrangement was a matter of concern for quite a few months, until they found a way out.

- Stage - 2: It was decided that the system must be made self-sustaining, and some strategy must be devised towards that. They noticed that community members depend on private water suppliers for drinking water. In 2011, it was decided that Hand-in-Hand shall financially support Mudichur Panchayat to install a Reverse Osmosis Plant (RO Plant with a capacity of 4000 litres per hour) for drinking water supply under Hand-in-Hand Inclusive Development Services (HHIDS). The understanding was HHIDS will work with Mudichur Panchayat to:

◊ Provide the residents of Mudichur Panchayat with potable water conforming to WHO and BIS standards.

◊ Provide packaged drinking water to local shops and marriage halls at half the existing market prices.

◊ Support the Solid Waste Management Project at Mudichur with the revenues earned out of the Project.

◊ Operate and run the plant for a period of four years to recover the investment made over the plant before handing over the plant and its operation to the Panchayat.

Hand-in-Hand is running the plant successfully now through their network of local SHG women. Rs.3.3 million invested in the RO Plant (including construction of an open well of 30 feet depth and 30 feet diameter) is treated as SHG loan. The RO Plant, the open well and vermicompost shed are all in two acres of land given to the Panchayat by the government. The HHIDS sells a 20 litre water can at Rs.11 to SHGs. The SHGs are allowed to sell it for an MRP of Rs.15 to households in Mudichur. On an average 800 cans are sold daily. This arrangement has made local SHG women also to earn an income out of this operation. This can be considered as a social enterprise.

As of March 2015, HHIDS has one-and-a-half years left to recover the investment they made on the plant. After one-and-a-half years, HHIDS shall hand over the plant to the Village Panchayat. The plant is functioning successfully, and the income from water sale is used to make up for the loss incurred in solid waste management plant. This is the financial sustainability strategy that Mudichur Panchayat has devised and is implementing successfully.

Lessons from Mudichur for Replicability in Other Parts of the Country

For solid waste management, there is no dearth of technologies. The requirement is a functional management system (model), and they have developed one in Mudichur. They are implementing it meticulously and it has become a regular one, making us call it 'a system'. The Panchayat President, Mudichur, with the help of a team of youth (and appointed Green Friends), is managing household waste admirably. Certainly, the role of Hand-in-Hand (NGO) in making this system functional and it deserves to be appreciated as well. The challenges presented here, along with the factors that have contributed to the success of Mudichur Model, could

be taken as a lesson for those who wish to replicate Mudichur model. Mudichur model has several ideas and precautions for any Panchayat that wants to replicate. In replication, the following points deserve to be emphatic.

- **Systemic Thinking:** Measures taken in advance to avert possible failures and secure good results are an imperative in a solid waste management project. The normal way of thinking about solid waste management are (Failure Model - 1) placing dustbins at certain distance and forgetting about it - it overflows and takes a run-off extending the area under garbage, (Failure Model - 2) and collection, transportation and disposal of waste –dispose irresponsibly at the outskirts. On the contrary, in Mudichur, they have created a system taking into account the logistic, technological and financial aspects, and have roped in the support of external support agencies wherever required. This systemic thinking makes the difference, and this has made Mudichur Panchayat President stand tall amidst the crowd.

- **System Sustainability:** The experience of Mudichur puts it fairly clearly that finding the sources of income for meeting out the 'operational expenses' (day-to-day running expenses) month after month, determines the real system's sustainability. Without a clear-cut idea of sources of income to meet the operational expenses, investing in non-recurrent expenses such as dustbins and tricycles do not augur well. Such a case shall help write only a failure story very soon. This is a caution one should make note of.

- **Social Enterprise Model:** In order to meet out the expenditure involved in managing the solid waste management system, the source of income from user fees collected plus sale of compost, etc., were found to be insufficient. This did not deter them. They have thought out of the box to come up with sensible solution, instead of being on the same sludge grumbling about the impossibility. The excess income earned out of RO Plant through sale of drinking water is used to make up the loss incurred in running the solid waste management system for the same community. It is win-win in terms of both drinking water supply and environmental sanitation in a given community.

Conclusion

For solid waste management, there is no dearth of technologies. Mudichur has developed a functional management system (model), and they are implementing it meticulously that it has become regular, making us call it 'a system'. The Panchayat

President, Mudichur with the help of a team of youth (and appointed Green Friends) is managing household waste admirably. Certainly, the role of Hand-in-Hand (NGO) in making this system functional deserves to be acknowledged.

Measures to be taken in advance to avert possible failures and to secure good results are an imperative in a solid waste management project. One surmise from Mudichur's success is - technology failure is perhaps not the reason for non-sucess of many of the solid waste management projects. Rather, it is due to 'poorly planned management system' which include logistics planning, manpower planning, operational planning, and financial planning and so on. Inappropriately, we have been barking at a wrong tree, meaning someone comes with avermin-composting solution, another person comes with a biogas plant from waste, and so on. In the absence of a local management system, solid waste management is solidly a waste of time only. Mudichur model has several ideas and precautions for any Panchayat that wants to replicate. It may not be suitable in all socio-cultural and economic contexts. Sure enough, the system is flawless. Mudichur Panchayat has a lot of instructions and guidance to build a functioning solid waste management system.

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VERMICOMPOSTING - SUSTAINABLE ENTREPRENEURSHIP

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Introduction

A vermicomposting unit was set up in the Rural Technology Park, NIRDPR in the year 2004 as a live production unit to demonstrate waste management as well as to support the requirement of farmers practising organic farming. The unit is also being used for training farmers and others who are interested in undertaking the process of vermicomposting. Biowaste available on the campus is used for composting. The required cow dung is purchased from a local dairy unit on a regular basis. The unit is run as a self-income generating unit that runs without any external funding to showcase that vermicomposting can be a profitable venture. Three to four workers are engaged in the operation of this unit and the entire cost required for the operations is generated from the sale of vermicompost produced in the unit. In a month, on average, close to 10-12 tonnes of vermicompost is produced from this unit.

Apart from this, the sale of products such as vermiwash and earthworms required for people are also provided through it.

Experiences of Vermicomposting

The experience of NIRDPR shows that vermicomposting can be an effective process adopted for managing waste and it can be an effective means for value addition to the cow dung and biowaste/crop residue generated in rural areas. Farmers and others engaged in dairy can use the cow dung collected to generate vermicompost, which is an enriched organic fertiliser. The process adopted also is quite simple and robust that helps in easy management of the units. It can be replicated either on large scale or it can be taken up by a group of farmers in the form of smaller units in their fields, which further can be bagged and marketed in scale after aggregation in the form of producer companies. Marketing the vermicompost was also easy as the quality of products produced at RTP has been found to be very high. At present, the vermicompost produced at RTP is sold at Rs.9 per kg. Farmers who are having

orchards are the major customers. In addition, people staying in around Hyderabad and pursuing kitchen garden also purchase vermicompost in large quantities.

Vermicomposting Model

The vermicomposting model adopted in RTP is based on the Gaddipally KVK located close to Hyderabad city. In this model, the vermicomposting beds are created on the natural ground and no masonry construction is used for its creation. In the unit, two sheds of 100 ft long and 30 ft wide are constructed using low-cost materials. The support for the roof is provided using concrete pipes as columns and bamboo under structure is provided to support the bamboo mats (chataee) covered with polythene sheets on top for the roofing. The sides of the sheds are protected with 3-feet -high welded mesh to prevent the entry of animals into the sheds. The advantage of this method is that the temperature of the sheds are kept low while the beds formed in the natural ground provides better living conditions for the earthworms and other micro-organisms to act upon the materials used for composting. The live beds created on the natural grounds also help in reducing the composting time. Earthworms species used are Eisenia fetida varieties as they can adapt to any environmental condition easily and can also process larger amounts of bio-waste to deliver higher yields of vermicompost.

Vermicomposting

Vermiculture is a scientific method of breeding and raising earthworms in controlled conditions. Vermicomposting is the process of making compost with the use of earthworms, which generally live in soil, eat biomass and excrete it in digested form. This compost is called vermicompost. It is one of the easiest methods to recycle agricultural wastes and to produce quality compost. The end product of vermicomposting is vermicompost. It contains N (2.5-3.0 per cent), P (1.8-2.9 per cent) & K (1.5- 2.0 per cent). The vermicompost beds should not be covered with plastic sheets. The beds also should not be overloaded as it will help in maintaining the temperatures lesser than 30 degrees centigrade. It is important to ensure that the beds are adequately sprinkled with water so that they have 50 per cent moisture; otherwise, earthworms will die due to heat, especially in summer. The organic materials used for composting should be free from materials such as stones, plastics

and others. Cow dung should be dried before placing them on the beds. Also, the biowaste/crop residue should be shredded to reduce their size and must be brought to partially composting stage by watering and storing before placing these in the bed for effective composting.

The unit at RTP has two 100 ft long x 30ft wide sheds situated in the east-west direction lengthwise to minimise sunlight exposure. The vermi bed sizes of 30 ft length and 4 ft width are marked on the ground. For carrying out the operations, a space of 2 -3 ft is provided around the vermi beds. In each shed, about eight vermi beds have been created, making the total of 16 vermi beds of 1920 sqft bed area in the unit functional at RTP, NIRDPR. A 6-inch layer of semi-dried organic/biowaste is placed at the bottom of the bed and dried cow dung is placed over it for about 1.5 ft height. After this, the bed is watered for four days, earthworms of around 2 kg quantity is released at every 4ft interval through holes made over the centre of the beds.

Water is sprinkled on alternative days on the vermi beds, according to the requirement and the seasons to maintain the moist condition. The appearance of black granular crumbly vermicompost on top of the vermi beds indicates the maturity of the compost. It takes around 35-45 days for completing a cycle of harvest. The mature vermicompost is light in weight and does not emit any foul smell. The pH of the mature vermicompost remains in the neutral range. Watering is stopped for at least five days before final harvest from the top layers. Harvesting of vermicompost is done by scrapping layer-wise from the top of the heap of the vermi beds. The harvested vermicompost has to be sieved. Sieving helps in the separation of the earthworms, cocoons and eggs from the compost. After sieving, the compost should be shade dried for a couple of hours, packed and stored in shade.

Economics of Production

S. No	Particulars	Cost (Rs.)
CAPITAL INVESTMENT	
SHED AND STOREROOM	
1	Building Vermicompost Unit Sheds with Local Materials (100x30ft size - 2 nos. of sheds, Total area 6000 sqft @ Rs.250 sqft) and Store Room with GI sheet roofing (10x15 ft size, Area 150 sqft @ Rs.600 per sqft) - subject to local rates	15,90,000
2	Levelling the earth and preparing vermi beds	20,000
3	Fencing and Gate for the 10000 sqft area required for the unit	50,000
	Sub Total (Rs.)	16,60,000
EQUIPMENT	
1	Sieving Machine (manual)	15,000
2	Weighing scale 100 kg capacity	2500
3	Weighing Machine Platform Type	6000
4	Bag Sealing Machine	4500
5	Wheel Barrows 2 nos.	15,000
6	Electrical Installations	7500
7	Furniture's and Fixtures	5000
8	Tools (spades, shovels, baskets, dung fork, buckets, etc.)	5000
	Sub Total (Rs.)	**60,500**
	Total Capital Cost (Rs.)	**17,20,500**

S. No.	Particulars	Amount (Rs.)
OPERATING COST	
1	Agriculture Wastes (L.S. Rs.5,000) and Cow dung (5 mini trucks @ Rs.2,500 per truck) per month	17,500
2	Salary wages for four employees @ Rs.9000 per month	36,000
3	Electrical charges for pump and other repairs per month	2500
4	Cost of bags and stationery per month	5000
5	Miscellaneous (bleaching powder, other consumables) per month	2500
	Total Operational Cost per Month (Rs.)	**63,500**
	Total Operational Cost per Year (Rs.)	**7,62,000**

S. No.	Particulars	Amount (Rs.)
BENEFITS	
1	Sale of vermicompost (10 Tonnes per month @ Rs.8 per kg)	80,000
2	Sale of 50 Kg worms cost 1kg @Rs 100 per month	5000
	Total Benefit per Month (Rs.)	**95,000**
	Total Benefit per Year (Rs.)	**11,40,000**

S. No.	Particulars	Amount (Rs.)
NET BENEFITS	
1	Total Operational Cost per Month	63,500
2	Total Benefit per Month	95,000
	Net Benefit Per Month (Rs.)	**31,500**
	Net Benefit Per Year (Rs.)	**3,78,000**

Notes:

i. On average, Rs. 3,78,000 per year will be the profit @ Rs.31,500 per month. The capital investment of Rs.17,20,500 can be recovered in nearly 4.5 years' time.

ii. On average, a production of 5.2 kg from per sqft of vermicompost bed is expected per month

iii. The production in the 1st year will be 50 per cent (i.e. 5-6 tonnes) and will reach 10-12 tonnes from the second year onwards.

Advantages

♦ Soil biological component is favourably influenced by the addition of vermicompost

♦ Makes the soil loose and porous, and hence it improves the water-holding capacity of soil and promotes the establishment of microorganisms. It also helps in preventing soil erosion.

♦ It contains earthworm cocoons and increases the population and activity of earthworms in the soils.

♦ Vermicompost also enhances the process of decomposition of organic matter in the soil.

♦ Percentage of NPK content is more in vermicompost. It is rich in all essential plant nutrients and provides excellent plants growth.

♦ Vermicompost does not have any adverse effect on soil, plant and environment. It improves soil aeration and texture, thereby reducing soil compaction.

♦ It also promotes better root growth and nutrient absorption and improves nutrient status of soil, both macro-nutrients and micro-nutrients.

♦ Earthworms also can be used as a protein source for poultry, fishery, pigs and pets.

Conclusion

♦ The vermicomposting unit has been functioning over the last 16 years at RTP, NIRDPR successfully.

- The process has been found simple and easy for management. Apart from value addition to biowaste/crop residues and cow dung, the venture can yield additional income to the people in rural areas.

- With the right training and financial support, the unit can be replicated by farmers, SHGs, waste management ventures and Panchayats.

- The FPOs who are now being asked to diversify their activities can be mandated to consider the promotion vermicomposting as their primary activity, given the potential it offers.

- Smaller units can be established by farmers or SHGs in their lands and a larger producer organisation can be formed to aggregate the produce for marketing as it will be difficult for a small farmer to find suitable markets, especially in remote villages.

- Calculations carried out for smaller plot size of 10 x 10 ft area by farmers having one or two cows show that a farmer can produce about 3200 kg of vermicompost in a year in eight cycles with a harvest of 400 kg per cycle. This activity can be carried out daily in just half an hour time and no major management is needed. Annually, this alone will provide an income of Rs.25,600 at the sale price of Rs.8 per kg of vermicompost.

- Vermicomposting activity can be leveraged using the provisions in major MoRD schemes such as NRLM, MGNREGA, PMEGP and Rurban. It can also be incorporated under the low-cost project being initiated at Panchayats using the GPDP.

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DECENTRALISED SERVICE DELIVERY: CASE STUDY OF NANDAGAD GRAM PANCHAYAT IN KARNATAKA

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Introduction

Panchayati Raj Institutions (PRIs), the units of local self-government, act as the most accessible form of governance for people living in rural areas. The landmark 73rd Constitutional Amendment Act, 1993 in India witnessed a democratic revival of local government institutions, which were once conceived as the edifice of governance structure by Mahatma Gandhi. The decentralisation process aims at not just transfer of the power and responsibilities from centralised authority to local institutions but to promote a governance system, where citizens at the bottom level will claim a greater stake in government by way of involving themselves in the local decision-making process. The constitutional amendment, in the Eleventh Schedule, has listed 29 subjects that may be devolved to the Panchayats. However, wide variations exist across States and UTs in the devolution of powers and functions to the Panchayats. As institutions of local government, Panchayats are responsible for the delivery of basic services to local citizens and address vulnerabilities of poor and marginalised sections. The Panchayats are intended to improve the delivery of basic services, including water supply, sanitation, sewerage and solid waste management, stormwater drainage, community assets maintenance, roads, footpaths, streetlights, burial, and cremation grounds and other basic functions assigned to them under their basic statutes. To provide effective delivery of basic services to all the citizens of rural India, the government has developed operational strategies in partnership with various stakeholders like civil society and local youth groups.

Decentralisation and Service Delivery:

The quintessence of decentralisation reforms is to improve service delivery at all levels of government. The important alignment of the 73rd Constitutional Amendment Act is to entrust 29 subjects as part of the decentralisation of functions to the local bodies, i.e., PRIs. Gram Panchayat (GP) being the lowest body in the three-tier

structure, is considered as one of the powerful institutions to deliver basic services. Efforts to improve the delivery of health, education, drinking water, and local infrastructure through elected local governments have often been ineffective, although Panchayat has a socio-political and geographical affinity with the residents. Conversely, it is argued that despite the effective institutional mechanisms, service delivery is poor at all levels and the problem is more acute at the grassroots level because of fiscal and administrative capacity.

One of the important ingredients for democratic decentralisation is the stakeholder's participation in the development process. However, most often, the empirical literature found the missing of stakeholders' participation in the decision-making process, which affects their development. This largely leads to the failure of effective service delivery in rural areas. Therefore, it is imperative to make decentralisation process and the participation of stakeholders an integral part of the effective service delivery.

Waste Management in the Panchayats

Waste collection and disposal is a gigantic task in every village. It ensures the cleanliness of the village and helps in curbing the spread of epidemics. Waste management and sanitation are essential to all villages for controlling diseases and providing safe surroundings. There is a massive surge in daily waste due to the increased use of plastic and other non-degradable materials. Waste is considered useless and thrown away. However, proper treatment of waste would make them a resource for various purposes. Single-use plastic is defined as any plastic item that has to be disposed of after being used once and cannot be recycled. This kind of plastic is often misunderstood as just polythene carry bags. Sachets for packing products like tobacco and packaging snacks, like chips and fries, chocolates, beverages, etc., are equally hazardous. The Plastic Waste Management, 2016 rules prohibit the use for storing and selling gutkha/tobacco and paan masala, but it is hardly enforced. India with 1.3 billion people living in the fastest growing economy of the world, aims to drastically reduce the usage of plastic. It also has taken a most ambitious pledge to combat plastic pollution that is taking place in 60 nations around the world. According to the Ministry of Environment, about 70 per cent of the plastic the country consumes is simply discarded and there is no processing of waste in most

of the Indian cities. According to Plastic Waste Management (Amendment) Rules, 2018 notified by the Ministry of Environment, Forest and Climate Change, every Gram Panchayat (GP) either on its own or by engaging an external agency shall set up, operationalise and coordinate to address issues relating to waste management under their control and to perform associated functions. The GP should carry out the following for effective waste management:

a.   Ensure segregation, collection, storage, transportation of plastic waste and channelisation of the recyclable plastic waste fraction to recyclers having valid registration;

b.   Ensure that no damage is caused to the environment during this process;

c.   Create awareness among all stakeholders about their responsibilities;

d.   Ensure that open burning of plastic waste does not take place by blocking drains, or being eaten by cattle;

e.   Further, the Gram Panchayats can incorporate the plan and management of single-use plastics in their Gram Panchayat Development Plans.

Context and Background

Gram Panchayats (GP) as the local government plays a crucial role in the development of rural India. It is often noted that efficient planning and governance in the rural Panchayats is the key measure of progress. Gram Panchayats bear a great responsibility and opportunity to bring about the change that any government envisions. Under the Gram Panchayat Development Plan (GPDP), the Gram Panchayats are being tasked to prepare plans for economic development and social justice. The GPDP planning process must be comprehensive and based on a participatory process that involves full convergence with schemes of all Central Ministries/Line Departments related to 29 subjects listed in the Eleventh Schedule of the Constitution. Gram Panchayat must conduct a Special Gram Sabha to list out the developmental needs of the Gram Panchayat with the presence of all frontline officials of the departments and the participation of villagers. In this context, the present case study documents the successful initiatives of development carried through effective

implementation of the GPDP. Various activities implemented by the Gram Panchayat and the transformation obtained because of the effective use of its resources and opportunities lay the context of the case study. The GP with its effective outcome of better service delivery can be taken as a model for further replication. The broad objective of the study is to document the process of developmental initiatives taken up by the GP through convergence with various programmes and schemes for better service delivery in the Panchayat. Further, the case study focuses on Solid and Liquid Resource Management (SLRM) which is the flagship initiative of the GP. The study tries to explore the process of how, through the ideology of 'waste to wealth', resources and mechanism are being utilised to optimise the revenue of the village by converting the household garbage and other waste materials into compost fertiliser. For the study, Nandagad GP of Khanapur taluk in Belagavi district of Karnataka was chosen for documenting a detailed case study. Nandagad has got wide recognition in the country for its effective local governance and developmental activities carried out by the GP. The GP stands in 2nd place in the State and 5th in the country in the Mission Antyodaya survey.

Profile of the Gram Panchayat (GP)

Nandagad village is situated in Belagavi district of Karnataka and comes under Khanapur taluk. Nandagad is one of the villages in Karnataka that has got historical importance. Krantiveer Sangoli Rayanna who was the army chief of the Kingdom of Kittur ruled by Rani Chennamma, was from Nandagad village. He was hanged by the British and buried in Nandagad. Rayanna's mortal remains were buried at Nandagad. Legends say that a close associate of Rayanna planted a Banyan sapling on his grave which is now revered as Punya Bhumi. The miraculous holy cross is also another important place in Nandagad village. In the middle of the 19th century, during the winter season, the village was getting infected by the deadly Bubonic plague. In order to survive the deadly disease, the Christians made a vow to implant the cross on the hillock so that they could be saved from the scourge of Bubonic plague. The holy cross erected on the hills of Nandagad is a monument that was built as an offering to Christ and is still continued to be a tourist and pilgrimage attraction. Kannada and Marathi are the two prominent languages spoken in the village. The GP ensures that all the public announcements and notices displayed, including the street names and other boards across the villages, are in both languages.

The GP has a total population of 9297, including 4715 males and 4582 females. The social composition of the GP has Scheduled Castes (628), Scheduled Tribes (635), OBC (3255) and General caste (4779). There are 1864 households in the GP. The GP has 23 elected representatives out of which 11 were male and 12 were female. The Gram Panchayat (GP) president seat is reserved to the Scheduled Castes and the present elected President is a woman. There were 11 anganwadi centres, 110 self-help groups (SHGs) available in the GP. Various village level committees are functioning in Gram Panchayat to plan and address the developmental programmes and other issues. The Committees that are presently working are Water and Sanitation committee (16 male and 12 female members), Biodiversity committee (4 males, 5 females), Social Audit committee (11 males and 12 females), Watershed and irrigation committee (5 male and 15 female members), Village Infrastructure committee (2 males and 3 females), and Vigilance committee under MGNREGA (8 males and 5 females).

The GP building comprises a state-of-the-art conference hall with cutting edge communication technology to hold regular meetings. The proceedings of the meetings are being telecasted for the public through a large television screen fixed outside. The GP has set up CCTV cameras at strategic locations. Each of the Panchayat staff has been given a walkie-talkie for efficient communication among themselves.

Development Initiatives taken up by the Gram Panchayat: The GP has received Gandhi Gram Puraskar by the Karnataka State government. The Gram Panchayat has initiated many programmes and developmental activities in convergence with the schemes initiated by Central and State governments that have increased the infrastructural and overall progress of the villages. Under the Gram Panchayat Development Plan process, the GP managed to construct many infrastructural facilities such as garden, LED streetlights, digital library, proper roads, water pipelines, GP building, Rajiv Gandhi Seva Kendra, etc. Other schemes such as Anand Jal (door-to-door water supply), Swanthana (help for the cremation of the deceased from the village), Mukti (wood for cremation to all households whenever there is a death in the Panchayat) are also implemented in the Panchayat.

Anand Jal – water supply to households in the GP: There are 24 bore wells, six overhead tanks and 50 public standposts with water tanks in the GP. There are two kinds of water supply in the GP through which households are getting drinking water facility. First, water supply to 847 households via pipe is being provided for the last 10

years. Further, under the Anand Jal scheme, the GP provide RO water through four RO plants built in convergence with the drinking water department. The GP purchased a battery-operated electric vehicle to provide safe drinking water at the doorsteps of each household. The electric vehicle costing Rs. 1.53 lakh was bought using the GP fund. The GP also has a water ATM which provides 10 litres of filtered water for Rs.1. In the past year, 822 household piped water connections have been sanctioned under the Jal Jeevan Mission.

Digital Library: In the year 2018, the GP established a digital library with a cost of Rs. 3 lakh and purchased five computers and scanners for digitising the documents. The digital library provides free internet browsing for school children. Digital copies of more than 3,500 books, school textbooks and several books for competitive exams are available in this library for citizens to access. School children have been provided basic computer training at the digital library.

Swanthana scheme of GP: The GP under the scheme provides an assistance of Rs. 2500 to the family members as a help for the cremation of the deceased. As of now, 274 beneficiaries, irrespective of caste, class and religion, have been benefited under the scheme. The GP has generated own source revenue to provide assistance under the Swanthana scheme to the beneficiaries in the villages.

Streetlight provisions in the GP: The GP has provided streetlights with 534 LED lamp posts. Besides, there are seven high mast lighting poles on the crossroads and chowk with six LEDs bulbs per post.

Garden and Children's Park: The Panchayat has built a garden at the cost of Rs. 8 lakh in convergence with MGNREGS (Rs. 5 lakh), Central Finance Grant (Rs. 2 lakh) and own-source revenue of Rs. 1 lakh. Built in an area of 6000 square metres, the garden also has a children's play area, swimming pool, green gym and walking tracks for senior citizens.

Solid and Liquid Resource Management in the Panchayat: Though all the initiatives are working effectively, the one that stands out among all these is the solid and liquid resource management (SLRM) in the Panchayat. The GP considers garbage not as waste but as a resource of the village. SLRM is to convert the household garbage and street waste in the Panchayat into fertilisers and saleable trash. In July 2018, the Gram Panchayat under the Gram Panchayat Development Plan initiated a solid and liquid resource management project costing around Rs.65 lakh in the GP.

The resource envelope for the developmental work was created by converging funds from the State, Central fund, and own-source revenue of the GP. The State government had funded Rs. 30 lakh and the GP allocated Rs. 15 lakh from its own resource revenue whereas Rs. 20 lakh have been allocated under Swachh Bharat Mission (SBM) scheme. The GP rigorously worked to ensure efficient use of the resources. The SLRM Project was divided into the following three stages based on the major steps involved: a) Training b) Transportation and c) Treatment.

IEC materials for awareness regarding SLRM

Source: Fieldwork

SLRM Training: The training on SLRM was the core to the success of the project. It happened in four steps. For the purpose of training, a projector was installed in the GP. With the help of this, different functionaries from the Panchayat were given training on the SLRM. The main reason behind this training was to facilitate the villagers and educate them regarding waste management in the village. Different Panchayat functionaries were used for dissemination of information regarding waste collection, treatment, and transportation of waste to treatment plants. The frontline workers of all line departments, and government employees working in the village such as teachers, sanitary staff were trained on the waste management project in the village. In the second stage, ASHA and anganwadi workers were given training. After them, all the self-help group (SHGs) members and elected members of GP were given training. Almost 100 SHGs are working in the village. Around 2000 brochures

containing the information regarding waste management were distributed among the villagers as part of the IEC. This process provided the villagers with the technical know-how aspect of resource management before the execution of the plant.

Training of Elected Representatives on SLRM

Source: Field Work

Transportation: In total, 3500 buckets/waste bins, both in red and green colour, were distributed to all households. Red colour waste bins were for collecting the dry waste and green for the wet waste. Detailed information was given in the form of repeated announcements regarding the issuance of waste bins and sensitise people regarding the treatment of garbage. There are 63 streets in the village. For the process of collecting household waste, the Gram Panchayat procured a waste collection vehicle. It goes to the households and collects the waste every three days. This vehicle brings the collected waste to a waste management site established in the village where its segregation based on their recyclability happens. Bio bin shed is constructed at an allocated site under the Swachh Sankeerna scheme for the treatment of waste.

The waste collection vehicle

Source: Fieldwork

Treatment: The GP allocated 32 gunthas of land for establishing the plant. In the waste management site, a building was constructed to separate the dry waste for converting it to reusable items. Around 34 items are being separated based on their recycling capacity. Dry waste that can be recycled is sold to vendors after weighing them. Gram Panchayat receives around Rs. 5,000 to 10,000 per month by the sale of dry waste. Treatment of wet garbage also happens in the waste treatment site where they have built compost pits of 5 feet long, 10 feet deep with 4 feet wide. Gram Panchayat has built 10 compost pits near the waste treatment plant in convergence with the MGNREGA works. The wet waste is stored in the compost pit for almost three months. The waste would turn into compost after that period. The compost generated is given to villagers to encourage the use of organic fertilisers in their farms. The SLRM unit has provided employment to 13 people in the village, out of which six are working in the separation plant and seven are working in the collection process. The GP pays Rs. 6,000 per month as salary to the workers and Rs. 9,000 to the supervisor. The GP has plans to increase the generation of the compost to sell and generate more revenue in the coming years.

A day's work in progress at the Solid and Liquid Resource Management Unit
Source: Fieldwork

Outcome of the SLRM Unit: With the successful implementation of SLRM, Nandagad village has managed to transform its waste into wealth for the village. With the clean surroundings of the village and zero waste on the roads, the GP successfully continues the clean and green approach for bettering the life. Sincere and active participation of villagers made the SLRM an unprecedented event in the village. SLRM project not only created a clean environment in the village but also generated employment for the villagers. For the better operation and maintenance of the unit, the GP charges Rs. 30

per month per household, Rs. 50 per month from commercial business centres, and Rs.20 per month from small vendors and daily hawkers on the street. This is to make the villagers stakeholders in the project and ensure their responsible participation in the SLRM of the Panchayat. The compost made from the SLRM unit is being distributed to villagers in the Panchayat. The GP has plans to increase the production of compost and make it available for sale to other Panchayats.

Solid and Liquid Resource Management Unit

Source: Fieldwork

Conclusion

Nandagad GP in Belgavi district of Karnataka portrays a successful model which can be replicated elsewhere. The different successful initiatives, including the Solid and Liquid Resource Management unit in Nandagad, depict the process of convergence, community participation, and holistic development. The GP, by initiating the process of SLRM, created a culture of waste management among the villagers which would lead to sustainable development. This can be considered an important milestone for any such developmental work in the Panchayats. The capacity building and training activities for PRI members using the mass media interventions to make villagers understand the importance of sustainable use of the resources, mobilising the community to participate for the holistic development, envisioning and effective decentralised service delivery and planning have created a successful ambience for the Nandagad Gram Panchayat. The Panchayat is progressively moving towards achieving different Sustainable Development Goals.

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GENERATION OF SUSTAINABLE VILLAGE RESOURCE DEVELOPMENT PLAN USING PARTICIPATORY GIS APPROACH: A CASE STUDY OF TAJU VILLAGE, MAHARASHTRA

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Introduction

Gram Swaraj (Village Self Government) is the concept proposed by Gandhiji for the integrated development of society, which would be possible only with decentralisation in all spheres of activities. The planning process has undergone a drastic change in recent years where decentralised participatory decision-making is resorted to ensure sustainability. However, for this participatory decision-making, accessibility to a comprehensive database, which can make it easy to access and understand the land records, topography, resources, settlement patterns, new infrastructure, and technology, is needed. This is an area where spatial technologies play a key role in generating timely and reliable information for planning and decision-making.

Objectives

The specific objectives of the project are envisioned as follows:

a) To identify the present infrastructure and socio-economic conditions in the village and analyse the scenario.

b) To identify, analyse and prioritise felt needs of the village by social science research and through participatory GIS.

c) To generate action plans for improving the basic amenities and services, Social, Economic and Environmental Development.

Methodology

Primary data was collected using questionnaire, GPS and drone survey. For this project, field survey was the primary source of data collection. Census data, Mission

Antyodaya data, SECC data, satellite data, data from departmental websites, cadastral map and toposheet are the secondary sources. Data processing and analysis were done using GIS software. The information presentation is done via maps and tables.

Study Area

Taju village is located in Karjat Tehsil of Ahmadnagar district in Maharashtra, India. The latitude and longitude of Taju are 18.498781 and 74.78637, respectively. It is situated 40 km away from sub-district headquarter Karjat and 115 km away from district headquarter Ahmadnagar. Talwadi group is the Gram Panchayat of Taju village. The total geographical area of the village is 1278.62 hectares, and 2.91 square kilometres (23 per cent) of the total village area is covered by forest. Taju has a total population of 1,531 and has about 290 houses.

Land Use Land Cover Map of Taju Village
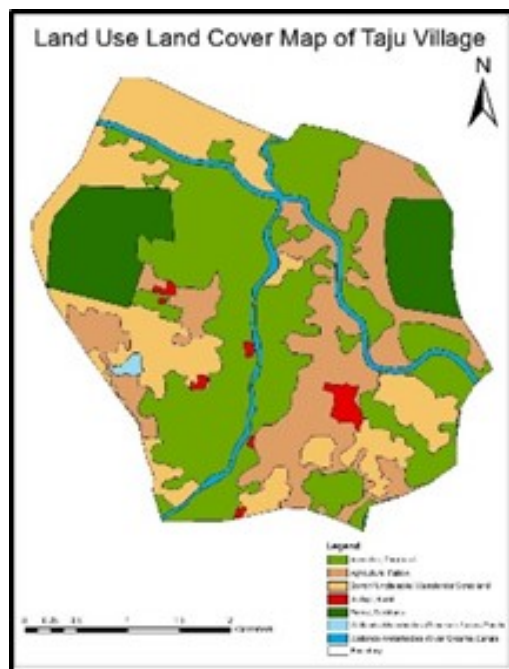
Findings

Agriculture is the main occupation of the village. Statistics show that around 90 per cent of the villagers are engaged is agriculture. Only 10 per cent of the households are engaged exclusively in non-farm activities.

The main crops raised in village are hulaga, millet, and sorghum during kharif and rabi seasons. Most of the croplands are along the banks of the water bodies and they use bore wells and normal wells for irrigation in the other parts of the village.

Map of Crops Grown in Taju Village

The village has a lot of barren and fallow lands.

The village does not have any government seed centre or market. In Taju, warehouse for foodgrains storage is not available within 10-km radius. At the village level, there are no primary processing facilities and the villagers do not have access to Custom Hiring Centres (agri-equipment).

No soil testing centres or fertiliser shops are available within 10-km radius of the village. For soil information, the village depends on the Agriculture Department through soil health cards. Soil health cards containing the status of soil with respect to 12 parameters, namely N, P, K (macronutrients), S (Secondary-nutrient), Zn, Fe, Cu, Mn, Bo (micronutrients), and pH, EC, OC (physical parameters), are provided to all farmers of this village. The soil parameters data from soil health cards has been collected and analysed for the study. Further analysis was done using Spatial Analyst Tools in the ArcMap. Kriging, an Interpolation Method, was used for the mapping.

Irrigation Availability in Taju Village

Water Resource Development Plan in Taju Village

Choropleth Map of Soil Macro Nutrients of Taju Village (Potassium) — Choropleth Map of Soil Macro Nutrients of Taju Village (Phosphorus) — Choropleth Map of Soil Secondary Nutrient of Taju Village (Sulphur)
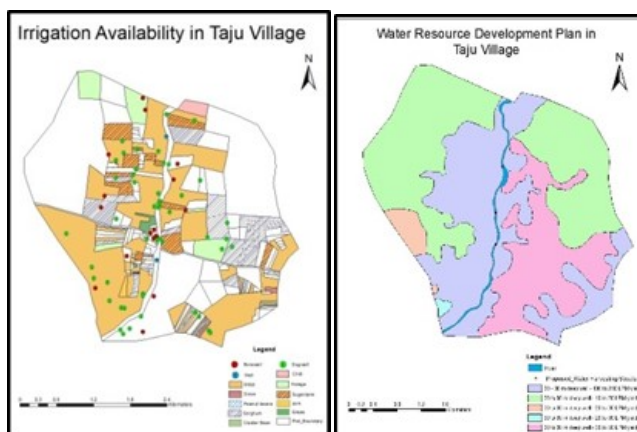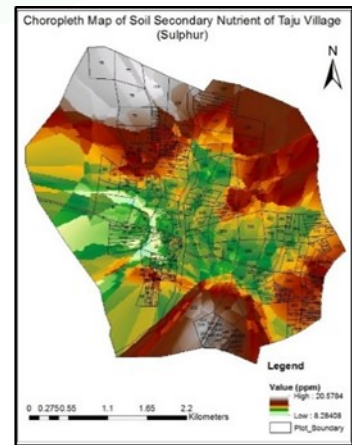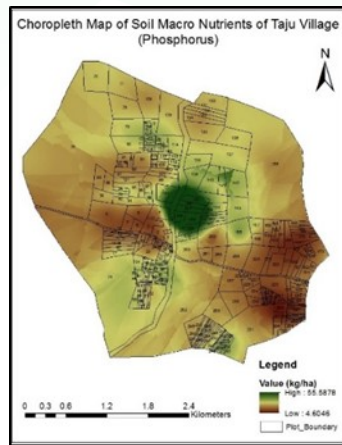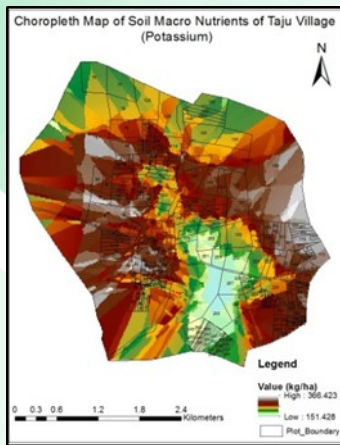
Field surveys show that there is no public transport facility available in the village due to the lack of roads. Even the village roads are not connected to other roads, which adds to the worries of villagers and it comes under the critical gap. Only one road is Black Topped (BT), whereas the remaining ones are earthen roads. The total length of the road is nearly one km. The below figures shows the existing and proposed road network in this village.

Road Network Map of Taju Village — Proposed Road Connectivity Plan of Taju Village
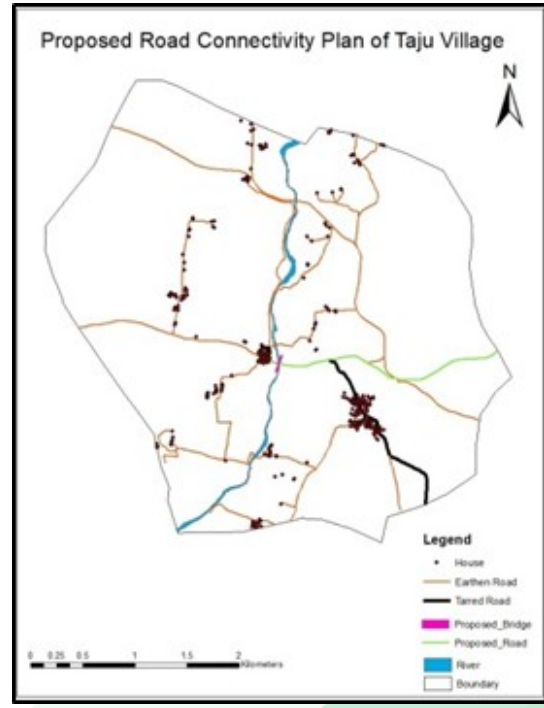
According to the survey, Taju has two primary schools for children up to 5 years. The village had 177 children in this age group. Further, there were 298 children in the age group of 6 to 15 years. However, there was no upper primary school or higher secondary school in the village. For high school education, the students have to travel to Baradgaon Sudrik.

As per the surveys, the village does not have any waste disposal system, drainage facilities, PHC/CHC sub-centre, veterinary hospital. The villagers practised open defecation.

The village has no facility for community biogas or recycling of waste. In Taju, health and sanitation domains were in a critical condition. The figure shows the location of healthcare facility available in nearby areas which highlights the need for a primary health sub-centre in Taju. While considering the transportation facility, population and the nearby villages, map pointing area is suitable for PHSC.
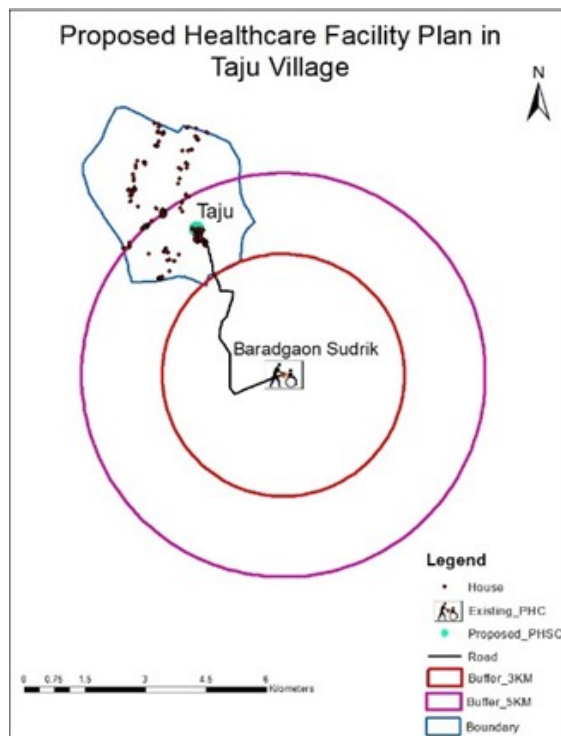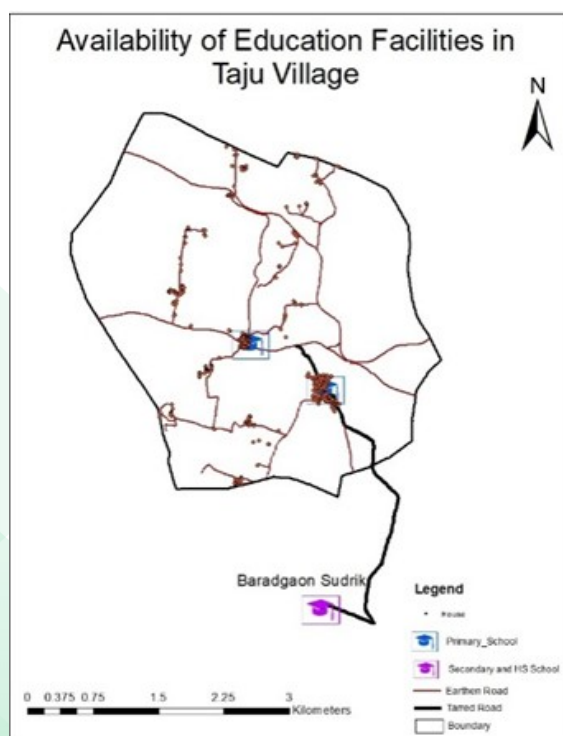
Conclusion:

It is important to bring more accountability and transparency in the process of preparing Village Development Plan, which can be achieved by linking it with the Geographic information system (GIS). There is a need to have objectivity in the planning process by acquiring relevant data and performing planning at the GP level with the use of geographic data for sustainable development. It enables the user to take better decisions based on geographical data. With the aid of GIS and satellite imagery, a detailed visual record of the projects can be maintained, which can be accessed at any time. Physical verification of the projects can be done by anybody, from anywhere and at any time. GIS can increase the legitimacy and acceptability of the PRIs among its stakeholders. This is especially useful in ensuring convergence of various activities and knowing all the works that are being taken up in a certain geographic area within the GP. Remote sensing and GIS contributed a great role in analysing the required data for the analysis. Geo-analytic tools were used to get the results.

Drone mapping of the village has given detailed information of crops, land use, dug wells and land parcels. Also, Gram Panchayat and community assets like village roads, ponds, canals, open spaces, schools, anganwadis, health sub-centres, etc., were mapped. These maps can be used to prepare better Gram Panchayat Development Plans. This would facilitate the monetisation of rural residential assets for credit and other financial services. Further, this would also pave the way for a clear determination of property tax.

From the available resources, it can be concluded that the livelihoods of Taju village can be improved by implementing the proposed road network, constructing PHSC, etc. By improving the soil health factors, the potential of agricultural lands for crop production can be increased. Also, groundwater restoration to address the drought situation faced by villagers by constructing check dams.

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VALIDATION OF GRAM PANCHAYAT BOUNDARIES USING GEOSPATIAL-BASED APPROACH: A CASE STUDY OF TIRLA GRAM PANCHAYAT, KHUNTI BLOCK & DISTRICT, JHARKHAND

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Introduction

Preparation of a proper annual plan by each Gram Panchayat is essential for its holistic development. Preparation of plan in a spatial format using Gram Panchayat (GP) map improves the objectivity of planning by easy visualisation of the location of each proposed activity, checking the convergence with other activities and judging the access to services that are being delivered by village-level public institutions. This requires the availability of GP maps, which need to be georeferenced to know the exact location of the interventions through planning as well as the location of existing facilities. However, georeferenced GP maps are not readily available.

The 73rd Amendment of the Constitution has placed the Panchayats as the third stratum of government. Still, the Land Revenue Department does not maintain the boundaries or produce maps of those units. The jurisdiction of Panchayats is notified by the Panchayat Department, which does not have any capacity to prepare any map. On an authentic map, jurisdiction of Panchayats is not usually seen as a compact territorial unit. Therefore, the jurisdiction of a Gram Panchayat is restricted to a mere list of revenue villages (full or part) comprising the GP, and no corresponding map of its territory is generally available. For proper rural governance comprising development of infrastructure and provision of services with equity, every GP should have a compact and clearly defined territory, which may be shown on a map along with the revenue villages within its area. The maps are to be prepared based on the notification as well as validation of the actual boundary, particularly where the GP contains a split revenue village.

Data Source

To validate the Panchayat boundaries, the study team collected the available Gram Panchayat boundaries from different sources.

1) Local Government Directory:

Local Government Directory (LGD) is one of the applications developed as part of the Panchayat Enterprise Suite (PES) under the e-Panchayat Mission Mode project (MMP) (http://epanchayat.gov.in). LGD aims to keep all information about the structure of local governments and revenue entities online. The main objective of LGD is to maintain an up-to-date list of revenue entities (districts/sub-districts/villages), Local Government Bodies (Panchayats, Municipalities and traditional bodies) and their wards, the organisational structure of the Central, State and Local governments, reporting hierarchy within the government organisations and Parliamentary and Assembly constituencies and their relationship with one another.

2) Survey of India:

The revenue village boundaries were procured from the Survey of India, which are prepared at smaller scales. The Gram Panchayat boundaries are prepared by merging based on the revenue villages under each Panchayat.

3) Bhuvan Panchayat Portal of NRSC (ISRO):

Bhuvan Panchayats is a web-based portal to facilitate "decentralised planning" at the grassroots level. It was designed to provide information in spatial and non-spatial formats to assist the local bodies' development activities in rural and urban areas. It provides information on various themes with high-resolution satellite images in the background and gives the detailed information regarding household amenities data and census population data at district and village levels, respectively. The Gram Panchayat boundaries of NRSC are the same as the Local Government Directory (LGD) boundaries.

4) Jharkhand Space Applications Center, Ranchi:

Under the supervision of Jharkhand Space Applications Center (JSAC), the Department of Revenue and Land Reforms has generated the village boundaries using cadastral village maps under the National Land Records Modernisation Programme (NLRMP). The Department of Revenue and Land Reforms of Jharkhand has developed the MIS portal (http://jharbhoomi.nic.in) in association with National Informatics Centre (NIC) to digitise the land records system in Jharkhand. The cadastral paper maps are scanned and georeferenced with the high-resolution satellite data and vectorised the boundaries, including the cadasters. Once refined village boundaries are prepared, the GP boundaries are derived by dissolving the refined village boundaries of individual villages falling under that GP as per the published government notifications.

Methodology: In the present study, CGARD has taken the Panchayat boundaries from JSAC, Jharkhand and validated these in the field of each Gram Panchayat and also compared them with the other sources. The shapefiles of GP boundaries along with village boundaries were collected from Jharkhand Space Application Centre (JSAC) and overlaid over the high-resolution satellite data. Easily recognisable features like rail lines, major roads, rivers, etc., were also overlaid on satellite data to check the boundary in the field with reference to these features. The overlaid image maps were printed for individual villages as well as a combined map of GP on different scales and shared with the GP officials for checking the boundary relating to physical features and cadastral maps available with GP.

The GP functionaries were trained to orient the image maps and read on the field with respect to the boundary and permanent features. They were also imparted training on collecting assets using Bhuvan mobile app. The assets thus collected were used for validation of the boundaries to ascertain whether all assets are falling inside the GP boundary or not. The village/GP boundaries were checked regarding field boundaries/road/drainage channels on high-resolution satellite data and rectified wherever deviations in the boundaries were found. The GP boundaries collected from different sources were overlaid on Bhuvan and cross-verified with reference to MGNREGA assets and recorded the number of assets included/omitted due to wrong GP boundary. The boundaries were corrected with respect to HR satellite data, and field verification was also shown as insets in corresponding GPs. The combined map with all boundaries overlaid is also shown in different colours for each GP.

Findings:

Tirla Panchayat has nine villages, namely Bagru, Belahathi, Budhudih, Eranda, Saridkel, Simbhukel, Sosotoli, Tirla, and Torangkel.

Boundary With Respect to Bhuvan Panchayat:

Figure 1: The Panchayat Boundary with respect to Bhuvan Panchayat Boundary

Source: http://bhuvan-panchayat.nrsc.gov.in/

Boundary With Respect to SOI:
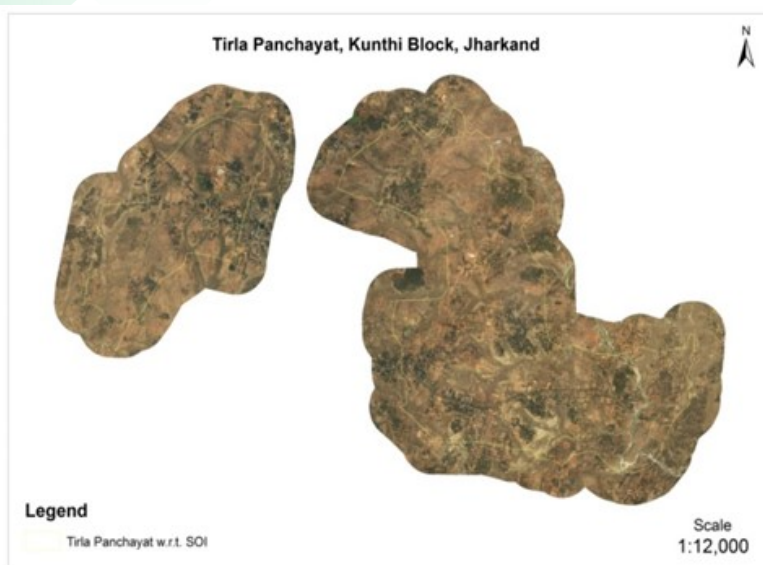
Figure 2: Tirla Panchayat with respect to SOI Boundary

Boundary With Respect to RSAC Jharkhand:
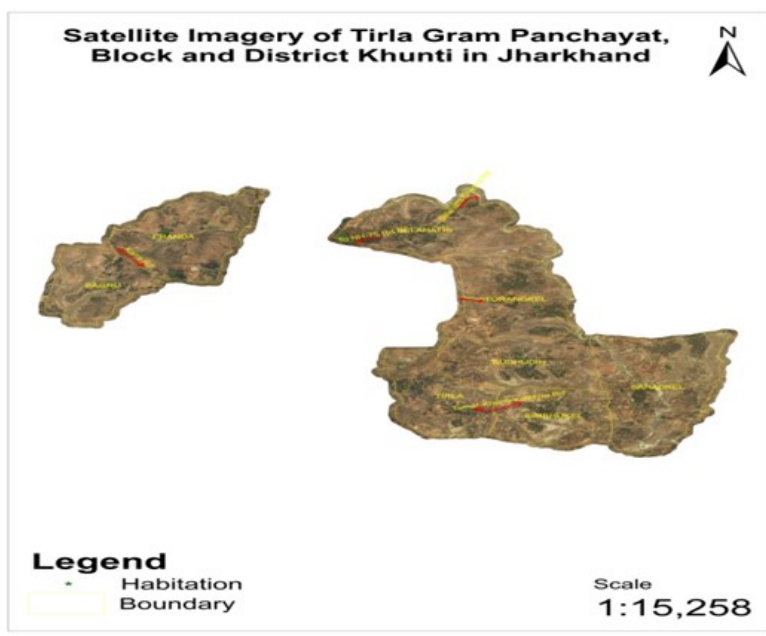
Figure 3: Tirla Panchayat with respect to RSAC Boundary

Validation of Tirla Panchayat:

The study team validating the village boundaries with elected representatives

The Panchayat boundary was updated by validating it in the presence of village representatives, Swayam Sewaks with the village cadastral maps, and comparing the boundary with respect to Bhuvan Panchayat, LG Directory and SOI Boundary files.

Corrections Suggested by Village Representatives:
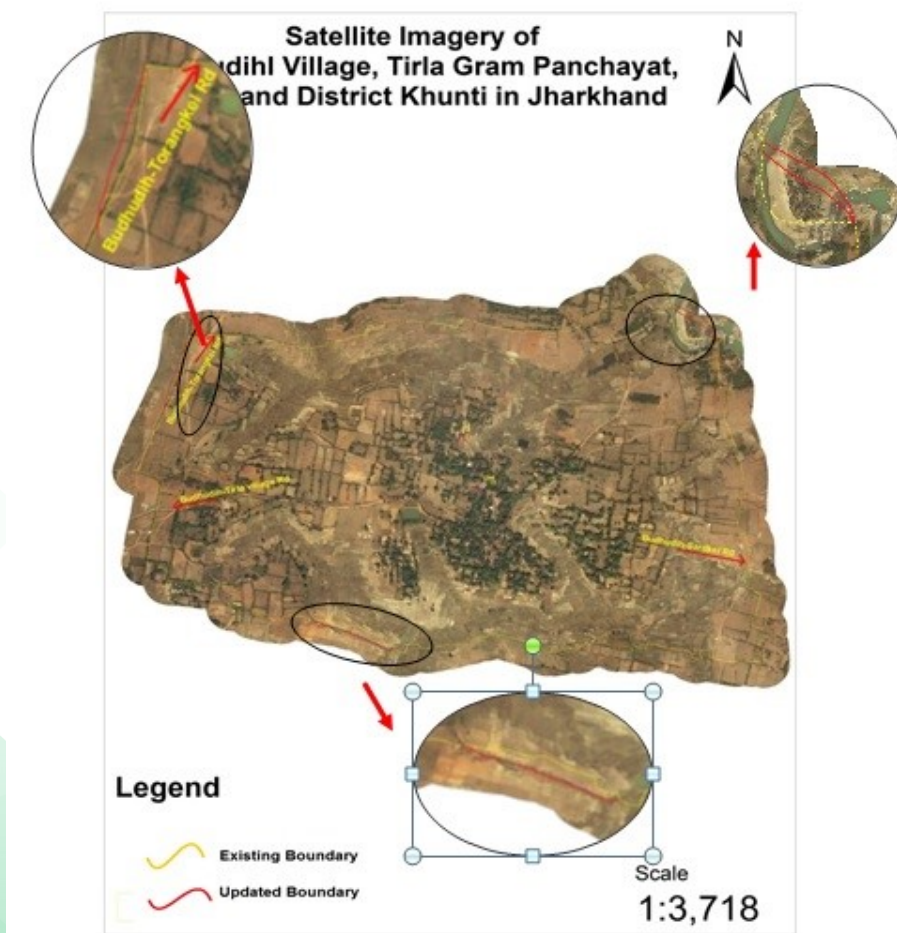
Figure 4: Corrections Proposed by Village Representatives during Panchayat Meeting

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Boundary Comparison:

The percentages of boundary shift between updated boundary of CGARD with LGD Boundary and SOI boundary are 19.16 per cent and 57.58 per cent, respectively
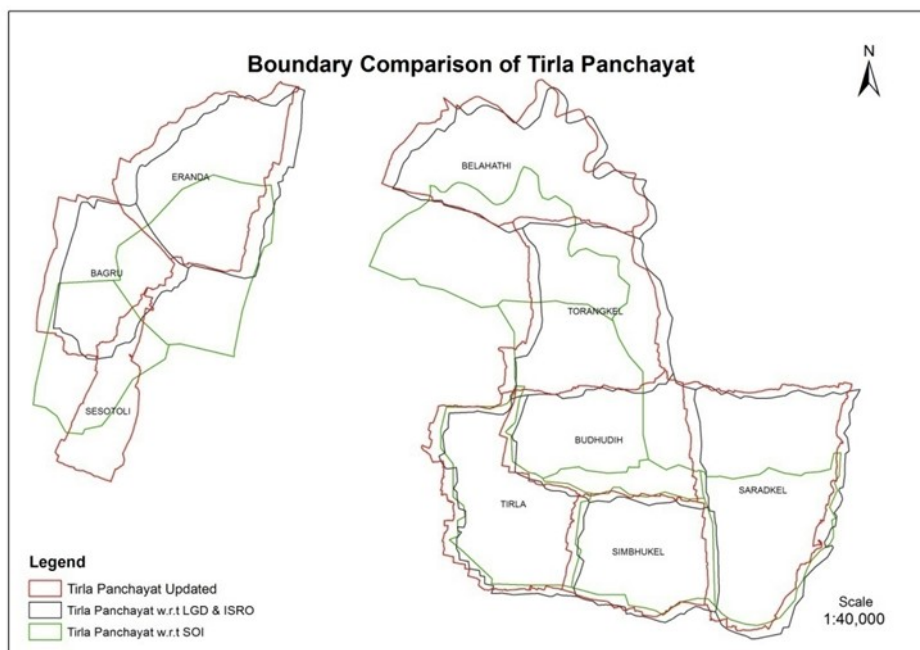
Figure 5: Boundary Comparison of Tirla Panchayat

Assets Mapped:
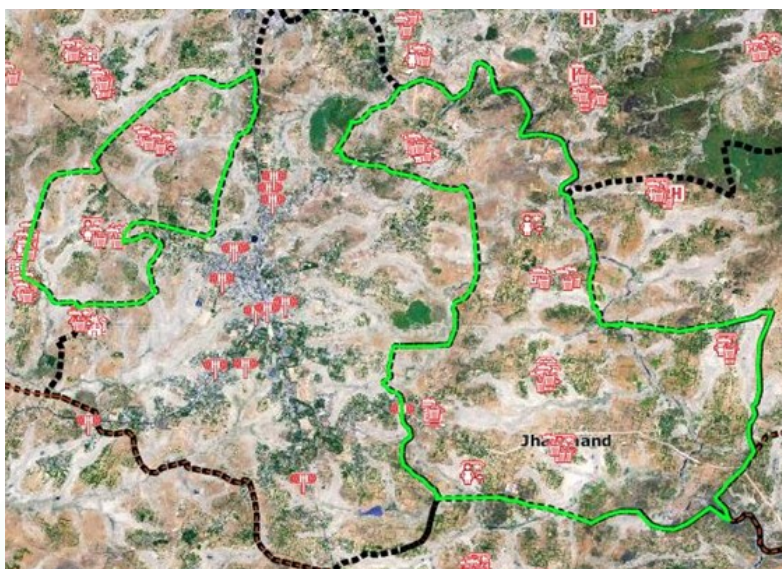
Figure 6: The Assets Mapped in Tirla Panchayat

A total of 43 assets were identified and geotagged using the Bhuvan Panchayat mobile application in Tirla Panchayat, Kunthi block, Kunthi district in Jharkhand. The following table consists of the assets captured.

Table 1: The Geotagged Assets in Tirla Panchayat

Assets in Tirla Panchayat		
S. No.	**Asset**	**Count**
1	Middle School	1
2	Primary School	6
3	Ration shop/Fair Price Shop	1
4	Anganwadi	8
5	Dug Well cum Borewell	5
6	Handpump	22
	Total	43

NREGA Assets Analysis Vis-à-vis Boundaries:

Out of the total 229 assets captured and uploaded on the Bhuvan portal under the NREGA scheme in Tirla Panchayat, 93 were omitted in SOI boundary, 19 in LGD and ISRO boundaries, as shown in Table 2.

Table 2: No. of Geotagged NREGA Assets in Tirla Panchayat

Panchayat	NREGA Assets	No. of Assets Omitted in SOI Boundary	No. of Assets Omitted in LGD Boundary
Tirla	229	93	19
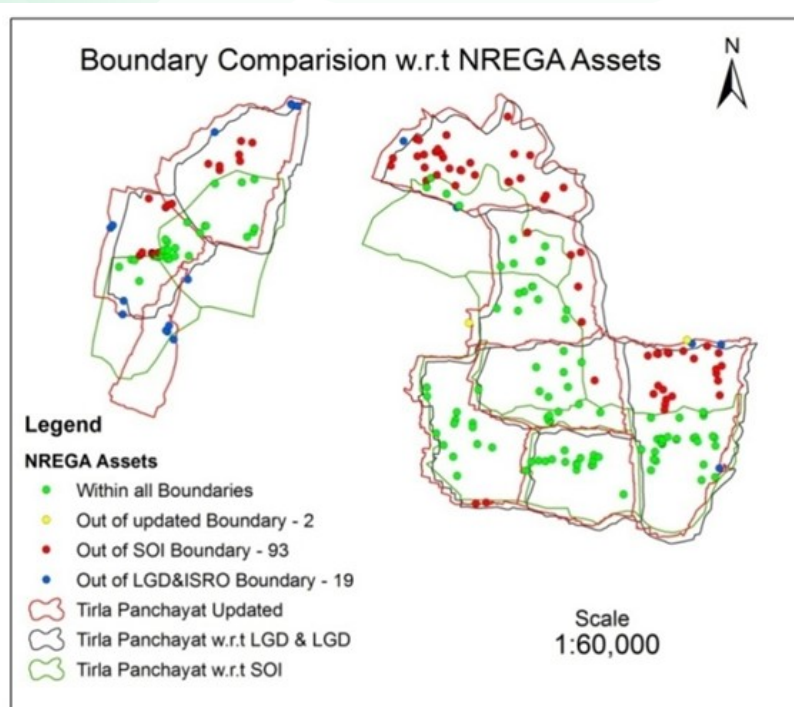
Figure 7: Boundary Comparison of Tirla Panchayat w.r.t NREGA Assets

Conclusions:

- The methodology presented here shows that high-resolution spatial resolution ortho-rectified satellite imagery is well suited for precise demarcation while defining the territorial extents of the administrative units.

- The Khasra map sheets are to be used with proper registration with ortho-rectified high-resolution satellite data for accurate village/GP boundary extraction.

- Analysis of NREGA assets vis-à-vis boundaries shows that a large number of assets were omitted in SOI boundary, and very few were omitted in LGD boundaries. The boundary derived from the cadastre includes all assets within the boundary.

- The digital geospatial modernisation of the administrative boundaries proves to be of immense help while implementing government schemes, including asset mapping.

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CASES ON MONITORING OF RURAL ROADS THROUGH MOBILE MAPPING APP

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Introduction

Open Source Mobile applications are being used nowadays for many purposes by the academia, government and community for location data collection and navigation, etc. These applications are customised for point data collection. In addition to these customised mobile mapping applications, other free applications are also there for both point and line data collection.

Under rural infrastructure, roads consume a large share of public money and facilitate the common man in various ways, like personal or commercial transportation of people and goods. The Pradhan Mantri Gram Sadak Yojana (PMGSY) is the major flagship programme of the Government of India for rural roads.

The roads are monitored by customised State-specific mandatory applications, including a dedicated portal and mobile application for submitting the field data. In addition to these applications, there is always a need to have solutions for monitoring road data locally and also to have quick onsite monitoring of roads. As the overall accuracy and application potential of these apps is not known to the users, they remain hesitant to use these applications available in the open domain in day-to-day purposes. Hence, largely they want to associate themselves with the customised applications provided by the departments.

National Institute of Rural Development and Panchayati Raj, Hyderabad, India is an apex Institute of the Government of India which caters for training, research and consultancy in Rural Development and Panchayati Raj. The author initiated testing the free OSMAND mobile mapping app on rural roads during training programmes. The app was tested on a total of eight roads during eight training programmes in seven States of India for accuracy and utility of application for monitoring rural roads.

Hence, the broad purpose of the case study is to give confidence to the users about line data proximity and spread along the roads in various terrain conditions,

and the application potential of the mobile apps for day-to-day professional use in rural development works in general, and rural roads in particular.

Procedure

Out of the eight roads constructed, one each was under the Forest Department, Government of Rajasthan and MGNREGA, and six were under PMGSY. These roads were studied in the field for mobile data consistency in width and accuracy using OSMAND mobile application. In the study, Google Earth and QGIS software were used for the visualisation and analysis of data in the desktop environment.

The training programmes were conducted at the State Institutes of Rural Development (SIRDs) functioning under the administrative control of respective State governments. The National Institute of Rural Development Panchayati Raj (NIRDPR) conducts off-campus training programmes at SIRDs in a collaborative manner. The participants were mostly graduate civil engineers working in the respective States, who are responsible for aspects related to road construction. All training programmes had a one-day field visit, in which half-day is dedicated for road data collection and understanding the data collection of the location in mobiles in a practical manner. All were five-day, full-time and residential programmes. In the remaining four days, mostly basics of Geoinformatics and cases of applications of Geoinformatics technologies were discussed with the participants and hands-on geo-referencing and data creation were taught in QGIS environment.

Collection of track data of same road by participants in OSMAND mobile application during field visit and sending by mail to author → Downloading all the data in PC and visualise and analyse in QGIS environment combinedly → Discussions with training participants on data quality, accuracy and use of application
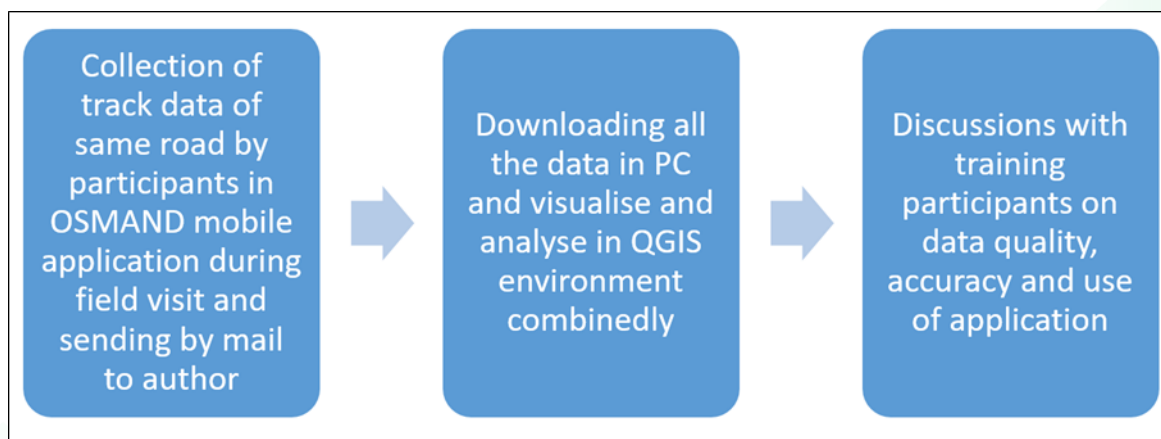
Figure 1: Flow Diagram
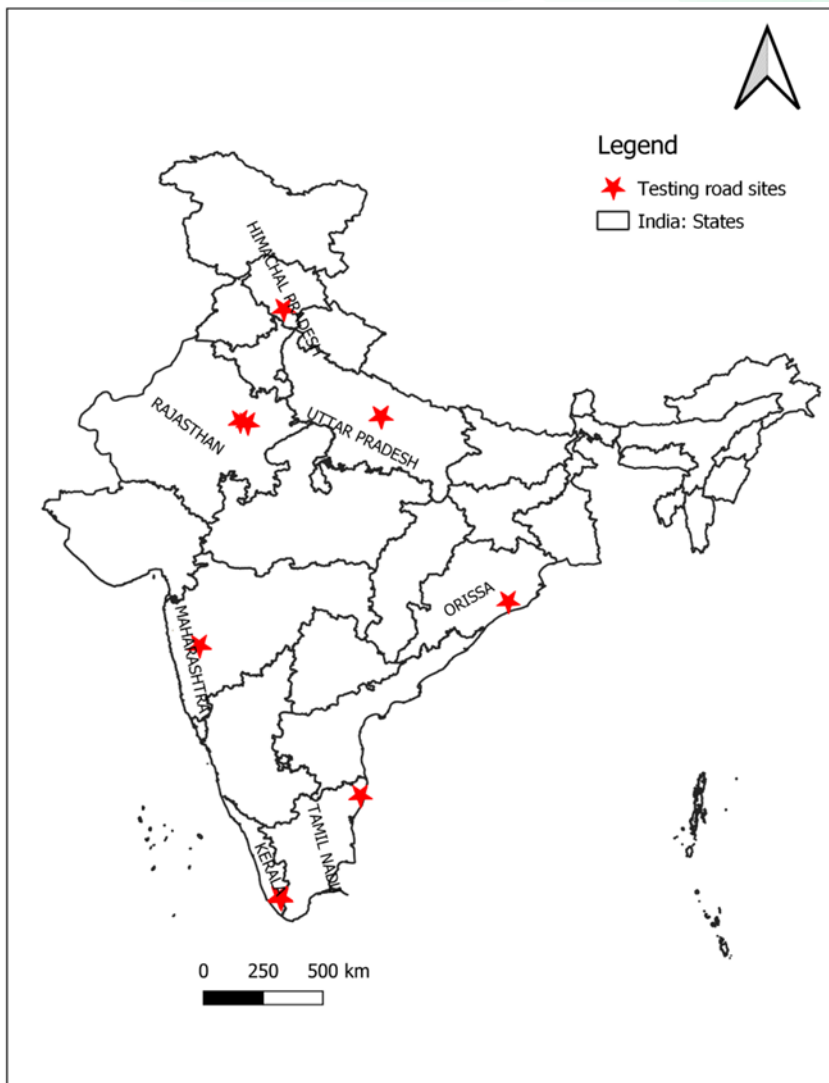
Figure 2: Area of Study

At three places (Tamil Nadu, one forest track in Rajasthan and Odisha), the roads were tracked by walk because of the short length and non-motorable conditions. Other roads were tracked by bus, and bus speed during the travel was kept less than 60 kilometres per hour. The participants used their mobile handsets for the data collection.

The terrain conditions and tree covers were different at each road and data collection timings, seasons were also different on each road. However, these factors were the same for a particular road for all mobile data collected on that road.

After the completion of the field visit and collecting the road data in mobiles on a

particular road, the whole team assembled at the training venue, i.e., State Institute of Rural Development in the respective States. The participants used to mail data to the author in the GPS exchange format (.GPX) from mobiles on the same day, or the next day during the class. The next day, the first session would be on data visualisation and analysis in Google Earth and QGIS.

During each training, discussions with participants were made on data quality, accuracy and use of the application in their professional life. The average width variations along each road visited were checked. The width of data spread used to be checked at four to five points along each road at the middle of road segments excluding the turns.

Details of Cases

Table 1: Details of Training and Road under Each Case

Case No.	Training Title	Duration	Training venue	Road Name	Road Location	Central coordinates of road	Tracks considered for analysis
1	Geospatial technologies for Planning and Management of PMGSY Roads	25-29 June, 2018	SIRD Rajasthan	Kapadiyawas to Govinda ki Dhani	Kapadiyawas Village, Jhotwara Block, Jaipur District, Rajasthan	24.94552 Latitude, 75.55362 Longitude	15
2	Geospatial technologies for Planning and Management of PMGSY Roads	24-28 Sep, 2018	SIRD, Maharashtra	Lonikalbhor to Ramdhara	Pune District, Maharashtra	18.46587 Latitude, 74.02071 Longitude	37
3	Geospatial technologies for Planning and Management of PMGSY Roads	22-26 Oct, 2018	KILA, CHRD, Kottarakkara Kerala	Nedumpara to Mampazhathara	Thenmala Panchayat, Anchal Block, Kollam District, Kerala	8.99796 Latitude, 77.05283 Longitude	15
4	Open Source GIS Tools for Forest Resources Management	28 Jan-1 Feb, 2019	Birla Institute of Scientific Research, Jaipur, Rajasthan	Forest track in Jhalana Wildlife Reserve area, Jaipur, Rajasthan	Jhalana Wildlife Reserve, Jaipur, Rajasthan	26.85647 Latitude, 75.83946 Longitude	19

Contd...

Case No.	Training Title	Duration	Training venue	Road Name	Road Location	Central coordinates of road	Tracks considered for analysis
5	Geospatial technologies for Planning and Management of PMGSY Roads	04-08 Feb, 2019	DDU, SIRD, Uttar Pradesh	NH 24 to Jamkhanwa village	Bakshi ka Talab Block, Lucknow, Uttar Pradesh	27.10804 Latitude, 80.86681 Longitude	32
6	Geospatial technologies for Planning and Management of PMGSY Roads	15-19 July, 2019	SIRD (HIPA), Himachal Pradesh	Sadhoda to Kyarkot (Mohanpur) Link Road	Basantpur Block , Shimla District, Himachal Pradesh	27.10804 Latitude, 80.86681 Longitude	16
7	Geospatial technologies for Planning and Management of PMGSY Roads	23-27 Sep, 2019	SIRD&PR Tamil Nadu	Anonymous PMGSY road	Maraimalainagar, Tamil Nadu	12.81565 Latitude, 80.08732 Longitude	29
8	Applications of Geo-Spatial Technology for Integrated Natural Resource Management (INRM) Plan under Mission Water Conservation	29 Feb- 04 Mar, 2020	SIRD Odisha	MGNREGS Road, Taraboi Gram Panchayat	Taraboi Gram Panchayat, Jatni Block, Khorda District, Odisha	20.12679 Latitude, 85.66169 Longitude	16

Table 2: Details of Travel, Terrain and Range of Variation at Selected Points under Each Case

Case No.	Mode of Travel	Terrain condition	Approximate Travel length (km)	No. of sites considered at map for width variation	Road tracks width variation at points (Metres)				
					1	2	3	4	5
1	Bus	Plain	3	4	7.02	8.50	7.36	11.34	-
2	Bus	Plain with houses along the roads	6	4	15.68	8.75	22.08	17.41	-
3	Bus	Hilly with tree cover	10	4	28.82	47.91	12.67	30.82	-
4	Walk	Undulated with scattered forest	1	4	7.69	8.05	6.80	10.10	-
5	Bus	Plain with habitations along the road	5	5	10.47	10.67	12.50	11.72	16.52
6	Bus	Hilly with steep slopes	6	4	16.82	14.66	10.26	22.25	-
7	Walk	Plain with habitations along the road	1	4	5.54	5.79	8.38	5.99	-
8	Walk	Plain	0.1	2	5.64	4.86	-	-	-
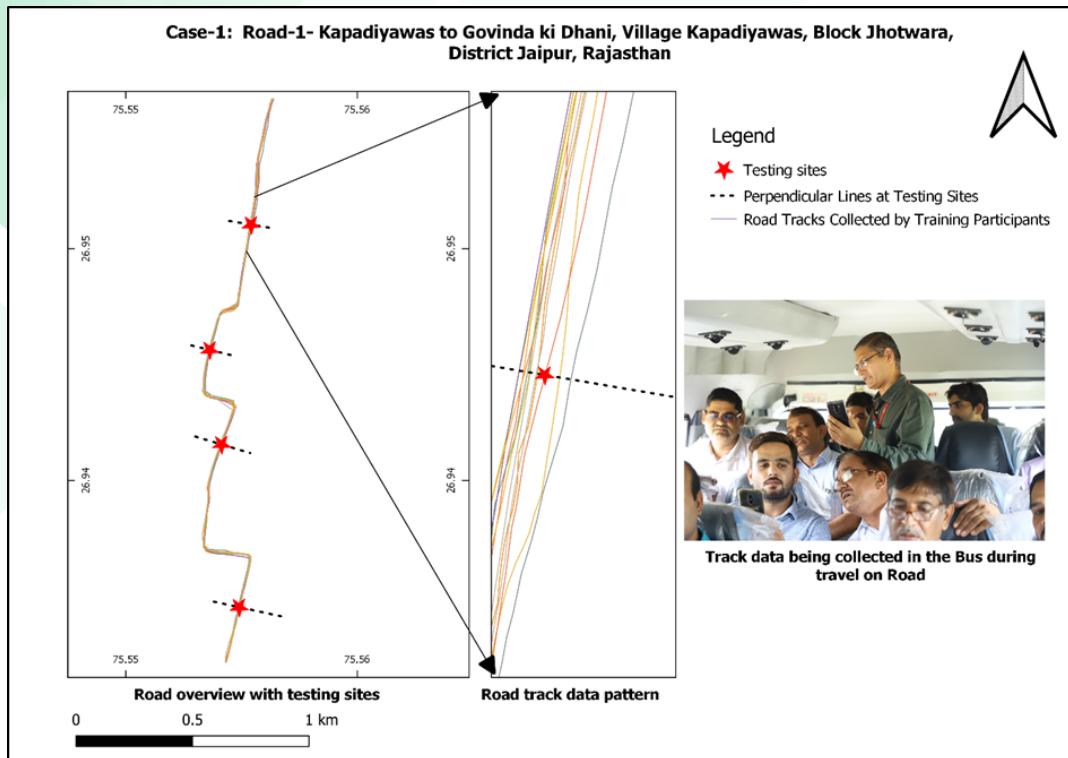
Figure 3: Road Overview and Track Data Pattern for Case-1
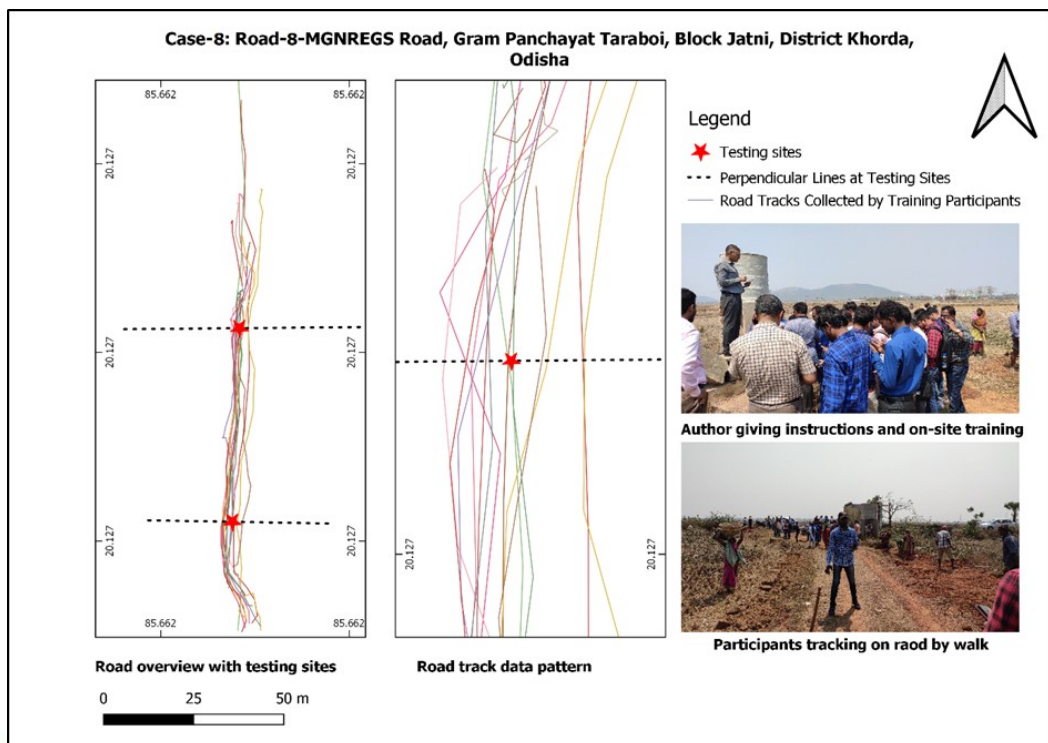
Figure 4: Road Overview and Track Data Pattern for Case-8

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General findings

The variation in terrain conditions was the cause for the spread between observations. In the areas where only GPS signals in tree covers and undulating lands were present, the spread along the track data was more. The augmentation of signals due to internet connectivity and Wi-Fi, etc., also was not present in these terrains due to the unavailability of mobile data.

It has been observed that speed of travel was also a factor in data spread and walking gave better results in comparison to travelling by bus, due to less signal disturbances and more stability of signals.

It was observed from the data (Table 2) that all tracks generated from mobiles remained within 5-50 metres spread/range of each other. For plain areas with less disturbances and in walking mode, the data remains within 5-10 metres in spread along roads and error may be considered as +-2.5 to +-5.0 metres from the centre line in plain areas with less disturbances along the roads. The data variation was more in hilly terrains with dense tree covers.

Conclusion

For developing countries, field mapping and data collections in the GIS environment is need of the hour. In addition to mandated customised applications of GIS in government environment, there is a need to have flexible tools and techniques in open source environment to support the officials in day-to-day manner for near real -time monitoring of works. Mobile mapping tools, which are using Open Street Map (OSM) as base map in offline and online mode and are able to use freely available GPS signals without internet dependencies, are a boon to the developing countries. OSMAND is one such application and there are other applications also to use and test. The study indicates that in the Indian terrain conditions, the road data may be collected by freely available mobile mapping applications, with +-2.5 to +-25.0 metres variations from actual line of travel considering almost all kinds of terrain conditions, which can be a good proposition for mapping, planning, execution and monitoring of development works in general, and rural infrastructure in particular. Hence, the use of these tools may be encouraged with proper capacity building of users.

Points of deliberation

- Future possibilities of better and stable signals

- Testing of other applications for usability and functionality

- Comparison with traditional and differential surveying techniques

- Capacity building of the users

- Parallel use of freely available tools and customised applications

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ASSESSMENT AND CHANGE DETECTION OF SELECTED TANKS IN GURLA MANDAL, VIZIANAGARAM DISTRICT USING SPATIAL TECHNOLOGY

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Centre for Geo-Informatics Applications in Rural Development

Introduction

A major part of India falls in arid, semi-arid and dry agro-climatic zones, where the rural agricultural practices dependent on rain. The considerable rainfall brought by the southwest monsoon is spread in a short period (two to three months) during the monsoon season. Most of the dryland regions come under the drought-prone areas due to climatic conditions and mismanagement of the water resources. The summer season experiences a shortage of water due to improper storage of runoff. Regions with an unpredictable climate need methods for water resource management.

Sustainable development is important for the proper management and utilisation of natural resources. The utilisation of water resources ensures sufficient amount of surface and groundwater, thus improving the quality of ecosystems and human living standards. Surface water and groundwater management is an important factor that helps store the required amount of water to meet the increasing requirement of population, agriculture, industrial, and energy sectors. The impact of climate variability is prominent on hydrologic responses in arid and semi-arid regions. Major parameters that influence the amount of available water are rainfall, temperature and evapotranspiration. Sustainable development can address many problems related to water resources with geospatial technology on a spatiotemporal basis. Increasing temperature due to climate variability further causes changes in the land-use pattern, which leads to uneven distribution of water across the area. Planning and implementation of sustainable programmes for the restoration of ecological balance are essential.

Andhra Pradesh (AP) has 13 districts, covering an area of 162,970 km^2. The State has a population of 49,386,799 it stands 10th in population in India. A total of 60 per cent of the population is employed (engaged) in agriculture and agri-related activities. Rice is the major crop of the State. Andhra Pradesh is a riverine State with

40 major, medium and minor rivers. Godavari, Krishna, Vamshadara and Pennar are major inter-State rivers. The potential irrigation projects were developed before 1956 (29.73 lakh acres), and now it has reached 101.72 lakh acres. There are 58,518 minor irrigation tanks in this State with 10,43,111 acres registered in ayacut. These tanks provide irrigation support in kharif and rabi seasons. Traditionally, the tanks are constructed to harvest the rainwater and water from rivers. These tanks are constructed along the slope to collect the runoff from the catchment areas.

Most of the tanks are made as small structures and have been neglected. These tanks are either dilapidated or encroached by locals with political influence. After rehabilitation, the tanks showed improvement in offering irrigation support to the small landholding farmers (below 2 ha cultivation land). Although there is improvement in the groundwater recharge and holding of water for dry seasons, many research studies were undertaken to analyse whether minor tanks rehabilitation has shown a positive impact on the local environment. The issues and challenges in implementing a cascade of tanks in Vallakulam was discussed by the Dhan Foundation in 1999. Many NGOs have been coming forward to study this work. The study on impact of the desiltation work by Babu and Manasa (2008) for Warangal district has estimated increase in water availability due to the desiltation work.

Satellite remote sensing technique is being used to generate reliable and objective primary data on existing irrigation schemes and the resultant productivity. Ground survey has to be conducted and supplementary information has to be obtained from satellite data. Landsat series of multispectral and thematic mapper images with a spatial resolution of 80 metres and 30 metres, respectively, at a 16-day repetitive coverage were used. Several case studies in south India have shown that satellite remote sensing technique provides reliable data on agricultural productivity and secondary data related to water management to help better water management practices. Monitoring and managing existing irrigation schemes using satellite remote sensing data and integration with several other data using computerised GIS for taking rapid management decision is more effective. Regular monitoring of land use land cover helps to recognise and identify the basic issues responsible for land cover transformation. Remote sensing is one of the emerging effective data information sources related to water and agriculture productivity, thus helping in bettering efficient water usage in the command area.

Land use and land cover information are the basic prerequisites for land, water and vegetation resource utilisation, conservation and management. This information is required periodically to monitor changes, particularly in areas where such changes occur more frequently. Hence, it became necessary to use technology and tools like remote sensing and GIS. It was evident that increased cultivation, agriculture expansion and encroachment bring changes in surface-water spread area. The increased area under tree/vegetation cover is an ideal and suitable sustainable ecological development activity on the earth's surface for planners and others to decide future course of various actions. The current study focuses on the assessment and change detection of selected tanks in Gurla Mandal of Vizianagaram district using spatial technology. The following objectives were framed based on the literature review and project needs.

Objectives:

- To study LULC change detection in the years 2005, 2011, 2016 and 2018

- To study Water Index using MNDWI

- To analyse vegetation density change using NDVI in the Tank Command Area

- To identify NDVI pattern at village level to show overall improvement after desiltation work

- To develop a script for visualisation and analysis of lakes using Google Earth Engine

Methodology:

The schematic representation of the methodology used in the present research work is shown in Figure 1. The satellite images of the study area were downloaded from the US Geological Survey. Downloaded images were initially subjected to atmospheric correction. The study aims to analyse the change matrix for land use/ land cover mapping of Gurla mandal of the central part of the Vizianagaram district. The maps were prepared on 1:50,000 scale using the Landsat-5 and 8 for the years 2015, 2016, 2017 and 2018 using supervised classification. The study area has been classified into eight classes, namely croplands, wasteland, built-up land, plantation,

water bodies, river stream and water bodies/tanks and forest. In this study, remote sensing and GIS gave detailed land cover information of Gurla mandal between 2005 and 2017 used for change detection.
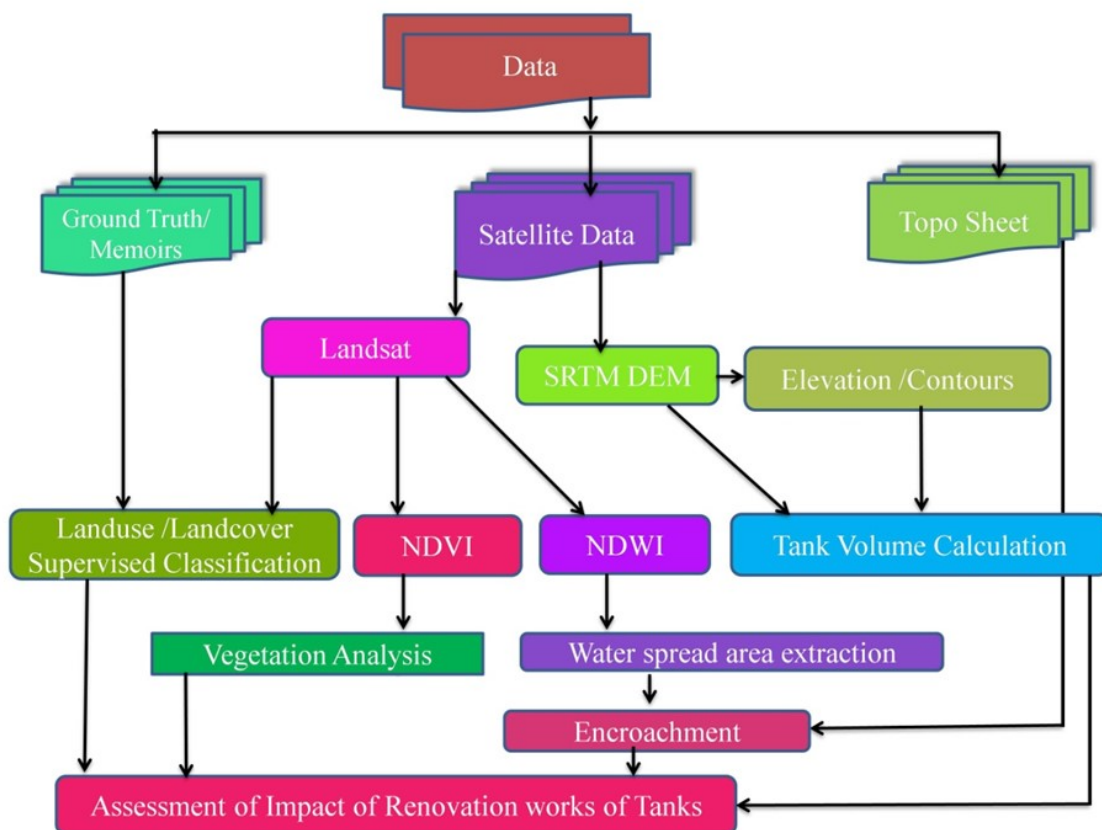
Figure 1: The Sequence of Methodology Adapted

Study Area:

Vizianagaram district is a major educational society hub and lush paddy field in Andhra Pradesh, India. The district was formed in June 1979 and its history dates back to the times of Kalinga Dynasty. The district is divided into two revenue divisions and 34 mandals. The major rivers flowing in the district are Nagavali, Champavathi, Gosthani and Kandivalasa Gedda. The average annual rainfall of the district is 1,131 mm. Around 82 per cent of the population lives in rural areas and depends on agriculture for their livelihood. The major crops grown are paddy, mesta, groundnut, ragi, bajra, cotton, sugarcane and pulses. The total tanks in the district are 9,183 (out of them, 459 are above 100 acres ayacut and 8,724 are below 100 acres ayacut).

Gurla is one of the mandals in Vizianagaram district. The total geographical area of the mandal is 163 km^2 and there are 39 revenue villages consisting of 37 Gram Panchayats. The total number of households in the mandal is 15,571 with a population of 64,695 (out of which 32,354 were female). Major crops grown in the mandal are paddy and maize but the area under mango is increasing gradually. The study area is situated in between 83°27'8" and 83°32'00" E longitudes, 18°10'35" and 18°16'40" N latitudes (Figure 2). The study area includes 13 Panchayats, namely Garida, Tettangi, Polayavalasa, Badaripeta, Jammu, Jammupeta, Kella, Vallapuram, Gudem, Achutapuram, Chukkapeta, Gujjangivalasa and Meesalapeta, which covers 64 km^2 of the geographical area. In total, 78 tanks were taken to analyse surface water extent and volume calculation before and after desiltation.

Two tank cascades were identified in Gurla Mandal, namely Tettangi and Garida with the renovation of 78 tanks. This is identified after a detailed study by DHAN Foundation with the community discussions with stakeholders – Irrigation, PR & RD and Groundwater departments, and district administration during April-May, 2016.
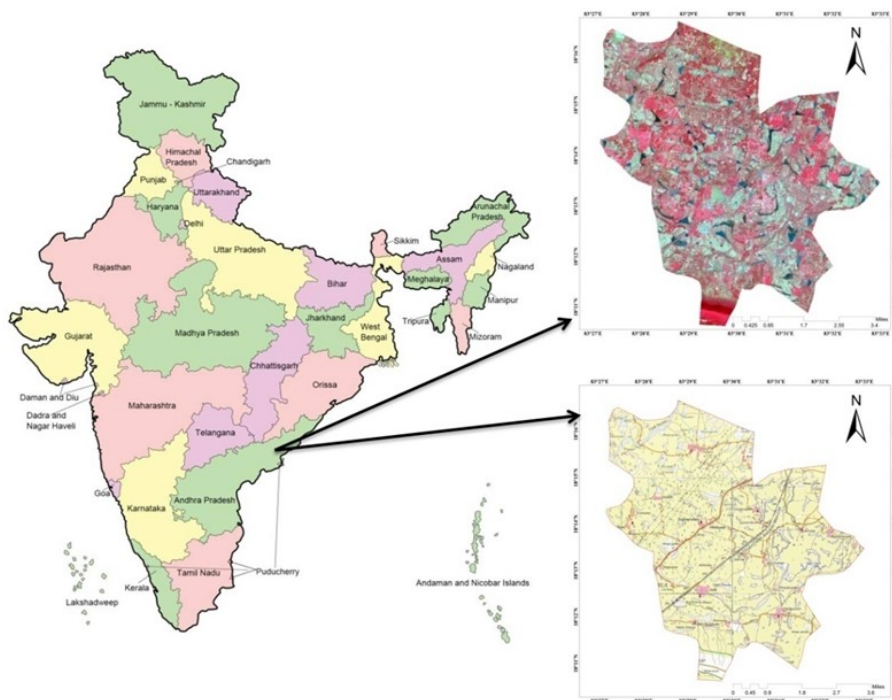
Figure 2: Geographical Location of the Study Area

Findings & Conclusions

The project is carried out using remote sensing satellite images, and spatial and non-spatial field data to give accurate information related to impact of tank renovation work on water bodies and agriculture land under Mahatma Gandhi NREGS done by DHAN Foundation. The methodology used was to monitor and assess small to medium village tank areas frequently to make appropriate decisions at the right time. Information collected from remote sensing data and different sources were analysed and stored for the future purpose of impact assessment. Changing climate and human -induced actions are responsible for the siltation and encroachment of tanks. Gurla mandal of Vizianagaram district is selected to monitor and assess the small and medium tanks with water spread area. The average annual rainfall of this area is 1,039 mm. Paddy and maize are grown, respectively, in rabi and kharif seasons.

Land-use changes in this area are increase in area under mango plantation, decrease in 12.73 per cent of the fallow land and increase in 14.07 per cent of plantation between 2016 and 2017. Forest cover did not show any change over the period of five years. The transformation matrix gives detailed information about each land cover change during the study period. Plantation within the water tank shows as 8.70 ha, in cropland 66.20 ha fallow land 17.06 ha and wasteland 2.22 ha. The increase in plantation area is because of lowered water content in all tanks and supply of water only for a few months. Most of the tanks were dry during the summer season leading to no crop cultivation. Desiltation of tanks will increase the depth of the tank and the silt is transported to agricultural land to improve soil fertility and productivity.

Either man-made or natural factors are leading to the siltation of tanks adding to the eroding of topsoil along with runoff. Monitoring small and medium scale tanks at different time periods is required for better water resource management. In Garida and Tettangi, tanks are connected via the cascading system. Surface-water spread is calculated using water indices to assess the presence of water in each tank. Satellite images collected from 2015 to 2018 with cloud-free data were used for the MNDWI index from +1 to -1. With the derived MNDWI index, water and land features can be calculated. However, high spatial resolution data would help to estimate tank water exactly and volume calculation is also possible with field measurement by the farmer groups.

Surface water extent is estimated by delineating pure water pixels by giving

threshold values for different land features. Most of the tanks show weed infestation up to 50 per cent with local plants. Field data is used for deciding threshold value for all land use classes while delineating water pixels. Each tank surface area varies seasonally and before/after surplus water filling from the upper tank.

Tanks support irrigation in the associated ayacut area throughout the year, depending on the water availability in each tank. Variation of agriculture within the ayacut area was estimated using NDVI. NDVI values of agriculture vary with crop growth and area of cultivation. This is assessed during rabi and kharif seasons. Plantation gives higher NDVI values than agriculture. Rabi starts in July and ends in October. Starting weeks give fewer NDVI values compared to fully grown plants; again harvesting period gives lower values. Images collected throughout the year give information about area sown, plantation and uncultivated land.

Village-level NDVI calculation supports as a productivity indicator to assess the overall improvement in agriculture. Silt removed from tanks serves as a good soil conditioner, thus improving soil nutrients. Desiltation of tanks increases groundwater and surface water by storing rainwater effectively. Desiltation work increased number of working days for farm labour, which contributed to raise in their income. Improved water resources increased the number of crops with high-quality yields.
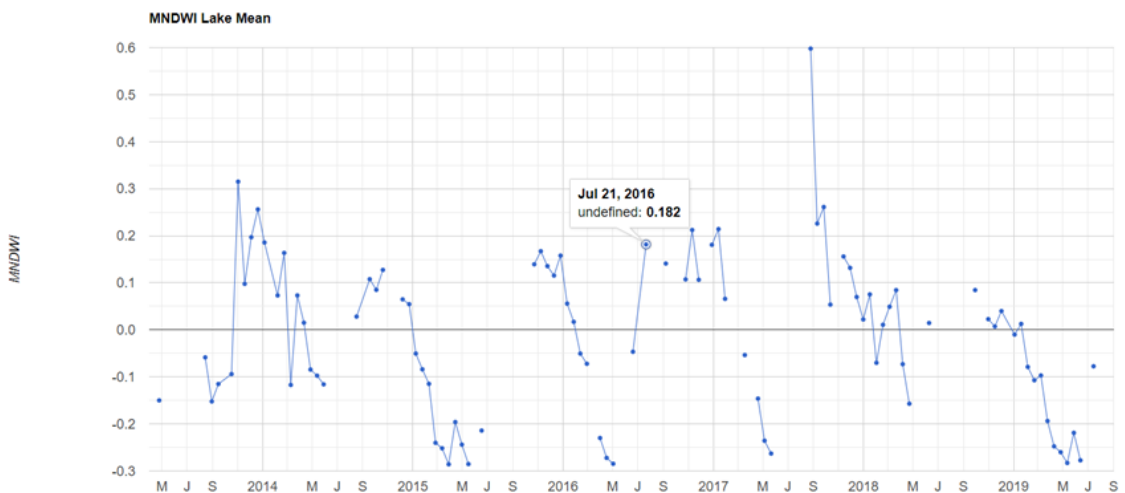
Figure 3: Scatter Chart of MNDWI Pixel Mean Values of Jaganna Cheruvu

Google Earth engine script developed will be useful to monitor any lakes without computation effort where the user-defines the time period (Figure 3). This script was performed on the optical remote sensing data sets; further it will be enhanced on active remote sensing data such as Sentinel – 1. With this, the missing data due to clouds can fill the gap.

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LOCAL GOVERNANCE AND MANAGEMENT OF HEALTHCARE SERVICES: A CASE STUDY IN RURAL ODISHA

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Introduction

Improvement in the standard of living and health status of the population has remained one of the important objectives in Indian planning ever since the country gained independence. As a part of the community development programme, India was one of the pioneers in health service planning with a focus on primary healthcare to promote, prevent, curate and rehabilitate health services to the entire rural population.

Close to 700 million people live in rural areas where the condition of medical facilities is deplorable. In the context of maternal health and reproductive healthcare, which are the major concerns of human development goals, the important question is about the reach, accessibility, and affordability of these services for the people living in rural areas. As such the well-being of the residents of the village depends to a great extent on the efficacy of the Gram Panchayat.

Despite the measures taken by Central and State governments to involve communities and stakeholders in the provision of basic healthcare services over the years, the community participation at grassroots has been virtually absent. Panchayats play a crucial role in development of healthcare services.

PRIs and Healthcare

As primary healthcare is a subject of local self-governments, Gram Panchayat is the first point of contact for the grassroots level workers with local governance at the village. Research studies show that deliberations of health issues in the Gram Sabha led to improvement of health in both men and women and reduction of private health expenditure. As Panchayats are linked to block and district level institutions, they play a decisive role in the programmes for reproductive health, child health and nutrition through community participation. Moreover, the involvement of the Gram Panchayat

in the selection of the ASHA, holding the untied funds with ANM, leading the Village Health and Sanitation Committee, etc., links the Panchayat very close to maternal and child health issues.

Role of Women Leaders in Health Services

Women PRI members participate actively in the immunisation of children, organising health camps, and mobilising women for accessing health and nutrition services. By working closely with adolescent girls and women, women PRI members prove to be powerful allies for campaigns against early marriage and teenage pregnancy as well.

Pierson (2013), in his study on gender analysis of health policies in South Asia, found that women who gain political power through gender quotas often act as the catalysts for improving health in their societies. Women, who have been in positions of power, are more likely to promote girl child education and child health in the form of immunisation. Beaman's study showed that seat reservations for women in village governments are positively related to a child between the ages of one year and five years being fully vaccinated. They also identified a statistically significant relationship between reserved seats for women in village governments and more water taps and hand pumps. This means that women invested more in terms of funding and delivery of safe drinking water relative to men.

For example, women leaders in Rajasthan and West Bengal invested more resources on drinking water facilities and roads, suggesting that the gender of policymakers has an impact on policy choices. Bhalotra and Clots-Figueras (2011) found that seat reservations in India are positively associated with increased investment in MCH, specifically more antenatal visits, higher probabilities of breastfeeding in the first 24 hours following childbirth, giving birth in a public facility, and full immunisation by age one. Village women found it easier to approach women representatives about issues that directly impact their lives, as compared to male elected representatives.

Material and Methods

Against the above backdrop, the present paper documents the findings of a case

study research conducted in three randomly selected villages in Koksara block in Kalahandi district of Odisha with an objective to understand the status of healthcare services and the involvement of local self-government in the same. Two villages from a female-headed GP and one village headed by a male sarpanch were purposefully selected for comparison. All the villages under study were tribal-dominated.

Table 1: Background Information of the Villages by Number of Households, Sex Distribution of the Population and by Social Groups

Villages	No. of HH	Total Population		OBC Population		SC Population		ST Population	
		Male	Female	Male	Female	Male	Female	Male	Female
Phupgaon	781	1522	1605	240	215	129	160	974	1009
Birimuhaan	183	407	408	67	73	56	56	335	337
Kashibahal	941	1691	1844	197	243	173	141	352	378

Tools for Data Collection

The information was primarily gathered through face-to-face interviews with the sarpanch, the ward members, anganwadi workers, community leaders, ASHAs and representatives of women SHGs to understand the health situation in the village. This was executed through a well-structured interview guideline keeping in mind the objectives of the study. Key informant interviews, field observations and focused group discussions were held for a deeper understanding of health issues and the involvement of the Panchayats. All the information was recorded through voice recorder and later elaborated in the form of notes. The interviews were mostly conversational, switching from one topic to another, based on probes.

Findings

Involvement of the Gram Panchayat in Healthcare

Panchayat members play a crucial and significant role in monitoring and

delivery of public health services. It is observed that nearly all the activities concerning health are monitored by the village health functionaries such as ANM and the ASHA along with the anganwadi workers. Apparently, health and hygiene are not prioritised as development issues requiring any intervention by the Gram Panchayat members. Hence no initiatives to organise health/medical camps were taken by the Panchayat at the village level officially. On a personal basis, one of the woman sarpanch who earlier served as a community health worker, counsels and advises the adolescent girls in the village on simple measures for disease prevention such as washing hands before serving and eating food and after defecation, maintaining menstrual hygiene, etc. Apparently, the advice rendered fell on deaf ears, according to her, as the young girls continued the practice of unhygienic methods during menstruation largely due to lack of awareness.

Awareness about Village Health, Sanitation and Nutrition Committee (VHSNC)

One of the key elements of the National Rural Health Mission is the constitution of village health, sanitation and nutrition committee (VHSNC), which is commonly known as *Gaon Kalian Samiti* in Odisha. It addresses the issues related to health and takes an initiative in providing a platform for improving health awareness among the community. The researcher observed that the village health sanitation and nutrition committee is almost non-functional in the villages under study. The Panchayat members could barely speak to the researcher on VHSNC, and the way they are linked with the delivery and management of health services. The village head was unaware of the composition of the members constituting the committee and their responsibilities in the delivery of services. The sarpanch was neither informed about the meetings nor had any knowledge about the way the money was spent. The ASHA workers in the villages under study were not even aware of the existence of such a committee.

On further probing, it was found that neither a village health plan was developed to assess the health priorities of the community nor a village health register existed at the time the interviews were conducted. According to the District Level Household and Facility Survey (2007-2008), only 3.3 per cent of villages in Odisha formed a health and sanitation committee and only in 11 per cent villages, the pradhan or any of the Panchayat members was aware of the untied funds. The GP members had limited knowledge of the untied funds and its utilisation.

Awareness about Government-Sponsored Health Schemes

The Gram Panchayat members were poorly informed about the health schemes of Central and State governments. Their general notion on health was that it was in the jurisdiction of the ANM, and as Panchayat members, that was something out of their focus. The GP members were not aware of NRHM and its work. Key informant interviews show that Gram Panchayat is not involved in a major way in the health development of the village. Although immunisation of children and pregnant women has increased over the years, simultaneously there has been continuous ignorance towards hygiene and sanitation issues. Strategies for mobilising the community and involving health workers for greater awareness on health and hygiene were never initiated. There is hardly any interaction between the village health functionaries and the Gram Panchayat members. As health is least prioritised, the village health plan is mostly ignored.

Generally, women leaders are more active than men in bringing issues of maternal and child health to the forefront. Strangely, the woman sarpanch in the GP under study was least enlightened on these issues. Hence, the involvement in terms of monitoring the work related to MCH services was considerably lower.

Concerns of Anganwadi Workers

According to the anganwadi workers, the Gram Panchayat showed little interest in the functioning of the AWCs. The difficulties and constraints faced by anganwadi workers were never discussed in Gram Sabha meetings. The anganwadi workers are often not informed about such meetings; as a result, they do not bother to inform the Panchayat members about the problems they face. Apparently, there was a disconnect between the Gram Panchayat and the anganwadi workers.

Adolescents' Health and Hygiene

Mobilising adolescents on health issues and personal hygiene has been attempted to some extent by the female sarpanch individually on a personal basis. Training courses on menstrual hygiene and the use of sanitary napkins were also undertaken with the help of a local NGO. It was reported that adolescent girls lack basic knowledge on simple preventive measures for good health such as washing

hands with soap and water before eating and serving food, and after defecation. Panchayats per se have not taken any initiative in this regard. Marriage at an early age is still a concern in the area. Girls are married off at an early age of 11 to 12 years, as soon as they attain menarche.

Interviews with the health personnel at the community health centre revealed that malnutrition and anaemia were common among young children, adolescents and lactating women in the entire block. Malaria, diarrhoea and tuberculosis are other major illnesses. Neonatal deaths among children occur primarily due to diarrhoea. The Panchayat members expressed their concern about this and said that village health workers monitor the cases and accordingly refer them to the closest government health facility. As health is not considered a primary concern for the development of the village, the local government at the village level shows minimal interest in understanding the causes and repercussions of such illnesses for the community.

Findings from FGDs with Village Women

FGDs with community women revealed that Panchayat interventions in the area of health and sanitation were virtually absent. Health camps were neither organised nor any discussion on sanitation and hygiene practices was conducted in the community. A need was felt for greater Panchayat interventions, along with NGOs to spread awareness among adolescent girls and pregnant women about nutrition and ways to prevent anaemia, as it is prevalent among lactating women in the community. Though ASHA workers actively mobilise the community for ensuring 100 per cent institutional deliveries, absence of public transport facility makes it difficult and time-consuming to approach government health personnel located distantly.

In the opinion of the anganwadi worker, the GP members rarely take any interest in women and child health issues. Formal meetings with GP members were neither held nor she is informed about the meetings. According to her, if the Panchayat at the village level is involved in a larger way in issues regarding women and child health, the entire community would benefit. In the absence of health camps and campaigns to generate awareness on health and hygiene, she expressed her concern by stating that in such situations, "how will poor illiterate people know and learn". A female health functionary in the village who has been working there for the past couple of years says, "if the sarpanch takes some interest to see how anganwadis function understand

the difficulties faced by the centre, I would feel happier and satisfied." It was reported that anganwadi workers were burdened with a lot of work, with minimal human resources, and the Gram Panchayat is hardly involved.

Interviews with the officials at the block level revealed that though there is a constant reminder to the Gram Panchayat members to hold meetings jointly with the village health functionaries, and have a health agenda and an open dialogue with them on health and hygiene issues, yet such meetings are rarely conducted resulting in poor hygiene and health of the community. Health is not prioritised as a development concern. Very few are also aware of the different health schemes and entitlements.

Seeking Treatment through Traditional Healers

Quacks popularly known as "kabiraj" are first visited for seeking any treatment. Every village has a 'devataa' or a 'devi', a person who is believed to possess supernatural powers. Such persons are deeply revered and worshipped by the villagers. There is a belief that treatment provided by government doctors are free of cost and will not be effective; hence, quacks are first preferred for treating any illness, before approaching public health providers.

Open Defecation and Sanitation Practices

Open defecation is commonly practised in the villages. Due to scarcity of water and religious reasons, the villagers are not in the favour of attached toilet at home. Most of the time, the constructed toilet space is used for keeping cattle, storing fodder and other unusable items. According to the key informants, the communities do not feel a sense of 'owning their toilets' and therefore, do not maintain them well. In the words of the sarpanch, open defecation is a practice since ages, which she describes as 'abhyas' (practice) that is difficult to give up. Women and girls are hesitant to use toilets attached to their homes. In this context, the Gram Sabhas can play a key role in motivating and encouraging the community to have toilets attached to homes as a sign of good sanitation practice.

Discussion & Conclusion

Panchayats, in the context of the study area, are not empowered with the understanding and mechanisms required for them to play their role in the governance of health and enable communities through their leadership to take collective action for the attainment of better health status in the village. Owing to their lack of proper education and awareness, rural people do not readily accept modern practices and habits related to health and hygiene. Quacks and informal healthcare providers are initially approached for treatment due to lack of public transport facility leading to unnecessary expenditure.

Sensitising the GP members towards health, hygiene, and sanitation is imperative to enable them to play a more proactive role in improving community health and hygiene. It is recommended that health camps should be organised once a quarter in the GP headquarters for addressing the health concerns of the community. Exposure visits to model villages could be one way to generate awareness and develop a sense of responsiveness, and understand the importance of health and hygiene. Government schemes and interventions will bring a positive impact only when the mindsets are changed. Village Health and Sanitation Committee (VHSC) has to be more proactive in its functioning. The woman sarpanch should be extended all support to execute the key issues of health and sanitation, keeping in mind the needs of women and girls. Lastly, initiatives for sensitising the villagers to demand quality health services, especially for women, and evolving a gender-sensitive environment in the village are important, and it requires the involvement of the Panchayats in a bigger way.

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QUALITY OF EDUCATION IN PUBLIC SCHOOLS THROUGH LITTLE LEADERS – LITTLE TEACHERS CONCEPT: A MODEL BY VANDE MATARAM FOUNDATION

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Background

The quality of children of any country is the backbone for the future development. Recognising the importance of investment in the children, the Government of India has launched the Right to Education Act in 2009. Under this Act, every child aged 6-14 years has been given the right to have free and compulsory elementary education. Despite spending Rs. 4385 per children per year under Sarva Shiksha Abhiyan, three per cent of children aged 6-14 years were out of schooling in year 2016 and this percentage increases as the age of child increases. In the year 2017, 14.4 per cent of children aged between 14-18 years were not enrolled in any school or college. At the age of 14, only 5.3 per cent of children were not enrolled, but by the age of 17 years, this percentage quadruples to 20.7 per cent and further increases to 30.2 per cent at 18 years.

The main reason for many young children not progressing to secondary school after completing elementary schooling, as studied by ASER over the years, is that completion of elementary schooling fails to guarantee even foundational reading and simple arithmetic skills. Majority of youth who had discontinued their studies said the reason of doing so was 'lack of interest'. So why there is lack of interest in schooling? ASER (2016) found that 27 per cent children in standard VIII were unable to read a standard II level text and 57 per cent were unable to do simple division taught in standard IV. These learning deficits were observed across all grades and it got accumulated with each grade. So, in such a situation where a child who is unable to read and do simple arithmetic, how he/she can accomplish the curriculum of standard VIII that includes algebra, science, and geography?

In addition, the teachers are briefed to complete the course curriculum in traditional teaching methodology and while doing so, they are able to teach/mentor only top students of the class, whereas majority of students are left without getting

their needs and interests addressed. Hence, the majority of students are compelled to discontinue their studies. There is no mechanism within our school system to effectively address the needs of children who have fallen behind. Keeping in view the above-mentioned issues of education in India, Vande Mataram Foundation (VMF), a private educational, research and training centre located in Kalwakurthy, Nagarkurnool district of Telangana, has made an impressive effort to improve the quality of education in government schools, especially in rural areas, by evolving scientifically validated teaching methodologies. Therefore, CHRD, NIRDPR has made an effort to carry out a case study on the processes and activities of Vande Mataram Foundation.

Objectives of the Case Study

The main objective of this case study is to document the efforts made by Vande Mataram Foundation to ensure quality education in public schools, especially in rural areas. The specific objectives are as follows:

1. To understand the pedagogies developed by Vande Mataram Foundation to reduce the growing gap between expected and possessed competencies of students.

2. To document the process of activities carried out by Vande Mataram Foundation in order to bring qualitative improvement in the educational competencies of students of public schools.

3. To assess the feasibility of this teaching model for recommendation purpose.

Data Collection: The information for the case study was collected by using mix method. In-depth interviews with senior officials, staff members, and students who were currently residing in the campus of Vande Mataram were conducted and secondary sources such as reports and documents available at Vande Mataram office were also used. The data for the present case study was collected from the office of Vande Mataram Educational Research & Training Centre (VERTC)- Aksharavanam located in Kalwakurthy, Nagarkurnool district.

About Vande Mataram

The overall objective of this organisation is to improve the quality of education among the children of public schools, particularly those studying in classes VI - IX. To achieve this objective, three basic skills, i.e., language, logic and life skills (LLL model), which are essential for any child to grow in the academics were focussed However, the specific objectives of the Vande Mataram Foundation are as follows:

1.   To improve the language skills thereby enabling the communication skills.

2.   To improve the logic skill for cultivating computational and learning skills, and

3.   To improve the life skills among children to inculcate values, ethics, teamwork, leadership and management skills in them.

Three Essential Learning Skills:

To improve these three essential skills among the children, this organisation has developed a Learning Enhancement Programme that focuses on the importance of language, logic and life skills among the children for academic growth and ways to substantially improve skills in every child with minimum input (cost) support.

1. Language Skills: The language skill here refers to a child's ability to read, speak and understand a text. Reading and ability to understand a text is the first and fundamental step to climb up in educational attainment. However, we know that 25 per cent of children aged 14-18 years in India are unable to read the text in their native language. Therefore, language skills are essential. To improve language skills, this organisation focuses on building reading habits among children by motivating them to read books of their own interest/choice at their own speed, with no time-bound. Unlike the conventional teaching method, this model (learning enhancement programme) recommends that we neither demonstrate the behaviour of correcting the mistakes of children nor ask them to recollect what they have remembered while reading the book. This helps in building reading habits, thereby improving language skills. Majority of students at Aksharavaram have read, on average, 100 books. Once the language skills are built-up, it boosts the confidence of children and helps them in communicating/presenting things in a better way.

2. Logic Skills: A child has to learn logical skills simultaneously in the process of

learning language skills. Logical skill means the ability of a child to understand the numbers' relationship, in other words, computational skills. It is a universal finding that most students report mathematics as the most difficult subject among all subjects simply because they fail to understand the numerical relationship or computational complexities of numbers. The inability to understand the numerical relationship creates a psychological fear in the child about the numbers, which slowly get translated as a fear of gland in child's brain. As a result, the child stops participating in teaching and learning process, and keeps himself disconnected from the classroom environment. So, the major challenge before academicians, researchers and policymakers is to develop a plan of action to remove the fear of numbers or mathematics from a child's brain.

Accordingly, overcoming the fear of math or numerical relationship and providing a conducive learning environment to the children were the major agenda of this organisation. To overcome the fear of numbers' relationship, Vande Mataram has developed a scientific reliable tool called **Minimum Numerical Skills (MNS) test**, consisting of 40 numerical questions at the level of students of classes VI - IX. Several series of this test have already been developed. The MNS test has also been validated by State Council of Educational Research and Training (SCERT). After achieving a certain level of proficiency in MNS test, students are promoted to **Minimum Learning Abilities- Math (MLA-Math)**. Like MNS test, MLA test is about improving the essential mathematical capabilities and confidence of students so that he/she can connect himself/herself with the classroom teaching environment. Once you have overcome the fear of numerical relations, your confidence and interest in mathematics increases and you tend to learn more about mathematics in the classroom.

3. Life Skills: Ethics, values, teamwork, leadership skills, and management skills are the fundamental skills for any student to become a good learner. Therefore, Vande Mataram focuses on the above-mentioned skills by organising Balasabha, arts activities, and sports and games. Students themselves organise Balasabha.

Methodology to Implement Learning Activities:

Although Vande Mataram has recognised the importance of all three Ls, i.e., language, logic and life skills, due to several constraints, at present, the programme is modeled on improvement in mathematics and logic skills of the students. Therefore, to
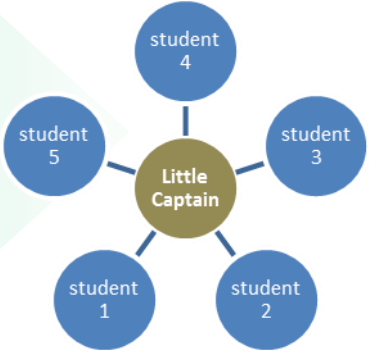
impart the logical and mathematical skills among the children, Vande Mataram has evolved following innovative strategies:

Fearless Learning Environment: Based on research, review of literature and their own experiences, Vande Mataram felt a need for drastic change in the children's learning environment where they learn skills and abilities. Therefore, Vande Mataram has designed such a learning environment for students where they can feel free and learn by themselves at their own speed and will not solely depend on teachers. This design basically focuses on personalised learning and self-assessment.

How to create fearless learning environment: Studies have mentioned that the traditional way of teaching in the Indian context has not been effective mainly due to huge variation in competency levels of the students, and hence to reach out every student of the classroom by class teacher is not possible. Due to this, many students in the classroom are left with their unaddressed doubts which further generate frustration in them. So, this creates a rigid and distress kind of learning environment in the classrooms and generates fear among students to ask the questions which results into demotivation. To get away from this traditional black board teaching and distressed learning environment, Vande Mataram has introduced a system of learning through peer groups, which is called as Little Leader – Little Teacher (LLLT) method. In this method, a select group of students will work as teacher/leader for their own classmates and will help them in learning or solving numerical/mathematical problems, in case they are unable to solve the problem by themselves. The mode of operation of this method is detailed below:

Formation of Teams, Groups and Houses

Since learning through peer groups is central to this teaching methodology, the selection of peer groups according to their levels of ability is imperative. To select these peer groups, the first step is to carry out a 'baseline test' at school level. This test consists of 50 questions representing 50 different types of minimum learning abilities. Based on the score obtained, students are categorised into different levels of abilities, and accordingly receive treatments to improve skills. Students are further sub-divided into teams, groups and houses on the basis of different scores. Following is the methodology to form Teams, Groups and Houses at school level.

Teams	Groups	House
5-6 students form a team and most academically advanced student of team is selected as Little Captain (LC).	Similarly, 5-6 teams form a group and most academically advanced student among them is selected as Little teacher (LT).	A house is formed with two groups. The most academically advanced student of the house is selected as Little Leader (LL).

In addition, a facilitator (for every 200 students) at school level is also selected to manage the overall learning environment. The facilitator also interacts with other facilitators at school level in order to answer the questions left unanswered by little leaders. This entire structure creates a very healthy and fearless environment for the students to learn from each other at their own pace of learning.

How this structure works

As mentioned earlier, the structure has been evolved in such a way that the one student learns from other. However, if a student himself/herself is not able to solve a question, he/she will first approach his/her team members. If they are unable to answer, he/she will approach little captain. If little captain is not able to answer, he/she (LC) will approach other little captains and they, as a group, discuss among themselves to find out solution. If they are unable to find the answer, LC will approach his/her Little Teacher (LT) and discuss. In case this little teacher is unable to solve the problem, he/she (LT) will contact other LTs and try to find out the solution. However, if solution still is not found by LTs, this LT will approach his/her Little Leaders (LL) and if even he/she fails in answering the question, the other LLs can be approached and together they can find out the solution. Ultimately, if all LLs are unable to answer, all LLs can discuss the problem with facilitator who is at school level. This method

provides eight opportunities/options for a student to get the answer of his/her question compared to only one in traditional method of teaching.

Self-assessment as a tool to improve Numerical and Mathematical abilities

The best part of this learning model is that it doesn't focus only on how to create enabling environment for students to learn but also provide a scientific way for analysing the learning achieved, abilities acquired and the abilities which they need to gain. In addition, through this scientific method, the speed of learning can also be assessed and hence, one can project the time required to learn any specific skill.

Impact of the Intervention (Model)

The success of any intervention or model is recognised if the outcomes of the intervention can be measured and it has the quality of reliability and validity. As far as the measurable outcome is concerned, the secondary data provided by Vande Mataram shows that there is significant improvement in basic mathematical skills of the students during one year of course. Figure 1 shows improvement in mathematical learning abilities over a period of one year among the students of different schools where this model was carried out and measured during 2016 to 2017. On average, the basic mathematical skills among the students of different public schools have increased from 3-4 to 10-12 on numbers out of 50 in one year.
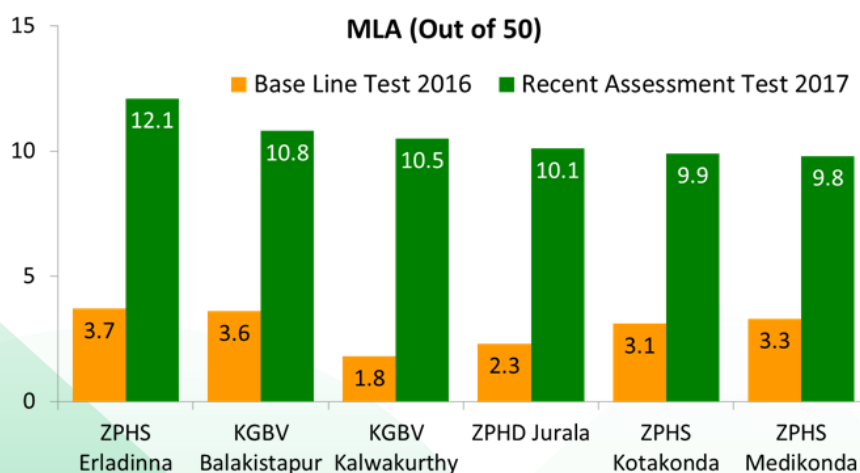
Similarly, improvement in minimum numerical skills among the students of classes III-IX during 2017-2018 has increased from an average of 0.24 -5.57 at the time of baseline in 2017 to 3.71-28.57 skills in 2018 (shown in Figure 2). So, the impact of the teaching methodology evolved by Vande Mataram on improving the quality of education is clearly visible.

Class wise MNS: ITDA RCVM

MNS out of 40

Class	Recent Assessment Test, 2018	Base line test, 2017
III	3.71	0.24
IV	10.88	0.39
V	18	1.37
VI	19.14	1.42
VII	24.24	1.73
VIII	25.81	3.48
IX	28.57	5.57

Recent Assessment Test, 2018 — Base line test, 2017
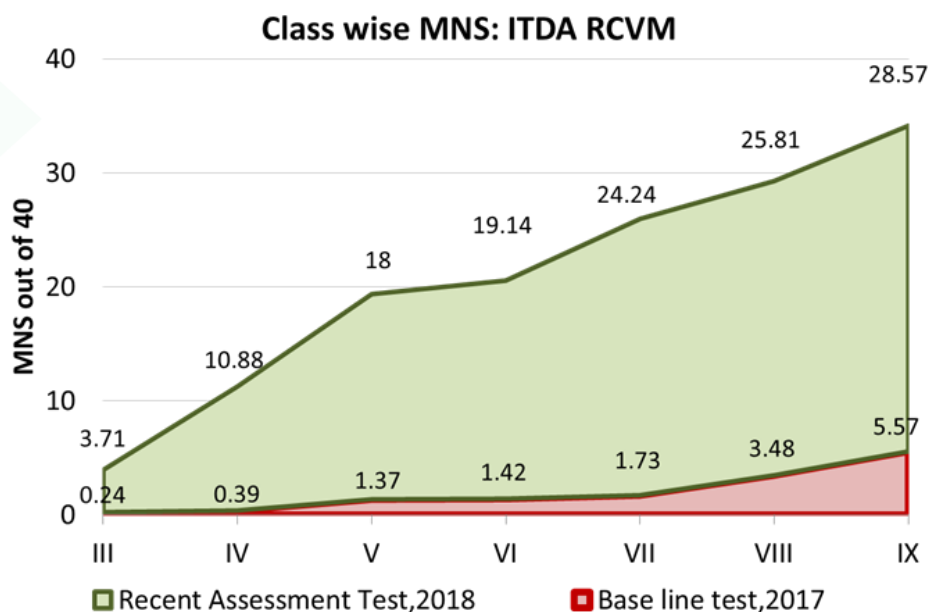
A few of in-depth interviews were also conducted with government school students of classes III to IX who were campus resident of Vande Mataram Educational Research and Training Centre. These students have sought special permission from their school authority to be allowed to continue education under the guidance and mentoring of VERSTC. All of them were found to have high motivation and aspirations for their future. Some of the basic questions such as, "How do you feel about VERTC?", "What did you learn here?", "How it is useful for you?", and "What you want to become in future?" were asked to them. A few of verbatim of the students in response to questions are as below:

"My friends are my teacher; that is the best part of this school. There is no fear of teacher, who sometimes used to beat us. We play together. We get newspaper every day to read, lots of books are available here, and people are very friendly. I don't feel afraid in asking questions to my friends. I was scared of reading English but now I can read it very easily. I want to become an English teacher." - a class V student

"I had fear of math as I was very poor in the subject. In school, I was afraid of my math teacher as he used to beat me if I don't solve the question. Because of this fear, I stopped interacting with him. I was just attending classes. Whatever he taught, I could not understand anything. Now, I started liking math and have learnt how to solve the questions as I get lot of support from my friends and others. We get lot of practice booklets. I want to be a scientist." - a class IX student

Director General of NIRDPR, Hyderabad interacting with students at Vande Mataram Educational Research and Training Centre

Outreach of the programme: The secondary data provided by Vande Mataram shows that so far 74,000 students of Telangana and Andhra Pradesh have been benefited by this programme. In addition, 1600 teachers of 1008 public schools have also been trained on new pedagogies of teaching methodology developed by the organisation. The model has been successfully implemented on demand basis in the public school of Telangana, Andhra Pradesh, Karnataka and Maharashtra.

Conclusions

Based on the participatory observations and in-depth interviews with staff and students of Vande Mataram at two different times, it may be concluded that the Vande Mataram, to a large extent, has been successful in achieving the goals of improving the quality of education in the government schools, keeping in view the limitations of the

Facilitators evaluating the answer sheets and some of students practicing the test (right); Students learning the dance

case study. Vande Mataram has done good research on the quality of education in India, and therefore understands both macro and micro issues of education in detail. Vande Mataram has spent significant time in developing a new teaching methodology with the support of education experts, and validated this methodology repeatedly before implementing it in public schools. The proposed model of teaching method is child-friendly; there is no traditional teacher in this method, rather students themselves are teachers for each other. The method is called as "One Facilitator-Many Student Teachers-Many Students" instead of traditional method of "One Teacher-Many Students." The proposed model of teaching mainly focuses on the most important issues of school education, i.e., reasons for 'discontinuation of study' and 'lack of interest in the study'. The fear of mathematics has been cited as one of the important reasons for lack of interest in study, which further leads to discontinuation of study among students. That is why Vande Mataram has decided to help the students acquire basic essential learning abilities in mathematics, which will help them to stay connected with classroom teaching, and thereby continue their schooling. The learning materials and its implementation procedures are scientific and measurable. The proposed methodology is cost-effective. The success rate of the programme has been appreciable, due to which district administrators of different States have offered to implement this teaching methodology in their government schools to improve the quality of education and retention of the students. Based on the above discussion, it may be concluded that this teaching methodology has the potential to improve the quality of education in public schools of India.

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INSTALLING SOLAR ENERGY IN GOVERNMENT SCHOOLS OF RURAL TELANGANA TO ENHANCE LEARNING OPPORTUNITIES OF STUDENTS

S. Ramesh Sakthivel and Mohammad Khan

Centre for Innovations and Appropriate Technologies for Skills & Jobs

Introduction

The Annual Status of Education Report (ASER Rural) – 2018 calls for introducing proactive steps to improve the status of education in rural schools of India. According to the study, enrolment of students in rural schools has been above 96 per cent since 2010. However, low attendance rates of 60 per cent, especially in schools in States such as Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh and Manipur, is still a major concern. Also, learning level tests conducted show that only a quarter of the students passed the test.

Over the years, it has been established that it is important to ensure the availability of basic amenities in schools for improving the overall learning ability of children, rather than merely improving the quality of teaching. Although many of these initiatives are being taken up to address this issue, provision of electricity for ensuring lights and fans in classrooms has not been given adequate attention.

Contrary to the most commonly used phrase "Let there be light," which reinforces the realisation of better knowledge and wisdom, schools in most parts of India are reeling under darkness. As a result, children as well as the teachers stay in very uncomfortable classroom environments both in summer due to the hot weather as there are no fans installed in the schools, and in winter due to lack of lighting facility when the opaque wooden window shutters have to be kept closed due to cold.

The State-wise data of electrification for primary and secondary level schools across India prepared by the District Information System for Education (DISE) for 2016-17 gives credence to this issue. According to the data, the percentages of schools with access to electricity in India in the primary and secondary school categories are about 64.4 per cent and 91 per cent, respectively.
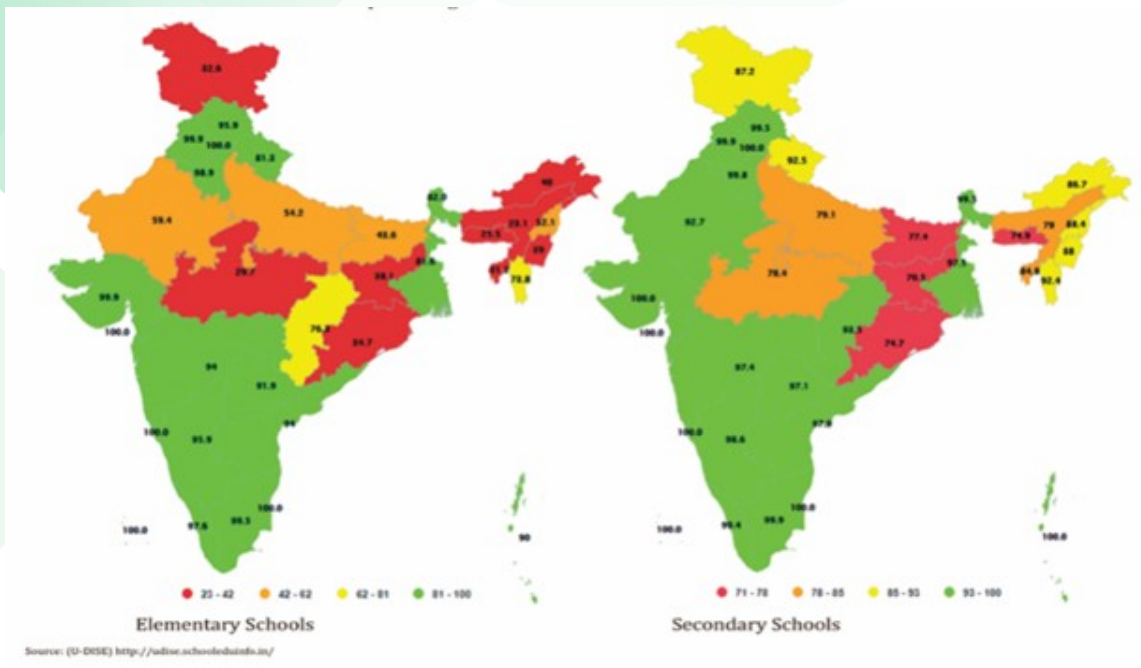
Figure 1: State-wise Percentage of Schools Electrified till 2016-17 in India

The Initiative

Considering these issues and encouragement of Padma Bhushan awardee Late T.L. Sankar, IAS (Former Energy Secretary, GoI), the National Institute of Rural Development and Panchayati Raj (NIRDPR) promoted solar installations for lighting and cooling purposes in 21 schools of Talakondapally mandal of Mahabbobnagar district and Kadtal mandal of Ranga Reddy district of Telangana. This initiative was funded by Shri. Malli Varanashi, an NRI based in the USA.

Although the 21 schools had grid electricity connections, the situation was the same as other government schools in which only office rooms had lights and fans. Due to lack of funds, some schools were not paying electricity charges that ranged from Rs.5,000-10,000 per year. Considering these factors, with the help of the State Education Department, solar systems ranging from 0.3KW to 2KW capacities were installed at anganwadis and primary schools.

Impact of the Initiative

In order to meet the power requirements, rooftop solar panels have been

connected to a battery system and an inverter in these schools. All the classrooms in these 21 schools have been provided with two lights and two fans. After experiencing the benefits, some schools have totally disconnected the regular grid electricity connections and managed their power supply with solar energy system.

Children, who are predominantly from poor families, were overjoyed to see lights and fans in their classrooms. Students in schools having smartboard facilities also expressed that they can use the smartboards without any power interruptions. This initiative has also given an opportunity for the children to realise the potential of solar energy.

Although solar energy installations require higher level of initial investments, the overall advantages it offers are immense. At present, the off-grid solar systems of 1KW and 2KW capacities consisting of batteries, wiring, lights and fans would cost approximately Rs.1.5 lakh and Rs.3 lakh, respectively, per school. On average, 1KW and 2KW systems can provide power for 10 classrooms and 20 classrooms, respectively.

Conclusion

For supporting the repair and maintenance of solar power systems and to ensure trouble-free maintenance in schools, a central core team with required skills at the district level can be created. In addition, creating a school or district level corpus fund from the amount being spent for paying electricity bills can be reserved for meeting the cost of replacing batteries and solar panels. On average, batteries need replacement after five years while solar panels have a long life span of 20 years.

This initiative stands as an example of how governments can ensure proper learning environment in schools. Apart from the governments, donors and corporate social responsibility initiatives of companies can consider replicating this initiative. NIRDPR is willing to offer the much-needed technical assistance to promote this noble initiative.

Table 1: Capacity, Estimated Energy and Revenue Generated by Solar System Installed in Schools (21)

S. No.	Name the School	Capacity of Solar System Installed in Schools	Estimated Energy Generated in Units Per Year	Revenue Generated Per Year (at Rs.6/unit)
1	Talakondapally Primary School	2 KW	2880	17,280
2	Talakondapally Anganwadi	300 Watt	432	2592
3	SadakThanda Anganwadi	300 Watt	432	2592
4	Chepunuthala Primary School	1 KW	1440	8640
5	Chepunuthala Anganwadi	300 Watt	432	2592
5	Chukapoor Primary School	1 KW	216	1296
6	Chandradana Primary School	2 KW	2880	17,280
7	Velijole Girls High School	1 KW	1440	8640
8	Velijole Primary School	1 KW	1440	8640
9	Antharam Primary School	1 KW	1440	8640
10	Yadaiahpally Primary School	300 Watt	432	2592
11	Chowdripally Primary School	1 KW	1440	8640
12	Medakpally Primary School	1 KW	1440	8640
13	Mudval Primary School	1 KW	1440	8640
14	Medven High School	2KW	2880	17,280
15	Settipalli Primary School	1 KW	1440	8640
16	Akuthotapalli Primary School	1 KW	1440	8640
17	SingamPalli Primary School	1 KW	1440	8640
18	Ekvwapaly Primary School	1 KW	1440	8640
19	Solar Palli Primary School	1 KW	1440	8640
20	Nyamathpur Primary School	1 KW	1440	8640
21	Muktamadaram Primary School	1 KW	1440	8640
Total Energy Generated Per Year & Revenue (@ Rs.6/unit)			**30,744**	**1,84,464**

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BUILDING COLLECTIVES FOR GENDER EQUALITY AND WOMEN'S HUMAN RIGHTS: EXPERIENCES OF THE GENDER JUSTICE PROGRAMME LED BY MPSRLM

NRLM

Context

Since June 2011, the National Rural Livelihoods Mission (NRLM) is building on the strength of collective voice and agency of women, and strengthening institutions of the poor women to address some of the structural and institutional constraints rural women face in realising their right to livelihoods. With this goal, MPSRLM focuses strongly on creating institutions of poor women, building their social capital to claim social and economic rights and entitlements, leveraging economic benefits from collectivisation and enhancing their collective agency for gender equality and empowerment of women, as envisioned in the Sustainable Development Goals (SDGs) and other policy mandates of the Government of India.

Madhya Pradesh Government has over the years shown its commitment to gender equality and empowerment of women, including the endorsement of a State Policy for Women 2015. Yet, gender inequality and its manifestations in violence and discrimination persist and are reflected in core indicators related to the status of women in the State, such as, the unequal sex ratio of 931/1000 against a national average of 948/1,000, literacy among women at 59.4 per cent, infant mortality rate in rural areas at 54 as against 44 per 1000 live births in urban parts of the State (NFHS - 4), and workforce participation in the State for rural women at 39.3 as against the total rural workforce participation rate which is at 47.0 (census 2011).

Empowering women and their collectives formed by the MPSRLM contribute significantly towards addressing some of these glaring gender disparities in rural areas where the Gender Justice Programme intervention is part of the overall interventions. To achieve this, a strong gender equality and women's rights approach is adopted at each stage of the Programme, and at every level, an institutional platform therein ***to overcome gender barriers and access opportunities and resources that enable their empowerment and improvements in their status.***

In partnership with ANANDI as a technical support organisation, MPSRLM is working towards strengthening the gender equality goals through the Gender Justice Programme (GJP) for empowering women and their collectives.

Core Components of Gender Justice Programme

The GJP comprises a range of approaches and strategies to initiate dialogue on gender equality among women to be able to engage with other social institutions to identify and take action for social transformation.

- Strengthening women's leadership and women's collectives at Village Organisation (VO) and Cluster Level Forums (CLFs) for gender equality and women's human rights

- Capacity building of the community resource person – Samata Sakhi, Samata Samanvayak for gender equality actions

- Engaging SHG members and community through the Gender Point Persons and the Social Action Committee advancing gender-transformative actions

- Supporting the Gender Action Plan process

- Forming Gender Justice Centre/Lok Adhikar Kendra in the leadership of the CLF

- Negotiating and organising Block level Gender forum

- Building decentralised MIS of the CLF

Community Resource Persons trained in various thematic and functions to deliver last-mile services and capacity building has been a key strategy of the NRLM. Women SHG members have been trained in mobilisation, bookkeeping, para-veterinary services, health and nutrition, WASH, and agriculture. Similarly, Samata Sakhi and Samanvayaks are identified and nominated for community training and collective action by the CLF.
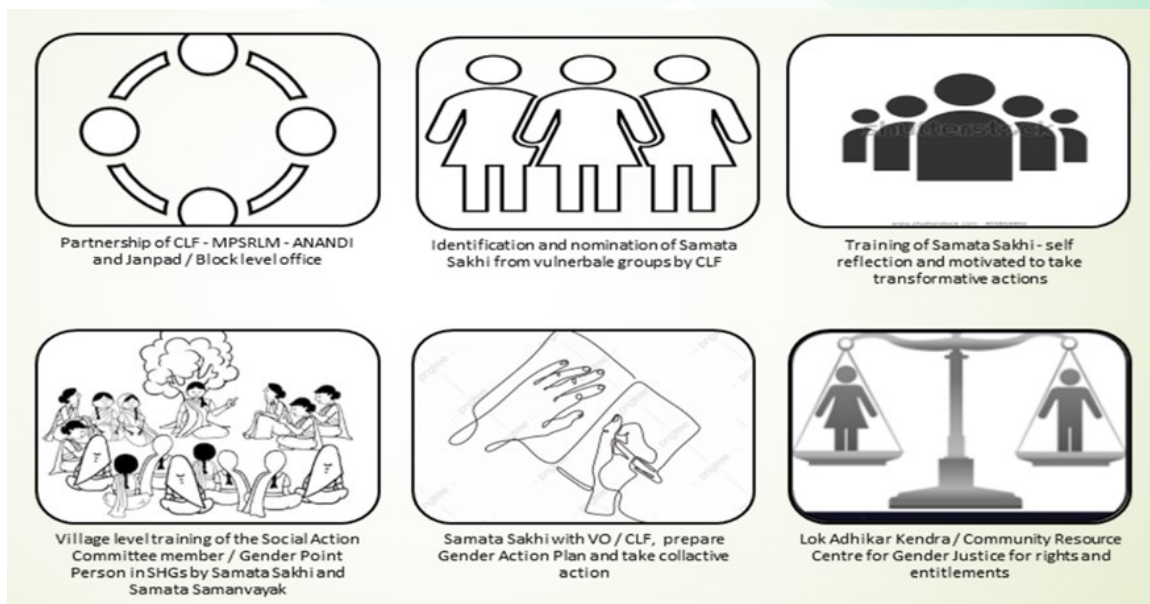
Figure 1: Gender Justice Programme Strategies

Key Steps of the Gender Justice Programme

These women leaders are often leading their struggles or supporting other survivors of violence and social denial. Thus, they are not only compassionate but also committed to work towards social transformation.

As community resource persons for gender equality, their role is to build and strengthen the agenda of women's collectives in a rights-based approach to advocate improved access to rights and entitlements through the Gender Justice Programme. There are over 250 Samata Sakhis and Samata Samanvayaks trained to reach out to nearly 1400 Village Organisations of 60 Cluster Level Federations. The trained Samata Sakhis further reach out to hundreds of Gender Point Persons in each of the villages, which was disturbed due to the second wave of the COVID 19 pandemic followed by the devastating floods in the northern districts of Madhya Pradesh, including Sheopur.

The Samata Sakhis and Samanvayaks are trained and equipped with participatory tools to initiate discussion around the social construct of gender, the institutions of socialisation, gendered division of labour and decision-making at the household level, impact of the patriarchal mindset, discriminatory practices, systems and structures that perpetuate inequities of power, and opportunities in all formal and

informal institutions. This process helps women understand the normative practices and barriers created by social norms. Regular training, and a plan for change in self and society lead to collective action.

Samata Sakhis and Samanvayaks coordinate all interventions around gender for the entire cluster with a special focus on enabling and enhancing the role of the Social Action Committee at the village and cluster level organisations. The Gender Repository on the website of the MPSRLM http://www.mpsrlm.com/ under the section of Training Modules contains the training modules that enable dialogue around gender relations and issues in the Village Organisations.

Often the unresolved issues of entitlements or civic amenities are raised to the level of Gram Sabha and Gram Panchayat. They also exercise citizenship by taking it up to the Jan Sunvai (public hearing) at the level of the Gram Panchayat and document the process in their Gram Sangathan (VO) records for the SAC processes.

The following instance illustrates the role of Samata Sakhi and Samanvayak. On 29th April, 2021 Sudamabai (name changed), a survivor of domestic violence, shared her predicament in the meeting of Suraj Gram Sangathan (VO) of the Sagar CLF, Sheopur where the office-bearers as well as the members of the Social Action Committee were present. Sudamabai and her natal family had made several attempts to make peace with her alcoholic husband and stop his drinking problem. However, during the pandemic, the violence increased manifold. In January 2021, Sudamabai's husband and in-laws deserted her without any support and separated her two children from her.

Due to mobility restrictions during the second wave of COVID 19, the President of the VO and members of the SAC contacted the family as well as the VO where the in-laws and husband belong to, over telephone. This being the VO of the neighbouring CLF, they approached them as well.

To begin with, both the VOs ensured that Sudamabai could contact her children over telephone. The VOs also briefed each other about the situation and jointly with the support of the SAC members of both the VOs decided to have a conversation with the husband. After consistent negotiation and persuading for over a month, Sudamabai's husband assured that he would quit drinking, not abuse his wife and children or be violent with them.

They informed Sudamabai and her parents that they could take her to her marital home when SAC members of both VOs were convinced. Since May 2021, the VO members of both the villages continued contact with her marital home to safeguard them.

In another similar incident in village Dalarna Khurd of Sheopur, Simlabai, a distressed woman, asked for support from members during a VO meeting. Her husband was a *haali* (practice of bonded labour hired for ploughing and other agricultural activities) but was forced to do all other errands that run for several hours of unpaid and exploitative jobs. The family was compelled to assent to this practice as they had borrowed money for family emergencies during the second wave of COVID.

The members of the Social Action Committee of the VO looked into the matter and recommended that Simalabai's application for loan may be approved considering the socio-economic condition of the household. On 5th May 2021, the VO approved Simlabai's loan application for Rs.25,000. The VO office-bearers and the SAC members accompanied Simlabai when she went to the landowner with the money to release her husband from the informal contract as *haali*. In their conversation with the landowner, the VO representatives made it clear that Simlabai was returning the amount they had borrowed, adding that to keep someone "bonded" for the money given was illegal. This intervention set an example not only for the landowner and other villagers to stop such illegal practices but also for the borrower, the SHG and VO members that they could oppose and speak up against such undue conditionalities. Also, they learnt that they could use collective resources to rescue their members and their families from such oppressive social practices prevalent in society.

The trained Samata Sakhi and Samanvayak support the women and marginalised communities to improve access to rights and entitlement in the community, promote actions for gender equality and challenge the denials and discrimination faced by women. Monthly meetings of CLF and VO are the regular platforms for planning and sharing. While the schemes and programmes of State are important contributors to the livelihoods of poor and marginalised households, often the access to these schemes and programmes is delayed and denied due to the bureaucratic system and faulty identification norms and criteria.

Functions of Gender Justice Centre

Lok Adhikar Kendra (LAK) or the Gender Justice Centre (GJC) is an institutional mechanism led by all the CLFs at the block level collectively to create space for women in public or formal institutions, something that has been uncommon. They negotiate with the block level administration to create space for the women and other rights holders from marginalised communities to access systems and institutions equally, without fear.

LAK Management
- Opens twice a week (Tuesday and Friday)
- Managed by 2 people every week (from amongst - Samta Samanvayak &Samta Sakhis)
- Accompany rights holders

Case
- Cases not resolved at the village level are escalated to LAK by Samta Samanvayaks/Samta Sakhis or SHG/VO/CLF members
- Walk-in cases brought directly by community members
- Cases can be of all types such as water, ration, pension, land, domestic violence, identity cards, etc.

Monitoring Process
- All cases are documented in the LAK register and the GJC App
- Monthly report is prepared and presented to the CLF
- Follow-up of every case is done till resolved
- In case of excessive delays in resolution, pending case is escalated to the Block Gender Forum

Block Gender Forum
- Quarterly meeting hosted by the CLFs of the block collectively
- Hosted by the Block CEO and anchoring CLF
- Support in resolving bulk cases
- Strategies for setting up accountability

Figure 2: The Mode of Functioning of Gender Justice Centres

Experiences of the LAK in Niwas block of Mandla district, and Sheopur and Karahal blocks of Sheopur district in Madhya Pradesh show that these actions enhance women's citizenship and collective agency for rights and entitlements. Also, it provides women with collective power and position to initiate action for social justice and equality for women and marginalised communities in society.

Women along with Samata Sakhis approach the LAK located within the premises of the Janpad – the block administration - when an issue or complaint is not addressed. It is escalated to the level of LAK for the block administration to respond to the complaint or demand.

The Samata Sakhis at the LAK support and accompany women or the right holder to the department concerned for redressal. The experience of negotiating and advocating with the administration empowers the claimant and also makes the system accountable to the citizen.

The Block Level Gender Forum held every quarter comprises representatives from the line departments and the leaders of the CLFs. These meetings are chaired by the CEO, Janpad and the anchor CLF of the LAK. The block gender forum reviews the work of the LAK and reflects on the types of complaints or cases received at the LAK.

It has been significantly responsive to the pending cases with respective departments. Examples of the block gender forum of Sheopur and Karahal are very encouraging, where the block officials took progressive measures in resolving the pending matters of the social security pensions for physically challenged persons and the special scheme of "Kuposhan se Jang" for the Sahariya – PVTG (particularly vulnerable tribal groups).

The Gender Justice Programme is a comprehensive strategy for rural women's right to livelihoods with dignity and empowerment of their collectives for sustainable livelihoods with strong grassroots institutions for social justice. The data below shows how LAK has enabled access to entitlements critical for livelihoods that were delayed and not sanctioned in time. While the resolution of a complaint is an encouraging process, unresolved cases or complaints uncover the irregularity in service delivery of rights and entitlements. This also exhibits the administrative apathy and the complexities in implementation; most importantly, the VO and CLF women pose the deep-rooted gender inequities that deny them their rights and entitlements.

Launch of Gender Justice centre

Table 1: Lok Adhikar Kendra Data for Sheopur District, Madhya Pradesh (up to Sept 2021)

S.No.	Type of Cases	Sheopur since Oct 2020	Karahal since June 2020	Total Cases – Sheopur District	Complaints Resolved
1	Food Security: PDS and ration card related	232	23	255	68
2	Food and nutritional Security for PVTG	75	86	161	152
3	National Social Assistance Programme and other schemes	70	27	97	82
4	Violence against Women and Children	20	5	25	10
5	Identity card / certificate for entitlements	67	67	134	113
6	Land and Housing	83	60	143	59
7	Community issues	57	2	59	6
	Total	**604**	**270**	**874**	**490**

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SOCIAL AUDIT OF NATIONAL SOCIAL ASSISTANCE PROGRAMME IN ANDHRA PRADESH

Srinivas Sajja and C. Dheeraja
Centre for Social Audit

Introduction

Government of India (GoI), on Independence Day, 1995 introduced the National Social Assistance Programme (NSAP) as a fully funded, Centrally-sponsored scheme targeting the destitutes who were identified by the States and Union Territories (UTs) to provide basic level of financial support. From the year 2007, the scheme was expanded to cover all eligible persons Below Poverty Line (BPL).

The scheme for senior citizens was renamed as Indira Gandhi National Old Age Pension Scheme (IGNOAPS). NSAP was expanded in 2009 to cover more vulnerable groups. In February 2009, Government of India approved pension to BPL widows in the age group of 40-64 years. This scheme was named Indira Gandhi National Widow Pension Scheme (IGNWPS). Government of India also approved pension to individuals aged 18-64 years falling under the BPL category, and suffering from severe or multiple disabilities. This scheme was named Indira Gandhi National Disability Pension Scheme (IGNDPS).

NSAP at present includes four sub-schemes: a) Indira Gandhi National Old Age Pension Scheme (IGNOAPS), b) Indira Gandhi National Widow Pension Scheme (IGNWPS), c) Indira Gandhi National Disability Pension Scheme (IGNDPS) and d) National Family Benefit Scheme (NFBS).

Social Audit of NSAP

Social Audit is a process in which, details of the resources, both financial and non-financial, used by public agencies for development initiatives are shared with the people, often through a public platform such as the Gram Sabha in rural India. Social audits allow people to enforce accountability and transparency, providing the end users with an opportunity to scrutiny development initiatives.

It has been mentioned in the chapter 6.1 NSAP guidelines that social audit is mandatory to fulfil the gaps and reach the benefits to the target people. Participation of the public in decision-making and policy execution is one of the tenets of good governance. If the members of the society, particularly the stakeholders of a scheme, are involved in scrutinising and evaluating the implementation of the scheme at the field level. The learning can help in implementing the scheme in a meaningful manner and the shortcomings, if any, found and brought to the fore, could be eliminated.

It is for this purpose 'social audit' is essential in the implementation and monitoring of the schemes under NSAP. Social audit not only leads to the refinement of the schemes but also enhances transparency and accountability, besides redressing grievances of the beneficiaries. By promoting awareness, social audit enhances the reach in implementing the scheme as more people will be able to get the benefit of pensions.

Social Audit of NSAP in Andhra Pradesh

A focus group discussion with beneficiaries in progress

Social Audit in Andhra Pradesh (AP) is being conducted by the Andhra Pradesh Society for Social Audit, Accountability and Transparency (APSSAAT). According to the NSAP guidelines, APSSAAT has been conducting social audit of the pension scheme in

the State since 2012. In this connection, APSSAAT has signed an MoU with SERP (Society for Elimination of Rural Poverty), which is the nodal agency to implement the pension schemes in Andhra Pradesh (Pensions in AP are being disbursed under the name, YSR Pension Kanuka). Along with the four categories of pensions in NSAP, Government of Andhra Pradesh is giving pensions to 12 categories of people, along with a top up of Rs. 2,250 per month. All the pensions being disbursed were socially audited once a year along with MGNREGS social audit.

The process of social audit for NSAP is similar to MGNREGS and it is done along with social audit of MGNREGS in Andhra Pradesh. Prior to the conduct of social audit, the social audit team identifies the Village Social Auditors (VSAs) in the community and orient them on the implementation process of pension schemes, list of documents and registers required to conduct the social audit, process of disbursal of pension money to beneficiaries and grievance redress mechanisms. These VSAs are trained in the social audit processes over a three-day period for carrying out the social audit of MGNREGS and NSAP.

During the training period, the VSAs will get training on the main features of the NSAP, RTI and social audit. Social audit teams also verify and consolidate the NSAP records pertaining to that mandal (block). The social audit team takes the details of the beneficiaries from the service provider, i.e., Tata Consultancy Services (TCS) in Andhra Pradesh, on pension payments made for the last three months before the conduct of the social audit. The VSAs are organised into teams that are headed by Block Resource Persons (BRP). The BRP's role is to help facilitate the social audit verification process at the village level through the VSAs. The teams are then allotted two Gram Panchayats for the conduct of social audit.

The social audit team conducts door-to-door verification in the village, during which they verify the beneficiary's pension book, death list and conduct focused group discussions. Generally, two SHG Village Resource Person women along with one VSA do the door-to-door verification of the beneficiaries in the Gram Panchayat. The social audit team will carry out awareness-building activities like providing information on the rights and entitlements of the pensioners as an important part of the social audit process. After the completion of the door-to-door verification, social audit findings are discussed in the social audit Gram Sabha and further in the public hearing.

The social audit verification process ends with a Social Audit Gram Sabha, which

is scheduled by the MPDO (BDO) through written instructions to the sarpanch. The social audit Gram Sabha has an independent observer not less than the rank of a Tahsildar in front of whom the report as well as the evidence is to be finalised. Further, the social audit process culminates in a public hearing at the mandal (block) level where social audit reports are read out in the presence of the beneficiaries, people's representatives, the NSAP functionaries concerned and senior officers of the government. All social audit public hearings are video graphed and media also covers the event.

Awareness, participation and perception of people on social audit of NSAP in AP:

In AP, awareness regarding social audit in general, and NSAP in particular, is very good as most of the beneficiaries knew about the social audit of pension schemes that happened in their Gram Panchayat. Since pension disbursement happens regularly at a fixed place in the GP, people are able to get their pensions on time. Across the State of AP, people have good awareness regarding the various pension schemes. Since social audit has been happening for more than a decade, majority of the people were aware of the social audit process and as a result, the awareness levels are quite high.

While the participation of beneficiaries in social audit Gram Sabha was high, they could not recollect much about details like what happened, who was the chairperson and whose grievances were discussed during the social audit Gram Sabha. This could be linked to the frequency of social audits as the social audit of NSAP was being carried out only once a year instead of twice a year. The participation of beneficiaries in the block-level public hearings was less compared to participation in social audit Gram Sabha in GP. The attendance in block-level public hearings was not even one-third of the Gram Sabha. Some of the reasons for low attendance are issues of accessibility (transport) are loss of daily wages for travelling to a block, which is quite far from GP and the time/distance of the venue from GP.

People perceive social audit as an important tool in ensuring effective implementation of pension scheme in AP. Due to the focus on transparency and accountability and in view of the large sum involved under various pension categories, social audit, according to them, ensures that ineligible beneficiaries are kept to the minimum. Also, it leaves very little scope for misappropriation or rent-seeking behaviour among the people disbursing the pension.

Challenges for Conduct of Social Audit of NSAP in AP

Human resources and funding are the major challenges for the conduct of social audits of pensions schemes in AP. Lack of manpower is a major challenge in the conduct of social audit as it had to be done along with social audit of MGNREGS. Majority of the resource persons stated that the workload is very high during the conduct of social audit of pension schemes in AP, which definitely has an impact on the quality of the audits done. Lack of proper training on social audit and rejection of social audit findings by Gram Panchayat and Block officials were the common challenges faced during the conduct of the social audit of pension scheme (NSAP). Due to lack of funding support, social audits of pension schemes were discontinued in AP. The last time they did a social audit was during 2018-19 during which they covered 10 per cent of the pensions in each GP. From the year 2019-20, it has been discontinued completely due to lack of funding.

Conclusion

Social Audit unit of Andhra Pradesh, the first social audit unit in the country, has been at the forefront of initiating social audit in several rural development programmes. But lack of support from administrators has forced it to curtail the social audit process in NSAP during the year 2018-19 and stopped it completely from 2019-20 due to lack of funding. However, it was observed that the implementation of the scheme was very good with very few instances of financial misappropriations being reported. This is a direct result of the robust social audit process that was being followed by social audit unit and the awareness generated among the people regarding the programme. During interaction with officials of SERP, which is the implementing agency for pension schemes in Andhra Pradesh, they exuded confidence that the scheme implementation will remain good despite the absence of social audit. But it must be noted that the implementation is good only because of the continuous monitoring taking place in the form of social audit. Recognising the need for institutionalisation of social audits, the Ministry of Rural Development (MoRD) had issued fresh guidelines in November 2019 for carrying out the social audit in NSAP.

(*The study was carried out in one GP each from five districts across the five sub-regional parts of AP. Selected GPs were Taduku from Chittoor district, Billakur from East Godavari district, Betamcherla from Kurnool district, Tripurantakam from Prakasam district, and A.Venkampeta from Vizianagaram district*).

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PROCESS DOCUMENTATION OF SOCIAL AUDIT OF INTEGRATED WATERSHED MANAGEMENT PROGRAMME (IWMP): A CASE STUDY OF ANDHRA PRADESH & TELANGANA

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Introduction

About IWMP:

Integrated Watershed Management Programme (IWMP) is a modified programme of erstwhile Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP) and Integrated Wastelands Development Programme (IWDP) of the Department of Land Resources. This consolidation is for optimum use of resources, sustainable outcomes and integrated planning. The scheme was launched during 2009-10 and is being implemented as per Common Guidelines for Watershed Development Projects, 2008. The main objectives of the IWMP are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water. The outcomes are prevention of soil erosion, regeneration of natural vegetation, rainwater harvesting and recharging of the groundwater table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area.

About Social Audit:

Social audit can be defined as an approach and process to build accountability and transparency in the use and management of public resources. It relies on engagement from citizens and/or Civil Society Organisations (CSOs) to directly and/or indirectly demand accountability and transparency in the public policy and budget cycles. Social audit is participatory, and can be an anti-corruption and efficiency-enhancing mechanism. It is based on the premise that citizens want and have the right to know what the government does, how it does, how it impacts them, and that the government has an obligation to account for and be transparent to citizens.

Social audits are being conducted as a means to empower the people and to facilitate public scrutiny of the implementation of the government development schemes and programme in the utilisation of funds in the prescribed manner and to access their rights and entitlements.

Objectives

1. To use detailed methods of social audit tool in partnership with local NGOs and community members and generate awareness and empowerment through the process. To make clear recommendations based on ground evidence for better implementation of IWMP.

2. To investigate whether transparency and accountability principles are being applied through the delivery mechanism of the IWMP

3. To probe into the social and political dimensions of the implementation mechanism and the related impact on rural communities

4. To ascertain the current practices and processes adopted for the implementation of IWMP.

Methodology

For the proposed case study, two real-time step-by-step procedures of social audit in IWMP (process documentation) was documented from Andhra Pradesh and Telangana.

Study Area

M. C. Palli watershed project, in Chittoor district in Andhra Pradesh, and Satwar watershed project in Medak district Telangana.

Findings

IWMP is a consolidated programme launched in 2009 of erstwhile Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP) and Integrated

Wastelands Development Programme (IWDP) of the Department of Land Resources. This consolidation is for optimum use of resources, sustainable outcomes and integrated planning. The programme is being implemented as per the Common Guidelines of Watershed Development Projects 2008 (Revised Edition 2011).

The main objectives of the IWMP are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water. The outcomes result in prevention of soil run-off, regeneration of natural vegetation, rainwater harvesting and recharging of the groundwater table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area.

The common guidelines for Watershed Development Programme, 2008 (Revised edition 2011), emphasise on 'Social Audits' of IWMP Projects for ensuring transparency and accountability. As per the guidelines, the State government is committed to ensuring the social audit process for transparency and accountability in the programme. It is in the interest of programme implementation to arrange social audits for the works undertaken. Social auditing of a scheme by the primary stakeholders or with the active involvement of the primary stakeholders of the scheme includes facilitation and verification of facts on the ground, while taking into account official records, verification of works and verification by meeting beneficiaries, recording written/oral evidence of beneficiaries, writing the social audit report followed by a discussion on the report in a public assembly in presence of the independent observers.

The Department of Rural Development, Government of Andhra Pradesh is the first department in the country to carry out the social audit process for IWMP projects by SSAAT. The Social Audit process was first piloted in two project areas in Anantapur district in the year 2011.

The main objectives of a social audit in IWMP are

- To promote the empowerment of rural communities directly benefiting from welfare schemes such as the Integrated Watershed Management Programme

- To develop a sense of ownership amongst the beneficiaries towards these schemes by encouraging them to participate in the social audit as well as

training them in the nuances of the process

- To create awareness amongst the rural communities about their rights and entitlements under the schemes

- To serve as a monitoring mechanism to improve the quality of the scheme, and

- To minimise the leakage and wastage of public funds by finding the anomalies and people responsible for the same during the social audit process in the public hearing.

The current case study on 'Process Documentation of Social Audit in IWMP' explains step-by-step social audit process in IWMP and brief findings of the study in both the States as follows:

A.   M. C. Palli Watershed Project, in Chittoor District, Andhra Pradesh

Under Palempalli MWS, the total expenditure is Rs. 7,31,312 and the same amount was spread to over 12 works, namely 10 horticultural works, one each avenue and threshing pond work. Rs. 7,00,825 (96 per cent) was identified as a deviation by the SA team during physical and technical verification. During the public hearing in the presence of the Presiding Officer, the accepted deviation amount was Rs. 3,94,970 (54 per cent) and PIA was insisted to spend the same amount for repairs & replantation, etc. Purchase of desktop system and solar lamps was made as entry point activities for the villagers worth Rs. 1, 80,000. During the social audit period, it was observed that the desktop was used by one of the Panchayat members and except for one solar lamp, the others were not identified. On the Public Hearing Day, Presiding Officers instructed the PIA that desktops would be brought back to the Panchayat office for better education of students in the village and also solar lamps should be installed.

B.   Satwar watershed project in Medak District, Telangana

On the whole, the amount of deviation identified as part of Social Audit was Rs. 85,25,937; out of this, during the public hearing, the amount of deviation accepted by the Presiding Officer was Rs. 35, 89,597 (42.1 per cent) and the amount referred for recovery during public hearing is Rs. 7,46,285 (8.8 per cent).

Conclusions and Suggestions:

Uses of the Social Audit:

The Social Audit has a number of possible uses. These uses include the following:

◊ The Social Audit determines how well the organisation is living up to the mission and values it espouses

◊ Social Audit monitors the social and ethical impact and performance of the organisation and its impact on stakeholders

◊ Social Audit informs the community, public, other organisations and institutions about the allocation of their resources invested in the organisation

◊ Social Audit facilitates the strategic management of organisations, including concern for their influence and social impact on organisations and communities

◊ Social Audit increases the organisation's accountability to the groups it serves and on which it depends

◊ Social Audit provides a basis for shaping management strategy in a socially responsible and accountable way, and identifying opportunities and potential problems before they arise

◊ Social Audit facilitates organisational learning on how to improve social performance.

Benefits of social auditing for government departments.

The following are the benefits of Social Audit[1]:

1. **Increases accountability:** Social auditing uses external verification to validate that the Social Audit is inclusive and complete. An externally verified audit can add credibility to the department's efforts. But the greatest demonstration of a Social Audit's authenticity must be seen in how the performance of the department improves over time in relation to its mission, values and objectives

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[1]http://unpan1.un.org/intradoc/groups/public/documents/cgg/unpan023752.pdf

2. **Supports in replacing and re-focusing urgencies:** Social Auditing could be a useful tool to help departments reshape their priorities in tune with people's expectations

3. **Augments reputation:** The information generated from a Social Audit can provide crucial knowledge about the ethical performance of departments/ institutions and how stakeholders perceive the services offered by the government. Social auditing helps the legislature and executive in identifying the problem areas and provides an opportunity to take a proactive stance and create solutions

4. **Affects positive organisational change:** Social auditing identifies specific organisational improvement goals and highlights progress on their implementation and completeness. Also, by integrating Social Audit into existing management systems, employees responsible for day-to-day decision-making can more effectively consider stakeholders' issues and concerns

5. **Delivers amplified self-confidence in the community:** Social Audit can enable departments/institutions to act with greater confidence in social areas that were neglected in the past or were given a low priority.

6. **Alarms policymakers to stakeholder trends:** Social auditing is a tool that helps managers understand and anticipate stakeholder concerns. This tool provides essential information about the interests, perspectives and expectations of stakeholders facilitating the interdependency that exists between the government and the community.

Conclusions

Based on the observation by participating in the study team during both the State Social Audit in the IWMP process, the major findings were as follows:

a. In both the SA process, the deviation of amount identified was almost more than one-fourth, i.e., 25.7 per cent (Rs. 57,55,566) in Andhra Pradesh and 41 per cent (Rs. 85, 25,937 - almost 90 per cent of this expenditure was towards investment on NRM activities) in Telangana as against the sanctioned amount

b. The deviation was found more in cases where PIA was a government agency

(WCC, 41 per cent in Telangana) compared to NGO as a PIA (DHAN Foundation, 25.7 per cent in Andhra Pradesh)

c.   During the public hearing, the amount of deviation accepted was high (83.3 per cent) in the case where PIA was an NGO (DHAN Foundation, Rs.47,92,312 (83.3 per cent) compared to low (42.1 per cent) in the case of a government agency (WCC, Rs.35, 89,597 (42.1 per cent)

d.   The recovery amount was insisted to the funding agency (SLNA) from the PIA as accepted during the public hearing was Rs.7,46,285 (20.8 per cent) and Rs.7,63,507 (15.9 per cent) in Telangana and Andhra Pradesh, respectively.

e.   A case study on findings related to Palempalli MWS: Palempalli MWS was implemented by DHAN Foundation (NGO). The total expenditure made towards horticultural works (10), avenue plantation and threshing yard was Rs. 7,31,312 as per the record. During physical and technical verification of the SA process, a deviation of almost 96 per cent (Rs. 7,00,825) was identified in the presence of Presiding Officer, but the PIA accepted a deviation of 54 per cent (Rs. 3,94,970). The Presiding Officer insisted on PIA that the accepted deviation amount should be spent towards repairs of watershed structures and afforestation.

f.   As part of the entry point activities of Palempalli MWS, the PIA has purchased computer and Solar Lamps (10) for the Panchayat in the village worth of Rs. 1,80,000. During the Social Audit process, it was observed that the computer was used by one of the Panchayat members and only one solar lamp was found. On the public hearing day, Presiding Officers instructed the PIA that the computer should be brought back to the Panchayat office and also rest of the solar lamps should be installed.

Advocacy/ Policy Suggestions:

The democratic form of governance relies on public participation, transparency and accountability and all of these were effectively followed in the Social Audit process, which ultimately reflects on improved service delivery:

a.   The effective participation of villagers in the Social Audit process during Gram Sabha observed that variations and leakages were clarified with the beneficiaries as well as villagers. This indicates that the effective participation of the villagers

in the Social Audit will make the PIA accountable and transparent

b. In both States, the amount of recovery/penalty was insisted during the public hearing by the SA team led by a Presiding Officer. It shows the extent of leakages/deviations and also it brings the participation of the community, transparency and accountability in the implementation of the programmes

c. Finally, conducting the Social Audit for all government programmes could result in better implementation and improvement in the programme and also awareness levels of stakeholders, participation, transparency, accountability and time-bound service delivery.

d. Finally, the case study on 'Process Documentation of Social Audit in IWMP' explains step-by-step social audit process in IWMP, which will be useful for the researchers, academicians and social audit development practitioners for the complete process of social audit in IWMP.

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A CASE STUDY OF ISO-CERTIFIED GRAM PANCHAYAT IN KERALA

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Introduction

Good governance intends protection of human rights, maintaining rule of law, strengthening of democracy, promoting transparency and improving the capacity of administration. The responsiveness of the government and its institutions to the needs and aspirations of the people and inclusive development are imperative to good governance and participatory democracy. It focuses on the equality among people, right to participate in political developmental decision-making and to live with dignity. Panchayati Raj is a system that paves ways and means towards achieving good governance. Panchayats are meant to be autonomous institutions of Local Self-Government. However, they are treated as subordinate institutions. A set of wide variations in the devolution of powers to the Panchayats are found across the States in India. As per the 73rd amendment, 29 subjects were earmarked under the Eleventh Schedule of the Indian Constitution. It is mandated that the State government has to devolve functions, functionaries and funds to the Panchayati Raj Institutions for fair planning and implementation of various welfare and development schemes pertaining to the Gram Panchayat. A few States have made commendable efforts in encouraging the Panchayats to function effectively by devolving powers and funds as per the provisions in the Act.

Kerala had made innovative approaches and ranked among the leading States in terms of making the local bodies self-reliant institutions and made a number of efforts to make transparent and accountable institutions. One of the initiatives has been the announcement of cash prize of 'rupees one lakh' for each Panchayat that obtains ISO certification. State governments are focusing on bringing e-office which will gradually get transformed into online administration through paperless communication. Computerisation of records for quick references and online correspondences are part of the ISO acquisition. The people are the most important beneficiaries as addressing grievances redressal and receiving essential services as quick as possible even without physical presence. The study documented covers various aspects, initiatives and effects of ISO certification on the services delivery of selected Panchayats.

Objectives of the Study

- To study the process and strategies followed to achieve ISO certification

- To analyse the performance of Panchayat in the delivery of basic services after ISO certification.

- To identify the strategies for mobilisation of people for participatory decision-making

- To identify the factors that contributed to the success and sustainability of performance.

About Chottanikkara Gram Panchayat

Chottanikkara Gram Panchayat is located in Mulanthuruthy block, Ernakulam district, Kerala. The Panchayat consists of 14 wards and 3 villages and is spread over 12.68 sq.km having 814 households, including 617 Scheduled Caste and 2 Scheduled Tribe households. The total population of the Panchayat is 22,656.

Background of the Initiatives by the State for Quality Improvement

Department of Local Self-Government, Government of Kerala has given the required training for the Presidents and Secretaries of the Panchayats on Total Quality Management. The State motivated the Panchayats to get the international standard certification under the total quality management by announcing financial incentive of rupees one lakh to each Panchayat. Chottanikkara Panchayat received the award of ISO 9001:2008 in the year 2014 by fulfilling the process of ISO through the formation of quality circle, quality policy, quality objectives, rules manual, citizen charter, quality service delivery and computerisation of data and documents that enabled the online services. Through this effective process, the Gram Panchayat has got an international standard certification with validity up to the year 2017.

Awards and Recognition

In appreciation of the good work by the Panchayat, it received seven awards, namely Nirmal Gram Puraskar (2007-08) and Panchayat Sasaktheekaran Puraskar (2012-13) by the President of India, Best Panchayat in the District (2009-10, 2010-11, 2011-12 & 2013-14), Chief Minister Award (2014) by the State.

Concept of Total Quality Management (TQM) in the process of ISO

Kerala government with the help of the Kerala Institute of Local Administration (KILA) framed the strategies of getting ISO certification for Panchayat in the vision of Good Governance through Total Quality Management. The concept of TQM is to ensure efficient office management and timely delivery of quality service by making use of the existing resources. Good Governance through quality in service delivery mechanism can be achieved by adopting TQM measures.

Process of ISO

i.   **Participatory Decision-Making:** One of the important criteria for ISO certification is maintaining transparency through proper documentation and quality service delivery. For the purpose of maintaining transparency, the people were given liberty to express their views through Gram Sabha, which is an important bottom-most democratic unit that serves an active and vibrant institution allowing people's participation in decision-making on the development initiatives of the Panchayat.

ii. **Citizens Survey:** It is a kind of survey where people play a vital role in understanding their situation and planning for their development. In the process of citizen survey, a group of people collect information on the demography, problems and needs of the people and resources available in the Panchayat. The group will collect additional information by referring to a number of documents and literature pertaining to the Panchayat and people, finally making data readily available for use by any clients. As we know, the basic information about the people, issues and resources are inevitable components of the planning. This Panchayat made appreciable action on collection and compilation of data and used it for planning the development of Panchayat. The data collected through citizen survey have been presented in the Gram Sabha and gets approval after thorough discussions on the validity of data before use.

iii. **Formulation of a Quality Policy:** Another important area of requirement for obtaining ISO certification is developing policies on authenticating the quality of service on delivering of basic needs of the community. In this direction, the Panchayat has prepared a policy on development maintaining the quality in all its projects. Accordingly, Chottanikkara Gram Panchayat framed the Vision and Mission.

Vision: 'Transforming the Panchayat as people-friendly by giving quality service.'

Mission: 'Transforming the Panchayat as people-friendly by achieving the ISO certification through TQM'

Based on the vision and mission, the Panchayat has framed a quality policy. 'The quality policy of the Panchayat is to ensure ardent efforts in all phases with teamwork, transparency, friendliness, responsiveness and based on the democratic principle to achieve the ISO certification through a time-bound implementation of TQM to realise the vision of a completely people-friendly Panchayat, thereby attaining the satisfaction of citizen'

iv. **Quality Objectives:** Focusing on the vision, mission and policy of the Panchayat, it developed the objectives to fulfil the people's needs with quality in a time-bound manner and reaching the needy. While developing the objectives, priority was given to the problems of the poorest of the poor. Simultaneously, the feasibility and viability options of any initiative under the development process was underlined.

v. **Standard Operating Procedures (SOP):** Developing and maintaining SOP is another important component towards obtaining ISO 9001:2008. The Panchayat has made a very good attempt in developing Terms of Reference manuals for each service provided through Panchayat. The manual comprises the information on the requirements, approach, service division and documents to be annexed for the purpose to guide the beneficiaries. Further, this SOP manual contains functions available in the Panchayat, particulars and responsibilities of the elected representatives and officials, etc.

vi. **Planning and Monitoring:** In order to achieve the objectives and vision of the Panchayat, the existence of a suitable planning mechanism is vital. It is well known that the State of Kerala is successful in implementing decentralised democracy and follows participatory planning at every tier of the PRIs. Even for obtaining ISO, proper planning mechanism play as part and parcel in achieving quality service. This Panchayat has appropriate institutions, namely Ayal Sabha, Ward Development Committee and Working Groups and these institutions are guided and supported by a number of committees, namely, Steering Committee, Standing Committees, Institutional Management Committees, etc. The Panchayat made adequate actions to conduct subject-specific capacity building programmes for the members of the committees orienting towards the achievement of better performance.

Quality Audit is aimed to weed out the malfunctions, if any, in the implementation of development programmes of the Panchayat. In Kerala, each Panchayat has to undergo various stages of auditing procedures, including first-party audit, internal audit, pre-assessment audit and surveillance audit. The surveillance audit is conducted by a qualified auditor appointed by the State government and other audits are carried out by the Panchayat with the help of different committees. Auditing the accounts and documents is the most important prerequisite for obtaining ISO certification which was fulfilled by this Panchayat without any issues.

Initiatives under TQM in the process obtaining of ISO

a. **Creation of Front Office:** A Service Counter was opened in the front corridor of the Gram Panchayat to ensure the smooth delivery of various services. The receptionist at the counter receives the application from the visitors and issues acknowledgement on receipts, which shows the proposed date of service response. Proper registration of all applications is ensured. The counter works as a single window for receiving applications, service delivery and information dissemination. The applications collected from the public are dispatched to the official concerned at the earliest for the timely delivery of service. Adequate furniture was provided in the front office of the service counter for the complainants, which enabled them to write applications and other requests. In addition, it also made available accessories like table, papers, pens, application formats for various services, gum, pins, tags, clips, drinking water, TV, reading corner for public, clean separate toilets for men and women, first-aid kit, complaint dropbox for dropping the applications in the official's absence.

b. **Office Arrangement:** The seating arrangement inside the office has been made to ensure optimum service. Contact numbers and addresses of elected representatives and other service providers are made available in the service counter for easy access to the people. Necessary mechanisms were created to ensure speedy movement of complaints and service applications on proper registration in the movement register as per the office procedure. A file tracking system was also created for effective transparency to know the file status by both public and Panchayat.

c. **Office Renovation:** The Panchayat office building was renovated and painted, furniture was repaired and polished, office premises were cleaned and the efficiency of the computer section was improved so as make it a real

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management information system. Name boards of officials with designation and sections were exhibited in the chamber of officials. The record room was rearranged systematically in such a manner to get any document or record for quick and easy access.

d. **Citizen's Charter:** Citizen Charter is a written commitment by the Panchayat for assured service delivery. It is a commitment document on the fundamental basic service delivery which displays various services offered by the Panchayat, required time, fees charged for services, documents required, etc. The copies of citizen charter were distributed to trade union officers, LSGIs, households, village office and other offices having public contact.

e. **Organogram and Notice Boards:** An organisation functional chart having details with designations and responsibilities of the functionaries is exhibited in the Panchayat office with a signboard. Notice boards display the meetings of various bodies like Gram Sabha, Panchayat, steering committee, standing committee and staff of the Panchayat. Other information related to the Ombudsman, Appellate Tribunal, formalities of birth and death registration, Right to Information, addresses of Vigilance and Anti-corruption bureau are also displayed on the Panchayat premises. These display boards help the people to have a better understanding and access to various officers. The Gram Panchayat takes initiative for continuous monitoring and evaluation for the updation and sustainability of these mechanisms.

f. **The Quality Circle:** 'Quality Circle' is a platform consisting of a group of officials having similar job chart who come together to discuss and resolve work-related problems. It is a kind of participative management approach within the organisational framework to ensure a quality functioning system. The Quality Circle is an informal mechanism to build teamwork that facilitated a hassle-free atmosphere in the organisation. It solved many official and personal problems of functionaries. The members were given several training sessions for capacity building and establishing a healthy working environment. The Vice President of the Gram Panchayat is chairing the quality circle with the provision for change of Chairman in every three sittings on rotation.

g. **The Grievance Redressal System:** Citizen's complaints related to administration, development and welfare activities are effectively addressed by the Panchayat in a time-bound manner and proper records are maintained. The grievances that arise from officials and elected representatives are redressed by

the Joint Redressal Committee formed for the purpose. The complaints between officials and people were solved through Quality Circle. Those complaints unsolved by the Quality Circle are referred to the Finance Standing Committee for clearance. The recommendations of the Finance Standing Committee are implemented by the Panchayat, which is very active in solving the grievances. Timely intervention and continuous efforts of monitoring by the Panchayat ensure a conducive functional environment among elected representatives and officials.

h. **Capacity Building and Rewards:** Gram Panchayat conducts periodical training to the officials and elected representatives on the functional domain including office procedures, file management, amendment rules and orders, personality development on every first Wednesday of the month, and officials are asked to complete the tasks a day prior to the training schedule to avoid inconvenience to the public. One official was made in charge to cater to the needs of service delivery during the training. Better performing officials are appreciated well and rewarded.

i. **E-Governance:** All the documents and records of the Panchayat were made online with current updation, according to the guidelines of the Kerala Information Commission.

Major Development Activities Carried out by Panchayat after Getting ISO Certification

◊ The Panchayat has constructed a Bus Stand cum Shopping Complex with a built-up area of 13,500 sqft. It covers a two-storied building consisting of 37 commercial units and Gram Panchayat office. The office has a multipurpose auditorium with a fully furnished conference hall. It also constructed a LPG-oriented Common Crematorium. Moreover, it facilitated the construction of 54 houses for the homeless people of the Panchayat with the help of the Kerala State Housing Board.

◊ **Health Support:** The Panchayat implemented Palliative Care projects and provides services to the aged, weak and permanently disabled people, and bedridden patients. Besides, the GP is providing necessary medical care and medicines to 80 psychiatric patients in collaboration with a local hospital run by the TATA Private Ltd. and Mehac Charitable Foundation. Appreciating this effort,

Cochin Shipyard donated an ambulance and van to attend the emergency medical cases. A Physiotherapy centre was also established for the welfare of physically and mentally challenged people with priority to children. Children are also getting support like life protective instruments and scholarship for studies.

◊ **Efforts on Energy Saving:** As per the instructions of Government of Kerala on energy saving, the Panchayat replaced 522 CFL lights with LED lights. It also installed six LED high mast lights.

◊ **Drinking Water and Sanitation:** All the houses of the Panchayat were provided with piped water connection and water is supplied adequately without any break. In the series of efforts on strengthening the Panchayat development, it decided to create a 'less waste' Panchayat. Being one of the pilgrimage centres, Chottanikkara attracts large crowd during the Sabarimala pilgrimage season. Systematic arrangements were made to collect, segregate and safe disposal of home-based waste as well as waste from common areas in the jurisdiction of the Panchayat.

◊ **Social Security Welfare Schemes:** To strengthen and support poor people for their socio-economic development, the Panchayat facilitated to avail social security schemes. In the Panchayat, 1101 people receive Old Age Pension (OAP), 219 persons avail handicapped pension, around 727 women receive widow pension, in addition to 44 aged and unmarried beneficiaries. Moreover, 482 agricultural labourers also enjoy the benefits of financial assistance.

◊ **Kudumbasree:** Kudumbasree is one of the innovative approaches implemented by the State government aimed at achieving the socio-economic empowerment of women. The activities of the groups are paddy cultivation, running a flour mill and a sewing machine unit. Eighty-five other cottage industries are also successfully operated by these groups. The Panchayat constructed a workshed for flour mill for the SHGs of Scheduled Caste women by spending Rs.15 lakh. It has organised 163 SHGs to start economic activities and also extended forward and backward linkages for the better functioning of micro-enterprises.

Conclusion

The ISO 9001:2008 specifies requirements for a quality management system where an organisation needs to demonstrate its ability to consistently provide a product that meets customer and applicable statutory and regulatory requirements,

and aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements. As it is mentioned, the ISO certification is not directly aiming to mention the services of different organisations; it puts common yardsticks to measure the standard operating procedures. But, for obtaining this certification, each organisation has to put enormous efforts, innovative approaches and strategies to improve the performance level ultimately to satisfy the consumers at the maximum. The Panchayats selected for the study in both the States made maximum effort to deliver basic services to satisfy the needs of the people. The direct purpose of obtaining ISO certification by the Panchayats was to get a better name and fame among the people as well as Central and State governments. These endeavours enable the Panchayats to maintain transparency and accountability through participatory process by establishing a number of community-based institutions and empowering them to act with autonomy and responsibility. The major difference between ISO certification Panchayats is, in Kerala, the State government made appropriate interventions, guidance and motivation with conducive strategies for the fulfilment of requirements of ISO by creating a number of institutions at the Panchayat level. The structures created at the Panchayat level are given statutory powers and functions and it carry forwards the roles even after the expiry of ISO certification. Overall performances of both the ISO-certified Panchayats have improved the performance level in all aspects of quality management, transparency in administration, accountability in documentation, appropriate grievances redressal and timely delivery of services. Therefore, the State government has to make appropriate strategies to encourage the elected representatives at various levels of PRIs to achieve quality improvement in the services delivery and obtain ISO certification to fulfil the needs of the local community.

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STRENGTHENING OF PANCHAYAT FINANCE THROUGH OWN SOURCE REVENUE (OSR) AND ITS ROLE IN LOCAL DEVELOPMENT

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Introduction

The 73rd Amendment resulted in the creation of a three-tier local government in rural areas collectively referred to as Panchayat Raj Institutions (PRIs), viz. District Panchayat, Intermediate Panchayat and Gram Panchayat. The amendment provided the legal basis for the independent functioning of local government as envisaged in Article 40 of the Constitution. The enactment of the 73rd Constitutional Amendment Act (CAA) puts the Gram Panchayat at the centre of rural governance. Under Article 243 G of the Constitution, the State legislature is required to transfer such powers, functions and responsibilities to village, block and district Panchayats to enable them to function as institutions of self-government. For the first time, the Tenth Finance Commission made a provision to support local bodies, explicitly through grants. It is expected that the State Governments would devolve the functions of the 29 broad areas listed in the 11th Schedule to the Constitution for Panchayats, to the latter whoever are required to undertake them concurrently. The Ministry of Panchayati Raj (MoPR), Government of India (GoI), was set up in May 2004. The vision of the Ministry is to make PRIs an effective, efficient and transparent vehicle for local governance, social change and public service delivery, while encouraging States to devolve powers to PRIs. The State Finance Commissions (SFCs) to be constituted are expected to assess the revenue requirements of local governments after taking into account their role and responsibilities and recommend sharing of State revenues with the PRIs.

Need for Resources for Gram Panchayats

Resources are required by the public agencies for delivering services. Normally, a local government is assigned certain specific services for which it would remain responsible. Once such a 'bundle' of services is assigned, ideally a commensurate 'bundle' of fiscal instrument is also assigned in order to enable the local government to

discharge the services it is responsible for. The fiscal instruments made available to a local government may be classified into three groups, namely (i) fiscal powers to raise revenue by imposing tax and/or different kinds of fees, rates, tolls, user charges, etc., which is generally called own source revenue (OSR), (ii) transfer from higher level government in 'tied' (conditional) or 'untied' (unconditional) form, and (iii) borrowing from market or financial institutions.

A critical factor in improving the fiscal autonomy of rural local bodies is to help them enhance their own revenues. Improving own revenues will also strengthen the link between revenue and expenditure decisions of local rural bodies at the margins, which is extremely important to promote efficiency as well as accountability in the provision of services. The Thirteenth Finance Commission (TFC) highlighted the need for augmenting local government resources through better tax administration and improved collection efficiency along with the provision of better quality services. Accordingly, the concept of performance-based grants was introduced for the TFC period starting from 2010-11. The Fourteenth Finance Commission (FFC) also re-emphasised the need to augment resources by GPs at the local level.

Sources of Funds of the Panchayats

All the available resources of Gram Panchayats may be classified into two categories, namely tied and untied funds. Untied funds include Own Source Revenues (OSR), statutory grant from State government and local contributions/deposits from the public, etc. Grants under Central Finance Commission may be considered as untied as the amount may be spent on developmental works. All the State and Centrally sponsored schemes like MGNREGS, PMAY, PMGSY, Swachh Bharat Abhiyan, etc., are tied grants which are provided for a specific purpose and the money has to be utilised according to the guidelines of the specific schemes. Therefore, a higher level of untied resources indicates a higher level of financial autonomy (Fiscal Empowerment) of the GPs and vice-versa.

The Own Sources of Revenue (OSR) is a deciding factor of 'Fiscal Empowerment'. A number of studies on Panchayat financial management have highlighted that Gram Panchayats are expecting more untied funds to meet the basic needs such as service delivery and infrastructure for their citizens. In general, majority of GPs are unable to meet the routine expenditures on supply of safe drinking water, electricity,

maintenance of sanitation system, maintenance of public buildings, construction of roads and bridges and other facilities required for human lives. In recent years, total funds granted to a Gram Panchayat has increased manifold, but in reality, the question is about their freedom on financial autonomy to use these funds is not flexible. Therefore, the Ministry of Panchayati Raj is insisting as well as motivating Gram Panchayats to make all efforts to create more and more of Own Source Revenues for attaining fiscal empowerment of the Panchayats.

This present case study was an attempt to analyse and understand the status of creation and mobilisation of OSR of the GP in the State of Odisha. One of the successful GPs, namely Mukundapurpatna in Keonjhargarh district, was selected and reported as case study.

Legal Provisions for Own Source Revenue for GPs in Odisha

In Odisha, only the Gram Panchayats are having taxation powers and the other two higher tiers, namely Panchayat Samiti and Zilla Parishads, have not been assigned with taxation powers. They mostly rely upon the grants-in-aid and assigned revenues as well as inter governmental transfer from the State and Central government to implement their specific development programmes. The Odisha Gram Panchayat Act, 1964 and OGP Rule, 1968 which were revised in 2014 state that taxes and fees mentioned under Section 83 are optional. The following taxes and fees may be levied by Gram Panchayat as per the statutory provision.

i.   Vehicle tax, latrine and conservancy tax, water rate, lighting rate and drainage tax

ii.   Fee on private market, animal brought for sale, regulating the movement of cattle, use of building or structures, shops, stalls in the market, slaughter houses/cart stands, licence fee on brokers, commission agents and weighman

iii. Rent from dealers temporarily occupying open grounds, toll fee or rate are the items on which Gram Panchayat is empowered, subject to the approval of State government.

It may be mentioned here that the taxes such as vehicle tax, latrine and conservancy tax, water rate, lighting rate and drainage tax are coming under the tax category where as the rest are coming under non-tax categories. Sections 83, 71, 55

and 91 of Odisha Gram Panchayat Act, 1964 as well as Section 32 to 56 of Odisha Gram Panchayat Rule, 1956 empowers Gram Panchayats of Odisha to collect tax and non-tax revenue for augmenting their resource base. In Odisha, the First and Second SFCs had recommended re-introduction of Panchayat tax (property tax), which was not accepted by the State government. In line with earlier SFC recommendations, the Third SFC of Odisha had also recommended that PRIs should be allowed to levy property tax.

Mukundapurpatna Gram Panchayat

In the State of Odisha, as the State government is not permitting the Gram Panchayats to collect property tax, majority of the Panchayats do not have any sources of own fund and they are finding it difficult to manage day-to-day administration and pay even the electricity charges. Whatever funds they receive from the Central and State governments are spent on the specified activities or earmarked schemes. Due to lack of taxation powers, the Panchayat leaders are also not having any motivation and interest to create own source of revenue. Very few Panchayats are able to collect meagre revenue from local sources like shops, private institutions, small and minor industries and entry fees at the entertainment/tourism sites. The Panchayats neither have investment capital to establish revenue sources nor the capacity to create and manage such sources. A few Panchayats have natural advantage of locations that are either tourism-bound or located with pilgrimage centres. Such Panchayats also have limited options to earn revenues due to lack of manpower.

Background of the Gram Panchayat

Mukundapurpatna is one of the best Panchayats in Odisha which made tremendous effort in creating and maintaining own sources of revenue recently. Mukundapurpatna GP under Ghatgaon block is 0.3 km away from the block headquarters. The total population of this GP is 6695 (ST - 2519, SC - 677 & others 929, households 1538) and the main source of livelihood is agriculture. There are seven revenue villages with 11 wards. The people have easy access to education and health facilities. The GP has 10 primary/upper primary schools and two high schools. T.T Mahavidyalaya, Ghatgaon is an important higher education centre in the tribal-

dominated GP. There are two mobile towers for better communication purposes. The GP has been awarded the best Gram Panchayat as per district level performance parameters. Mo-Dakhyata, Mo-Sahara & Scholarships to poor talented students are the own schemes of the GP that speak volumes of its overall excellence. This GP is famous for Maa Tarini Temple and Gundichaghagi waterfalls, a tourist attraction famous for its scenic beauty. Chaiti Parba, Ghatgaon Mahotshab and Ravanpodi are the important festive occasions that lure a number of tourists to the GP. It has a good sources of own income from its market complexes and Hats.

Sources of Own Funds

The sarpanch of the Gram Panchayat is a poor woman educated up to secondary level, who has decided to work for the betterment of her native community. Displaying commitment and dedication, she is dynamically connecting various development schemes for the beneficiaries. A most famous pilgrimage centre, namely Maa Tarini Temple is located in the heart of the headquarters of the Gram Panchayat. This temple is attracting people from Odisha as well as the neighbouring States. Surroundings of this pilgrimage centre has created a number of revenue sources for the Gram Panchayat as follows:

◊　Construction of decent lodging and catering service to the temple devotees and visitors. This source of own fund gives perennial income to the Panchayat and significantly contributes to implementation of a number of development activities.

◊　An open marriage hall has been constructed which is rented for the marriages and it has the provision of catering services. It encourages traditional marriage rituals with in the temple ambience, which attracts more families.

◊　Within the premises of the temple, the Panchayat has created an eco-amusement park and collects entry fee from the all visitors.

◊　The Gram Panchayat has created vehicle parking area and collects charges. During the festival season and important occasions, the temple attracts huge crowd and mobilises good revenues to the Panchayats.

◊　In and around the temple premises, more than hundred small shops have been

opened. They are rented out to the local people which fetch income to the Panchayat as well as livelihood to the local community.

◊ It also created a market complex on the side of the highway as well as the road towards waterfalls and collects good amount of rent.

◊ In addition, a good number of vegetable vendors and other agricultural produce sellers operate on the roadside as well as on the pathways near Panchayat headquarters. The Gram Panchayat collects around Rs.30 per day from each vendor, which also serves as a source of income.

◊ Another major weekly market (Mandi) is also built and rented out to different vendors on monthly payment basis. The rent is charged on the basis of the size of the place or building occupied by the vendors. The rent ranges from Rs. 250 to Rs. 1,000.

◊ A waterfall in the Panchayat is a local tourist attraction. The Panchayat has constructed a 'viewpoint' near the waterfalls to attract visitors and collects entry and parking fees.

Welfare Activities Carried out by the Panchayat Using OSR

◊ **Athma Tripty Yojana:** The most important activity under OSR is offering subsidised lunch to the local community members assemble at the weekly haat. Both vendors and buyers get lunch and tea or coffee for Rs. 5. This activity is being continued for a long time. The people who are coming from remote villages for selling their agriculture produce as well as buyers of nearby villages find it difficult to eat from the private hotels due to higher prices. In majority of cases, rural poor people coming to the market skip their lunch either due to lack of time or high price. Against this background, the food offered at subsidised rate attracts a large number of people and the Panchayat's initiative is highly appreciated.

◊ **Mera Bharatsar Scheme:** Being a tribal Panchayat, majority of people are living below poverty line, who find it difficult to earn their livelihood. Understanding the situation, the Panchayat is lending a helping hand by offering Rs. 1,000 to the family as a grant on important family occasions like childbearing, hospital admission and any other family rituals.

◊ **Kanyadhan:** The poorest of the poor families are aided with an amount ranging from Rs. 10,000 - Rs. 25,000 as one-time grant to meet the expenses related to the marriage. This scheme was launched in the year 2017 aiming to help brides belonging to families having annual income below Rs. 24,000 . This scheme has been genuinely administered to help the real poor beneficiaries.

◊ **Mor Sahara Scheme:** An amount of Rs. 2,000 per family has been given to the families of the victims of natural calamities to look after immediate requirements for survival.

Conclusion

Gram Panchayats are expecting more untied funds to meet the needs of the community preference such as service delivery and infrastructure. For example, many GPs are unable to meet the expenditure on safe drinking water supply, uninterrupted electricity supply, drainage and sanitation, addition and alteration of public buildings, construction of roads and bridges, etc. GPs are unable to fulfil the needs of their citizen from untied resources/own funds as the statuary grant is also a kind of tied grant. Sixty per cent of this goes to electricity dues and the remaining 40 per cent goes to the administrative expenditure of the GP, including the salary of staff. Own sources of revenue is a deciding factor for financial autonomy and hence, the degree of financial autonomy of Gram Panchayat is higher in the developed regions.

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SKILL-BASED MODEL VILLAGE: A CASE OF DARAMALI GRAM PANCHAYAT, GUJARAT

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Introduction

Daramali Gram Panchayat of Idar taluk is located 20 km away from Himmatnagar, the administrative headquarters of Sabarkantha district in Gujarat. Sabarkantha district is surrounded by Rajasthan in the northeast, Banaskantha and Mehsana districts in the west, Gandhinagar in the south and Aravalli District in the southeast. Sabarmati River flows to the west of Sabarkantha district. The sex ratio of the district is 952 and the literacy rate is 65.57 per cent. Patels are the dominant caste in this Gram Panchayat, and cotton, wheat and castor are the major crops. Sabarkantha is home to a couple of very celebrated Gram Panchayats of Gujarat - Akodara and Punsari, both often cited across the country as model villages. However, with a population of around 1500, Daramali GP has become another pioneer in its own way.

Daramali GP at a Glance:

1	Total Households	532
2	Total BPL Family	1
3	Aadhar Card and Bank Account	100 per cent
4	Sukanya Samriddhi Yojana	22 Accounts
5	No. of Ponds	4
6	Support to Widows	9
7	Old Age Pension	4
8	Vatsalya Card Holder Family	271
9	Senior Citizen Card Holder	52
10	Pradhan Mantri Surakhsha Bima Yojana	387
11	Cattles	628
12	Drinking Water sources	4
13	No. of Shops	360
14	Primary School	1
15	Anganwadi	2

Contd...

16	Secondary or Middle School	1
17	Govt. B.Ed College	1
18	Post Office	1
19	Dena Grameen Bank	1
20	Veterinary Hospital	1
21	Members of Dairy Committee	360
22	Members of Seva Committee	328

Daramali has been developing overwhelmingly since 2012. The village is open defecation free (ODF) and has a well-maintained drainage system connecting every hamlet. The household wastes are collected daily. The village has a blood donors' collective and it has installed 16 CCTV cameras, street lights and public address system to ensure the safety and security of the villagers. No child in the GP suffers from malnutrition. All the schools have internet-linked computers and students even hold video conferences with the district officials whenever required. The GP has also facilitated the setting up of 15 women's self-help groups (SHG) that produce and sell phenyl, washing powder, chilli and turmeric powder. The residents use an app called DRML, which they developed themselves to digitally market their products, streamline inventory and the supply chain. The GP uses POS machines to collect property and other taxes. The village received the 'skilled village' award from Gujarat Government in 2015.

Snowballing of Development Process

Before 2012, Daramali was just like any other ordinary village of India. The change process was initiated around 2012 when the village community decided that the Gram Panchayat should be guided by an educated and aware person. Subsequently, Hetalben Ankurbhai Desai who hailed from a local educated family was nominated and elected by the villagers as the GP Sarpanch (GP Chairman). Traditionally, rural development programmes in India have been implemented in a top-down manner and there was no model in front of Hetalben to showcase the effectiveness of the bottom-up approach.

Hetalben, with support from her husband who is a teacher by profession, began her work by performing routine functions of the Gram Panchayat. Soon, she realised

the need of bringing the villagers on a common platform to make the development cycle rolling. To make the village green was the stepping stone towards this initiative. The GP mobilised the villagers for tree plantation drive on a large scale to make the village green and eco-friendly. Subsequently, the initiative for making the village ODF and other technology-driven initiatives followed. This way, the wheel of change kept rolling. The following thematic sectors have been the GP's foundation pillars for development:

Unfolding of the process

Green GP
Massive community-led plantation drive

Planted at least 100 trees every monsoon with the help of local youth

Transformation to green and eco-friendly GP

Clean GP
Door-to-door waste collection

Surveillance and fine of Rs.1000 for open defecation

Regular cleaning of village

Community contribution in cash and labour

Smart GP
Online tax collection
E-service delivery
Wi-Fi facility
Surveillance through CCTV
LED street lights and public address system
Biometric attendance at the GP
Own Mobile app

Skilled GP
Skill training for youth
Special entrepreneurial skill training for women SHG members
100% people are employed
Awarded "Skilled Village" by Govt. of Gujarat

Hetalben, the Sarpanch, with support from her husband who is a teacher by profession, began with performing routine functions of the Gram Panchayat. She realised that the village required urgent attention and a plethora of available government schemes could be a useful source to finance development projects. She did not follow the path of asking for donations from corporate entities under their corporate social responsibility schemes or funds from Non-Resident Indians (NRI). She knew that the revenue generated by the Panchayat was not the only resource and it was not adequate also for financing such programmes. Hence, the GP relied on leveraging funds from the Central and State government schemes.

The key challenge was to establish a link between Gram Panchayat and various

existing government schemes. Under the leadership of the sarpanch, the GP planned to link the village requirements with the provisions of existing schemes and extract benefits from them. For example, under the Sarva Shiksha Abhiyan (Scheme for Education for All), Central government gives funds to construct rooms, toilets, and buy educational materials for primary schools. Similarly, the GP consistently identified such schemes of ministries and departments for rural rejuvenation, prepared related proposals, and utilised the money for local development. The GP utilised its own revenue as the last resort for financing development programmes.

Details of Good Practices of Daramali GP

Over the years, Daramali GP has achieved numerous developmental landmarks in the areas of human resource development, sanitation, enterprise development, technology-driven governance and citizen-centric service delivery. Following are glimpses of some of their praiseworthy good practices.

"Skilled Village"-Promoting Home-based Enterprises of Women SHGs

The GP has around 20 women SHGs (Sakhi Mandal) each comprising 10-20 women. These SHGs manufacture soaps, phenyl, spices, pickles, etc., and sell them through home-based enterprises. The GP provided free skill development training to the SHGs. The GP also arranged skill development training for interested youths from time to time. This has ensured 100 per cent employment and improvement in the overall quality of life of the people over the years. The Chief Minister of Gujarat felicitated the GP with the "Skilled Village" award on 17th June, 2016.

A total of 240 women of Daramali GP have been mobilised and brought under 22 Sakhi Mandals. The GP facilitated linkage of these SHGs with the bank for easy access

to credit. These SHGs run home-based enterprises, training centres and sell chilli, turmeric, garam masala, agarbatti, phenyl, detergent powder, areca nut, handbags, etc., for self-sustenance. This initiative has made the local women and their families economically self-reliant.

Gram Haat

Daramali GP has developed a 'Village Haat' for marketing and sales of products manufactured by the women SHGs. The GP procures the products made by the SHGs and trades them through the Village Haat. They have also developed a system of online village shopping which also acts as another mode of trade for the villagers.

Sanitation, Drinking Water and Cleanliness

All households of Daramali have functional latrines and the GP is Open Defecation-Free (Nirmal Village). The GP has a surveillance system to maintain the ODF status and imposes a fine of Rs.1000 on any open defecator. The GP procured a tractor to facilitate door-to-door collection of wastes from households, markets and shops of the village and transport it to the dumping site. The GP has also procured a water tanker using GP's resources and by

mobilising community contribution to provide drinking water to households at low cost. It also earns revenue for the GP. The GP also received an award from the State government for efficient operations related to sanitation services.

Regular cleaning of the GP area is carried out by the Panchayat sanitation workers. The villagers also take part in the village cleaning work, especially during various local festivals and events.

Smart GP-Citizen-Centric Cervices, Transparent Governance


Wi-Fi Internet: Damarali GP, with the help of Rail Wire Company, is providing Wi-Fi internet services to the villagers. This has also increased own-source revenue of the GP.

LED Street Lights and Public Address System: As many as 182 LED street lights have been installed by the GP covering the entire GP area and 80 speakers have been installed to develop a public address system. Songs are played in the morning and evening to create a soothing ambience and to promote local culture. Various public announcements are also been made to address local citizens as and when required.
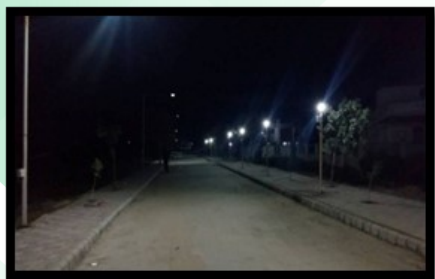
A separate sound system is installed on the main approach road where the Panchayat plays old songs and soothing music from 7 PM to 9 PM. Villagers use this road for evening walks and sit-in sessions with their families after dinner.

CCTV Cameras for Public Safety: Sixteen CCTV cameras have been strategically installed across the GP to increase surveillance and prevent commuting of trespassers. The above initiatives have largely increased the safety of the local people.

Online services (E Gram Panchayat):

Daramali also has provisions for providing e-services like distribution of ration key coupons, electricity bill, filling up of online forms, etc. The GP is also generating some revenue out of these services.

e-Library: The GP has set up a rural library with a good collection of books, newsletters, magazines, etc., which is freely accessed by the villagers and students. Using Wi-Fi connectivity, it has been converted into an e-library.

Knowledge Bank: Daramali has developed the knowledge and information bank system that collects information about jobs and various issues. Interested rural youth can access the information from the GP office, fill up online forms and access related literature. Free coaching classes for various exams are also offered in the evening.

DRML Mobile App: In order to increase the convenience of the people and make the GP governance more transparent, the GP has developed a mobile application called DRML. People can stay connected with the GP through this app and follow all information related to GP administration.

Cashless Transaction: Daramali GP had introduced an online tax collection facility through swipe machine, mobile app, net banking, M.Payas, etc., in 2015. As the GP lacks an ATM, it has promoted and ensured that cashless facility is available through POS machines at shops, petrol pumps, cooperative circles, etc., within the GP area.

Bio-metric attendance: The GP has installed a biometric attendance system. The Sarpanch and GP staff use the biometric attendance system to ensure transparent and efficient GP governance.

Internet Centre: A computer centre to promote computer literacy and provide the villagers with internet-based services has been set up in Daramali. The women, youths, farmers and children are being trained by the Gram Panchayat through this centre.

Grievance Management: The GP has put in place a grievance management system on its own. The complainants can enter their grievance in the complaint register kept in the GP office and action is initiated at the earliest. After addressing the issue, the comments and signature of complainant are taken to close the case.

Other Innovative Initiatives

Model School:

Daramali Village Government Primary School is ISO: 9001: 2008 certified. The school is equipped with computers and internet connectivity and most of the students have e-mail accounts. Students use ICT extensively to do their homework and even hold video

conferences with the district administration in Himmatnagar whenever required. They also have the option to undertake various extra-curricular activities that include horse riding, skating, karate, yoga and other games. The school always gets an 'A' Grade in Gunotsav.

Blood Donors' Club: The GP has taken a proactive role in setting up a Blood donors' club by forming the 'Yuvanoka Group' of the village. Blood tests are done to identify specific groups of donors. If any person in the village needs blood, the GP facilitates identification of potential donors through Yuvanaki or their list of donors.

Plantation Board: The GP created a dedicated youth group that is committed to plant and protect at least 100 trees every monsoon. This initiative has created a huge impact and has transformed Daramali into a real green and environment-friendly GP.

The GP has constructed a state-of-the-art conference hall used for seminars, meetings, film shows, etc.

Panchayat Magazine: Daramali Gram Panchayat publishes a quarterly newsletter named 'Gram Sandesh' covering the happenings in the Panchayat. Information about the works performed by the Panchayat and its vision is communicated to the local people through this newsletter.

As a truly innovative step, the GP, along with the villagers, has identified its flower, tree, food and animal.

S. No.	Items	Name
1	Village Flower	Cotton Flower
2	Village Tree	Henna
3	Village Food	Tamarind
4	Village Animal	Dog

EMERGENCE OF A MODEL VILLAGE: A CASE STUDY OF PIPLANTRI IN RAJASTHAN

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Introduction

Rajasthan is one of the largest States in India, covering 342,239 square kilometres or 10.4 per cent of India's total geographical area (Census, 2011). The population of the State is 6.89 crore and it is bounded to the north and north-east by the States of Punjab and Haryana, to the east and southeast by Uttar Pradesh and Madhya Pradesh, to the southwest by Gujarat and the west and northwest by the provinces of Sindh and Punjab in Pakistan, respectively. Rajasthan mainly has arid or semi-arid climate and features fairly hot temperatures over the year. Piplantri emerges as an oasis in Rajsamand district of the State and this case study underscores the factors that led to the emergence of Piplantri as a celebrated model village in India.

Digging for Development

Those who scan the vista at Piplantri can observe that the place is rich in marble. The undulating skyline is spotted with hillocks and valleys. Incessant extraction of marble can be seen at the mining sites that open the heart of Mother Earth. Frequent blasts shake the earth below one's feet and the tremors can be felt in a wide area, thus halting the rural tranquillity for a few moments.

The mining sites, though an eyesore, are still not a matter of contention as they are the main source of livelihood for the local people. As the soil is not productive, there is a meagre opportunity for practising agriculture. The area also faces serious drought problems and the decreasing water tables have added to the woes of the people. There was once a time when water was fetched by trains and was sold at a high price. People were poverty-ridden and were completely marginalised from the fruits of development. Over the generations, the men of the village sought their livelihoods at the mining sites as there was not much of an alternative available. As

there was negligible scope for agriculture, most of the people opted for working at the mines for extracting marble, even at the cost of their health and destruction of Mother Earth.

The result of the excessive mining has resulted in changing the hillocks nearby to an eyesore which have been covered in white debris. The air itself is heavily laden with fine white dust. This dust, when it settles on the nearby surroundings, appears as a white veil from a vantage point. The water bodies too got polluted, adding to the existing distress situation of the masses.

A mining site at Piplantri village

Ushering Development through Effective Leadership

However, the challenges were soon realised by the residents who had faced despair times. They took cognisance of the side-effects of the mining taking place and discussed the issues at village level in Piplantri. Thus, a forward step was taken by Shri Shyam Sundar Paliwalji who took the baton in his hands. Having faced a personal loss in 2007, he was determined to improve the quality of life of his fellow mates in the village. Through continuous meetings and discussions, he convinced people to realise the demerits of mining at Piplantri. Holding the post of Sarpanch (headman) added to his advantage. His initiative "Panchayat aapke dwaaar" helped in an all-inclusive approach for reaching out to the common masses. He highlighted to

the people how industrial pollution from the marble mines had added further to the existing water scarcity, frequent power cuts, child marriage, female feticide, illiteracy, crime and violence, etc. The Sarpanch revolutionised the regressive social outlook through his persistent efforts. He mobilised the people to come together to work for the common problem thus, cashing in on the social capital existing in the area. Focussing on the oft-cited tagline, "beti, paani, ped, gochar, bhoomi ka sarakshan," he attempted an all-inclusive approach for refurbishing the life and ecology. Through his efforts, the people realised that a healthier environment meant cleaner air and reduced risks of changes caused by climate changes. Deforestation is considerably reduced as is evidenced by hillocks that are turning greener. These are now used as pasture lands for grazing cattle. The marble residue is contracting gradually and financial support is drawn from the watershed development schemes and MGNREGA.

A hillock that was covered in marble residue being reclaimed with greenery

In just five years, the water level at Piplantri has reached from 60 feet to 5-15 feet. Moreover, 11 trees were planted in the memory of the departed, and the community people, especially the elderly women, take care of these plants. This apart, Piplantri is now famous for its unique tradition of planting 111 trees on the birth of every girl child in the village. The upper and lower nurseries are a sight to behold for

anyone visiting Piplantri. The variety of plants and trees at these two nurseries invite researchers for their studies too. The common grounds have been used to grow trees like neem, sheesham, mango, amla, kadam and aloe vera. The by-products are also indigenously prepared and add to the source of income. Moreover, the monetary contribution at community level ensures that the girl child receives a handsome amount once she grows up. It is mandatory to implement Janani Suraksha Yojana along with other government interventions for the benefit of all, especially the girl child. Over three lakh trees have been planted through the implementation of this tradition and the community ensures its conservation. On the occasion of Rakshabandhan, women tie rakhis to the trees and plants to protect them. Though Shri Shyam Sundar Paliwal is not holding the post of Sarpanch now, he marches on for ensuring people's participation in all activities at Piplantri.

Discussion and Conclusion

Through Paliwal's concerted efforts, Piplantri has emerged as a model village that works on a "participatory model." The indigenous ways of water conservation have led to rejuvenation of water bodies at close quarters in the village. The restoration of hillocks has resulted in protection of wildlife. Community mobilisation has led to people overcoming the challenges they had been facing for decades. Under the mentorship of local leaders, people have turned the white marble-laden hillocks back to the lush green ones. The gender gap in schools has decreased and the schools have improvised their quality of education. The SHG women are participating in all activities of the village and are able to make a mark through their efforts. The incidences of violence have also reportedly come down over the years. The government too has recognised the unstinted efforts of Paliwal and honoured him with the Padma Shri award in 2021. The systematic approach, and strong and effective leadership have resulted in Piplantri transforming into a "model village." The village sets an example for others to plan their roadmap of development.

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About NIRDPR

National Institute of Rural Development and Panchayati Raj (NIRDPR) continuously strives to serve the nation through research, training, action research and consultancy activities for development of the rural poor and enhance their quality of life. It aims to:

1. Organise training programmes, conferences, seminars and workshops for senior-level development managers, elected representatives, bankers, NGOs and other stakeholders;

2. Undertake, aid, promote and coordinate research on its own and/or collaborate with State, national and international development agencies;

3. Analyse and offer solutions to problems encountered in the planning and implementation of the programmes for rural development, decentralised governance, panchayati raj and related programmes;

4. Study the functioning of the Panchayati Raj Institutions (PRIs) and rural development programmes across the States;

5. Analyse and propose solutions to problems in planning and implementation of the programmes for rural development; and

6. Develop content and disseminate information and transfer technology through periodicals, reports, e-modules and other publications.

Considering the challenges faced by the government in the development of a large section of rural poor across the country through its various policies and programmes, NIRDPR as an apex training institute in the field of rural development, has to cater to the training and capacity development needs of a larger clientele. To achieve these objectives, a nationwide network of training infrastructure has to play its rightful role. The clientele includes a large number of elected PRI representatives at different levels, rural development functionaries, NGOs, bankers and other stakeholders. Capacity building of rural development personnel and elected representatives is an intrinsic part of the entire rural development process. It helps to improve their managerial skills while keeping them abreast with the latest changes in strategies, government policies and programmes to augment their knowledge and working efficiency, resulting in strengthening of the delivery mechanism for the benefit of all the stakeholders. The challenge is huge and NIRDPR has been able to play its role in the country's rural development initiatives by facilitating qualitative changes in the implementation of programmes through a process of training, research, action research, consultancy, information dissemination and information building on a continual basis. This has enabled the Institute to emerge as the National Apex Institute for capacity development in the area of rural development.

In its continuous effort to develop managerial skills of functionaries in the rural development process, the Institute offers two regular fully residential diploma programmes – one-year Post Graduate Diploma in Rural Development Management (PGDRDM) and two-year Post Graduate Diploma in Management (Rural Development). Further, it offers M.Tech Programme on Appropriate Technology & Entrepreneurship (ATE) and three distance mode programmes - Post Graduate Diploma in Sustainable Rural Development (PGDSRD), Post Graduate Diploma in Tribal Development Management (PGDTDM) and Post Graduate Diploma in Geo-Spatial and Technological Applications in Rural Development (PGDGARD). The Institute is also offering one-year Diploma Programme on Panchayati Raj Governance & Rural Development (DP-PRGRD) in association with the University of Hyderabad through distance mode.

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