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RESEARCH PAPER

Information technology (IT) application in bench mark assessment and project monitoring

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ABSTRACT

The present study was conducted during 2010-2011 in Chitradurga district of Karnataka state with community residing around Narrain Mines of SESA GOA LIMITED, which is a mining and highest iron ore exporter in India in the private sector. The study was a part of initiation of the project entitled Alternative livelihood opportunities project (ALOP) which was funded by the Sesa Goa limited and implemented through University of Agricultural Sciences, Dharwad. Benchmark assessment was done with the activities such as orientation on project and rapport building, collection of secondary data, participatory rural appraisal (PRA) exercise and organizing the data and data entry. The household maps and plot maps drawn in the village and field was digitized using Auto CAD package which was converted it into Dxt. file (Drawing file to text file). The first information collected would be transferred on the maps by application of GIS tool ARCINFO (Dxt. to coverage's). The study brought out the fact that bench mark survey would be more meaningful if it is done focusing various dimensions of the family as well as resources. Further application of IT tool's would benefit in mapping the status which can be understood by the community easily. It also helps in monitoring the flow of project inputs to the community members and also their impact on the families. These tools also makes possible to share the information among the different project team for mutual learning and bringing innovative ideas in to development project.

Key Words : Information technology, Project monitoring

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Development in IT during last one decade has brought sea change in information and data management. The IX Plan emphasized the important that information technology (IT) can play in social sectors like health, education and rural development (IX Five Year Plan, 1997). Since the 1980s, information and communication technology has become a part and parcel of development planning in India, particularly for rural development. It provides inter-governmental link, so as to achieve the required broad-based process of socio-economic transformation. It is strongly acknowledged that IT can help in overcoming most of the problems in government schemes, more so in rural areas. It promises ever-expanding individual freedom and choices, growing democratic aspirations, rising trend towards gender equalization, empowerment of women and the weaker section, besides strengthening participatory development, process and accelerating human development.

In the last decade, the enthusiasm over the rapid growth of information and communication technologies and their applications have generated a variety of projects, research, events and other initiatives that focus on fostering development. Many of these initiatives are directed at arresting the growing divide between countries and communities that had access and mastery of new information technologies and

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those who do not access to IT is typically divided along traditional lines of development resulting in unequal access that has become known as the 'digital divide' or 'digital exclusion'. This divide is often characterized by high levels of access to technologies including the internet while infrastructure in less developed nations is at a very low levels due to problems of poverty, lack of resources, illiteracy and low levels of education. However, application of IT in agriculture is very limited. Recently GIS, GPS, Remote sensing have been used in natural resource management (NRM). An attempt has been made to use a soft ware and application of GIS tools for benchmark assessment, planning of intervention and monitoring of activities in alternative livelihood opportunities project (ALOP) which has been implemented in selected village of Karnataka state.

RESEARCH METHODOLOGY

Benchmark assessment:

In order to conduct the benchmark assessments following steps were adopted:

Orientation on project and rapport building:

In the beginning effort were made to orient the community member through group meeting, awareness camps and personal visits, meetings were also held with SHG members and community leaders as well as informants. Some of the entry point activities like exposer visit, establishment of vermicompost were conducted for rapport building with community.

Collection of secondary data:

Secondary data on families, plots, family size, caste etc were collected from village accountant.

Participatory rural appraisal (PRA) exercise:

PRA exercise such as social maps, resource maps and matrix ranking, were conducted with focus on type of family, family size, family income, livestock population, migration pattern, employment days etc. After making social maps, street wise directory were created with help of informants. In order to collect detailed information of each plot NRM survey was conducted for each plot along with the farmers. The information such as slope, soil type, soil texture, depth, existing gullies and number of plants in the plots were recorded. Matrix ranking was conducted to know the preferences of the village community on different tree species.

Organizing the data and data entry:

The benchmark information was focused on two types of information

– Household information

– Plot/Field information

Household information:

Following steps were followed:

– To start with, we had to collected some secondary information like revenue map, *Khata* list; villagers list and house hold information.

– Later social map exercise was conducted in the village, which helped to map the households and other milestones like roads, temples, water sources etc

– The maps so generated through social map were cross checked with actual situation through visits.

– It was ensured that, all households are depicted in the map

– In order to collect details of house hold, street-household-kitchen (SHK) was developed

– Each of SHK (Which represents one family) was given code number for its recognition

Examples:

AA01 First street first house

AA02 First street second house

AB01 Second street first house

AB02 Second street second house

– The data collected through social maps includes number of days of employment, family size, family category (Big, Small, Medium), health status, livestock population etc.

Plot/Field information:

Similarly the directory for the plots was created with different features. The procedure followed was as followed:

– Initially the revenue map was collected from the revenue department.

– Fields were visited along with the farmers to draw the boundaries as per the *khata* list for all the survey numbers.

– The plots were verified with the *Khata* list to ensure all the survey numbers are depicted on the map.

– Later, each plot was given number, which is code for identification of the plots.

– Transect walk was conducted to each plot to elucidate the information such as type of soil, slope, gullies, cropping pattern, forest/fruit trees, SCW measures etc.

This methodology was followed by Saha *et al.* (2007), they included three main steps, the first step was to produced geo-referenced database, the second step was to use that to systematically and periodically enter data on variables through participatory approach which could be observed and the third step was to initiate dialogues between SHG's, famers and scientists regarding the future soil, crop and water management strategies on the basis of thematic maps.

Application of IT tools:

The household maps and plot maps drawn in the village

and field was digitized using AutoCAD package which was converted it in to Dxt. file (Drawing file to text file). The first information collected would be transferred on the maps by application of GIS tool ARCINFO (Dxt. to coverage's). Although data were transferred, the map outputs of the data were obtained as per the requirement. Maps were created on different features like HH with livestock, farmer's category, etc. (Fig. 1). Similarly for the plots, maps can be generated with characters like, plot depicting the land type, slope and cropping intensity (Fig. 2). Saha *et al.* (2007), reported that the plot to plot mapping was undertaken using differential global positioning system (GPS) and LASER range finder with built in compass coupled to Huskey fex21/ pocket PC (Compaq IPAQ) and further maps and direct observation data were integrated through Arc view GIS software's using common identification number.

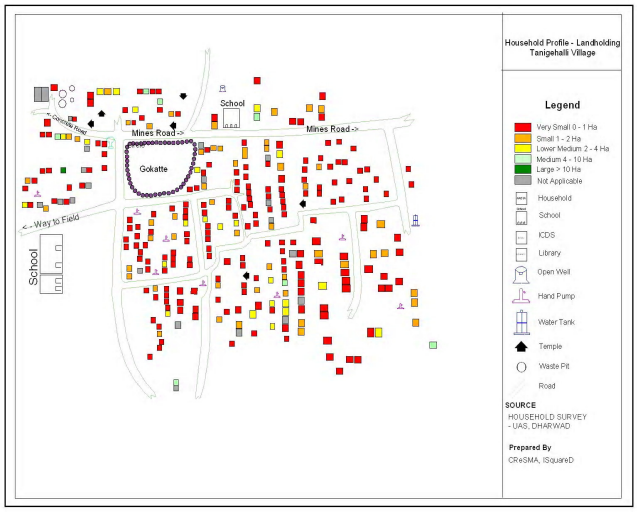

Fig. 1 : House holds of different farmers categories based on land holding showed that, he detailed information about the house hold of tanigehalli village with different category like, very small (0-1 ha), small (1-2 ha), lower medium (2-4 ha), medium (4-10 ha) and large land holding (>10 ha)

House holds data:

– Distribution of female and male headed families
– Distribution of families based on caste
– Distribution of families based on land holding
– Livestock possession by the community member

Plots data:

– Distribution of plots according to the male and female head
– Distribution of plots based on the size of the of the land holding
– House hold vulnerability based on the plots
– House hold at risk based on the plots
– Plots at risk based on the erosion and soil fertility
– Categorization of the plots based on the slope
– Categorization of the plots based on land use pattern

Planning of interventions based on the benchmark survey out put:

Data collected were analyzed and shared with community to identify and prioritize the interventions. As the land holding at risk are higher and slope is also higher, it means that it was felt necessary to take up natural resource management (NRM) activities on priority. Secondly, the single crop area is quit high therefore integrated farming system (IFS) is best suited to the area. Hence, it was decided to encourage the IFS units. In addition to these interventions change in crop production technology including introduction of new crop as well as improved practices were taken up to increase the cropping intensity as well as productivity. It was observed that the livestock population was low and no appreciation for the dairy as a source of livelihood. It was felt necessary to established the artificial insemination (AI) centre and provide door step services as the resource base and economic condition of the families were low. Similarly, it was felt necessary to introduce off farm micro enterprises, especially for the self help group (SHG) members.

Use of GIS tool in project monitoring and impact assessment:

The progress made in the project has been uploaded to the base line data like vermicompost units, poultry birds etc. The maps on the output or outcome has been created these maps can be viewed at any point of time. The spread of the technologies or adoption can be monitored using the maps.

RESEARCH AND REMONSTRATION FINDINGS

The results of the present study as well as relevant discussion have been summarized under following heads:

House hold profile of the village:

The results of benchmark survey of Tanigehalli presented in Table 1 clearly depicts that, about 90 per cent of the households were headed by the male and 10 per cent by female. It was observed that most of the families (98.00 %) belonged to SC, ST categories, while only 2 per cent of the families belonged to other categories as presented in Table 2. The data pertaining to the category of the farmers presented

Table 1: Distribution of families based on the female and male headed (Gender) (n=291)

Category	No. of HH	%
Female headed	31	10.65
Male headed	260	89.35

Table 2: Distribution of families based on caste				(n=291)
Category	No. of HH	%	Female	Male
SC	241	82.82	27	214
ST	44	15.12	3	41
OC	2	0.69	0	2
BC	4	1.37	1	3

Table 3: Distribution of families based on land holding				(n=291)
Category	Number	%	Female headed	Male headed
Large >10ha	1	0.34	0	1
Medium 4-10 ha	8	2.75	2	6
Lower medium 2-4 ha	25	8.59	2	23
Small 1-2 ha	54	18.56	4	50
Very small 0-1 ha	203	69.76	23	180

Table 3 (A): Average family income of the house hold		(n=291)
Income	Number	%
Below average (< Rs. 21200)	201	69.00
Above average (> Rs. 21200)	90	31.00

in Table 3 depict that, 70 per cent of the families were marginal farmers and followed by small farmers (18.56 %), lower medium (8.59 %) and there was only one large farmer in the village. The map corresponding to these variables are presented in Fig. 1. It is vary clear from the data that the village had highest number of the SC and ST families, who had small land holdings. However their income was Rs. 21,200.00 per annum (69 %). Majority of household had family income less than Rs.21200.00 and only 3 per cent of families belonged to above average family income) category. Data related to livestock in the Table 4 indicates that, almost 40 per cent of the families do not have any livestock, majority of the families (24.74 %) had draft and dairy animals followed by family with dairy (11.68 %), family with draft animals (14.09 %), sheep and goat were maintained by only 2.14 per cent of the family and some family (5.50) maintained both draft animals and sheep. The results makes clear that livestock was not a major source of income for the livelihood of the family.

Table 4: Livestock possession by the community member				(n=291)
Category	Number	%	Female	Male
Family with draft animals	41	14.09	3	38
Family with draft and dairy	72	24.74	5	67
Family with draft, dairy, sheep/ goat	16	5.50	1	15
Family with draft, sheep/goat	4	1.37	2	2
Family with dairy animals	34	11.68	7	27
Family with dairy, sheep/goat	3	1.03	0	3
Family with sheep/goat	7	2.41	1	6
Family without livestock	114	39.18	12	102

NRM status of the village:

Data presented in Table 5 clearly indicates that, only 4.4 per cent of the plots were owned by the female. The data presented in Table 6 related to distribution of the land holding depict that only three per cent of the land holding belonged to CPR, while larger area (48.45) was having very small plots size (0-1 ha) followed by small plots of 1 to 2 ha (25.13 %), lower medium (11.92 %) and medium (8.55 %). It can be inferred from the data that 70 per cent of the families (marginal families) owned 46.83 per cent of the area, while, 11.00 per cent of the house holds (Medium and lower medium family) owned 20.00 per cent of the land, it means that there is a wide gap in land resource possession by the families resulting into uneven distribution of the resources. The data presented in the Table 7 pertaining to the house hold vulnerability indicate that 66.32

Table 5: Distribution of plots based on the male and female headed families		(n=386)
Category	No. of plots/house holds)	%
Male	349	90.41
Female	17	4.40
Landless	20	5.18

Table 6: Distribution of plots based on the size of the of the land holding				(n= 386)
Category	No. of plots	%	Area (ha)	%
Large > 10 ha	3	0.78	2.89	0.90
Medium 4 - 10 ha	33	8.55	23.92	7.44
Lower medium 2 - 4 ha	46	11.92	45.60	14.18
Small 1- 2 ha	97	25.13	78.31	24.35
Very small 0 - 1ha	187	48.45	150.61	46.83
CPR	12	3.11	9.33	2.90
Landless	8	2.07	10.96	3.41

Table 7: House hold vulnerability based on the plots		(n=386)
Category	No. of plots	%
Low	13	3.37
Medium	97	25.13
High	256	66.32
Landless	20	5.18

Table 8: House hold at risk based on the plots		(n=386)
Category	No. of plots	%
Low	76	19.69
Medium	220	56.99
High	64	16.58
Landless	26	6.74

Table 9: Plots at risk based on the erosion and soil fertility (n=386)

Category	No. of plots	%	Area (ha)	%
No risk	118	30.57	58.07	18.06
Low risk	97	25.13	92.16	28.65
Medium risk	140	36.27	119.06	37.02
High risk	26	6.74	42.74	13.29
Very high risk	5	1.30	9.58	2.98

Table 10: Categorization of the plots based on the slope (n=386)

Slope in percentage	No. of plots	%	Area (ha)	%
0-1	8	2.07	4.20	1.31
1-3	159	41.19	126.25	39.26
3-5	166	43.01	132.45	41.18
5-7.5	48	12.44	50.20	15.61
>7.5	5	1.30	8.51	2.65

Table 11: Categorization of the plots based on land use pattern (n=386)

Category	No. of plots	%	Area (ha)	%
Fallow	51	13.21	14.14	4.40
Single	327	84.71	305.96	95.13
Double	8	2.07	1.51	0.47

per cent had high vulnerability followed by medium (23.13 %) and low vulnerability (3.37). Similarly data in Table 8 depict that 57.00 per cent of the families were in medium risk followed by low risk (19.69 %) and high risk (16.58%). The plots are classified as higher to lower risk based on erosion and soil fertility presented in the Table 9 surprising that 50.00 per cent of plots were at medium to very high risk (37.02, 2.98 per cent respectively) and only 18.00 per cent of land had no risk. Data supported by the Table 10 that 41.18 per cent of the plots had slope of 3-5 per cent followed by 5-7.5 per cent (15.61%) and grater than 7.5 per cent slope (2.65%). The map corresponding to these variables are presented in Fig. 2. The data presented in the Table 11 related to the land use pattern shows that, 84.71 per cent of the farmers followed the single crop followed by 2 per cent of families with double crop. Based on these results developmental interventions were introduced during

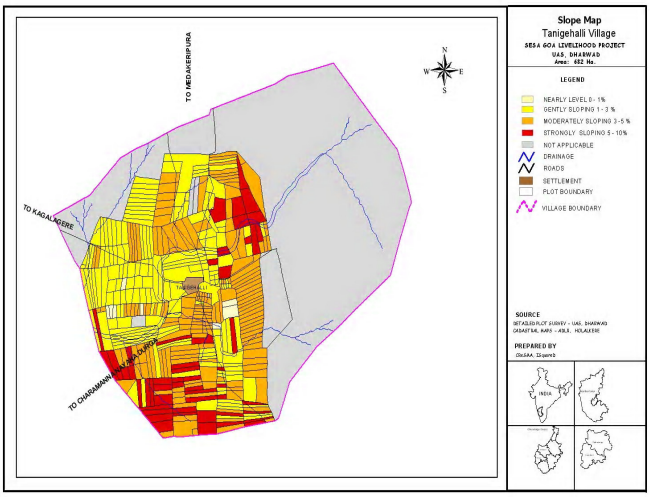

Fig: 2. Slope plots map indicated the detailed information about the slope of the plots/field of Tanigehalli village, like near/less slope (0-1 %), gentle slope (1-3%), moderate slope (3-5%) and strong slope (5-10%)

the year 2009-10. Similar observations were reported by Saha *et al.* (2007).

Conclusion:

The study brought out the fact that bench mark survey would be more meaningful if it is done focusing various dimensions of the family as well as resources. Further application of IT tool's such as GIS would benefit in mapping the status which can be understood by the community easily. It also helps in monitoring the flow of project inputs to the community members and also their impact on the families. These tools also makes possible to share the information among the different project team for mutual learning and bringing innovative ideas in to development project.

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