

Characterization of Socio-Economic Status of Watershed Community in Semi-Arid Agriculture Zone in Karnataka, India

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Abstract This study was undertaken to analyze socio-economic status of watershed community. Watershed is a multiple-use common pool resource considered as more appropriate measure for agriculture and other human activities in arid regions. The arid and semi-arid tropics are regions characterized by rainfall variability, low productivity and degradation of natural resources, climate variability and poor infrastructure. A baseline study was conducted in three micro-watersheds (Dindur sub watershed) in Gadag district to ascertain the current status of the households in terms of available resources, assets and other socio-economic factors. Data generated from sample

size of 82 is tabulated and analyzed using automated land use evaluation planning (ALEP) database. Results have revealed that small and marginal farmers constitute about 86% of the farming community. Amongst many social parameters assessed; caste distribution indicated that schedule castes (SC) account for nearly three fourths of the population with an average family size of 5.84. Agriculture is the predominant vocation 92% practice. Even today about 98% still depend on fuel-wood or other biomass for cooking purpose. Close to half of the population is deprived of sanitation facilities mainly drainage and toilets. Literacy level is found to be 61%. Lack of literacy may be considered as one of the reasons for poor sanitation facility in the micro-watershed areas. On the economic front; indicators point out that nearly 89% fall under below poverty line category showing the poor economic status of the people. This is further evident from the fact that only 18% of the population have valuable domestic (durable) and farm assets. Migration in search of work during lean or drought period is a concern as the data shows that 37% migrate to far-flung places like Goa, Bangalore. This needs to be arrested by creating better livelihood opportunities. Government sponsored schemes such as Mahatma Gandhi national rural employment guarantee scheme, grama nirmal yojana (=village sanitation program) and yashaswini (free health care scheme) have limited outreach. Financial institutes have a bigger role to play in advancing loans not only for agriculture but

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also for other purposes. Results have shown that 83% have access to loans from the formal financial institutes such as nationalized banks and cooperative societies, but farmers have complained that loans are not advanced for non-agriculture purposes, this being the reason farmers resort to other funding sources such as commission agents at exorbitantly high rate of interest eventually succumbing to vicious cycle of debt trap. Marginal and small farmers found to be more affected as the banks deny them loans owing to their small land holdings. In addition to farmers, women may also be empowered with micro-finance facilities. Results have shown that there exists a yield gap in the range of 40-50% against the package yield, which indicates that interventions need to be necessitated to bridge the yield gap level, as these crops in the micro-watershed areas are considered not only staple ones but also generating good sources of income to the farming households.

Keywords Characterization, Socio-economic status, Watershed, Community, Semi-arid zone.

Introduction

According to Efati (2000) watershed management projects improve the social and economic situation of the farming community. The watershed is a multiple-use common pool resource used for agriculture, manufacturing and other human activities (Ravnborg and del Pilar Guerrero 1999, Steins and Edwards 1999). Agriculture is an "umbrella" term that refers to the result of different associations between people, plants and animals. Since the earliest stages of agricultural production it has been an economic activity. However, as this is the most extensive form of human land use; it also had important implications for other uses of land and the conservation of natural resources (Angel Paniagua and Kathleen Baker 2003).

One of the important factors in selecting the micro-watershed areas for study is the climatic condition of the region. Secondary reports indicate that

low and erratic rainfall has affected crop cultivation of these watershed areas. In addition, the area under dry-land agriculture is prone to periodic droughts severely affecting rain-fed farmers, especially the marginal and small farmers owing to their smaller landholdings.

The arid and semi-arid tropics are regions characterized by rainfall variability, low productivity, natural resource degradation, climate variability and poor infrastructure (Anantha et al. 2006). Hence, rain-fed farmers face substantial risk in generating income owing to lower crop yield and price uncertainties.

Large investment made on irrigated agriculture and technological development had little impact on dry areas. Therefore, it is imperative to manage and conserve water and soil resources in order to enhance productivity and improve the well being of people (Wani et al. 2003).

Project aims to identify measures that facilitate achieving sustainable livelihood for farmers in general and marginal and small farmers in particular. The project would also aim to strengthen the involvement of small and marginal farmers in the existing extension delivery systems, agricultural schemes and value chains to increase opportunities to adopt new technologies.

Socio-economic status assessment is one of the sub-components of the support for the improved project program integration in rain-fed areas. Various socio-economic parameters have been identified and defined in accordance with the primary objectives of the project to assess the socio-economic status and livelihood opportunities of the farmers. The identified parameters are divided broadly into human capital, social capital, physical resources and financial capital.

Data was generated from three micro-watersheds in Gadag district. Selected micro-watersheds are Nabhapur Tanda I, Nabhapur Tanda II and Kabulayakatti III, which are grouped in Dindur sub-watershed in Gadag district, Karnataka.

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Materials and Methods

This study was carried out in the year 2016-17. Soil unit maps and cadastral maps were employed to identify the survey numbers. Area was divided into grids of definite size. 30% of the total numbers of grids were used for sampling. Maps were also used to demarcate other MWS features such as forest and habitation cover, grazing land. Farmers were classified as marginal (>0 to <2.47 acres), small (>2.48 to <4.94 acres), semi-medium (>4.95 to <9.88 acres), medium (>9.89 to <24.7 acres) and large farmers (>24.7 acres). Eighty two households in all the three micro-watersheds were selected and questionnaires were used as tool to generate primary data. Thus collected data is tabulated and analyzed using automated land use evaluation planning (ALEP) database. In addition to the primary data, secondary information is sourced from books reports and journals. In certain cases laboratory reports made on soil properties and water quality of micro-watershed area is used to further authenticate the field data.

Results and Discussion

The baseline study of households has generated information on the current socio-economic status of the farmers, their agricultural practices, land use status, crop productivity, cropping pattern, crop intensity, quality of water used for domestic and agriculture purposes among others. The research work has analyzed the socio-economic characteristics that influence their decisions in carrying out farming activity.

It is important to investigate the influence of demographic and socio-economic characteristics of the entrepreneurs on their enterprise's performance and to suggest a new theoretical framework (Levesque and Minniti 2006). Socio-economic status of any society has a direct reference with the progress and development of each member of that community.

Numerous studies have emphasized the role of demographic characteristics such as age, religion, gender, experience, background and education of entrepreneurs towards their entrepreneurial behaviors and performance (Welmilla et al. 2011).

Human capital

Indicates the following demographic features. Watershed areas are dominated by schedule caste group who account for three fourths of the population followed by general caste accounting for about 24%. Average family size is found to be 5.84 where 92% of the households have agriculture as their main vocation. Nearly 90% have access to public distribution system (PDS) as 88.69% of the population is found to be below poverty line (BPL).

Of the total population farmers account for 94%, among the farmer groups marginal and small farmers account for about 49 and 37% respectively. Semimedium and medium farmers account for 13 and 2% respectively. There is no occurrence of large farmers in the sample size of 82. Marginal and small farmers put together constitute about 86%. There are about 23% farmers who have irrigation facility. Temporary migration during lean or drought period in search of work to bigger cities is slightly over the third of the population. Migration pattern is independent of landholding size (Table 1).

Social capital and physical resources

There are about 35% Mahatma Gandhi national rural employment guarantee scheme (MGNREGA) beneficiaries. Yeshaswini, a government run health

Table 1. Farmer category distribution across micro-watersheds (n=82).

MWSs	Marginal	Small	Semimedium	Medium	Large
Kabulayakatti	9.76	12.20	4.88	0.00	0.00
Nabhapur Tanda 1	21.95	10.98	3.66	0.00	0.00
Nabhapur Tanda 2	17.07	13.41	4.88	1.22	0.00
Total	48.78	36.59	13.41	1.22	0.00

Table 2. Social parameters (n=82). ¹Schedule Caste, ²Schedule Tribe, ³Below Poverty Line, ⁴Public Distribution system, ⁵Mahatma Gandhi Rural Employment Guarantee Scheme, ⁶Grama nirmal yojana, ⁷Financial institutes.

Parameters↓	MSW→	Kabulayaka tti 3	Nabhapur Tanda 1	Nabhapur Tanda 2	Overall (Avg)
Social group	SC ¹	27.27	100.00	96.67	74.65
	ST ²	4.55	0.00	0.00	1.52
	General	68.18	0.00	3.33	23.84
Family size		5.50	6.17	5.87	5.84
Agriculturists		95.04	97.30	84.09	92.14
Housing structure	Semi pucca	81.82	28.00	90.00	66.61
Cooking energy	Fuelwood	100.00	96.67	96.67	97.78
Sanitation	Toilet	45.45	53.33	26.67	41.82
% Literates		65.29	63.24	53.41	60.65
Access to PDS ⁴	BPL ³	72.73	96.67	96.67	88.69
	Migrate	31.82	50.00	30.00	37.27
	Farm assets	22.73	10.00	23.33	18.69
Good quality drinking water		27.27	90.00	23.33	46.87
	NAREGA ⁵	72.73	16.67	16.67	35.35
Government sponsored schemes	Yashashwini	18.18	16.67	16.67	17.17
	GNY ⁶	36.36	16.67	23.33	25.45
Borrowers from FI ⁷		63.64	100.00	86.67	83.43

scheme has shown 17% beneficiaries. Data indicates that 60% are literates and tenth of which are graduates.

As far as housing structure is concerned about 67% are semi-pucca in nature. About 98% of the population even this day depend on fuel-wood for cooking. It is evident that almost every household is fuel-wood dependent for cooking causing enormous pressure on natural resources and green house gas emission. Nearly half the population have said that drinking water quality is good.

Sanitation is one of the concerns as about 58% population is deprived of toilets facility. Grama Nirmal Yojana (GNY) a government sponsored development program that provides sanitation facilities to the needy has registered 25% beneficiaries in the watershed areas. Lack of education can be attributed to poor sanitation facilities. Every household has a television and cell phone. Households own basic farm tools such as sickle and ploughs. Only about 19% have tractors, tillers and threshers.

Financial capital

Nearly 84% of the farming community have access to credit for agriculture. Sixty five percent have borrowed exclusively from finance institutions such as nationalized banks at 3—7 % rate of interest per annum. Farmers have borrowed money either from commission agents or cooperative societies or both for non-agricultural purposes.

The results have indicated that 90% of the farmers dispose their agricultural produce in distress mainly to repay the loan advanced from the banks and for domestic needs. Farmers opine that formal financial institutes deprive the marginal and small farmers the loan facilities owing to their smaller land holdings, which being one of the reasons farmers resort to other sources for funds at exorbitantly high rate of interest succumbing to the vicious cycle of debt trap. Most often farmers require money for other than agriculture activity source funds from non-banking resources and remain debt ridden forever. Hence, banking norms must be eased in lending loans to the needy and especially the small land holders.

Table 3. Livestock economics (n=82).

Dindur SWS	% HHs owning milch animals	Per capita live-stock	Avg No. of milch animals /HH	Avg milk Production /day /HH
Kabulayakatti 3	59.09	0.42	1.31	13.00
Nabhapur Tanda 1	40.00	0.59	1.42	12.00
Nabhapur Tanda 2	13.33	0.36	1.25	4.00
Overall (Avg)	37.47	0.46	1.32	9.67

(Table 2).

Livestock enterprise

Per capita livestock was observed to be 0.46 while percent households owning milch animals are found to be 37.4% with an average milch animal per household is 1.32. Milk production (average lactation of seven months) per day per household is 9.67 liters per day (Table 3).

Cropping pattern

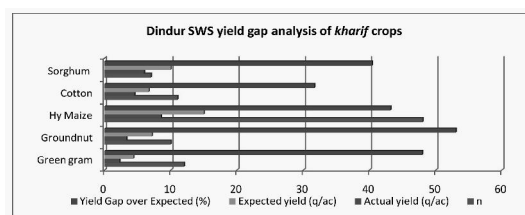
Average land holding of rain-fed farmers is observed to be 2.23 acres against 0.48 acres of irrigated land in the watershed areas. More than three-fourths of the population are found to be rain dependent for agriculture, which being one of the main reasons *kharif* season is considered to be an important period for crop cultivation. Pulses are the major *rabi* season crops in the watershed area. The annual cropping intensity is observed to be 121.08%. (Table 4).

Yield gap

A study has analyzed major yield levels of crops in

Table 4. Economic parameters.

Dindur SWS	Avg land holding (Ac)		Irrigated (%)	Rain-fed (%)	Cropping intensity	Produce disposal Distress sale
	Rainfed	Irrigated				
Kabulayakatti 3	2.22	0.10	1.22	25.61	126.02	90
Nabhapur Tanda 1	1.80	0.63	14.63	21.95	114.23	95
Nabhapur Tanda 2	2.67	0.73	9.76	26.83	123.00	85
Overall (Avg)	2.23	0.48	25.61	76.26	121.08	90

**Fig. 1.** Yield gap.

kharif season in the microwatershed area (Fig. 1). Results indicate that there exists a yield gap in the range of 30—53% against the package yield, which indicates that effective interventions need to be necessitated to bridge the yield gap level as these crops in the micro-watershed areas are considered not only staple ones but also generating good income to the farming households (Table 5).

Conclusion

Uplifts of any area depend upon development of socio-economic status of the people (Daniel D. Santos 2010). This assessment is expected to pave the way to identify the socio-economic issues in mitigating the risks associated with rain-fed agriculture, livestock and other allied enterprises. The farmers often end up in distress sale of their produce in 90% cases due to immediate cash needs as they have no savings of their own. Hence, there is a need to strengthen institutional arrangement towards creating village storage infrastructure and linking credit with marketing by advancing credit against produce as security to tide over immediate cash needs. Borrowing of credit by small (marginal and small farmers) land holders who constitute a large majority (86%) depend on private sources (commission

Table 5. Dindur SWS yield gap analysis of *kharif* crops.

Crop	n	Actual yield (q/ac)	Expected yield (q/ac)	Yield gap over expected (%)
Green gram	12	2.29	4.40	47.95
Groundnut	10	3.35	7.13	53.02
Hy Maize	48	8.52	15	43.20
Cotton	11	4.55	6.66	31.68
Sorghum	7	5.96	10	40.40

agents) for credit at a very high cost. Demand for security by banks against advances (especially long term farm needs) often constrain them from borrowing from institutional sources. Hence, more liberal policies be adopted towards these resource poor farmers. Increased anthropogenic activities in the fragile rain fed watershed areas have reduced the forest cover and natural vegetation. Hence, interventions are needed to increase the vegetation cover through afforestation programs. There is need for demarcation of village common property (*gomala*) for the benefit of village community as a whole. A large majority of village community (over 98%) still dependent on fuel wood as a source of energy for cooking. Hence, there is a need to increase the coverage of households with LPG facility to reduce the pressure on natural resources. Results indicated that there exists a yield gap in the range of 30–53% against the package yield, which indicates that effective interventions need to be necessitated to

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