

Rice Farming Systems in Backward Regions: socio - economic assessment and sustainable livelihood analysis

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Abstract

Evolving a methodology for livelihood mapping at micro level in the vulnerability context helps in preparation of suitable strategies and policy interventions. It is also important to assess different factors associated with and influencing the livelihood options of the weaker and vulnerable sections of the farming community like the scheduled caste/ scheduled tribe (SC/ST) farmers. The present study investigated the livelihoods of SC/ST target population in Kothakota, Wanaparthy and Pebbaire mandals (blocks) of Mahaboobnagar district which is identified as one of the backward regions by the Government of India. This is expected to immensely help in defining the technological interventions and other developmental efforts. For the first time, an effort is made to develop a strong base so that improving the livelihoods could be addressed in a more scientific way rather than focusing on isolated efforts. The study found that sustainable livelihoods was at the medium level which can be attributed to high social capital and social networks even though human, physical, natural and financial capitals were not encouraging.

Introduction

A livelihood irrespective of the type of the farming system or kind of vulnerability the community is undergoing, comprises the capabilities, assets and activities required for a means of living. If the farming community can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities both now and in the future, while not undermining the natural resource base, then their livelihoods become sustainable. Sustainable Livelihood approaches are based on evolving thinking about poverty reduction, the way the

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poor and vulnerable live their lives, and the importance of structural and institutional issues (ADB, 2004).

The livelihoods approach recognizes the importance of technological interventions and there is a need to understand the livelihoods of poor people in context. It is also important to assess different factors associated with and influencing the livelihood options of the weaker and vulnerable sections of the farming community like the scheduled caste/ scheduled tribe (SC/ST) farmers. Evolving a methodology for livelihood mapping at micro level in the vulnerability context helps in preparation of suitable strategies and policy interventions. An investigation of livelihood strategies may reveal a wide range of alternatives and options. The most visible livelihood strategy may not be the most important.

Notwithstanding the importance attached to the livelihood options in the changing scenario, little extension efforts have been made so far. Lack of systematic efforts to draw lessons and develop insights into the livelihood options of the rural poor particularly, that of SC/ST communities is quite evident. In this backdrop it was decided to undertake the survey on baseline indicators and sustainable livelihoods of SC/ST target population in Kothakota, Wanaparthi and Pebbaire mandals (blocks) of Mahaboobnagar district which is identified as one of the backward regions by the Government of India (GOI, 2007). This is expected to immensely help in defining the technological interventions and also other developmental efforts. For the first time, an effort is made to develop a strong base so that improving the livelihoods could be addressed in a more scientific way rather than focusing on isolated efforts.

Methodology

An *ex-post facto* research design was followed to carry out the survey since the variables chosen for the study had already occurred. According to Kerlinger (1964) *ex-post facto* research is a systematic empirical enquiry in which the scientists do not have direct control of influencing the variables because their manifestations have already occurred. Hence this design was considered appropriate for the study. For any research in social science, it is important that the situations in which investigations are carried out give the basic idea to relate the findings to similar situations.

The survey was conducted in three mandals of Mahaboobnagar district of Andhra Pradesh state of India. The selection of respondents was purposive in nature. From 12 hamlets, 147 poor SC/ST farmers were selected. The criteria followed for the selection was that the households should have cultivable land (either owned/ leased in).

The variables for the study were selected based on the review of literature and in consultation with experts, social scientists, officials and administrators in the field of rural development and poverty alleviation.

The concept of Sustainable Rural Livelihood (SRL) is an attempt to go beyond the conventional definitions and approaches to poverty eradication. The earlier methods/interventions had been found to be too narrow because they focused only on certain aspects or manifestations of poverty, such as low income, or did not consider other vital aspects of poverty such as vulnerability and social exclusion. It is now recognized that more attention must be paid to the various factors and processes which either constrain or enhance poor people's ability to make a living in an economically, ecologically, and socially sustainable manner. The SRL concept offers a more coherent and integrated approach to poverty.

Different combinations of livelihood activities with respect to the corresponding mean man days of employment created or generated per year was computed to achieve sustainable rural livelihoods. To achieve sustainable rural livelihoods, different livelihood capitals such as human capital, physical capital, natural capital, social capital and financial capital would play a greater role to cope with or recover from shocks /stresses and maintain or enhance the individuals capabilities and assets both in the present and in the future without degrading the natural resource base.

An index was developed for the study comprising of the livelihood assets such as human capital, physical capital, natural capital, social capital and financial capital for which sub indices were computed and summed up to arrive at the sustainable rural livelihood index.

Socio-economic Assessment of Sustainable Rural Livelihoods among the Rice Farmers

Personal Factors

It can be inferred from Figure 1 that most of the middle aged farmers (40 %) and old farmers (43 %) were the key generators of income, who occupy the main work force in different occupations. This may be due to the prevailing joint family system (68.7%) amongst the tribal farmers where the head of the family belongs either to the middle aged group or old aged group. It also reveals that the farmers have not recognized the large family as a liability which could be unaffordable to run the entire family and increases the responsibility and accountability among the members. A vast majority of the farmers (98%) were married and a meager (1.4%) were unmarried while 0.7 per cent of the farmers were divorced / widowed.

The middle aged farmers and most of the young aged farmers are generally married and very enthusiastic to involve in income generating activities. These farmers also indirectly influence other farmers in improving their standard of living. Most of the respondents were farmers and agricultural labour (wage earners) which confirms a fact that most of the farmers are very prone to poverty due to economically unproductive cultivation, poor rainfall coupled with poor market facilities and unsustainable ground water levels. A cursory glance at the results clearly reveals that 42 per cent of the farmers belong to the small category of land holding followed by 39 per cent of the farmers who belonged to medium farmers category. The results are in comparison with the national statistics as these farmers were more prone to natural calamities like drought, cyclones and floods and it was due to poor adaptive strategies to combat this, poor investment and credit facilitation and poor technology utilization.

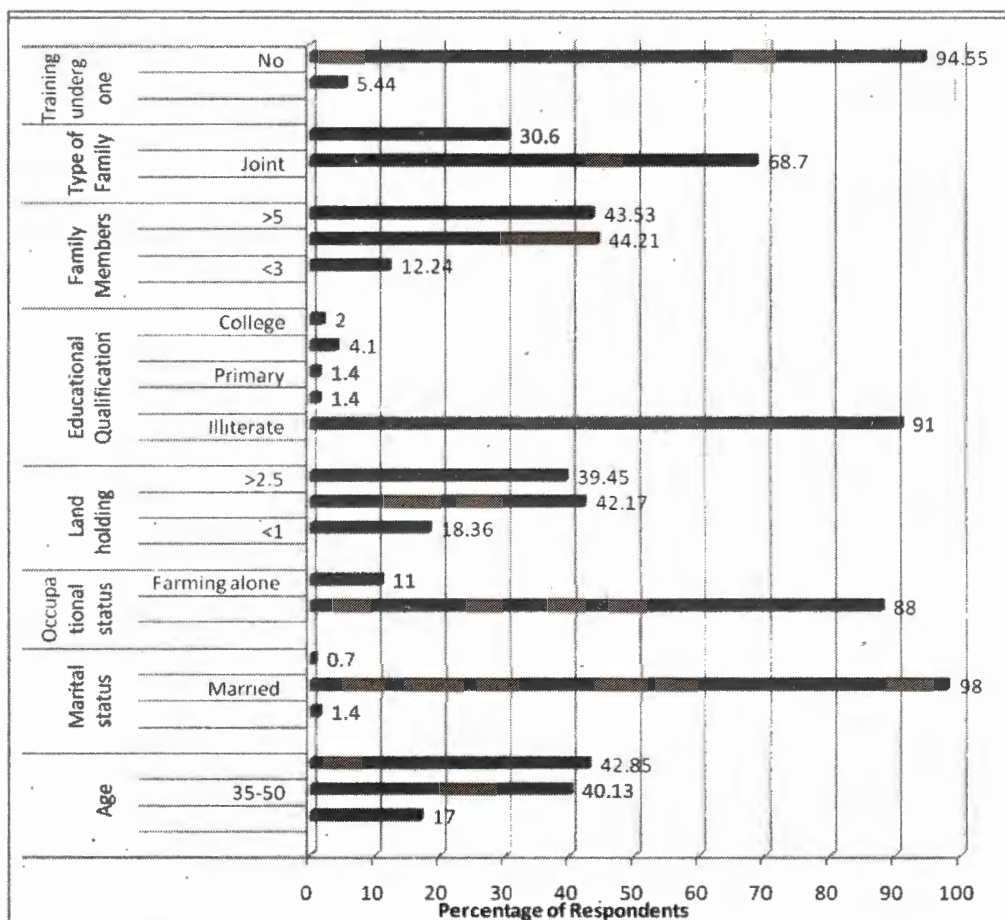


Figure 1: Personal factors influencing the sustainable livelihoods of the SC/ST rice farmers

Socio-Economic Factors

Caste plays a dominant role in the Indian rural society. Caste remains a pervasive social problem in India. Research shows that scheduled castes and scheduled tribes (SC/STs) who account for 17 per cent and 8 per cent of the total population of the country, respectively, continue to be victims of systematic discrimination and violence. Scheduled Castes and the Scheduled Tribes are marginalized and vulnerable communities who were forced into poverty due to various reasons, over centuries. It is a well established fact that poverty is higher among the scheduled castes and scheduled tribes due to higher illiteracy, lack of exposure and awareness apart from the socio-economic, psychological and technological factors which also constrain them to continue to live in poverty:

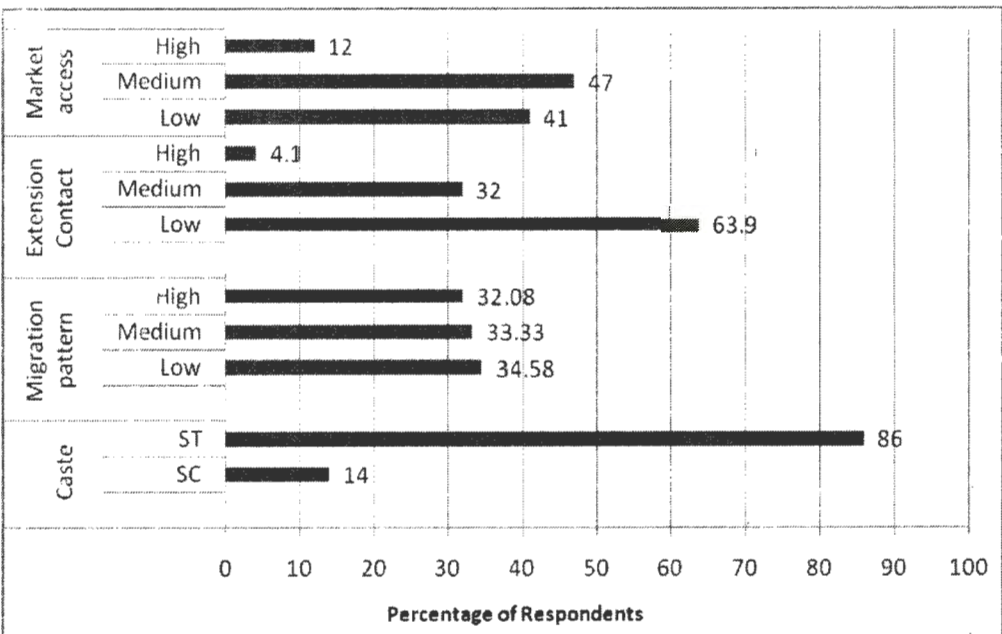


Figure 2: Socio-economic factors influencing the sustainable livelihoods of SC/ST rice farmers

The vast majority of the farmers (47%) had medium access to market facilities 41 per cent had low access and 12 per cent had high access. However, the study also found that 34.58 per cent of the farmers belonged to low migration category followed by medium migration (33.33%) and high migration (32.08%). In order to have an insight into the various aspects of migration, an item analysis has been carried out which revealed that nearly 37.4 per cent of the farmers were temporarily migrating, 16.3 per cent had permanently migrated and the rest of the farmers had

never migrated in the recent past. There is a lot of drought induced migration due to lack of rainfall in the off season. It is very interesting to note here that more people generally migrate through mere social networks. In most of the cases, it was the male and the migrants were moving out either for wage employment (agricultural labour) or as a contractual labour force. It is confirmed from the study that among migrants, 49 per cent were going as construction labour. The increasing urbanization in metro cities such as Hyderabad leads to such migration patterns.

Over all it was observed that more than half of the farmers had low to medium urban contact with respect to their agricultural occupation. This trend clearly indicates that the farmers with low education and low exposure to training programmes, less social participation make an individual have more access to urban areas for the purchase of inputs and other specialized tools. The low urban contact may be more for non-agricultural purposes, since farming is not encouraging and due to other multiplier effects of market and resource endowments and ultimately low income generation.

Based on the scores obtained on extension contact, the respondents are classified into three categories. The results in Figure 2 indicate that nearly three-fourths of the farmers had low extension contact. About 32 per cent farmers had medium level of extension contact. Very few (4.10%) fell into the high extension contact category. The trend may be due to the non-availability of the extension staff or less staff strength, low need of meeting the extension staff since farming is at doldrums due to the pervasive drought condition where the farmers may not try to cultivate new crops for higher profits.

Psychological Factors

The information from figure 3 reveals that the majority of the farmers had low level of aspiration (72.11 %) followed by medium level of aspiration (27.89 %). This clearly reflects the need for motivating the SC/ST farmers for adopting the new technological interventions. The technological interventions for these vulnerable groups have to be planned well in advance. For each of the cropping season, there is a need to organize training programmes. Moreover, all the respondents under the survey had poor change proneness. Hence the attitude changes should also find place in the extension efforts aimed at these target groups. The role of opinion leaders should not be ignored during the interventions aiming at enhancing the change proneness. A majority of the farmers (69%) belonged to medium to high

self orientation. This result coupled with the above results clearly state that if proper interventions are targeted during the adoption period, the rate of adoption levels will be effective.

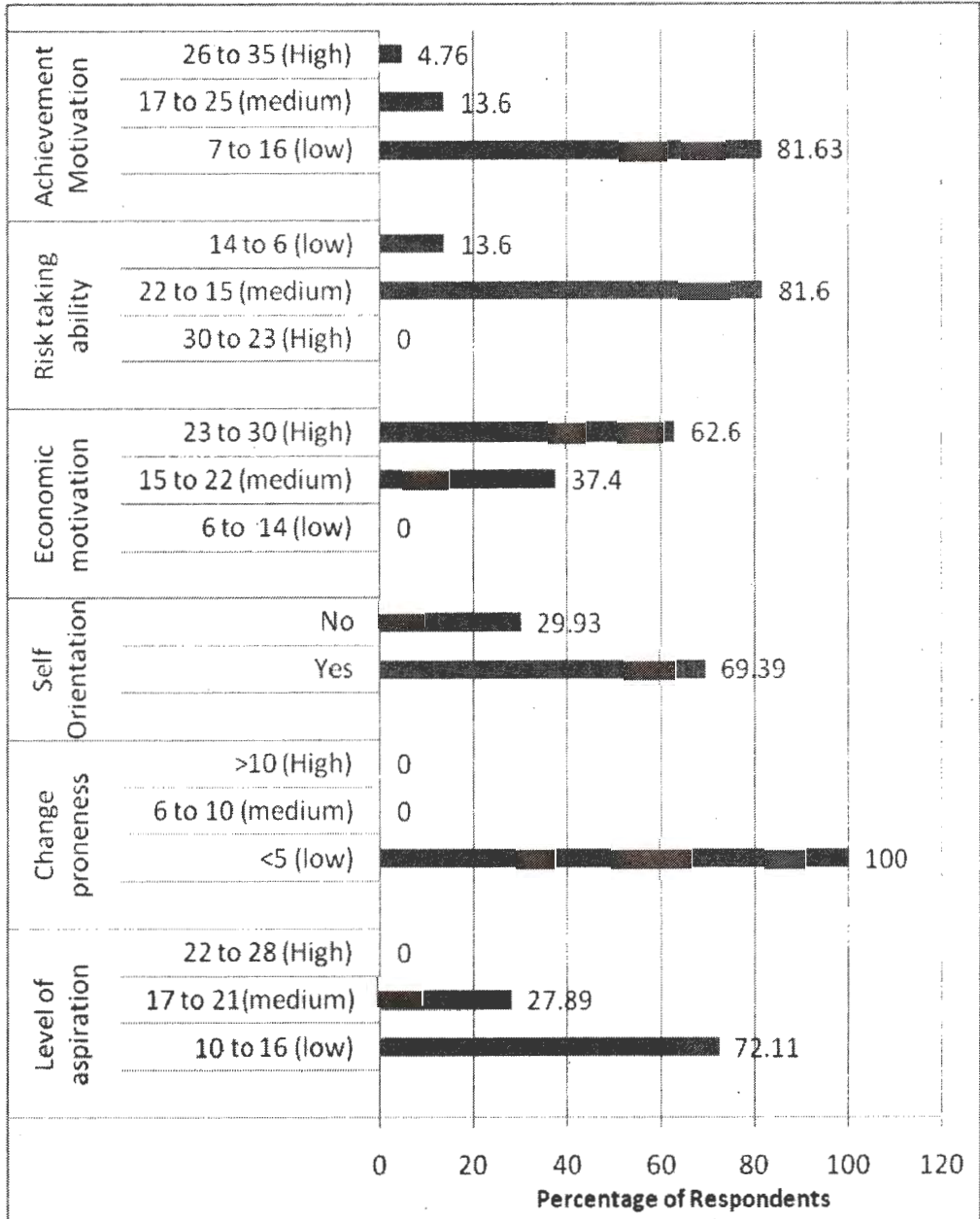


Figure 3: Psychological factors influencing the sustainable livelihoods of the SC/ST rice farmers

The majority (62.6%) of the farmers had high economic motivation. This should be read with the low extension contacts and low aspiration levels. The expectations of the farmers are clearly visible for enhancing the income levels and improving the livelihoods. However they seldom get an opportunity and necessary support from the extension agencies. Hence any intervention will directly influence the livelihood of such farming systems. When high economic motivation is coupled with risk taking ability, they turn to be more entrepreneurial. The survey area reported about 81.63 percent of the respondents as possessing medium risk taking ability followed by high risk taking ability (13.6%). The low extension support and other factors might have resulted in low achievement motivation amongst these farmers. If proper support services are provided, they shall thrive well in adverse conditions also.

The concept of sustainable rural livelihoods is becoming increasingly important in the developmental debate. In the present study, sustainable rural livelihoods is defined in relation to five key capitals which are achieved through access to livelihood resources (i.e., human, physical, natural, social and financial capitals) which are combined in the pursuit of different livelihood strategies.

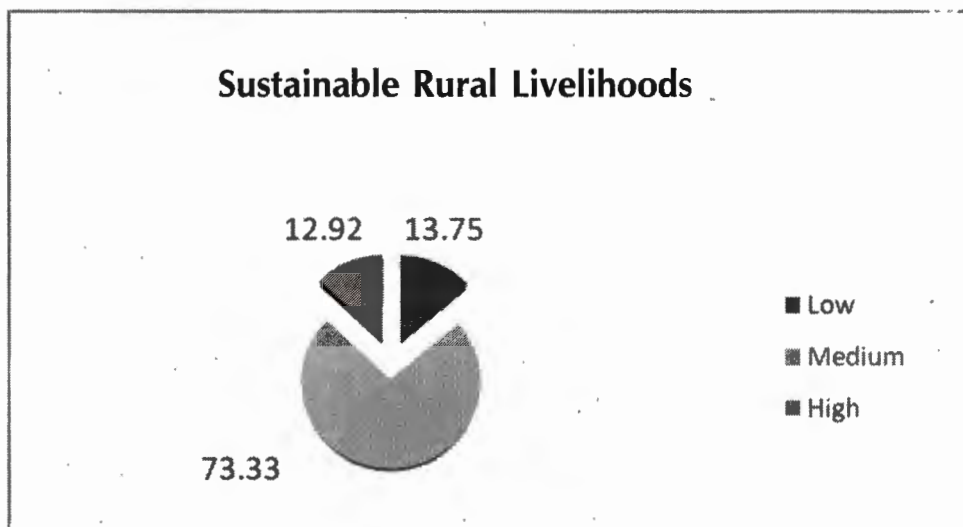


Figure 4: Sustainable Rural livelihoods of the SC/ST rice farmers

The data from the figure 4 reveals that a majority (73.33 %) of the farmers had medium sustainable rural livelihoods followed by low (13.75%) and high (12.92 %). The medium sustainable rural livelihoods can be attributed to high

social capital and social networks even though the human, physical, natural and financial capitals were not encouraging. The sustainability was mainly maintained through social capital. In order to have a clear understanding about the various livelihood capitals, an in depth item analysis was carried out.

Human capital

The following figure vividly explains that 52.92 per cent of the farmers had low human capital followed by medium (27.08 %) and high (20%).

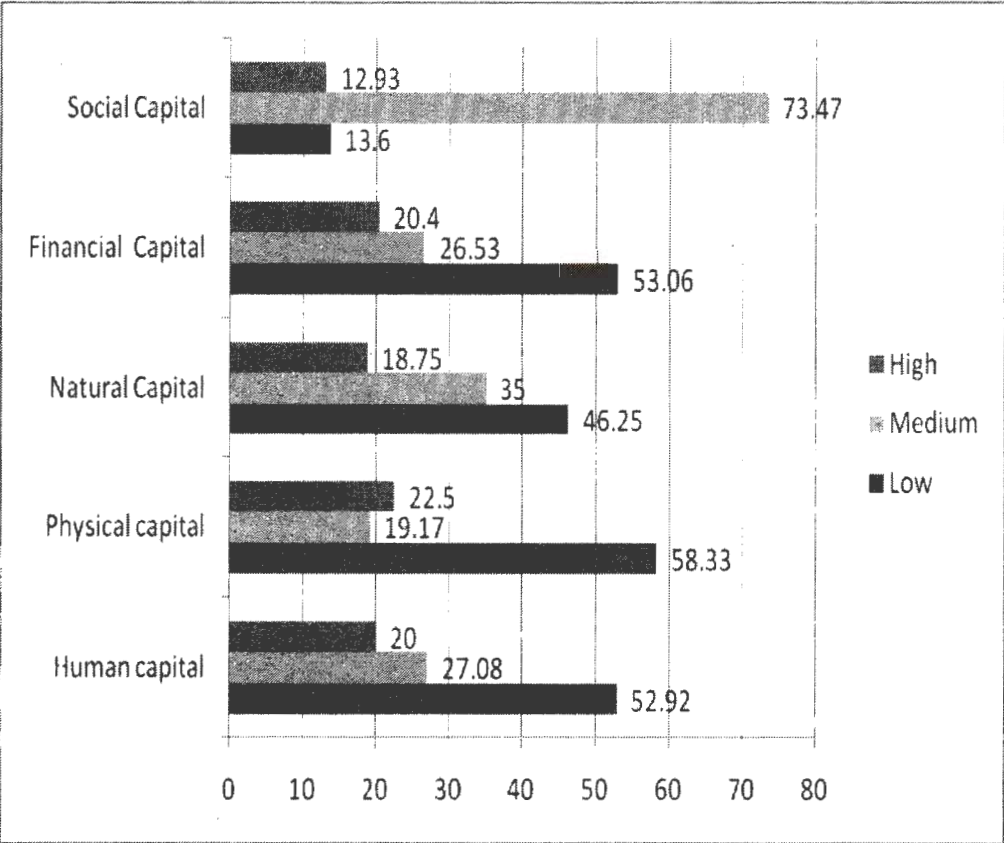


Figure 5: Five Key Capitals of the SC/ST Rice Farmers

The item analysis of various indicators such as health, education, trainings undergone and labour availability are presented as follows.

Table 1. Factors contributing to the Human Capital

Human Capital	Variable/Items	Percentage of Respondents
Health facility	Private clinic	100
Access to Health facilities	5 to 10	62
	> 10	38
Means of Transportation	Ambulance	61
	Tractors	11
	Bullock carts	28
Education	No school education	11.6
	Middle school	88.4
Training undergone	Yes	5.44
	No	94.55
Engage own labour	Yes	97.28
	No	2.74
Number of family members engaged	0	1.4
	1 to 3	60
	4 to 6	20
	7 to 9	13
	> 10	1.4
Labour adequate for farm work	Yes	38.8
	No	59.9
Labour adequacy	Adequate	71.4
	partially adequate	25.2
	inadequate	0
Labour wages for outsiders	Yes	40
	No	59

Table 1 shows that the farmers had poor access to health facilities, depending completely on the private health facilities. It clearly explains that poor health conditions and facilities were prevailing in the sampled area where these poor farmers were most vulnerable to various diseases. Poor education of farmers, subsequently poor awareness of the diseases and access to public health clinics and dominance by costly private health clinics which poor can access but cannot afford. Moreover, the survey also revealed that the majority of the farmers are

educated upto primary to middle school (88 %) and rest of the respondents were illiterate farmers (11.6%).

Education generally empowers human beings not only to understand the situation but also be aware of problems and solutions to come out of the deprived situation. The efforts of probing about various other educational activities like training clearly enunciate that a vast majority (94.55 %) of the farmers had not undergone any training programme. Low education coupled with low training which imparts knowledge, changes the attitude and improves skills were depriving the farmers (who are agricultural labour as well) of skill up gradation on new technologies or venture into new means of livelihood.

Labour availability and their skillfulness is one of the important contributors of enriching the potency of human capital. It was found that labour was substantially available with these farmers. This might be due to the joint family system that is prevailing in this region.

Physical capital

The data from figure 5 exposes the fact that a majority (58.33 %) of the farmers had low physical capital followed by high (22.50 %) and medium (19.17 %). The low physical capital may be due to the lack of availability of infrastructural facilities i.e., affordable means of transport, poor housing conditions, poor sanitation facilities, unhygienic sources of energy, poor material possession and poor sources of information especially mass media. Further, an item analysis was carried out to have a clear focus into problem dimensions in the physical capital of the farmers.

Table 2. Factors contributing to the Physical Capital

Physical Capital	Variable/Items	Percentage of Respondents
Affordable transport	Bullock cart	2.04
	Public transport	0.68
	Jeep/Auto	89.8
	Own vehicle	7.48
Type of House	Kutcha	61.9
	Pucca	37.41
	Tiled house	0
	Building	0

Physical Capital	Variable/Items	Percentage of Respondents
Adequate water supply	Yes	100
	No	0
Sources of energy	Fire wood	4.08
	Kerosene	93.87
	LP gas	0
Source of information	Neighbours	51
	Newspaper	24.58
	Television	15.83
	Radio	9.17
	Local leaders	19.58
	Panchayat society	5.42
Material possession	None	0
	One animal or material	8.84
	Two farm animals	6.8
	Three farm animals	10.88
	Five to ten farm animals	30.61
	More than ten animals	26.53

The results in Table 2 clearly show there is lack of public transport facilities by State Road Transport Corporation to the interior villages and frequency of buses is also very less. The results indicate that majority (61.9%) of the farmers were living in kutchha house, 37.41 per cent were dwelling in pucca house and majority of these houses are built under different schemes of government and YFA- Krishi Vigyan Kendra and the majority of the respondents were using either firewood or kerosene (97%). A little more than fifty per cent of the farmers had neighbours as the main source of information, with newspapers (24.58%), local leaders (19.58 %), television (15.83%), radio (9.17%) and panchayat/society officials (5.42 %). The data clearly exemplifies the fact that there is lack of mass media support which includes print media and broadcast media, even though lot of information and communication technology revolution has taken place in the last decade.

A little over 25 per cent of the farmers had low material possession. The low to medium material possession is a characteristic feature of poor farmers. In brief, the low physical capital is due to poor infrastructural and physical facilities such

as poor affordable transport, poor housing, poor water supply and sanitation, poor sources of information and poor material possession. It is worth noting that physical or 'man made' capital can substitute for natural capital in many circumstances. Indeed, the entire long-term process of technological change coupled with industrialization and urbanization is one in which physical capital cumulatively substitutes for natural capital over time. The important categories of physical assets that facilitate livelihood diversification are infrastructural assets such as roads, power lines and water supplies. They also facilitate movement of people between the places i.e. more urban contact which offers different income earning opportunities, which create markets that otherwise would not come into existence. The relative absence of electricity and adequate water facilities inhibit the choice of establishment of rural industrialization. Provision of physical capital assets has multiple beneficial affects on sustainable rural livelihoods due to saving of time on access.

Natural capital

The results in the figure 5 clearly reveal that a majority of the farmers (46.25 %) had low natural capital followed by medium (35.00 %) and high (18.75 %). These results can be best explained along with the factors contributing to natural capital (given in table.3). Mere possession of natural capital in terms of land will not make them sustainable until such natural capital is remunerative. For example, natural capital can be enhanced or augmented when it is brought under human control to increase productivity, income generation and proper livelihood options. For describing what makes a majority of farmers have low natural capital (in spite of possessing the land), an item analysis was carried out (details are provided in table.3).

A cursory glance at Table 3 shows that majority (40.13%) of the farmers were cultivating under 'sandy soils' type followed by black and sandy loam soils. The type of soils generally limits the type of crops to be cultivated which may not be profitable under dry land conditions and better livelihood options. About 71 per cent of the farmers were cultivating under tube well irrigation followed by canal irrigation. This trend clearly signifies that the farmers were cultivating under these dry land conditions characterized by poor fertility, unassured irrigation facilities and poor rainfall. The data clearly explains that farmers mainly depend on the tube wells where ground water levels have got depleted due to over exploitation and the cost of digging a bore well is also more which ultimately results in poor production and productivity which is uneconomical.

Table 3. Factors contributing to the Natural Capital

Natural Capital	Variable/Items	Percentage of Respondents
Type of soil	Black	27.89
	Red	46.3
	Alluvial	0.68
	Sandy	40.13
	Sandy loam	16.32
	Chalka	39.45
Type of irrigation facilities	Canals	18
	Wells	71
	Tanks	1.4
	Lift irrigation	3.4
Type of cultivation	Rainfed	37
	Irrigated	53
	Irrigated dry	9
Type of crop	Cereals	80.95
	Millets	8.16
	Pulses	40.13
	Oil seeds	63.94
	Cash crops	6.12
	Fruits	0
	Vegetables	0.68
	Flower crops	0
	Medicinal plants	0

A vast majority of the farmers were farming under rain fed conditions and irrigated conditions with higher cost of cultivation. Now because of the Irrigation Projects taken up by the Government of Andhra Pradesh, it is expected that these areas will have assured canal irrigation down the line, five years from now. In the absence of assured irrigation, farmers would be under vulnerable conditions where livelihood diversification and possibility of agrarian change is very less, triggering the farming community to go to far off places in search of more livelihood opportunities (resulting in more migration). The majority of the farmers were cultivating cereals (80.95%) and it is clearly evident from the results that the dry

land cereals and millet crops were less profitable and employment generation for farmers and agricultural labourer were also very less in terms of income generation. Hence, any strategy for enhancing the income levels and livelihoods will have to focus on 'Rice Based Technological Interventions'.

Social capital

The term social capital mainly tries to capture community and wider social claims on which individuals and households can draw by virtue of their belonging to social groups of varying degrees of inclusiveness in the society. Socio – political participation, inter connectedness through trust and solidarity among the members of the community and the extent of trust among them forms strong social networks for achieving livelihood objectives through various livelihood options and strategies. The results in figure 5 clearly reveal that majority of the farmers (73.47 %) had medium social capital followed by low (13.6%) and high (12.93%).

Table 4. Factors contributing to the Social Capital

Social Capital	Variable/Items	Percentage of Respondents
Socio-Political Participation	Yes	2.27
	No	97.28
Trust and Solidarity	Trust and Solidarity	
	4 to 6	55.7
	7 to 9	10.2
	10 to 12	9.52
	13 to 15	23.2
	16 to 20	1.36

Table 4 clearly exemplifies that a vast majority (97.28 %) of the farmers had no socio – economic participation followed by 2.27 per cent with official positions in self help groups (SHGs). Majority of the farmers had a medium trust and solidarity. This needs to be built for future interventions. Mutual trust and solidarity lowers the costs of working together. This means that social capital has a direct impact on improving the efficiency of economic relations, can increase farmer's incomes and the rate of savings, helps to reduce the 'free rider' problems associated with management of common property resources, facilitates the development and

sharing of knowledge, creation of more livelihood opportunities ultimately increasing incomes and overall human development.

Financial capital

Financial capital denotes the financial resources that people use to achieve their livelihood objectives. In the present study, indebtedness and savings of the farmers is taken into consideration in overall financial capital of the farmers. The results clearly show that the farmers had low financial capital (53.06%) followed by medium (26.53%) and high (20.40 %) (figure 5). The low financial capital might be due to the low incomes from agriculture, more money spent on digging bore wells, low production and predominance of the non-institutional credit system (i.e., through money lenders) which increases the debts of the farmers and reduces their savings.

Table 5. Factors contributing to the Financial Capital

Financial capital	Variable/Items	Percentage of Respondents
Indebtedness	Purposes	
	Agriculture	55.78
	Non-Agriculture	2.04
Over all Financial Capital	Low	53.06
	Medium	26.53
	High	20.4

The low financial capital of the farmers was mainly due to low livelihood opportunities to augment the income from farm, lack of proper and timely institutional credit support, subsequently over exploitation by the money lenders with more rate of interest, 'sell back' mechanism with the money lenders and more money being spent on the exploitation of natural resources especially digging up of bore wells which were already dried up.

Relationship between personal socio-economic and psychological factors with that of sustainable rural livelihoods

The data were subjected to zero order correlation to analyze the nature of relationship of selected independent variables with dependent variable "sustainable rural livelihoods". The values of correlation coefficient (r) were then tested for their statistical significance.

Table 6: Correlation coefficients of sustainable rural livelihoods with independent variables

S. No.	Variables	r' values
1	Age	0.526 **
2	Marital Status	-0.046
3	Occupational Status	-0.146
4	Family	0.394 **
5	Landholding	0.709 **
6	Farming experience	0.105
7	Expenditure pattern	-0.411**
8	Employment generation	0.034
9	Access to Market facilities	-0.601**
10	Migration pattern	0.787 **
11	Technology utilization	0.362 **
12	Urban contact	-0.041
13	Extension contact	-0.062
14	Level of aspiration	-0.015
15	Change proneness	-0.285 **
16	Self orientation	0.042
17	Economic motivation	0.411**
18	Risk taking ability	-0.004
19	Achievement motivation	0.048

* Significant at 0.05 level of probability ($r > 0.1285$)

** Significant at 0.01 level of probability ($r > 0.1684$)

It is evident from table 6 that among the personal, socio economic and psychological factors, age, family characteristics, land holding, migration pattern, technology utilization and economic motivation were found significant at 1 percent level of probability with that of sustainable rural livelihoods. Poverty and livelihoods are the cause and effect and vice versa, which are dynamically related to each other. As the age increases among the farmers it would automatically reduce the productive capacity to perform any job. It could be explained that as the family

size increases, the creation of more employment for the members of the family can achieve sustainable livelihoods but at the cost of their children's human capital. It is very imperative to state here that migration is considered as a key livelihood diversification and survival strategy for the poor in many parts of the developing world. The extent and characteristics of migration are however context specific, which vary with different problem situations. Severe poverty may force farmers in dry lands to undertake permanent migration potentially aggravating the deprivation where there is no insurance against livelihood failure.

One of the interesting findings is that technology utilization pattern is negatively and significantly correlated with sustainable livelihoods. This means that, the more effective the technology utilization pattern, the more will be the sustainable nature of livelihoods. Interestingly, when the net returns are less, the farmers have realized the disadvantages of not using modern technologies. This has an indirect effect on farm related rural livelihoods. If all the factors work coherently, the farmer will be economically motivated to realize his livelihood objectives.

The factors like expenditure pattern, access to market facilities and change proneness were negatively significant at 1 percent level of probability and occupational status was negatively significant at 5 percent level. In fact the poor financial capital especially high indebtedness, high expenditure pattern to meet the burdened family requirements on poor market price for their produce was found to follow the traditional bonded labor system to improve the livelihoods. The lack of change proneness among the farmers is also a hindrance for occupational diversification to achieve sustainable rural livelihoods.

Predicting the Factors influencing Sustainable Rural Livelihoods

Multiple linear regression analysis was carried out with sustainable rural livelihoods and personal, socio economic and psychological factors. The factors like land holding, migration pattern and economic motivation were found significant at 1 percent level of probability where as employment generation and technology utilization were significant at 5 percent level of probability.

Table 7: Regression coefficients of Sustainable Rural Livelihoods with independent variables

S. No.	Variables	b-value	SE of b	't' value
1	Age	-0.374**	0.105	-3.571
2	Marital Status	0.165	0.905	0.182
3	Occupational Status	-0.450*	0.224	-2.007
4	Family	0.119	0.242	0.492
5	Landholding	0.671**	0.153	4.375
6	Farming experience	0.082	0.103	0.798
7	Expenditure pattern	0.000**	0.000	-7.056
8	Employment generation	0.025*	0.011	2.219
9	Access to Market facilities	-0.323*	0.152	-2.124
10	Migration pattern	0.607**	0.099	6.136
11	Technology utilization	0.422*	0.199	2.123
12	Urban contact	-0.095	0.133	-0.716
13	Extension contact	-0.150	0.224	-0.671
14	Level of aspiration	-0.303**	0.103	-2.956
15	Change proneness	0.037	0.169	0.219
16	Self orientation	0.120	0.154	0.776
17	Economic motivation	0.395**	0.140	2.825
18	Risk taking ability	-0.195	0.133	-1.465
19	Achievement motivation	0.076	0.129	0.591

 $R^2 = 53.29$

'F' Value - 12.49

* Significant at 0.05 level of probability ($t > 1.960$)** Significant at 0.01 level of probability ($t > 2.575$)

It could be conformed from the above results that as land holding increases, the ability of the farmers to lead sustainable livelihoods will increase. This could be due to the fact that more man-days of employment would be possible with increased landholdings.

Even though migration pattern has many disadvantages, it is considered to be a necessary evil in the developmental aspect. The migration pattern of farmer increases financial capital, enhances skill competencies and increases the inclination towards adoption of modern technologies under risky environments with the basic drive of economic motivation.

Among personal, socio economic and psychological factors in the regression model, factors like age, expenditure pattern, level of aspiration were negatively significant at 1 per cent level of probability and occupation and access to market facilities was negatively significant at 5 per cent level of probability .

As discussed earlier, as age increased, the livelihood options tended to decrease. Apart from this, caste based occupations tended to reduce the livelihood priorities of the farmer in an environment of high expenditure pattern and poor access to market facilities and all these combined together lessened the aspiration levels which would impinge the dynamics of sustainable rural livelihoods and hamper the broad goals of the nation's development.

The coefficient of multiple determination (R^2) was found to be 0.5329 inferring that 53.29 percent variation is explained by all the personal, socio economic and psychological factors taken in the regression model.

Conclusion

The study necessitates a sustainable livelihoods approach to highlight important factors or the livelihood parameters contributing to the livelihoods of the rice farmers in a representative backward region like Mahabubnagar district. In fact, the study has brought out different factors associated with and influencing the livelihood options of the weaker and vulnerable sections of the farming community like the scheduled caste/ scheduled tribe (SC/ST) farmers.

Multiple linear regression analysis was carried out with sustainable rural livelihoods and personal, socio economic and psychological factors. The factors like land holding, migration pattern and economic motivation were found significant at 1 percent level of probability where as employment generation and technology utilization were significant at 5 percent level of probability. The identified factors of livelihood like landholding, migration pattern, economic motivation, employment generation, technology utilization need to be given attention while formulating suitable strategies that can directly impact the livelihoods of similar farming communities and vulnerability contexts.

The findings of the study, suggest that a cafeteria of technologies targeting smaller landholdings need to be undertaken to reduce the migration behavior in this region. This may make livelihoods sustainable. Similarly, there is a need to take up interventions focusing on employment generation amongst the rural youth (eg. developing mass multiplication facilities for bio-control agents such as

Trichoderma, Trichogramma). The low technology utilization can be overcome by addressing issues such as lack of resource abundance, drought tolerant varieties / adaptation measures, depleted ground water resources, poor institutional credit support and poor extension contact etc., The technology utilization pattern needs to be changed over a period of 2-3 years with a series of technological interventions.

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