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Livelihood analysis of livestock farmers in arid region of Deccan Plateau

Nagaratna Biradar[1,*], P. Sharma[2], Sadhana Pandey[2], Satyapriya[2], Maharaj Singh[2], S. Radotra[3]
[1]Indian Grassland and Fodder Research Institute, Southern Regional Research Station, Dharwad-580 005, Karnataka, India
[2]Indian Grassland and Fodder Research Institute, Jhansi-284 003, Uttar Pradesh, India
[3]Indian Grassland and Fodder Research Institute, Regional Research Station, Palampur-176062, Himachal Pradesh, India
* Corresponding author e-mail: nagaratna123@gmail.com
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Abstract
Resource-poor farmers form a major part in arid eco system of the country. Livestock in the life of these farmers' plays varied roles - as an asset, offers economic fluidity, is all-weather income source etc. Most important one is it brings in sustainability to crop cultivation in arid system. A study was taken up to analyse the role of livestock in the livelihood of farmers, emphasising more on resource poor farmers using sustainable livelihood framework. Analysis of data collected by employing standardised interview schedule to 162 households of 3 districts of arid zone of Southern India revealed asymmetrical livelihood pentagon with limited social and financial capitals. Landholding explained 65 percent variation on livestock income indicating more equitable distribution of livestock income across farmers of different landholding categories. Therefore, promotion of collective actions, technology dissemination and also incessant research on livestock husbandry for resource-poor farmers should become part of the strategic plan to reduce agrarian crisis and bring in social parity in rural areas.

Key words: Arid districts, Employment pattern, Financial capital, Livestock, Rural Livelihood, Social capital**,** SRL framework

Introduction

Global agricultural growth rate is slowing down, from 2 percent per annum over the past several decades which is likely to dwindle down to 1.7 percent per annum over the next decade. Growing resource constraints, environmental degradation, and higher costs of some inputs are likely to inhibit supply in virtually all regions. So it is emphatically mentioned, 'more attention be paid to increasing sustainable agricultural productivity growth' (OECD-FAO, 2012). In Indian context, sustainability is more important owing to population growth and large area under arid and semi arid ecosystems. Though farmers practice mixed farming, livestock remains by and large at subsistence level. Change in the climate however demands more focus on livestock development activities in the country to bring in sustainability not only to the farm enterprise but also to the income. Severe reduction in the annual income of the farm households during drought year was observed, but the reduction in income from livestock was less pronounced as compared to crops (Biradar and Sridhar, 2009). Arid ecosystems in the country face extreme weather conditions. Livestock though plays an important role here but faces challenge of feed and fodder scarcity. Underprivileged families account for about one-fourth of the population and contribute major part of livestock production. Livestock are central to their livelihoods and culture (Rangnekar, 2006). A good understanding by the research and development community of the role of livestock in the livelihoods of the underprivileged is needed to guide effective research and development aiming to alleviate poverty. Towards this end a study was taken up with the objective to undertake livelihood analysis of livestock farmers in arid region of Deccan plateau.

Materials and Methods

Arid eco systems are characterised as areas of low precipitation, high temperature and high rate of evaporation. The zone of Deccan plateau, hot arid eco region with mixed red and black soils, includes the districts of Bellary and Bijapur of Karnataka and Anantpur of Andhra Pradesh covering 1.4 % of the land area. It is characterised by hot and dry summers and mild winters, with an annual rainfall ranging from 400 to 500 mm. The growing period is less than 90 days. The soils are shallow to medium red loamy and deep clayey black. Rainfed farming is most common. Prolonged dry spells and soil erosion are the major problems.

An extensive survey was taken up in these three districts

of arid eco systems of Deccan plateau by following stratified random sampling. Three blocks representing distinct cropping systems to reflect the different farming systems prevalent in the area were selected from each district. Three villages from each block and 6 households from each village were sampled. Households owning livestock but belonging to landless and landholding categories were interviewed to capture different socio-economic configurations present in the study area. Data was collected through personal interview technique using pretested and standardised interview schedule. In all, the study covered 3 districts, 9 blocks, 27 villages and 162 households.

The interview schedule was developed to assess the livelihood of these livestock farmers by incorporating 5 capital assets- human capital (HC), natural capital (NC), physical capital (PC), socio political capital (SC) and financial capital (FC). These assets are central to livelihoods analysis because they affect the ability of individuals or households to pursue particular livelihood strategies (or activities) (Scoones, 1998). Sustainable livelihoods framework of Department for International Development (DFID) is developed based on these capital assets and the present study used this framework for the analysis. It presents the main factors that affect the sources of people's livelihoods and also provides typical relationship between them. The conceptual framework of DFID provides attention to measured changes in different factors, which contribute to different livelihoods especially human, social, financial, physical and natural capital assets (Pasteur, 2001). Various key indicators were used to assess the different capital assets. The key indicators were scored on fixed mark and simple method of percentage was used to derive the present status of capital assets. In terms of measurement the total scored value of each indicator was averaged as number of indicators in each capital assets varied. The percentage of average value of each indicator to total average value of all indicators was calculated. The value in percentage of each capital asset depicts the present status of livelihoods capital in the form of pentagon (Sreedevi *et al*., 2009). Mean, percentages and regression equations were also employed to derive inferences from the data.

Results and Discussion

The capital assets of livelihoods: The status of livelihoods presented as pentagon (Fig. 1) depicts the five capital assets- natural, human, social, physical and financial. The pentagon is asymmetrical reflecting disproportionate distribution of assets in the context of semi arid situation. It explicitly showed limited social (10.26%) and financial (16.13%) capitals. Natural (21.13%) and physical (20.58%) capitals were on par although human capital (31.90%) dominated the pentagon. The findings of the pentagon are deliberated in the light of results presented in Table-1.

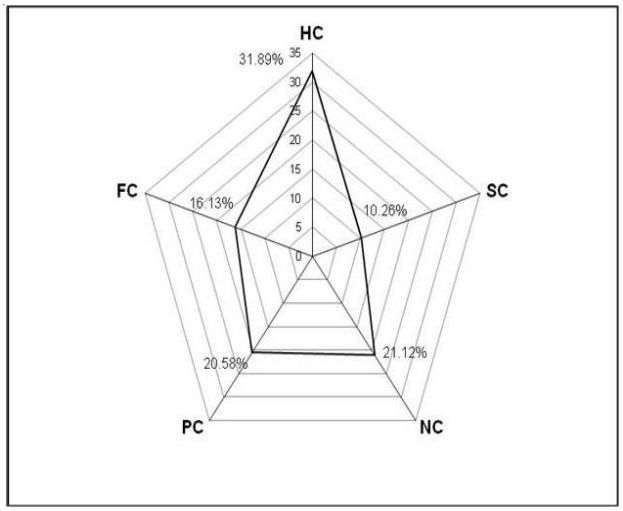

Figure 1. Livelihood pentagon depicting the five capital assets in Arid Eco System of Southern India

Social capital was limited as only 38 percent of the farm families were part of self help groups. Participation in other organisations was also found to be limited as only 16 percent participated in women's club and 15 percent in agriculture cooperative society. The decision making pattern in family was encouraging as 2 in 3 farm households followed consultative decision pattern. The distinct expressions of social capital emanate principally from the relations of participation and trust in social organizations, and several authors consider it to be an asset (together with human capital and physical and financial capital) that can contribute to improved levels of social and economic development (Knack and Keefer, 1997; Aker, 2007). However, besides trust in organisations, farm households' participation was also influenced by the realisation of benefits from such organisations and resources, mainly time and energy at their disposal. Small and marginal farmers of arid eco system would rather prefer to invest available time and other resources to make their daily living unless and until they were educated about the importance of participation in organisations for improvement of efficiency in several aspects, be it marketing of their produce or getting credit *etc*. Reddy and Soussan (2004) in their study reported limited social capital as compared to other capitals.

Table 1: Status of key indicators of varied capitals

Capitals	Status
Social capital	
Consultative decision pattern in the family	2 in 3 followed (72%)
Self help groups	2 in 5 participated (38%)
Primary agriculture cooperative society	1 in 7 participated (15%)
Women club (*Mahila Mandal*)	1 in 7 participated (16%)
Other organisations	Meagre participation
Natural capital	
Drinking water for humans	Adequately available for all (99 %)
Drinking water for livestock	Adequately available (98%)
FYM production	4 in five produce (85%)
Access to forest	2 in 3 accessed (72%)
Milk production	2 in 3 households have it (67%)
Rainfed land	3 in five possess (63%)
Irrigated land	2 in five possess (40%)
Physical capital	
House	Free hold to all (98%)
Adequate farm assets	9 in 10 (89%)
Livestock shelter	85%
Adequate domestic assets	2 in 3 (70%)
Human capital	
Family average age (years)	23.9
Family consumption status Min possible score-1 Max possible score-6	3.92
Family education status (average years of schooling)	4
Percentage of woman in good health	50%
Percentage of households participated in training and other extension activities	11.72%

Financial capital asset was also limited as majority earned their income by working as wage labourers in agriculture and non agriculture activities. Three in 5 farm households (63%) own rainfed land but crop failure due to fragile weather of arid ecosystem would restrict the earnings and make earnings from wages more assured. Overall, as depicted in Table 3, wages contributed 63.29 percent to their total income followed by crop (23.03%) and livestock (13.67%). Contrary to common perception that agriculture is the dominant source of income for rural farm households, in arid ecosystems households with small land holdings received substantial share of their income from wages. Similar observations were made by Birthal and Joshi (2009) in their study titled how important is rural non farm sector in enhancing farmers' income (NCAP). They reported that with falling farm sizes and lower yield, the rural marginal and small farmers are increasingly looking towards non-farm sector for earning their livelihood. Results thus reflect the crisis Indian agriculture faces in coming years.

Among indicators of physical capital, almost all the respondents mentioned that they live in freehold houses with majority having ownership tenure but study did not consider the size and type of the house. What it looked at was whether they have secure space for living as the study largely aimed at small and marginal farmers. Others like basic farm assets (89%), cattle-shed (85%) and basic domestic assets (70%) were owned by good number of families. Irrigation source, which is a crucial input for agrarian families, was owned though by 40 percent farm households but due to steep decrease in groundwater level they were not effectively benefitting them.

Though the study area belonged to arid region, the natural capital was on par with the physical capital. Drinking water for humans and livestock was adequately available. Scrubby forest area located near to the village was accessed by 71.60 percent families. The utilisation of common property resources is directly

related to the ownership of private property resources mainly the livestock (Singh *et al.,* 1996). Dry land was owned by 63 % and irrigated land was owned by 40% of families. Livestock unit, though could have been part of this capital, was not as sampling for the study was purposive. However milk production (67.28%) was considered as an indicator as it influences the livelihood and similarly FYM production (85.18%) was considered as it adds to fertility of the soil if applied and generates income if it is sold to big farmers.

When compared with other capitals the human capital faired well but its key indicators were not at highest level. Family consumption status (3.92 scores), family education status (4 years of schooling), good health of the woman (50%) and acquisition of knowledge and skills through training and extension activities (12%) were the indicators considered to assess this capital. Events that draw family labour away from farm work, such as education, off-farm employment, or prolonged ill health, may compromise a household's ability to farm effectively in the short term. However, in the longer term, households may benefit from better-educated household members, remittances and the ability to engage in non-farm employment.

Percentage contribution of different income sources for categories of farmers

Percent contribution of wages to the total income decreased as the size of landholdings increased. The reverse trend was observed for crop. In case of livestock, percent contribution did not vary much across the different land holdings (Fig 2).

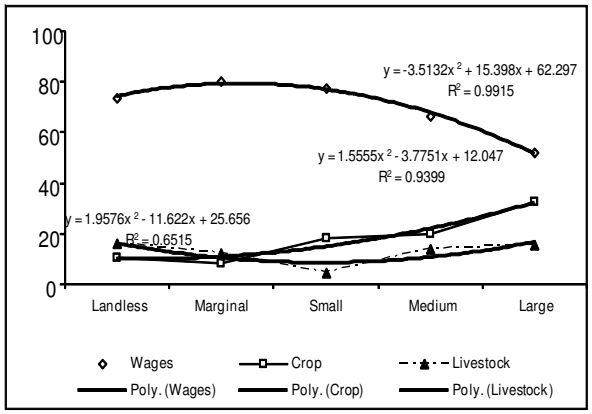

Fig 2: Trend showing percentage contribution of different income sources for categories of farmers

Landholding, which is the independent variable, explains 99 percent variation in the wages and 93 percent variation in the income from crop cultivation; in both cases polynomial 2 would fit better. However, for livestock, landholding explains only 65 percent variation indicating that income from livestock was not influenced by the size of the landholding. This is an important finding which explains the role of livestock even in landless and marginal farmers' livelihood. The linear best fit model was tried for this but in vain. In line with this finding, Mellor (2004) stated that smallholder livestock production has a special role in poverty reduction since more poor are involved in it. Another factor in favour is the low value of 'Gini coefficients', 0.16 against 0.65 for crop production as reported by Sharma and Poleman (1993), indicating that income distribution through livestock is more equitable than from crops.

So, income from livestock remained the same across different categories of farmers, though landless and marginal farmers earned more than small farmers from livestock. Large farmers might earn from livestock due to large herd size but for landless and marginal farmers it might be due to their better management. Singh and Verghese (2004) reported that the income from crops, in relative and absolute terms, increased with farm size; however, livestock income increased with farm size in absolute terms, while its relative contribution decreased. As the landholding size increased the earning from wages decreased. For landless farmers, wage earning was the primary source of income followed by livestock and crop. Even for the large farmers' wages comprised major income source but is in the form of salaried service by which they earn substantially. Nearly 10.20 percent large farmers' families have at-least one person in service/ job (Table 3). So, one way the farm households in arid ecosystem cope with risk is by diversifying their income over several activities. Singh *et al*. (2010), based on their study, indicated that raising the level of household income is dependent on increasing level of investment on agriculture activities and non-farm opportunities.

The livestock units varied across landholding categories (Table 2); however the income did not vary. So the finding could be attributed to the difference in the livestock management by the farmers. That means income from the livestock was influenced by their management levels- be it fodder and feed or health not by the landholdings or livestock units. It reaffirms the ability of the resource poor farmers to sustain livestock production and face competition from resource rich. Pandey (2000) mentioned that livestock not only generate income and employment but also stabilise income and meet equity considerations.

Table 2. Average livestock units against land holding categories

Categories	Land holdings	Respondents number	Average LSU*
Landless	Nil	27	6.12
Marginal	< 1ha	10	3.90
Small	< 2ha	27	5.70
Medium	2-4 ha	49	4.16
Large	> 4ha	49	10.28
Total		162	6.58

*-LSU: Livestock Units

Table 3. Percentage of farmers engaged in different livelihood sources

Sources	Percentage of respondents' engaged					
	Landless (27)	Marginal (10)	Small (27)	Medium (49)	Large (49)	Total (162)
Crop cultivation	11.11	30.00	77.78	85.71	95.92	71.6
Animal husbandry	25.93	10.00	3.70	4.08	8.16	9.3
Daily wages	70.37	70.00	66.67	36.73	12.24	42.0
Service	3.70	0.00	18.52	4.08	10.20	8.0
Petty business	11.11	0.00	0.00	4.08	2.04	3.7

Figures in parenthesis indicate number of farm households

Employment pattern of different categories of farmers

As is evident from table 3 animal husbandry is the second livelihood source next only to daily wages (70.37%), for landless farmers as one-fourth of them are engaged in it. Marginal farmers, though largely engaged in daily wages, still cultivate their available landholding to generate income. Ten percent of them were engaged in animal husbandry to derive income from it. Negligible percent of respondents of small (3.7%), medium (4.08%) and large (8.16%) land holdings were engaged in animal husbandry. However, majority of them were engaged in crop cultivation (78% small, 86% medium, 96% large). Their respective involvement in daily wage earning also reduced, as reported earlier in Fig 2, as the land holding size increased (small 67%, medium 37%, big 12%).

It could thus be concluded that in arid eco system the distribution of livelihood assets among livestock farm households was asymmetrical and efforts are to be made principally for improving the social and financial capitals. Educating, particularly marginal and small livestock farmers, about the benefits of participation in organisation for collective negotiation to varied situations and for techno economic support would facilitate in achieving symmetrical livelihood pentagon in the arid ecosystem. The study also brought out the fact that livestock income was more equitably distributed across the different categories of farmers. The fragile arid eco system thus calls for R&D to bring out more technical innovations in livestock husbandry than for crops which are adoptable, adaptable at resource poor farmers' level and cost effective. At the same time there are already such simple technologies available on shelf which needs push from extension agencies for better growth and development of arid farmers.

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