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# Analysis of Livelihood Systems of Small and Marginal Farmers in Rainfed Ecosystem

## ABSTRACT

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| The present study was conducted in Gadag and Bagalkot districts of Karnataka state during 2022-23. This paper emphasises the analysis of livelihood systems of small and marginal farmers in rainfed ecosystem in north Karnataka by employing “*Ex-post facto*” research design and by using random sampling technique in Gadag and Bagalkot districts constituting 80 small farmers and 80 marginal farmers there by making a total sample size of 160 farmers. A high per cent of small farmers (32.50%) and marginal farmers (18.75%) engaged in 'Agriculture + Livestock' system as the major source of their livelihood. agriculture constitutes the most important source of income for small farmers (96.25%) and marginal farmers (93.75%) followed by livestock (71.25% and 53.75%, respectively). Rainfed agriculture is particularly vulnerable to unpredictable weather conditions, which may explain why small and marginal farmers prefer agriculture mixed with livestock as the primary livelihood strategy in rainfed environments. Farmers protect themselves against crop losses by adding livestock into their agricultural practices. |

*Keywords: Rainfed ecosystem; livelihood systems; small farmers; marginal farmers.*

## 1. INTRODUCTION

India is an agrarian country where 65 percent of the population depends upon agriculture. India ranks first among rainfed agricultural countries in terms of both extent and value of produce. In India, around 143 million hectares of the total geographical area of 329 million hectares are under farming. In this farmed land, rainfed agriculture covers around 108 million hectares. Rainfed agriculture employs 40 per cent of the workforce. The importance of rainfed agriculture to the country's economy and food security cannot be overstated. It currently accounts for approximately 40 per cent of the total food grain output supports two-thirds of livestock and 40 per cent of the human population. Furthermore, the livelihoods of 80 per cent of small and marginal farmers are jeopardised.

Rainfed farmers are typically small and marginal farmers that farm on relatively small areas of land (less than five acres) and rely on the monsoon. The rainfed farmer's principal source of revenue is agriculture where it is seasonal employment for large farmers. Rainfed farmers diversify their livelihood choices by engaging in activities such as poultry, fishing, and so on, which play a major role in their revenue portfolio despite being single-season and rain-dependent. They also keep livestock, primarily small ruminants such as goats and sheep that are not used for dairy production, as opposed to irrigated farmers. Rainfed agriculture, which spans numerous agro-ecologies in the country, plays a critical role in inclusive growth, food security, livelihoods, and sustainable development.

A livelihood encompasses of the abilities, assets (both material and social resources), and activities required for a living. When a livelihood can withstand and recover from stressors and shocks, as well as retain or improve its capabilities and assets right now and in the future, it becomes sustainable [1].

Livelihood is the way through which people support themselves, persevere, and prosper. Livelihood results from how and why individuals organize to modify the environment to fit their needs using technology, power, work, and social ties as well as expertise. The larger political and economic institutions in which they operate also shape their livelihoods. To put it another way, about half of the world's population lacks the socioeconomic and political tools to exercise their economic and social rights. One of the biggest causes of poverty in the developing world is a lack of viable livelihoods.

A livelihood system is the totality of activities carried out by a normal household to make a living. Most rural households have several income earners who work in a variety of crop and livestock, farm, off-farm, and non-farm industries throughout the year (FAO, 2015).

Small and marginal farmers' land-based livelihoods have become increasingly unsustainable in recent years, as their land has failed to provide the family's food requirements and fodder for their animals. With this as a backdrop, the study on the livelihood systems of small and marginal farmers in rainfed ecosystem carried out with the following specific objective.

1. To analyze the Livelihood systems (LS) of small and marginal farmers in rainfed ecosystem

## 2. MATERIALS AND METHODS

The study was conducted in Gadag and Bagalkot districts of Karnataka in the year 2022-23 by using *Ex-post facto* research design and random sampling technique. Four taluks namely Nargund, Gadag from Gadag district and Badami,and Guledgudda from Bagalkot district were selected for the study where the areas receive lowest average rainfall. A list of eight villages from four taluks were selected for investigation. Further, Random sampling method used for selection of respondents. From each district two taluks were selected from each taluk two villages were selected based on rainfed areas, intern from each village 20 respondents were randomly selected, from each village 10 small and 10 marginal farmers purposively selected, thus the total sample constitute 160 respondents which consist of 80 small and 80 marginal farmers for the study.

To analyze the livelihood systems of small and marginal farmers of rainfed ecosystem, a

**Chart 1. Categories of livelihood system based on livelihood activities practiced**

|  |  |  |
| --- | --- | --- |
| **Sl. No** | **Categories of livelihood systems** | **Score** |
| 1 | Agriculture +Livestock | 11 |
| 2 | Agriculture +Livestock +Labour | 10 |
| 3 | Agriculture +Labour | 9 |
| 4 | Agriculture +Horticulture +Livestock | 8 |
| 5 | Agriculture +Livestock +Service | 7 |
| 6 | Agriculture +Horticulture | 6 |
| 7 | Agriculture +Livestock +Others (Sewing/Carpentry) | 5 |
| 8 | Agriculture +Service | 3 |
| 9 | Agriculture +Horticulture +Labour | 4 |
| 10 | Agriculture + Vendor +Labour | 2 |
| 11 | Agriculture +Others (Sewing/Carpentry) | 1 |

structured interview schedule was prepared by reviewing the previous studies and pretested in the non-sample area for its practicability and relavancy. Mean and standard deviation were used for classification of the members into various categories. Z-test was employed to know the significant difference between small and marginal farmers. In the research study eleven livelihood systems were standardized based on various livelihood activities undertaken by small and marginal farmers to meet their livelihood security. In turn, respondents were grouped in eleven livelihood systems based on their practicing livelihood activities.

An attempt was also made to analyse the distribution of each livelihood activity among the number of small and marginal farmers. To measure this component, existence of each livelihood activity either as sole or in combination with the small and marginal farmers was calculated and accordingly all the livelihood activities were ranked in terms of their distribution among the small and marginal farmers. The procedure as followed by Ramya et al*.* [2].

**Z test:**

Z-test is a statistical analysis tool that measures the average mean of two large data samples when the standard deviation is known. Formula is given below.

$$Z=\frac{(\overline{X}-μ\_{0})}{s}$$

Z = Z- value

$\overbar{X}$=sample average

μ0=mean

s= standard deviation

## 3. RESULTS AND DISCUSSION

**3.1 Different Livelihood Systems Followed by Small and Marginal Farmers**

It could be inferred from the (Table 1) that, one third (32.50%) of the small farmers engaged in 'Agriculture + Livestock' system as the major source of their livelihood. About 17.50 per cent of small farmers engaged in 'Agriculture + Livestock +Labour' as their livelihood system followed by 'Agriculture +Labour' with 13.75 per cent, 'Agriculture +Horticulture +Livestock' (08.75%), 'Agriculture + Livestock + Service' (07.50%) and 'Agriculture + Others' (5.00%). An equal per cent (03.75%) of small farmers engaged in 'Agriculture + Horticulture', 'Agriculture + Service' and 'Agriculture +Vendor + Labour'. Only 02.50 per cent of small farmers engaged in 'Agriculture + Livestock + Others' and 'Agriculture + Horticulture + Labour' (01.25%) as their source of livelihood.

In terms of marginal farmers, (18.75%) engaged in Agriculture + Livestock as a major livelihood system followed by Agriculture+ Labour (13.75%) and Agriculture + Livestock + Others (12.50%). One tenth (10.00%) of the marginal farmers involved in 'Agriculture + Livestock +Labour'. An equal (08.75%) per cent engaged in 'Agriculture + Service' and 'Agriculture + Others'. While (07.50%) engaged in 'Agriculture + Horticulture'. Where as equal (06.25%) per cent of marginal farmers engaged in 'Agriculture +Horticulture +Livestock' and 'Agriculture +Vendor + Labour' as a source of livelihood. An equal cent (03.75%) engaged in 'Agriculture + Horticulture + Labour' and 'Agriculture + Livestock + Service'.

**Table 1. Different Livelihood Systems followed by small and marginal farmers**

 **(n=160)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl. No** | **Categories of livelihood systems** | **Small farmers (n1=80)** | **Marginal farmers (n2=80)** | **Total (n=160)** |
| **f** | **%** | **f** | **%** | **f** | **%** |
| 1 | Agriculture +Livestock | 26 | 32.50 | 15 | 18.75 | 41 | 25.63 |
| 2 | Agriculture +Livestock +Labour | 14 | 17.50 | 8 | 10.00 | 22 | 13.75 |
| 3 | Agriculture +Labour | 11 | 13.75 | 11 | 13.75 | 22 | 13.75 |
| 4 | Agriculture +Horticulture +Livestock | 7 | 8.75 | 5 | 6.25 | 12 | 7.50 |
| 5 | Agriculture +Livestock +Others (Sewing/Carpentry) | 2 | 2.50 | 10 | 12.50 | 12 | 7.50 |
| 6 | Agriculture +Others (Sewing/Carpentry) | 4 | 5.00 | 7 | 8.75 | 11 | 6.88 |
| 7 | Agriculture +Service | 3 | 3.75 | 7 | 8.75 | 10 | 6.25 |
| 8 | Agriculture +Livestock +Service | 6 | 7.50 | 3 | 3.75 | 9 | 5.63 |
| 9 | Agriculture +Horticulture | 3 | 3.75 | 6 | 7.50 | 9 | 5.63 |
| 10 | Agriculture + Vendor +Labour | 3 | 3.75 | 5 | 6.25 | 8 | 5.00 |
| 11 | Agriculture +Horticulture +Labour | 1 | 1.25 | 3 | 3.75 | 4 | 2.50 |

*f = Frequency % = Percentage*

**Table 2. Distribution of each Livelihood activities among the small and marginal farmers**

**(n=160)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl. No.** | **Available Livelihood activities** | **Small farmers (n1=80)** | **Marginal farmers (n2=80)** | **z- Value** |
| **F** | **%** | **Rank** | **f** | **%** | **Rank** |
| 1 | Agriculture | 77 | 96.25 | I | 75 | 93.75 | I | **0.75ns** |
| 2 | Livestock | 57 | 71.25 | II | 43 | 53.75 | II |
| 3 | Non-agriculture labour | 15 | 18.75 | III | 18 | 22.50 | III |
| 4 | Horticulture | 12 | 15.00 | V | 14 | 17.50 | V |
| 5 | Agriculture labour | 14 | 17.50 | IV | 11 | 13.75 | VI |
| 6 | Vendor | 2 | 2.50 | VIII | 5 | 6.25 | VIII |
| 7 | Service | 8 | 10.00 | VI | 10 | 12.50 | VII |
| 8 | Others | 12 | 5.55 | VII | 15 | 18.75 | IV |

*Note: Multiple responses may elicited*

*f = Frequency % = Percentage*

*NS- Non- Significant*

Furthermore, analysing the overall distribution of small and marginal farmers revealed that 'Agriculture + Livestock' (25.63%) was the most important livelihood system, followed by 'Agriculture + Livestock +Labour' and 'Agriculture + Labour' with equal per cent (13.75%).

The probable reason for favouring agriculture combined with livestock as the major livelihood system in rainfed ecosystems among small and marginal farmers can be attributed to several factors that are often interconnected. Rainfed agriculture is highly vulnerable to unpredictable weather conditions. By incorporating livestock into agricultural practices, farmers create a safeguard against potential crop losses. The inclusion of both crops and livestock also introduces a broader array of income streams, ensuring that challenges affecting one sector can possibly can be countered by the other. In numerous rural regions, the contribution of agriculture and livestock is integral to the local culture and societal structure.

In addition to that small and marginal farmers may be forced to engage in labour activities due to insufficient land holdings. Furthermore, these activities may provide job opportunities during agricultural off-seasons. Engaging in labour tasks introduces an added layer of income variation for farmers.

The results are consistent with the findings of Sunil Kumar [3], Swathi [4], Ramya et al. [2] and Reddy et al. [5].

The distribution of each livelihood activity among small and marginal farmers was examined. Looking into the observation on investigation (Table 2) agriculture constitutes the most important source of income for small farmers (96.25%), followed by livestock (71.25 %). Where as non-agricultural labour employed 18.75 per cent of the workforce, followed by agricultural labour (17.50 %) and horticulture (15.00%). In contrast. one-tenth (10.00%) of small farmers were engaged in service. Only a handful (05.55%) worked in other activities such as sewing and carpentry and vendors constitutes 02.50 per cent.

When it comes to marginal farmers, agriculture constitute the most important source of income (93.75 %) followed by livestock (53.75%). Where as non-agricultural labour employed 22.50 per cent of the workforce, with other activities (18.75%) such as sewing and carpentry following closely behind. 17.50 per cent of marginal farmers were engaged in horticulture followed by agriculture labour (13.75%) and service (12.50%). Only a small percentage (06.25 %) engaged in vendoring.

Moreover at the 0.05 level of probability, the non- significant z value demonstrated a there is no significant difference in livelihood activities between small and marginal farmers.

## 4. CONCLUSION

The findings from this investigation shed light on the livelihood dynamics of small and marginal farmers in the study area. Agriculture emerges as the dominant source of income for both groups, with small farmers relying heavily on it, likely due to slightly larger land holdings. Livestock plays a significant role in supplementing income for both small and marginal farmers. Interestingly, the data suggests that marginal farmers, who often possess extremely limited land, are more inclined towards non-agricultural labor and other livelihood activities. This diversification can be attributed to the fundamental constraint of limited land availability, which restricts agricultural income for marginal farmers. As a result, they seek alternative income opportunities to achieve financial stability. In conclusion, this analysis underscores the importance of understanding the livelihood strategies of small and marginal farmers in rainfed ecosystems. It highlights the need for tailored interventions that address their specific constraints and opportunities, with an emphasis on sustainable agricultural practices and alternative income sources to enhance their overall well-being and resilience.

**DISCLAIMER (ARTIFICIAL INTELLIGENCE)**

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Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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**Details of the AI usage are given below:**

1.

2.

3.

Competing interests

Authors have declared that no competing interests exist.

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