

Assessment of Livelihood Sustainability and Economic Growth of the Rural Households in Hill Districts of Uttarakhand

*Tarak Nath Shaw

**Ajay Purohit

ABSTRACT

Uttarakhand is one of the Indian states that possesses districts both with plain and hilly terrain. To understand these two different classifications of districts we have taken two different methods. This study assess the livelihood sustainability and economical growth of the hilly districts through analyzing some Key Performance Indicators such as 1) Farm based production data of PGs/VPGs, 2) Average Cultivated Land (Farm), 3) Regular Marketing Turnover of Farm based Production and 4) Regular Business of Livelihood Collectives. In this study it was found that Key Performance Indicators play a vital role to accomplish the objectives or tracking the trends of outcome indicators. Project Management Information System facilitates the regular data tracking in a project and analysis of data for decision making. A historical data trend helps to prepare future strategy and advance arrangement of implementation. It also helps community service institutions to serve the community and strengthening of backward and forward linkages.

Key Words: Rural Livelihood, PMIS, KPI, Least square method

1. Introduction

Uttarakhand is located between 28° 43' – 31° 27' N latitudes and 77° 34' – 81° 02' E longitudes. Uttarakhand became the 27th state of the Republic of India on 9th November 2000. The population of the state primarily depends on agriculture for livelihood. Around 70% of the population is engaged in agriculture. Out of total reported area, only 14.02% is under cultivation. More than 55.0% of the cultivated land in the State is rainfed. The cropping intensity is 160.6%. The land holdings are small and scattered. The average land holding is around 0.68 ha (divided into many patches) in the hills and 1.77 ha in the plains. (Watershed Management Directorate, 2009) The major source of rural households' income is associated with farm based and non-farm based activities. Rural households of Uttarakhand are basically involved in agriculture - horticulture and allied activities, high value crops, off seasonal vegetables, medicinal and aromatic plants etc.

Poverty rate in Uttarakhand is low at 11.26 per cent (2011-12), much below the all-India poverty level of 21.92 per cent for the same year, with little disparity in rural – urban poverty rates (Department of Planning Uttarakhand, 2018). There are many poverty elevation programmes run by state government through central schemes i.e. Deen Dayal Upadhyay - National Rural Livelihood Mission (DAY-NRLM), Pradhan Mantri Krishi Vikas Yojna (PMKSY), Pradhan Mantri Kaushal Vikas Yojna (PMKVY) etc. along with externally funded projects

from World Bank, IFAD, JICA etc. The main focus of these programmes is to sustain the rural livelihood and natural resource management of Uttarakhand.

One of project i.e. Integrated Livelihood Support Project (ILSP) is implemented by the Department of Rural Development, Uttarakhand, which is funded by International Fund for Agriculture and Development (IFAD). The project is being implemented in 44 blocks of 11 hill districts of Uttarakhand namely Almora, Bageshwar, Nainital, Champawat, Pithoragarh, Chamoli, Tehri, Uttarkashi, Pauri, Dehradun, and Rudrapur. The overall objective (goal) of ILSP is to enable rural households to take up sustainable livelihood opportunities integrated with the wider economy. (Central Project Coordination Unit, 2013)

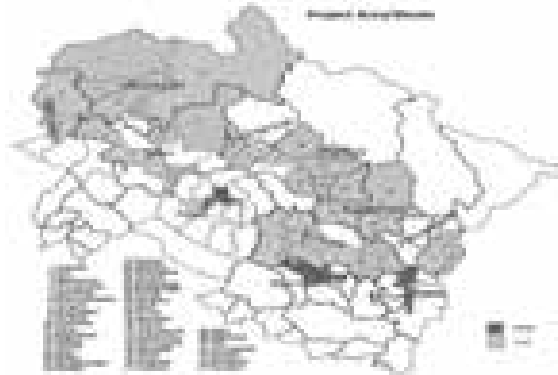


Figure 1 Project Implementation Area (Source - Central Project Coordination Unit, 2013)

*Associate Professor, IMS Unison University, Dehradun.

**Research Scholar, IMS Unison University, Dehradun.

This project has four major components - Food Security and Livelihood Enhancement: Participatory Watershed Development, and Livelihood Financing. The fourth component of the Project is Project Management. For the effective planning, implementation, concurrent monitoring and evaluation of the interventions, project has its own online Project Management Information System (PMIS). The PMIS has facilitated to measure the outcome indicators through dynamic Key Performance Indicators (KPI).

Performance indicators are measures of project impacts, outcomes, outputs, and inputs that are monitored during project implementation to assess progress toward project objectives. They are also used later to evaluate a project's success. Indicators organize information in a way that clarifies the relationships between a project's impacts, outcomes, outputs, and inputs and help to identify problems along the way that can impede the achievement of project objectives. (Mosse, 1996)

2. Research and Analysis

This project is being implemented with community group mechanism for collective development. At village level households are together in Producer group (PG) / Vulnerable producer group (VPG) and at cluster level Livelihood Collectives (LC, which is a registered entity under the Uttarakhand Self-Reliant Cooperative Act 2003). One PG/VPG has around 10 households with one LC having 500 shareholders, covering 10-15 villages. All PGs/VPGs are involved in farm/ non-farm-based livelihood activities based on their Food Security Improvement Plan (FSIP). Food Security Improvement Plan (FSIP) is a livelihood action plan of the group, based on the available resources of each member of the group. The plan covers resource mapping, investment plan, fund mobilization, and revenue generation etc.

The livelihood collectives are working according to their Agri-Business Up-scaling Plan (AUP) which is a kind of Business Development Plan (BDP). The AUP is consolidation of all FSIPs and cluster specific business activities including backward and forward linkages. The AUP has been revised based on farm/non-farm production of the cluster and market data analysis. Regular data flow from village to state has been captured through online PMIS, which is evaluated through dynamic KPI on monthly basis (see figure 2).

The KPI are based on project interventions implemented through community institutions i.e. PG/VPG and LC. The key data covers social mobilization, activity planning and execution, value chain based regular production and marketing of farm/non farm activities, irrigation activities, saving and inter-lending, infrastructural support, business turnover and profit, services to communities, convergence with others line departments schemes, Governance, etc.

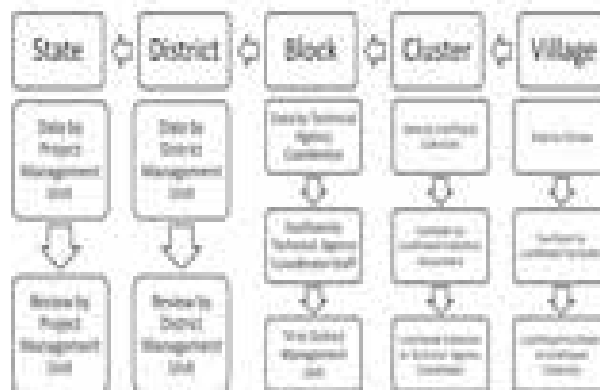


Figure 2: Data Flow of PMIS
(Source - Central Project Coordination Unit, 2013)

which helps to find out and establishing new market channels / linkages to sustain and build up their capacity for economical growth (Table 1).

All mentioned activities under KPI are directly measured by online PMIS. All KPI have different weights based on project phases and have specific formulas of monitoring and evaluation. Monthly production data is compared with the baseline data of each activity. Similarly, the marketed turnover is compared with the baseline assumption. The criteria for measuring the performance of these KPI are rated on 5-point scale i.e. Highly Satisfactory, Satisfactory, Moderately Satisfactory, Unsatisfactory and Highly Unsatisfactory.

3. Methodology:

The aim of this study is to investigate and confirm the key factors associated with economic growth of rural households. It will reflect the relationship between time, production, marketing, and business in the rural hilly areas. Village to state level data for analysis is taken from project management information system.

1. 2.3.3.1. Time Series Analysis

Experience with many examples of time series has revealed the presence of certain characteristic movements of fluctuations in a time series. Long time fluctuations of the time series are called Trend, while the short time fluctuations are measures of Seasonal fluctuation. (Ansari, 1991)

3.2. Least Square Method of Seasonal Indices

Following steps are involved in computing the seasonal indices by this method:

- i. First of all, calculate the monthly totals for each year, obtain monthly averages, by dividing the monthly totals by the number of months.
- ii. Then calculate yearly averages (y) for all years.

S.N.	Community Institution	Key Sector	Key Performance Indicators (KPI)
1	PG/VPG	Social Mobilization & Planning, Execution	<ul style="list-style-type: none"> • Number of PGs/VPGs • FSIP formation and execution
2	PG/VPG	Value Chain Interventions	<ul style="list-style-type: none"> • Number of PGs/VPGs • Average cultivated land (area) • Production Farm/Non-Farm • Marketed Turnover
3	PG/VPG	Saving and Inter - loaning	<ul style="list-style-type: none"> • Number of PG/VPG have regular saving • Number of PG/VPG have inter-loaning • Regular meeting and record keeping
4	PG/VPG	Irrigation	<ul style="list-style-type: none"> • Number of Irrigation facilities created and in use • Area under irrigation
5	LC	Business	<ul style="list-style-type: none"> • AUP projection vs business • Business from PG/VPG • Average Turnover, Profit Ratio and Margin
6	LC	Governance	<ul style="list-style-type: none"> • Regular Meeting and record keeping
7	LC	Infrastructure	<ul style="list-style-type: none"> • Establishment Market Infrastructures i.e. Collection Centers, Village Storage Centers and Regular use
8	LC	Service to members	<ul style="list-style-type: none"> • Input supply to community • Procurement from community
9	LC	Other Activities	<ul style="list-style-type: none"> • Fallow land development into cultivation • Convergence - resource mobilization from different line departments • Drudgery reduction activities i.e. chain link fencing, fodder development, farm machinery bank etc.

Table : List of KPIs

(Source - Central Project Coordination Unit, 2013)

- iii. Fit a straight line between years (x) and the yearly averages (y) using the method of least squares.
- iv. Shift annual straight-line trend equation to a monthly basis.
- v. The seasonal indices are now computed by expressing the monthly average as percentage of the trends.

This method is illustrated as -

Let the trend line be represented by $y = a + bx$

Using the method of Least Squares, we get the following two Normal Equations to give the values of constants a and b.

$$\sum y = na + b\sum x$$

$$\sum xy = a\sum x + b\sum x^2$$

4. Result and Discussion

To measure the performance of rural livelihood sustainability and their economic growth, there are many parameters / key performance indicators. Four different KPIs have been discussed in the subsequent sections.

4.1. Farm based production data of PGs/VPGs

Farm based data covers all agriculture-horticulture crops including off-season vegetables, traditional crops,

cereals, pulses, spices, orchard, and medicinal aromatic plants. The off-season vegetable is one of the produces in the value chain which has regular production. It directly impacts the rural economy. PG/VPG capture the data into their own production register are captured into PMIS. The PMIS facilitate in comparison with the baseline values of the activities and generate the KPI.

The table 2 describe three-year monthly rating of KPI based on farm-based data in comparison of baseline data.

Table 2: Comparison of KPI with Baseline Data

Year	APR	May	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
2016-17	2	1	1	3	2	1	2	2	2	2	2	2
2017-18	2	2	3	3	3	3	3	3	3	3	2	3
2018-19	3	3	3	3	3	3	3	3	3	4	3	3
Total	7	6	7	9	8	7	8	8	8	9	7	8
Average	2.33	2.00	2.33	3.00	2.67	2.33	2.67	2.67	2.67	3.00	2.33	2.67
Trend	0.57	0.62	0.67	0.72	0.77	0.83	0.88	0.93	0.98	1.03	1.09	1.14
Seasonal Indices	91	78	91	117	104	91	104	104	104	117	91	104



Figure 3: Trend Analysis

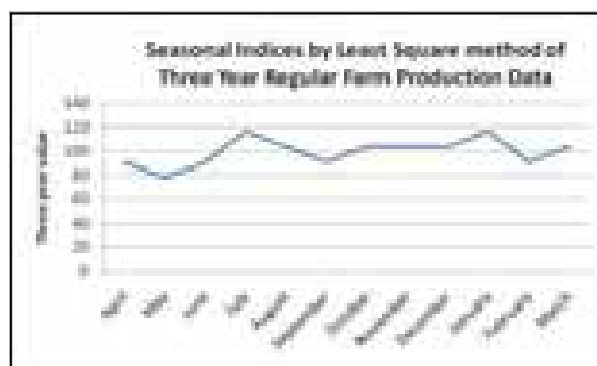


Figure 4: Seasonal Indices

The trend analysis shows (see fig 3) increasing trend of farm production and Seasonal Indices show (see fig 4) the seasonal fluctuations during June to August and December to February in the project area. It helps project implementation team to understand the situation and update the implementation strategy.

4.2. Average Cultivated Land (Farm)

Initially the average cultivate land area was 2 nali and over the period the average cultivate area has been increased which is now it is averaging to 5.25 nali (0.105 ha). (CPCU-ILSP, Annual Outcome Survey - 2018, 2019)

Table 3 shows three-year monthly rating of KPI based on average cultivated land under farm-based activities in comparison of baseline data.

Table 3: Comparison of KPI with Baseline Data

Year	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
2016-17	2	1	1	2	3	2	4	5	5	3	3	3
2017-18	3	5	5	5	5	5	5	5	5	5	5	5
2018-19	5	5	5	5	5	5	5	5	5	5	5	5
Total	10	11	11	12	13	12	14	15	15	13	13	13
Average	3.33	3.67	3.67	4.00	4.33	4.00	4.67	5.00	5.00	4.33	4.33	4.33
Trend	0.91	1.00	1.09	1.18	1.27	1.36	1.45	1.54	1.63	1.72	1.81	1.90
Seasonal Indices	79	87	87	95	103	95	111	118	118	103	103	103

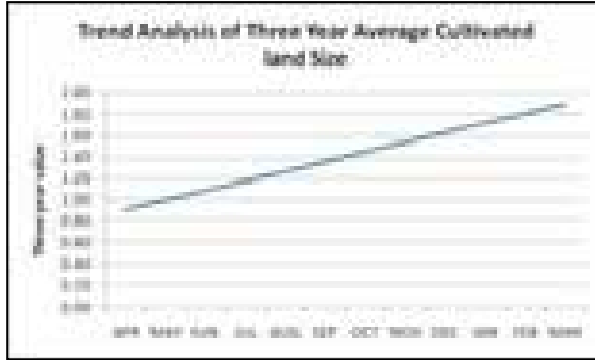


Figure 5: Trend Analysis

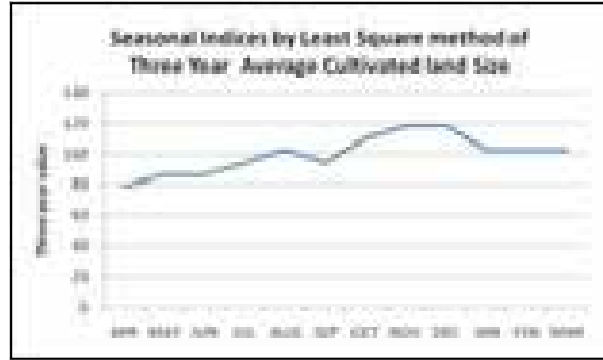


Figure 6: Seasonal Indices

The trend analysis (see fig. 5) indicates the average cultivated land area has been increased from baseline. The reason behind the increase could be due to production enhancement, irrigation facilities promoted by the project i.e. water use efficiency (drip/ micro sprinkler, LDPE tank, irrigation tank etc.), chain link fencing, fallow land cultivation, scientific farming techniques etc. The effect of such kind of interventions clearly shows the Seasonal Indices graph with increasing trend (see fig. 6).

4.3. Regular Marketing Turnover of Farm based Production

The marketing turnover of PGs/VPGs covers all agriculture-horticulture crops. After the ensuring own food security, group members sale their surplus produce in three ways i.e. first part of production is sold by individual, second part by PG/VPG, and third part by LC. The data is captured into PMIS like data from production register. Availability of raw marketing data facilitates PMIS to capture means of verification i.e. copy of production register, transaction slips, sale receipt. Without means of verification, PMIS cannot reflect data into KPI.

Table 4 shows three-year monthly rating of KPI based on marketed turnover of farm-based production of PGs/VPGs.

Table 4: Comparison of KPI with Baseline Data

Year	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
2016-17	2	1	1	3	2	1	2	2	3	2	2	2
2017-18	2	3	3	3	4	3	4	4	4	4	3	3
2018-19	3	3	4	4	4	4	3	4	4	5	4	4
Total	7	7	8	10	10	8	9	10	11	11	9	9
Average	2.33	2.33	2.67	3.33	3.33	2.67	3.00	3.33	3.67	3.67	3.00	3.00
Trend	0.57	0.65	0.73	0.81	0.89	0.97	1.05	1.13	1.21	1.29	1.37	1.45
Seasonal Indices	77	77	88	110	110	88	99	110	121	121	99	99

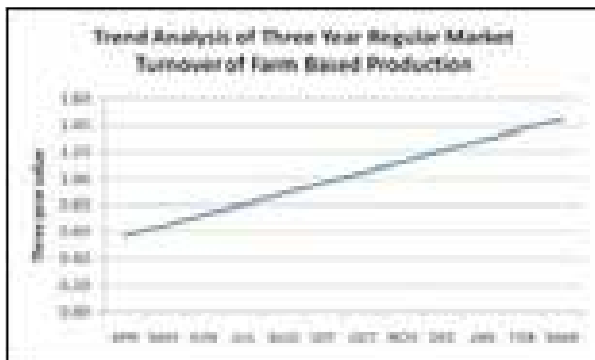


Figure 6: Trend Analysis



Figure 8: Seasonal Indices

The trend analysis (see fig 6) shows the increasing trend of market turnover of community institution indicating that the production increased from the baseline. The Seasonal Indices (see fig. 8) shows the seasonal fluctuations during June to August and December to February in the project area. The seasonal indices are also correlated with seasonal indices of production data. The data help project implementation team to ensure the pre-arrangement for post harvesting interventions i.e. storage, grading, shorting, processing, marketing tie-ups, etc.

4.4. Regular Business of Livelihood Collectives

The LC business covers input (daily consumption, livelihood inputs) supply to community, sale of surplus production of community, livestock, and other rural non-farm sectors. The profit distribution of LC to community is in the form of dividends. All LCs use regularly PMIS for their activities i.e. business and governance.

Table 5 shows three-year monthly rating of KPI based on business done by the livelihood collectives.

Table 5: Comparison of KPI with Baseline Data

Year	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
2016-17	1	1	1	1	1	1	1	2	3	3	2	2
2017-18	2	2	2	2	2	3	3	3	3	3	3	3
2018-19	3	3	3	3	3	3	3	4	4	4	3	3
Total	6	6	6	6	6	7	7	9	10	10	8	8
Average	2.00	2.00	2.00	2.00	2.00	2.33	2.33	3.00	3.33	3.33	2.67	2.67
Trend	0.44	0.51	0.58	0.65	0.72	0.79	0.86	0.93	1.00	1.07	1.14	1.21
Seasonal Indices	81	81	81	81	81	94	94	121	135	135	108	108



Figure 9: Trend Analysis



Figure 10: Seasonal Indices

The trend analysis (see fig. 9) shows the increasing trend of business turnover of Livelihood Collectives. Figure 11 shows actual turnover of livelihood collectives during the three years. (CPCU-ILSP, Annual Progress Report - 2016-17, 2017) (CPCU-ILSP, Annual Progress Report 2017-18, 2018) (CPCU-ILSP, Annual Progress Report 2018-19, 2019)

The Seasonal Indices (see fig. 10) shows the seasonal fluctuations during August to January during and after the rainy season. The last two quarter business is higher than first two quarters.

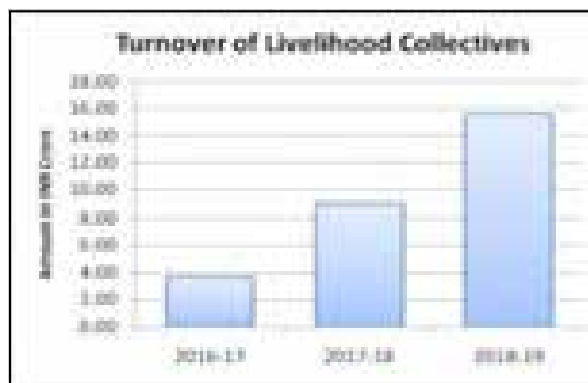


Figure 11: Turnover of LC

5. Suggestions

KPI helps implementation agencies to meet out the objectives or tracking the trends of outcome indicators. Project Management Information System helps the project to track and analyse regular data and for decision making. A historical data trend helps to prepare future strategy and advance arrangement of implementation. It also helps community institutions to serve the community and strengthening of backward and forward linkages.

It is also suggested that the Key Performance Indicators based Project Management Information System must be opted by every implementation / development organizations. It will not only help to the implementation of programme but also to facilitate the community in their economical growth.

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