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A study on occupational structure and its diversity among farm families of northern districts of West Bengal, India

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Abstract

India is a country where most of the population depends on farming for their livelihood and survival. Surprisingly, its contribution to national GDP is very low due to many factors like less productivity and marginalization of landholding. For decades, it was thought of that increasing production and income of farmers would itself increase their socio-economic condition. Conventional livelihood systems are prone to different natural and man-made shocks with less stability and resilience capacity. Livelihood diversity is a crucial strategy for the survival of rural farming communities to reduce vulnerability to different livelihood shocks by making a diverse portfolio of occupations and income source. The current study was conducted in three selected districts of West Bengal namely Cooch Behar, Dakhsin Dinajpur and Kalimpong to see the diversity and dynamics of occupational structure in farming communities. Information was collected using standard interview schedule from a sample size of 300 farm families and information were analyzed using various statistical tools like percentage, mean, standard deviation, R software programming. According to the study, the occupational structure in North Bengal was found to be primarily agriculture based. Most farmers prefer agriculture as their primary occupation followed by migration based works. Business and service based primary occupation groups come in the third and fourth category respectively. Agriculture again is the most preferred secondary occupations for almost all the other primary occupation groups except agriculture. The occupational diversity of the farmers in the study area was found to be at medium level. The diversity was found to be more at Terai and Old alluvial zones compare to the Hills zones. Over the years, the diversity was found to be at an increasing trend.

Keywords: Livelihood, occupational structure, diversity, primary occupation groups

Introduction

India is a land of agriculture. Indian agriculture plays an important role in the economy driving food security, inclusive growth and sustainable livelihood. The GDP of India is 3.57 trillion USD (WB, 2023). Agriculture and allied sectors contribute 17.66% to the total Gross Domestic Product (GDP) of the country employing nearly 46% of the total workforce of the country directly or indirectly (WB, 2023). The contribution of other sectors like industry sector and service sector to total GDP is around 27.63% and 54.71% respectively (MSPI, 2024). West Bengal has a total population of 99.72 million of whom 26.2 % are youths (MHFW, 2020). Agriculture contribute to 18.33 % of total states Gross Domestic Product. Indian agriculture face a dual challenge as the share from agriculture and allied sector to total GDP is very less compare to the other sector as well as the number of people that are generating this share is very high (approximately 46 %) reflecting the problem of low

productivity of farmers and Indian agriculture as a whole.

Indian agriculture has become more or less a subsistence oriented. In India, 86.1 % farmers are small and marginal farmers having a landholding size smaller than 2 hectares (Agricultural Census, 2015). West Bengal has 71.23 lakh farm families of which 96 % are small and marginal. These farmers are characterized by low capital, low mechanization, low productivity and high use of family labour. Majority of the farmers are practicing agriculture for their own consumption and even finding it difficult to meet their basic consumption requirements. As these small land based livelihood systems are no longer able to meet their food demand, farmers are looking for an alternative option or strategy in the form of livelihood diversification to survive and tackle this situation (Hiremath, 2007) ^[5].

A family farm is an agricultural holding which is managed and operated by a household and where farm labour is largely supplied by that household (FAO, 2014). United

Nations also has declared 2014 as international year of family farming signifying the growing importance of family farming over the years. Family farms mainly dependent on family members for labour and do not have any permanent hired labour. The family heritage and different cultural aspects also finds its place in family farming. Documenting the role family labour helps in understanding their contribution in total livelihood. Majority of their production is for family consumption and are of subsistence nature. Family farms play a key role in ensuring the food security of farmers in different zones of North Bengal like terai, old alluvial and hills ecosystem. Family based farming is important in ensuring not only food security, but also in promoting socio-ecological sustainability and equitable economic development (FAO, 2014).

Livelihood comprises the capabilities, assets and other activities required for a means of living (DFID, 1997). It tells about how people live in different situations and overcome different adverse circumstances to survive. The importance of sustainable livelihood has gained importance over the years due to changing demographic and economic scenario in India. Considering the ever growing population of India and small and marginal nature of Indian farmers, the concept of sustainable livelihood is inevitable (Saha and Bahal, 2014)^[8].

Whereas, livelihood means a way of living, livelihood diversification tells about a strategy people adopt to form a diverse portfolio of activities or possessions in order to survive by fighting with different livelihood shocks like climatic, social or ecological and to improve their standard of living by enhancing their capabilities (Ellis, 1998)^[10].

The term “occupational diversity” sometimes used interchangeably with “livelihood diversity” but there is a difference between them. Whereas occupational diversity tells about various diverse occupations or earning source someone has, livelihood diversity go one step ahead where it answer about what a person do to survive and make a living. Occupational diversity or livelihood diversity is the process by which rural families form a diverse portfolio of different contributing activities and capabilities for survival and to improve their standard of living. It is an attempt by the farm families to survive by finding different ways of improving livelihood by doing different activities, professions and possessing different assets. Occupational diversity tells us about the occupational complex and the contribution of different occupations in the total income of farm families and how they affect the overall livelihood of the farm families. It is one kind of strategy adopted by the farm families to reduce different natural and man-made shocks and overall vulnerability. The present study explores the occupational structure and its diversity among farm families of three zones of north bengal namely terai, old alluvial and hill zone.

The study here made an attempt to trace out the different occupational structure of the farmers. Also attempt was made to find out the livelihood diversity or occupational diversity of the farmers in different agro-climatic zones of north Bengal such as in terai zone, old alluvial zone and hills zone.

Methodology

The study was conducted in the state of West Bengal. Three agro climatic zones named Terai zone, Old Alluvial zone and Hill zone of North Bengal were purposefully chosen for the study. From those three zones, one district each were again purposefully chosen such as Cooch Behar district from Terai zone, Dakshin Dinajpur from Old Alluvial zone and Kalimpong districts from Hill zone. Two block each from three districts again were selected district. Block named Sitai and Coochbehar II were selected from Cooch Behar district, block Balurghat and Gangarampur were selected from Dakshin Dinajpur district and block Pedong and Gorubathan were selected from Kalimpong district. One village each was selected from each block randomly, so a total of six villages were selected from six blocks of three zones. A total number of 50 farm families from each village were interviewed through structured and non-structured schedule for data collection. So, in total, 300 farm families were interviewed, 100 farm families each from three zones. For analysis of occupational structure and it's dynamics, R software programming and SPSS software were extensively used for the purpose.

To study the occupational diversity or livelihood diversity, Simpson index of diversity (SID) was used.

$$S.I = 1 - \sum_{i=1}^N P_i^2$$

Here, N represent the total number of income source. Pi is the income proportion of the ith income source. The value of Simpson index score range from 0 and 1. If the value of the Index is zero, it means there is no diversity. It means, it has reached complete specialization. When the value is one that means it is the highest level of diversification. In simple terms, the more it goes towards the value one, the more is the diversification are and the more it comes towards the value "zero", the less the diversification are.

Results and Discussion

Occupational structure and its dynamics

The farm families of North Bengal are engaged in different occupations for their source of income as part of their livelihood strategy. Primary occupation is an occupation from which farmers receive their maximum income among different other occupations. The occupational structure and its dynamics among the farmers are being represented through the pattern of distribution of families under different secondary or tertiary occupations in relation to the primary occupations. These are studied in “Terai zone”, “Old alluvial zone” and “Hill zones” of North Bengal. As suggested by Lepcha. N (2022)^[14], different primary occupations are identified and farmer’s distribution and income share are studied.

The shaded cells in the table represents the number of families under primary occupations and other cells horizontally represent the number of families of secondary or tertiary occupations with respect to the primary occupations.

Table 1: Overall distribution of families under secondary/tertiary occupations according to primary occupations in northern districts (N=300)

| Occupation Category | Agriculture | Goatary | Dairy | Poultry | Fishery | Business | Service | Non Agri Labour | Agri Labour | Marginal work | Migration |
|---------------------|-------------|---------|-------|---------|---------|----------|---------|-----------------|-------------|---------------|-----------|
| Agriculture | 119 | 28 | 67 | 2 | 7 | 2 | 6 | 36 | 36 | 22 | 8 |
| Goatary | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dairy | 5 | 0 | 5 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |
| Poultry | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fisheries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Business | 43 | 11 | 27 | 0 | 2 | 43 | 3 | 4 | 3 | 2 | 3 |
| Service | 39 | 9 | 25 | 2 | 2 | 4 | 39 | 2 | 1 | 2 | 2 |
| Non Agri labour | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Agri labour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marginal work | 5 | 2 | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 0 |
| Migration | 87 | 19 | 60 | 1 | 1 | 11 | 7 | 35 | 29 | 12 | 87 |

(Shaded cells in the table represents the number of families under primary occupations)

The table 1 shows the overall dynamics of occupational complex found among the farmers of North Bengal. It is shown through distribution of families engaged in different occupations as their primary and secondary source of income. The families in north bengal are engaged in different occupations for their source of income such as agriculture, goatary, dairy, poultry, fishery, business, service, non-agricultural labour, agriculture labour, marginal work and migration related work. It can be seen from the table that the number of people having primary occupation as agriculture is 119 out of 300 families. Those who practice agriculture as their primary occupation (119 of 300 families), out of these 119 families, 67 families engaged in dairy, 36 each engaged in non-agricultural labour and agricultural labour respectively, 28 numbers practice goatary, 22 families in marginal work, 8 families in migration, 7 families in fishery, 6 in service, 2 each in poultry and business respectively.

It can be seen that 5 families out of 300 families has dairy as their primary occupations. They also has equal number of families (5.00) in agriculture as secondary occupation. Among them one each family practice business, non-agricultural level, agriculture labour and migration.

Only one family can be seen practicing poultry as primary occupation, they also has agriculture as secondary occupation.

Overall, all 43 number of families among 300 has business as their primary occupations. Among them all practice agriculture as secondary occupations for additional source

of income. It can be seen that 11 families engaged in goatary, 27 families in dairy, 4 in non- agricultural labour, 3 families each in service and agriculture labour, 2 each in fisheries and marginal work.

It can be seen that 39 numbers of families out of 300 are engaged in service occupation as their primary occupation. All 39 families are also engaged in agriculture as their secondary occupation. Other occupations such as 25 families engaged in dairy, 9 families engaged in goatary, 4 number of families engaged in business, two number of families each engaged in poultry, fishery, non-agricultural labour, marginal work and migration.

From the table it can be seen that only one family engaged in non-agricultural labour as their primary occupation. They also engaged in agriculture labour with practicing agriculture. Five families engaged in marginal work as their primary occupation, they all practice agriculture as their secondary occupation, they all also has dairy as their another component. Two number of families engaged in goatary and one in non-agricultural labour.

It has been found from the work that a significant number of population that is 87 families are engaged in migration related work for their survival. Among them, all 87 families are also engaged in agriculture, 60 families in dairy, 35 families in non-agricultural labour, 29 families in agricultural labour, 19 in goatary, 12 in marginal work, 11 in business, 7 in service, 1 each in poultry and fishery are found to be engaged as their secondary and tertiary occupations.

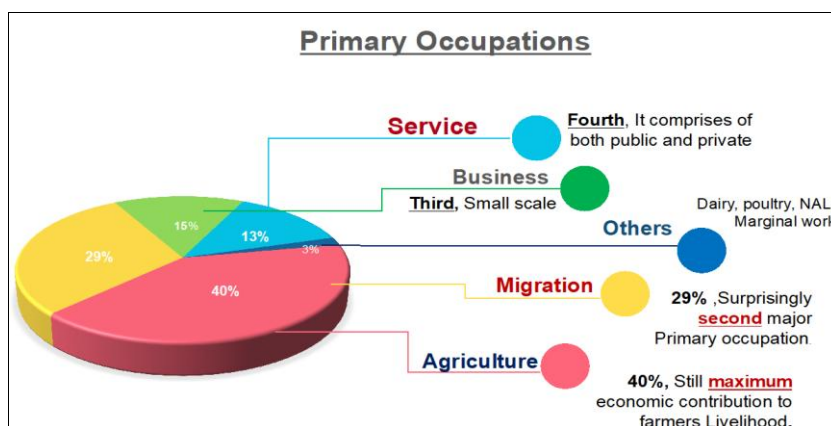


Fig 1: Overall Distribution of Families under primary occupations in Northern Districts

From the chart, it can be seen that a majority families that is around 40.00 percent engaged in agriculture as their primary occupations followed by migration (29.00 percent), business (15.00 percent), service (13.00 percent) and others combinely contribute to 3.00 percent comprising different

occupations such as diary, poultry, non-agriculture labour and marginal work.

The result of the study is in line with the finding of Lepcha. N (2022) [14] where he identified different primary occupations and distribution of respondents.

Table 2: Distribution of families under secondary/tertiary occupations according to primary occupations in Terai zone (Coochbehar district) (N=100)

| Occupation Category | Agriculture | Goatary | Dairy | Poultry | Fisheries | Business | Service | Non Agri labour | Agri labour | Marginal work | Migration |
|---------------------|-------------|---------|-------|---------|-----------|----------|---------|-----------------|-------------|---------------|-----------|
| Agriculture | 42 | 17 | 26 | 2 | 7 | 1 | 0 | 17 | 16 | 6 | 5 |
| Goatary | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dairy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poultry | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fisheries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Business | 18 | 5 | 12 | 0 | 2 | 18 | 0 | 2 | 2 | 0 | 1 |
| Service | 19 | 7 | 13 | 2 | 2 | 1 | 19 | 0 | 0 | 0 | 1 |
| Non Agri labour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Agri labour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Marginal work | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Migration | 21 | 7 | 13 | 1 | 1 | 0 | 0 | 11 | 11 | 4 | 21 |

(Shaded cells in the table represents the number of families under primary occupations)

The table 2 shows the distribution of families according to their primary occupations. It shows their status of respective secondary or tertiary occupations according to their primary occupation in terai zone. The data shows 42 families in terai zone has agriculture as their primary occupation. Out of 42, the number of families which are engaged in secondary/tertiary occupations are such as 26 in dairy, 17 each in goatary and non-agriculture labour, 16 in agriculture labour, 7 in fisheries, 6 in marginal work, 5 in migration, 2 in poultry, 1 in business.

It can be seen that 18 families out of 100 are engaged in business as their primary occupations. Out of 18 families, all are also engaged in agriculture as their secondary occupations. The other occupations where they were engaged such as 12 in dairy, 5 in goatary, 2 each in fishery,

non-agricultural labour and agricultural labour, 1 in migration.

The data shows that 19 families practice service as their primary occupations. Out of 19, all 19 are also engaged in agriculture as their secondary occupations. The other tertiary occupations are such as 13 in dairy, 7 in goatary, 2 each in poultry and fishery, 1 each in business and migration as their secondary or tertiary source of income. The data also indicates that a significant number of families which is 21 are engaged in migration related work as their primary occupations. The different occupation as their secondary or tertiary occupations are such a 21 also engaged in agriculture, whereas, 13 engaged in dairy, 11 each engaged in non-agricultural labour and agricultural labour, 7 in goatary, 4 in marginal work, 1 each in poultry and fishery.

Table 3: Distribution of families under secondary/tertiary occupations according to primary occupations in Old alluvial zone (Dakshin Dinajpur district). (N=100)

| Occupation Category | Agriculture | Goatary | Dairy | Poultry | Fisheries | Business | Service | Non Agri labour | Agri labour | Marginal work | Migration |
|---------------------|-------------|---------|-------|---------|-----------|----------|---------|-----------------|-------------|---------------|-----------|
| Agriculture | 32 | 5 | 27 | 0 | 0 | 1 | 0 | 13 | 13 | 16 | 3 |
| Goatary | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dairy | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Poultry | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fisheries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Business | 11 | 3 | 10 | 0 | 0 | 11 | 1 | 1 | 0 | 0 | 1 |
| Service | 12 | 2 | 10 | 0 | 0 | 2 | 12 | 1 | 1 | 2 | 0 |
| Non Agri labour | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 |
| Agri labour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marginal work | 5 | 2 | 5 | 0 | 0 | 0 | 0 | 1 | 0 | 5 | 0 |
| Migration | 38 | 6 | 35 | 0 | 0 | 4 | 1 | 18 | 18 | 8 | 38 |

(Shaded cells in the table represents the number of families under primary occupations)

From the table 3, it can be seen that around 32 families out of 100 are engaged in agriculture as their primary occupation. The data shows that out of 32 families, 27 families are engaged in dairy, 16 in marginal work, 13 each in non-agricultural labour and agriculture labour, 5 in goatary, 3 in migration and 1 in business as secondary or

tertiary occupation.

Only one family is engaged in dairy as their primary occupation, that family also engaged in agriculture and business for secondary or tertiary source of income.

The data shows that 11 families out of 100 families are engaged in business as their primary occupation. Out of 11

families, 10 are also engaged in dairy, 3 in goatary, 1 each in non-agricultural labour, agriculture labour and migration as their tertiary occupation.

It can be seen that 12 number of families out of 100 are engaged in service for their primary occupation. Out of 12, all 12 are also engaged in agriculture, 10 in dairy, 2 each in goatary, business and marginal work, 1 each in non-agricultural labour and agricultural labour.

One family is found who are engaged in non-agricultural labour as their primary occupation, they are also engaged in agriculture and agriculture labour for their secondary or tertiary occupation.

The data shows 5 families are engaged in marginal work as their primary occupation. The status of secondary or tertiary

occupation are such as among this 5, all 5 families are engaged in agriculture as their secondary occupations. The other tertiary occupations are such as 2 are engaged in goatary, 5 families again are engaged in dairy, 1 in non-agricultural labour etc.

The data shows 38 number of families are found to be engaged in migration related work as their primary occupation, among these 38 families, all are engaged in agriculture as their secondary occupations. The status of other tertiary occupations are such as 35 are engaged in dairy, 18 each are engaged in non-agricultural labour and agricultural labour, 6 are engaged in goatary, 8 are engaged in marginal work, 4 are engaged in business and one is engaged in service.

Table 4: Distribution of families under secondary/tertiary occupations according to primary occupations in Hills Zone (Kalimpong district) (N=100)

| Occupation Category | Agriculture | Goatary | Dairy | Poultry | Fisheries | Business | Service | Non Agri labour | Agri labour | Marginal work | Migration |
|---------------------|-------------|---------|-------|---------|-----------|----------|---------|-----------------|-------------|---------------|-----------|
| Agriculture | 45 | 6 | 14 | 0 | 0 | 0 | 6 | 6 | 7 | 0 | 0 |
| Goatary | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Dairy | 4 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Poultry | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fisheries | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Business | 14 | 3 | 5 | 0 | 0 | 14 | 2 | 1 | 1 | 2 | 1 |
| Service | 8 | 0 | 2 | 0 | 0 | 1 | 8 | 1 | 0 | 0 | 1 |
| Non Agri labour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Agri labour | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Marginal work | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Migration | 28 | 6 | 12 | 0 | 0 | 7 | 6 | 6 | 0 | 0 | 28 |

(Shaded cells in the table represents the number of families under primary occupations)

The table 4 shows the distribution of families under secondary or tertiary occupation according to their primary occupations in hill zone of North Bengal. From the table, it can be seen that majority of the respondents which is 45 family do agriculture as their primary occupation, out of this 45 families, 14 families practice dairy as their secondary occupation, the status of different other occupations are such a 7 number are engaged in agriculture labour, 6 each are engaged in goatary, service and non-agricultural labour respectively.

From the table it can also be seen that four number of families are engaged in dairy for primary occupations, among these 4, all four are also engaged in agriculture as their secondary occupation and one is engaged in non-agricultural labour and migration related work as there tertiary occupation.

One families practice poultry as their primary occupation and that family also engaged in agriculture for their

secondary occupation. 14 families are engaged in business related work as their primary occupation, out of these 14, all 14 are also engaged in agriculture for their secondary occupations, the status of other tertiary occupations are such as 5 are engaged in dairy, 3 are engaged in goatary, 2 each are engaged in service and marginal work and one each are engaged in non-agricultural labour, agriculture labour and migration. 8 families are found to be engaged in service as their primary occupations, all are also engaged in agriculture for their secondary occupations. It can be seen that the status of others tertiary occupations, two in dairy, one each are engaged in business, non-agricultural labour and migration.

The table shows that 28 families are found to be engaged in migration for their primary occupations, out of that 28, all 28 are also engaged in agriculture as their secondary occupation. 12 families are found to be engaged in dairy, 6 each are engaged in goatary, service and non-agriculture labour respectively and 7 are engaged in business.

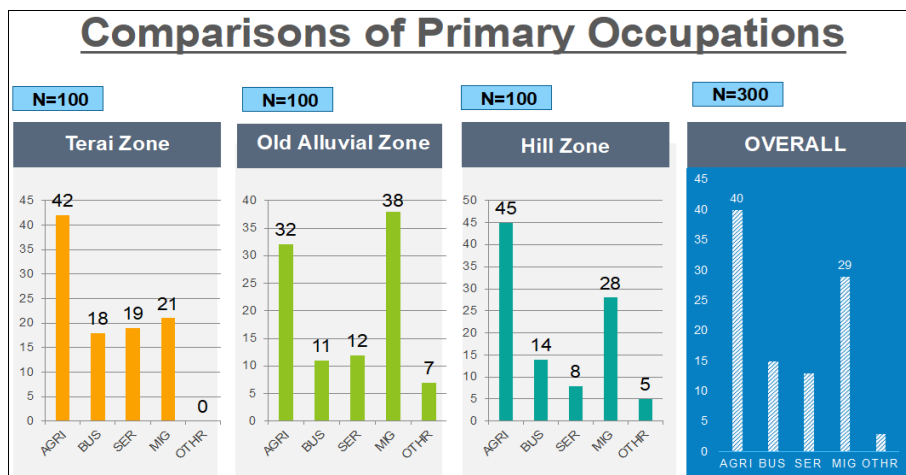


Fig 2: Bar chart of primary occupations of different zones of North Bengal

The chart compares the different primary occupations in different zones such as in Terai zones, Old Alluvial And Hills Zone. It can be seen that overall most of the people practice agriculture as their primary occupations which is 40.00 percent. A significant number of 29.00 percent farmers found to be engaged in migration related work which is quiet surprising. The number of people that has business as their primary occupation are 15.00 percent, in case of service, the number of families were 13.00 percent and others primary occupations comprise of 3.00 percent. Surprisingly, a major percentage of population of 45.00 percent in hills zone are dependent on agriculture as their primary occupations which is more compared to other zones, migration as primary occupations was greater in old alluvial zone which is 38.00 percent compared to other two

zones such as in terai zone 21.00 percent and in hills zone 28.00 percent). In terai zone, business as primary occupations was 18.00 percent which is greater compared to the number of people that are dependent on business as their primary occupation in other two zones such as in old alluvial zone 11.00 percent and in hills zone 14.00 percent. The status of service occupations was good in terai zone compared to other two zones.

Distribution of income under secondary/tertiary occupations according number of families under primary occupations

The table below shows the distribution of income under secondary/tertiary occupations according to number of families under primary occupations

Table 5: Distribution of income under Secondary/Tertiary Occupations according to Primary Occupations in Terai zone. (N=100)

| Occupation Category | Avg. income | Agriculture | Goatary | Dairy | Poultry | Fisheries | Business | Service | Non Agri Labour | Agri Labour | Marginal work | Migration |
|---------------------|-------------|-------------|----------|-----------|----------|-----------|----------|----------|-----------------|-------------|---------------|-----------|
| Agriculture | 111104.8 | 67023.81 | 5533.333 | 1666.67 | 1666.667 | 2619.048 | 1904.762 | 0 | 7714.286 | 3452.381 | 1190.476 | 8333.333 |
| Percentage | 100% | 60.32% | 4.98% | 10.5% | 1.5% | 2.36% | 1.71% | 0 | 6.94% | 3.11% | 1.07% | 7.5% |
| Business | 250305.6 | 72166.67 | 4555.556 | 12916.67 | 0 | 1611.111 | 151444.4 | 0 | 1944.444 | 1222.222 | 0 | 4444.444 |
| Percentage | 100% | 28.83% | 1.82% | 5.16% | 0 | 0.64% | 60.5% | 0 | 0.78% | 0.49% | 0 | 1.78% |
| Service | 262105.3 | 63210.53 | 4894.737 | 15263.164 | 4210.526 | 1842.105 | 578.9474 | 168947.4 | 0 | 0 | 0 | 3157.895 |
| Percentage | 100% | 24.12% | 1.87% | 5.82% | 1.61% | 0.7% | 0.22% | 64.46% | 0 | 0 | 0 | 1.2% |
| Migration | 294571.4 | 61476.19 | 5333.333 | 13142.86 | 1904.762 | 714.2857 | 0 | 0 | 8428.571 | 4666.667 | 2000 | 196904.8 |
| Percentage | 100% | 20.87% | 1.81% | 4.46% | 0.65% | 0.24% | 0 | 0 | 2.86% | 1.58% | 0.68% | 66.84% |

(Shaded cells in the table represents the distribution of income under secondary/tertiary occupations according to number of families under primary occupations)

The table 5 depicts the distribution of income under secondary or tertiary occupations according to different primary occupations in terai zones. From the table 5, it can be seen that those who practice agriculture as their primary occupations, the total income of that family is around 111104.8 rupees, out of that total income, income from agriculture is rupees 67023.81 which is 60.32 percent of the total income. The other secondary and tertiary occupations are such as the family received rupees 5533.33 (4.98 percent) from goatary, from dairy it received rupees 1666.67 (10.5 percent), from poultry, rupees 1666.66 (1.5 percent), from fishery rupees 2619.04 (2.36 percent), from business 1904.76 (1.71 percent), from service no income was received, from non-agriculture labour, rupees 7714.28(6.94 percent), from agriculture labour, rupees

3452.38 (3.11 percent), from marginal work 1190.47(1.07 percent) and from migration, it received rupees 8333.33 (7.5 percent). Those who had business as their primary occupations, the total income of the family was rupees 250305.6, out of that total income, business share was rupees 151444.4 (60.5 percent), the status of other secondary and tertiary occupations were such as from agriculture, it received rupees 72166.67 (28.83 percent), from goatary, it received rupees 4555.55 (1.82 percent), from dairy, it received rupees 12916.67 (5.16 percent), no income was received from poultry, service and marginal work, from fishery it received rupees 1611.1 (0.64 percent), from non agricultural labour, rupees 1944.44 (.78 percent), from agriculture labour rupees 1222.22 (0.49 percent) and from migration rupees 4444.44

(1.78 percent).

From the table it can be seen there those who had service as their primary occupations, there average total income of the family was rupees 262105.3, out of that total income, service share is rupees 168947.4 (64.46 percent), the share of other secondary and tertiary occupations or income of rupees was such as rupees 63210.53 (24.12 percent) came from agriculture, rupees 4894.73 (1.87 percent) came from goatary, rupees 15263.16 (5.82 percent) comes from diary, rupees 4210.52 (1.61 percent) come from poultry, rupees 1842.1 (0.7 percent) comes from fishery, rupees 578.94 (0.22 percent) comes from business, no income were received from non-agricultural labour and marginal work, other source of income was migration which was rupees 3157.89 (1.2 percent).

It has been seen that those who had migration as their primary occupations, the average total income of the family was rupees 294571.4, out of that income, migration constitutes rupees 196904.8 (66.84 percent). The other shares of secondary and tertiary occupation or income were such as rupees 61476.19 (20.87 percent) came from agriculture, rupees 5333.33 (1.81 percent) from goatary, rupees 13142.8 (4.46 percent) from dairy, rupees 1904.76 (0.65 percent) came from poultry, rupees 714.28 (0.24 percent) came from fishery, no income was received from business and service The other source of income were such as from non-agricultural labour, rupees 8428.57 (2.86 percent), from agriculture labour, rupees 466.66 (1.58 percent), from marginal work, rupees 2000 (0.68 percent) was received.

Table 6: Distribution of income under primary occupations in Old Alluvial Zone (N=100)

| Occupation Category | Average yearly income | Agriculture | Goatary | Dairy | Poultry | Fisheries | Business | Service | Non_agri_labour | Agri_labour | Marginal_work | Migration |
|---------------------|-----------------------|-------------|----------|----------|---------|-----------|----------|----------|-----------------|-------------|---------------|-----------|
| Agriculture | 102837.5 | 58531.25 | 834.375 | 12159.38 | 0 | 0 | 3750 | 0 | 8187.5 | 6250 | 11406.25 | 1718.75 |
| Percentage | 100 | 56.92 | 0.81 | 11.82 | 0 | 0 | 3.65 | 0 | 7.96 | 6.08 | 11.09 | 1.67 |
| Dairy | 370000 | 70000 | 0 | 150000 | 0 | 0 | 150000 | 0 | 0 | 0 | 0 | 0 |
| Percentage | 100 | 18.92 | 0 | 40.54 | 0 | 0 | 40.54 | 0 | 0 | 0 | 0 | 0 |
| Business | 389427.3 | 62245.45 | 1818.182 | 25818.18 | 0 | 0 | 263636.4 | 13636.36 | 4090.909 | 0 | 0 | 18181.82 |
| Percentage | 100 | 15.98 | 0.47 | 6.63 | 0 | 0 | 67.7 | 3.5 | 1.05 | 0 | 0 | 4.67 |
| Service | 348250 | 56250 | 1250 | 12333.33 | 0 | 0 | 21666.67 | 248500 | 1250 | 1000 | 6000 | 0 |
| Percentage | 100 | 16.15 | 0.36 | 3.54 | 0 | 0 | 6.22 | 71.36 | 0.36 | 0.29 | 1.72 | 0 |
| NAL | 330000 | 55000 | 0 | 0 | 0 | 0 | 0 | 0 | 250000 | 25000 | 0 | 0 |
| Percentage | 100 | 16.67 | 0 | 0 | 0 | 0 | 0 | 0 | 75.76 | 7.58 | 0 | 0 |
| Marginal | 162100 | 55000 | 2000 | 12100 | 0 | 0 | 0 | 0 | 2000 | 0 | 91000 | 0 |
| Percentage | 100 | 33.93 | 1.23 | 7.46 | 0 | 0 | 0 | 0 | 1.23 | 0 | 56.14 | 0 |
| Migration | 246321.1 | 51263.16 | 821.0526 | 12842.11 | 0 | 0 | 14736.84 | 3289.474 | 8921.053 | 5342.105 | 4473.684 | 144631.6 |
| Percentage | 100 | 20.81 | 0.33 | 5.21 | 0 | 0 | 5.98 | 1.34 | 3.62 | 2.17 | 1.82 | 58.72 |

(Shaded cells in the table represents the distribution of income under secondary/tertiary occupations according to number of families under primary occupations)

The table 6 shows the different information of distribution of income under secondary/tertiary occupations according to number of families under primary occupations in old alluvial zone of north Bengal. The data shows that those who have agriculture as their primary occupation, the total income of that family was around 102837.50, the share of agriculture in that income was around 56.92 percent (rupees 58531.25). The share of other incomes received were like 0.81 percent from goatary, 11.82 percent from dairy, from business 3.65 percent, from non-agricultural labour 7.96 percent, from agriculture labour 6.08 percent, from marginal work 11.09 percent, from migration 1.67 percent.

Those who have dairy as their primary occupations, their average annual income is around rupees 370000, the share of dairy in that income is 40.54 percent, (rupees 150000), the other share were like the share of business was also 40.54 percent, the share of agriculture was 18.92 percent.

Those who have business as their primary occupations, there average annual total income is rupees 389427.3, the share of business in that Income is 67.70 percent, (rupees 263636.4). The share of other income source where such as from agriculture 15.98 percent, from goatary (0.47 percent), from dairy (6.63 percent), from service (3.5 percent) from non-agricultural labour (1.05 percent) and from migration (4.67 percent).

Those who have services as their primary occupations, there average income of the family is rupees 348250, the share of service in those income is 71.36 percent which is rupees

248500. The share of other occupations were such as from agriculture (16.15 percent), from Goatary (0.36 percent), from dairy (3.54 percent), from business (6.22 percent), from non-agricultural labour (.36 percent), from agriculture labour (.29 percent), from marginal work (1.72 percent).

Those who have non-agriculture labour as their primary occupations, their annual average total income of the family is rupees 330000, the share of non-agricultural labour is 75.76 percent (rupees 250000), the share of agriculture labour is 7.58 percent and the share of agriculture was 16.67 percent.

Those who have marginal work as their primary occupations, there average total income annually was rupees 162100, the share of marginal work was 56.14 percent. (rupees 91000). the share of other source of income such as from agriculture 33.93 percent, from goatary 1.23 percent, from dairy 7.46 percent, from non-agricultural labour 1.23 percent.

Those who have migration has their primary occupation, their average annual income was rupees 246321.1, the share of migration was 58.72% which is rupees 144631.6. the share of other income sources such as from agriculture 20.81 percent, from goatary (0.33 percent), from dairy (5.1 percent), from business (5.9 percent), from service (1.34 percent), from non-agricultural labour (3.62 percent), from agriculture labour (2.17 percent), from marginal work (1.82 percent).

Table 7: Distribution of income according to Primary Occupations in Hills Zone (N=100)

| Occupation Category | Average yearly income | Agriculture | Goatary | Dairy | Poultry | Fisheries | Business | Service | Non_agri_labour | Agri_labour | Marginal_work | Migration |
|---------------------|-----------------------|-------------|----------|----------|---------|-----------|----------|----------|-----------------|-------------|---------------|-----------|
| Agriculture | 78426.67 | 59182.22 | 844.4444 | 8044.444 | 0 | 0 | 0 | 4533.333 | 2822.222 | 3000 | 0 | 0 |
| Percentage | 100 | 75.46 | 1.08 | 10.26 | 0 | 0 | 0 | 5.78 | 3.6 | 3.83 | 0 | 0 |
| Dairy | 195175 | 51425 | 0 | 93750 | 0 | 0 | 0 | 0 | 10000 | 0 | 0 | 40000 |
| Percentage | 100 | 26.35 | 0 | 48.03 | 0 | 0 | 0 | 0 | 5.12 | 0 | 0 | 20.49 |
| Poultry | 130000 | 55000 | 0 | 0 | 75000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Percentage | 100 | 42.31 | 0 | 0 | 57.69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Business | 223642.9 | 65214.29 | 1642.857 | 10928.57 | 0 | 0 | 118928.6 | 12857.14 | 1214.286 | 357.1429 | 1785.714 | 10714.29 |
| Percentage | 100 | 29.16 | 0.73 | 4.89 | 0 | 0 | 53.18 | 5.75 | 0.54 | 0.16 | 0.8 | 4.79 |
| Service | 224375 | 50125 | 0 | 6250 | 0 | 0 | 10000 | 139250 | 2500 | 0 | 0 | 16250 |
| Percentage | 100 | 22.34 | 0 | 2.79 | 0 | 0 | 4.46 | 62.06 | 1.11 | 0 | 0 | 7.24 |
| Migration | 269375 | 54750 | 1482.143 | 13035.71 | 0 | 0 | 23035.71 | 1464.29 | 5714.286 | 0 | 0 | 159892.9 |
| Percentage | 100 | 20.32 | 0.55 | 4.84 | 0 | 0 | 8.55 | 4.26 | 2.12 | 0 | 0 | 59.36 |

(Shaded cells in the table represents the distribution of income under secondary/tertiary occupations according to number of families under primary occupations)

The table 7 shows the distribution of income under secondary and tertiary occupations according to their primary occupations in hill zone. Overall, in the hill zone, it has been seen that those who had agriculture as their primary occupations, their average yearly income was rupees 78426.67. Out of that income, the share of agriculture was 75.46 percent (rupees 59182.22). The other secondary or tertiary occupations such as goatary contributes 1.08 percent, dairy contributes 10.26 percent which is very significant number, there was no contribution from poultry, fishery, business, marginal work and migration. It can be seen that from service the contribution was 5.78 percent, from non-agricultural labour contribution was 3.6 percent and from agriculture labour the contribution was 3.83 percent.

When it comes to dairy based occupations, those who had dairy as their primary occupations, their average annual income was around rupees 195175 and the contribution of dairy in that income was 48.03 percent (rupees 93750). The share of other incomes were such as contribution from agriculture was 26.35 percent, from migration 20.49 percent, from non-agricultural labour 5.12 percent, Now, those who had poultry as their primary occupations, their average annual income was rupees 130000, the contribution of poultry in that was 57.69 percent (rupees 75000). The share of other occupations were like from agriculture, the contribution was 42.31 percent.

In respect of business, those who had business as their primary occupations, their average annual income was rupees 223642.9 and the contribution of business in that was 53.18 percent (rupees 118928.6), the share of other secondary occupations were was agriculture again which contributes 29.16 percent, goatary contributes 0.73 percent, dairy contributes 4.89 percent, service contributes 5.75 percent, non-agricultural labour contributes 0.54 percent, agricultural labour contributes 0.16 percent, marginal work contributes 0.8 percent, and migration contributes 4.79 percent.

The table also shows that those who had services as their primary occupation, their average annual income was around rupees 224375 and the contribution of service in that was 62.06 percent (rupees 139250), the share of other incomes in that was such as from agriculture (22.34 percent), from dairy (2.79 percent), from business (4.46

percent), from non-agricultural labour (1.1 percent), from migration (7.24 percent).

At last, the table also shows the status of migration, those who had migration as were primary occupations, their families average annual income was rupees 269375 and the contribution of migration in that was 59.36 percent (rupees 159892.9), the share of other income sources were like from agriculture 20.32 percent, from dairy 4.84 percent, from business 8.55 percent, from service 4.26 percent and from non-agricultural labour 2.12 percent.

The study is in line with the finding of Lepcha. N (2022)^[14] where he identified different primary occupations and the contribution of different occupations to the total income of farmres.

Table 8: Distribution of respondents according Livelihood Diversity in Terai zone (N=100)

| Category | Frequency (N=300) | Percentage (%) | Mean: 0.49 SD:0.14 Maximum:0.74 Minimum:0 CV:30.24 |
|------------------------|-------------------|----------------|--|
| Low (0 to 0.33) | 11 | 11.00 | |
| Medium (>0.33 to 0.66) | 78 | 78.00 | |
| High (>0.66 to 1) | 11 | 11.00 | |

The table 8 shows the distribution of respondents according to their livelihood diversity score. The livelihood diversity or occupational diversity was measured through simpson index score. The simson Index score of livelihood diversity ranges from 0 to 1. The livelihood diversity or occupational diversity shows us the diversity of farmers different occupations practiced by them for their income. The livelihood diversity or occupational diversity also can be explained as a strategy that farmer use to cope up against different livelihood, natural or man-made shocks.

The table shows the distribution of respondents according to different level of livelihood diversity in terai zone. It can be seen from the table that in terai zone, the overall livelihood diversity was 0.49. So, the overall diversity was found to be at medium level. If we see the distribution of respondents, a majority of 78.00 percent of respondents was found to be at medium level of diversity followed by 11.00 percent of respondent each at high and low level of diversity respectively. The mean score was 0.49, the standard deviation was 0.14 and the coefficient of variation was 30.24.

Table 9: Distribution of respondents according Livelihood Diversity in Old Alluvial Zone (N=100)

| Category | Frequency (N=300) | Percentage (%) | Mean: 0.50 SD:0.14 Maximum:0.77 Minimum:0.11 CV:28.57 |
|------------------------|-------------------|----------------|---|
| Low (0 to 0.33) | 15 | 15.00 | |
| Medium (>0.33 to 0.66) | 71 | 71.00 | |
| High (>0.66 to 1) | 14 | 14.00 | |

The table 9 shows the the distribution of respondents according to their respective livelihood diversity in old alluvial zone. The average diversity here is 0.50 which is also at medium level. If we see the overall distribution, a majority of 71.00 percent of population has medium level of livelihood diversity followed by 15.00 percent of respondent has low level of diversity and 14.00 percent of respondents having high level of livelihood diversity. The mean score was 0.50, the standard deviation was 0.14 and coefficient of variation was 28.57.

Table 10: Distribution of TERspondents according Livelihood Diversity in Hills Zone (N=100)

| Category | Frequency (N=300) | Percentage (%) | Mean: 0.40 SD:0.21 Maximum:0.77 Minimum:0 CV:52.62 |
|------------------------|-------------------|----------------|--|
| Low (0 to 0.33) | 29 | 29.00 | |
| Medium (>0.33 to 0.66) | 64 | 64.00 | |
| High (>0.66 to 1) | 07 | 07.00 | |

The table 10 here shows the distribution of respondents according to different livelihood diversity in hill zone. Here also the average diversity was calculated and it was found at

0.40. Here also the diversity was found to be at medium to low level. Overall, a majority of 64.00 percent population or respondents has medium level of livelihood diversity followed by a significant of population which is 29.00 percent has low level of diversity, only 07.00 percent of respondents has high level of diversity. The standard deviation was 0.21 and coefficient of variation was 52.62.

Table 11: Distribution of respondents according Livelihood Diversity in North Bengal (Overall) (N=300)

| Category | Frequency (N=300) | Percentage (%) | Mean: 0.46 SD:0.19 Maximum:0.81 Minimum:0 CV:40.17 |
|------------------------|-------------------|----------------|--|
| Low (0 to 0.33) | 57 | 19.00 | |
| Medium (>0.33 to 0.66) | 188 | 62.67 | |
| High (>0.66 to 1) | 55 | 18.33 | |

Now, if we discuss the overall livelihood diversity, here the table 11 shows the status of overall livelihood diversity comprising respondents of three zones such as terai zone, old alluvial and hill zone. The overall livelihood diversity was 0.46 which is at medium level. So we can say that the diversity of most of the population was at medium level. The table which shows the distribution of respondents according to different livelihood diversity, it can be seen that 62.67 percent of population has medium diversity, 19.00 percent of respondent has low level of livelihood diversity and 18.33 percent of respondent has high level of livelihood diversity. The mean was 0.46, the standard deviation was 0.19 and the coefficient of variation was 40.17.

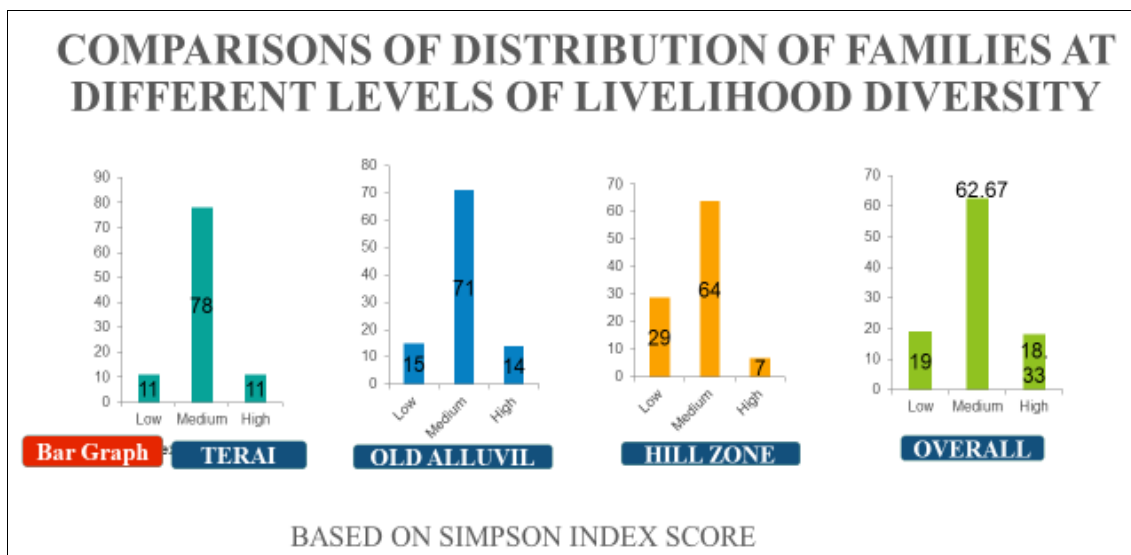


Fig 3: Bar Chart representing different levels of Diversity

The charts shows the comparison of different livelihood diversity of different zones. It can be seen that the population of terai zone has higher livelihood diversity (78.00 percent) compared to the other two zones such as old alluvial (71.00 percent) and hill zones (64.00 percent). Hills zone has low level of livelihood diversity compared to the other two zones. It can also be seen that the number of population who has low level of diversity is quite high in hills zone (29.00 percent) compared to the other two zones such as seen in terai zone (11.00 percent) and in old alluvial zone (15.00 percent).

The finding of the study is more or less similar to the finding of Ahmed et. Al. (2018) [12] where he found that majority of the respondents had medium to high level of diversity and majority has diversified their agriculture based livelihood with other activities. The study here also similar to the finding the of Bhutia P.T. (2016) [13] where he found the livelihood diversity at low to medium level in hill ecosystem of Darjeeling. Livelihood diversification is an important strategy to raise the income of the farmers in rural livelihood (Sujithkumar PS (2007) [11]. A careful approach to remove the barrier and expansion of opportunities for wider

and more inclusive diversification is the need of the hour for a better livelihood strategy for farmers in rural areas (Ellis, 1998) [10].

Conclusion

From the study, it has been seen that the different occupations where farmers are engaged as their primary occupations or primary source of income were like agriculture, dairy, goatary, poultry, business, service, non-agricultural labour, agriculture labour, marginal work and migration based profession. The occupational structure in north bengal was found to be primarily agriculture based. It means most of the farmers prefer agriculture as their primary occupation followed by migration based works. Business and service based primary occupation groups come in the third and fourth category respectively. Agriculture again is the most preferred secondary occupations for almost all the other primary occupation groups except agriculture. Though farmers perceive agriculture as less profitable occupation still they keep it as one of their secondary or tertiary occupation as it provide stability to different natural or man-made shocks.

The occupational diversity of the farmers in the study area was found to be at medium level. The diversity was found to be more at terai zone as farmers don't consider agriculture as a profitable option and they are looking for alternative options in business, service, migration and other alternatives. The diversity at hills zone was comparatively found lower compare to the other two zones as there are less opportunity to diversify in hills zone due to low productivity, lack of land holding and irrigation problem in hills zone.

Over the years, the diversity was found to be at an increasing trend as farmers perceive livelihood diversification as a cope up strategy to fight rising "push factors" in the study area such as like low income, irrigation problem and fragmentation of land holding etc.

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