



IMPACT OF STONE QUARRYING ON FOREST AND LIVELIHOOD: STUDY ON GOLAPARA FOREST FRINGE VILLAGE, MANBAZAR-II PURULIA DISTRICT, WEST BENGAL

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Abstract:

Stone quarrying is one of the most important processes undertaken by the building industry across the world. Stone quarrying has been one of the alternative livelihood methods in Golapara, Stone quarrying is a form of land use practice that is concerned. about the mining of non-fuel and non-metal minerals from rocks. The current review centres around the effect of stone quarrying on the Forest and the occupation of the networks in Golapara Forest Fringe Village. Both subjective and quantitative methodologies were utilized for information assortments and investigation. That's what result uncovers stone quarrying has fundamentally added to transient income acquiring of the stone labourers, quarry proprietors and the local area forfeiting long haul advantages of other manageable use of land. In addition, it was studied that stone quarrying likewise contributes towards adverse consequences, for example, corruption of land and vegetation cover, transformation of farming area, loss of NTFP and so on. The review prescribes that because of the negative human and natural effects experienced in Golapara tribal village, there is need to utilize advancements that are user and environmental-friendly and recovery of quarries after use assuming the networks have to continue enjoying the improved sustainable living in the research area.

Key word - Land degradation, Livelihood, NTFP, Stone quarrying

I. INTRODUCTION

Stone quarrying is a type of land use strategy worried about the extraction of non-fuel and non-metal minerals from rocks. It is generally finished by open-cast strategy utilizing rock drills, blast of explosive and utilization of different techniques. Mining assumes a significant part in the advancement of human social orders and economies. Stone quarrying is one of the vital monetary exercises in the Golapara forest fringe village, providing the main part of stone of shifting totals to the development business inside the region and

then some. It has been demonstrated exceptionally effective in reinforcing the neighborhood economy. Additionally, it was found that stone quarrying likewise contributes towards adverse consequences, for example, such as degradation of land and vegetation cover, conversion of agriculture land, loss of NTFP etc.

Many people in rural village have reported that the dependence on agricultural output could no longer provide year-round security in terms of finance due to continuous decline in farm yields. This is not surprising since most of the rural farmers are subject to varying degrees of uncertainty due to climate variability and post production loss. 350 million individuals in non-industrial nations to take part in occupations like limited scope surface digging and quarrying for endurance. Accordingly, have recognized that limited scale stone extraction in country regions is a significant wellspring of job regardless of the risks it stances to the climate and other business exercises like cultivating. The current review centers around the effect of stone quarrying on the timberland and the job of the networks in Golapara forest fringe village.

II. MATERIALS AND METHODS

Study Area: As indicated by Statistics 2011 data the area code or village code of Golapara village is 354000. Golapara village is situated in Manbazar II development of Puruliya region in West Bengal, India. It is arranged 28km away from sub-area settle Manbazar (tehsildar office) and 65.1km away from area settle Purulia. According to 2011 details, Buribandh is the gram panchayat of Golapara Village. The absolute topographical area of village is 69.0 hectares. Figure 1 review region for a determination of village measures utilized are for example (I) village must have Forest Protection Committee, (ii) the majority of populations belong to the tribal



Figure 1: Study Area
Source: Google Earth

For a determination of village standards utilized are for example (I) Village should have Forest Protection Committee, (ii) most of populaces have a place with the ancestral. According to Census 2011, Golapara has a total population of 1,396 peoples, out of which male population is 709 while female population is 687. Literacy rate of golapara village is 49.07% out of which 62.34% males and 35.37% females are literate. There are around 301 houses in golapara village. Pin code of golapara village area is 723131. Purulia is closest village to golapara for all major financial exercises, which is roughly 95km away. The majority of the tribal residing in the area depends up on the rain fed agriculture and collection of forest produce from the

nearby forest. The non-tribal communities who are residing along the plain area are basically dependent on the rearing of livestock, cultivation of crop of paddy, Maize and others and working in different professions.

Household survey:

Household surveys were conducted during the period extending from last week of January to end of December, 2022 across approximately one forest-fringe villages namely Golapara and households (120 households). The study is based on both secondary and primary data that have been collected from different sources. A mixed method approach has been used, employing both quantitative and qualitative techniques. Various books and articles have been widely reviewed to construct the framework of the study.

Observation and Questionnaires:

A semi-structured interview tool was developed for each respondent type with a mix of structured and open-ended questions. Interview tools also included questions about the impact on finances, food security, and cooking fuel, as well as additional knowledge and actions questions, including challenges related to following recommended preventative actions.

Questionnaires were administered to all the respondents. Participant observation was also used as a source of information. Published and unpublished books documents such as, Government and International Reports, Journals, Newspapers and Magazines and internet sources used as sources of information for the study.

Sampling Techniques:

To answer the study objective, purposeful sampling was used for all the study respondents namely: 45 quarry men, 45 community members (30 male and 15 female), 3 chiefs, the Chairman of the council of elders, panchayat official, 2 revenue officers from Manbazar II block. A sample size of 120 households was selected from one village.

Method of Data Analysis:

The study used Statistical Package (SPSS) to analyze the data collected from the questionnaire. Descriptive statistics such as cross tabulation and percentages were used to help the research to identify the existing relationships between the dependent variables and the independent variables of the study. Descriptive tools such as bar graphs, tables and pie charts were employed to present results.

III. RESULT AND DISCUSSION

The objective behind this paper was to inspect the effects of stone quarrying on the forest and the livelihood in Golapara, Manbazar II, Purulia area. The direct impact of this phenomenon is the degradation of land, declination of irreversible vegetation covers, for a and faunal biodiversity creating air and noise pollution, reduction of quality and quantity of surface and ground water, multiple displacement, health impact on the local population due to ingestion of dust and contaminated water such as stomach trouble, respiratory related problems, lung infection, fluorosis, silicosis and other prominent organ disorders etc. The indirect impact of the stone quarry and mining has the broad social implication and women and children are

the worst suffer dust We likewise tried to comprehend the condition of the land before stone quarrying was presented consequently, we requested that the respondents make sense of the kind of land use previously the presentation of quarrying. Open cast quarrying is supposed to have the maximum impact on the ecology. With this system, land is required not only for the area to be mined, but also for the dumping of overburden rocks. Removal of vegetation has made animals to leave the area acquired for quarrying which also resulted in to the composition and population of animals in the area. Graph (Figure 2) clearly reflects about the increase areas of stone quarry in the recent years and also decreasing forest land, agricultural land etc.

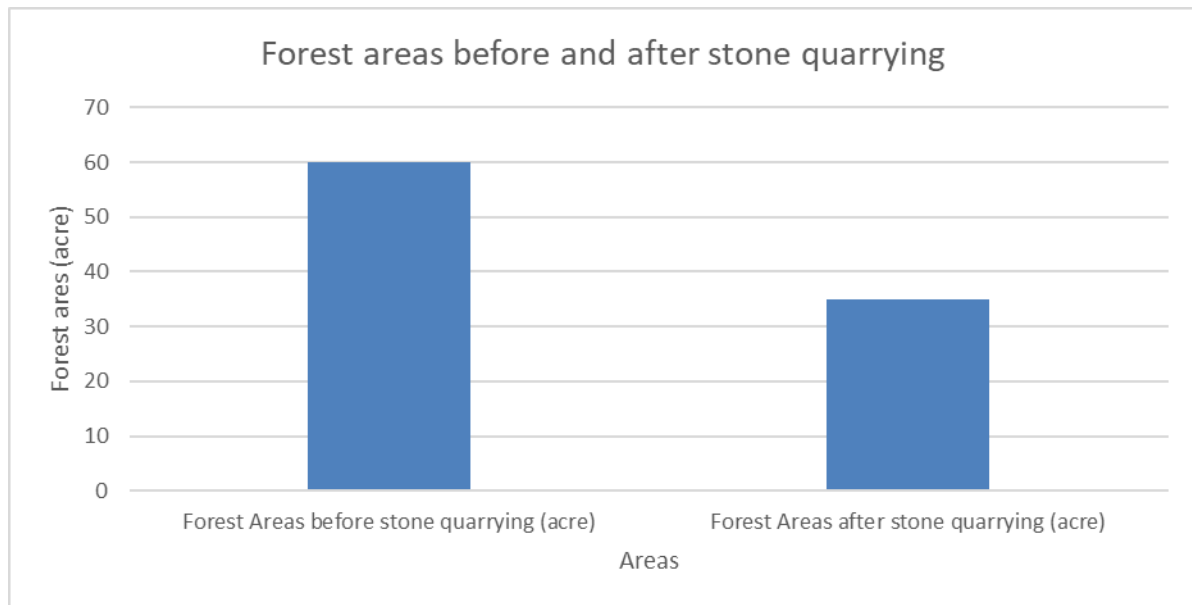


Figure 2: Forest areas before and after stone quarrying

Source: Field Survey

It shows (Figure 2) the total forest cover area before and after the stone quarrying in acre unit in the study area. It reveals that there has 60-acre land area before stone quarrying while it is recorded the remarkable decreasing of forest areas after stone quarrying and it is 35 acres. The data indicates a 41.67% decrease in forest areas after stone quarrying. The analysis suggests a significant negative impact on the forest ecosystem due to stone quarrying, with a notable reduction in forest areas. This emphasizes the importance of adopting sustainable and environmentally conscious practices in resource extraction to mitigate adverse effects on biodiversity, soil, and water quality. Addressing these issues requires a collaborative effort involving policymakers, industry stakeholders, and environmental organizations to ensure the responsible use of natural resources.

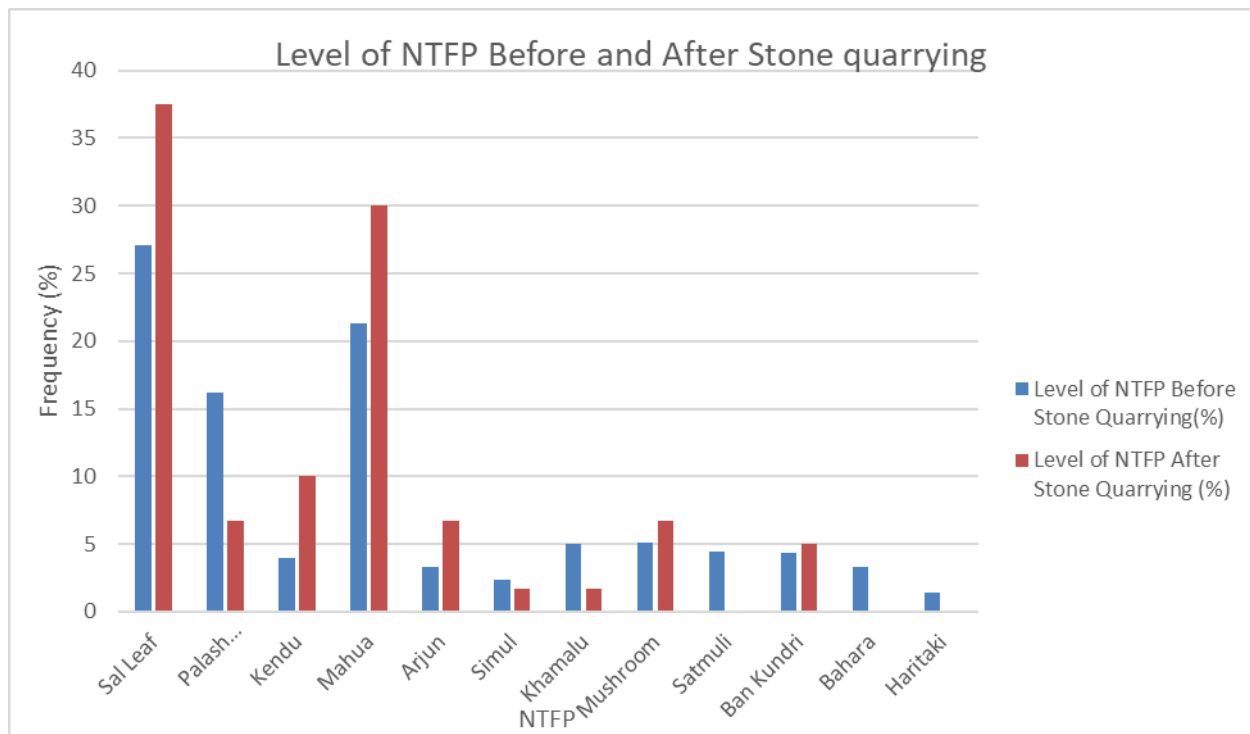


Figure 3: Level of NTFP before and after stone quarrying

Source: Field Survey

It illustrates (Figure 3) the level of NTFP before and after stone quarrying. Highest percentage of NTFP before and after stone quarrying found in the case of sal leaf. The percentage of sal leaf before and after stone quarrying are above 25% and above 35% respectively. It is followed by the Mahua and the percentage before stone quarrying is above 20% and after stone quarrying is above 25%. It is interesting that Palash flower, Khamalu and Simul has more percentage of before stone quarrying value than the after-stone quarrying value. The value before stone quarrying of Palash flower, Khamalu and Simul are above 15%, 5% and below 5% respectively while the value after stone quarrying of Palash flower, Khamalu and Simul are above 5%, below 5%, and also below 5% respectively. It is also interesting that only Satmuli and Horitaki have only value of before stone quarrying and the values are near about 5% and Below 5% respectively. Whereas Mushroom has near about 5% before stone quarrying and above 5% after stone quarrying but in the case of Bon kundri both the value of before and after stone quarrying is near about 5%.

The community members are also extracting NTFP from the forest areas. This NTFP extraction work has been also affected due to starting of Stone Quarry work. Data reflects (Figure 4) that areas under NTFP extraction work has been reduced due to start and increase in stone quarry areas. The stone quarry work not only reduced the extraction areas of NTFP, but production quantity has been also reduced.

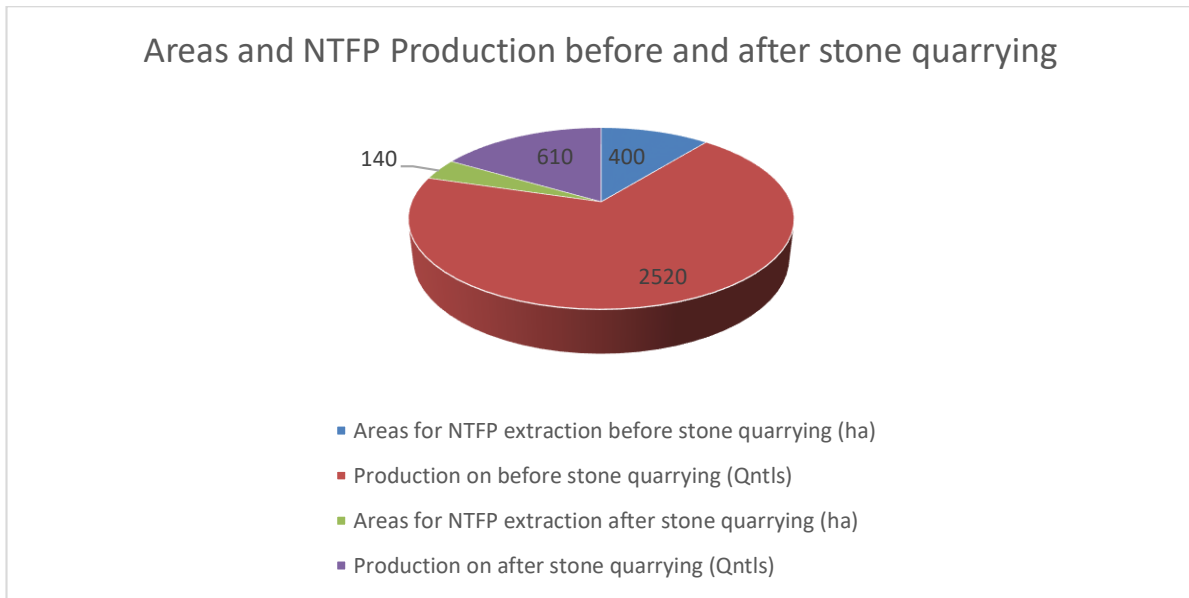


Figure 4: Areas and NTFP production before and after stone quarrying

Source: Field Survey

It shows (Figure 4) the areas for NTFP production before and after stone quarrying in Hectar and quintal unit. It depicts that there have 400 hectars for NTFP before stone quarrying and at that time the production was 2520 quintal. There have 140 hectars for NTFP after stone quarrying and at that time the production was 610 quintals. Initial area for NTFP extraction before stone quarrying = 667 ha and Area for NTFP extraction after stone quarrying = 231 ha. Change in Area=667ha-231ha=436ha.

Initial production of NTFP before stone quarrying = 2770Qntls. Production of NTFP after stone quarrying = 716 Qntls. Change in Production=2770Qntls -716Qntls = 2054Qntls the area allocated for NTFP.extraction has decreased by approximately 65.42% after stone quarrying. The production of NTFP has decreased by about 74.18% after stone quarrying. These results indicate a significant negative impact on the availability and production of Non-Timber Forest Products as a consequence of stone quarrying. The reduction in NTFP extraction areas and production may have implications for local communities dependent on these resources for their livelihoods.

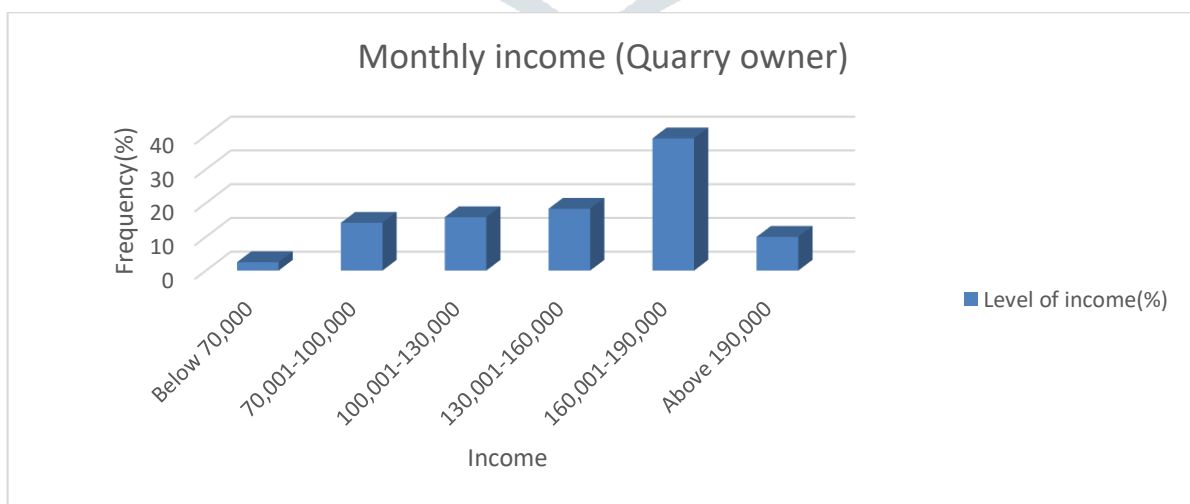


Figure 5: Monthly income of quarry owner

Source: Field Survey

It shows (Figure 5) the distribution of monthly income of quarry owner of the area. The majority of quarry owners (39.17%) fall into the income range of 160,001-190,000. The second-largest group (18.33%) falls into the income range of 130,001-160,000. The income distribution is skewed towards higher income brackets, with the top two categories (160,001-190,000 and Above 190,000) representing a combined 49.17% of the total. The concentration of quarry owners in higher income brackets may indicate successful or profitable quarrying operations.

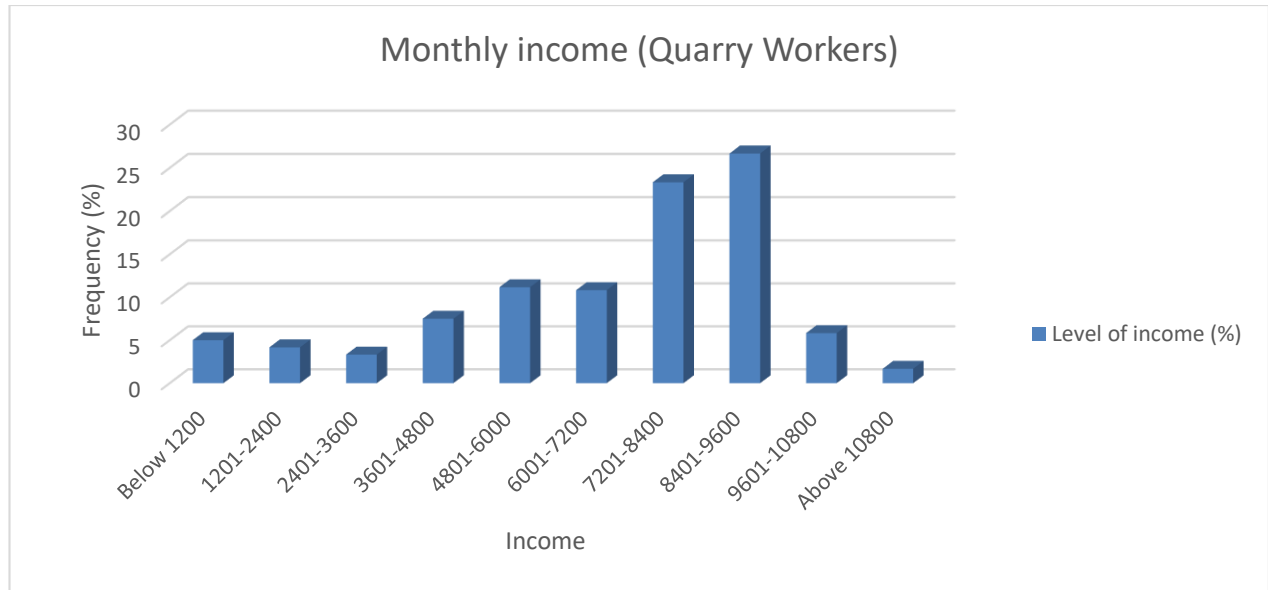


Figure 6: Monthly income of quarry worker

Source: Field Survey

It shows (Figure 6) the distribution of monthly income of quarry worker of the area. The highest percentage Quarry worker monthly income is between 8401 to 9600 and the percentage is near about above 25%. Only below 5% quarry worker has below 1200, 1201 to 2400, 2401 to 3600 monthly incomes whereas below 15% and near about 10% quarry worker has 4801 to 6000 monthly income and 6001 to 7200 monthly incomes respectively. Above 5% but below 10% quarry worker recorded as monthly income of 9601 to 10800. The income distribution among quarry workers is diverse, with significant representation in different income brackets. The largest percentage of workers falls into the higher income ranges, suggesting a substantial portion of the workforce earns relatively higher wages. A considerable proportion (10.83%) falls into the income range of 6001-7200, indicating a moderate level of income for a significant portion of the workers.

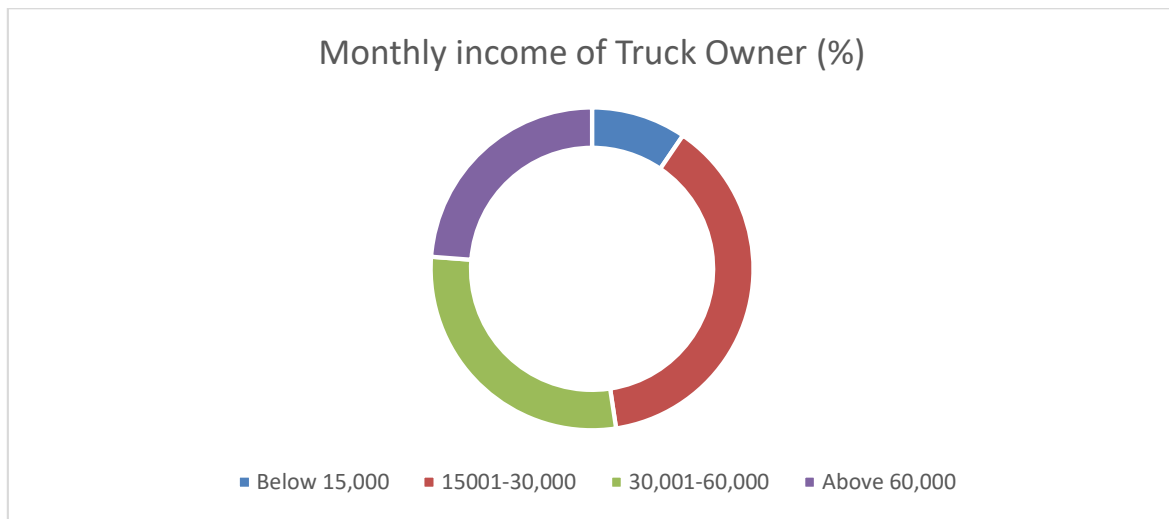


Figure 7: Monthly income of Truck owner

Source: Field Survey

It shows (Figure 7) the distribution of monthly income of truck owner of the area. The highest percentage truck owner monthly income is above 60000 and the percentage is 38.09%. Only below 9.52% truck owner has below 15000 monthly incomes whereas 23.8% truck owner has 15001 to 30000 monthly incomes. 28.57% truck owner recorded as monthly income of 30001 to 60000. The income distribution among truck owners is varied, with a notable representation in different income brackets. This suggests that policies and support programs for truck owners should be designed to cater to the diverse financial needs within this occupation. The presence of individuals with higher incomes also indicates the potential for financial success in the trucking industry. Further investigation into factors influencing income disparities could inform targeted interventions for the betterment of the entire truck owner community.

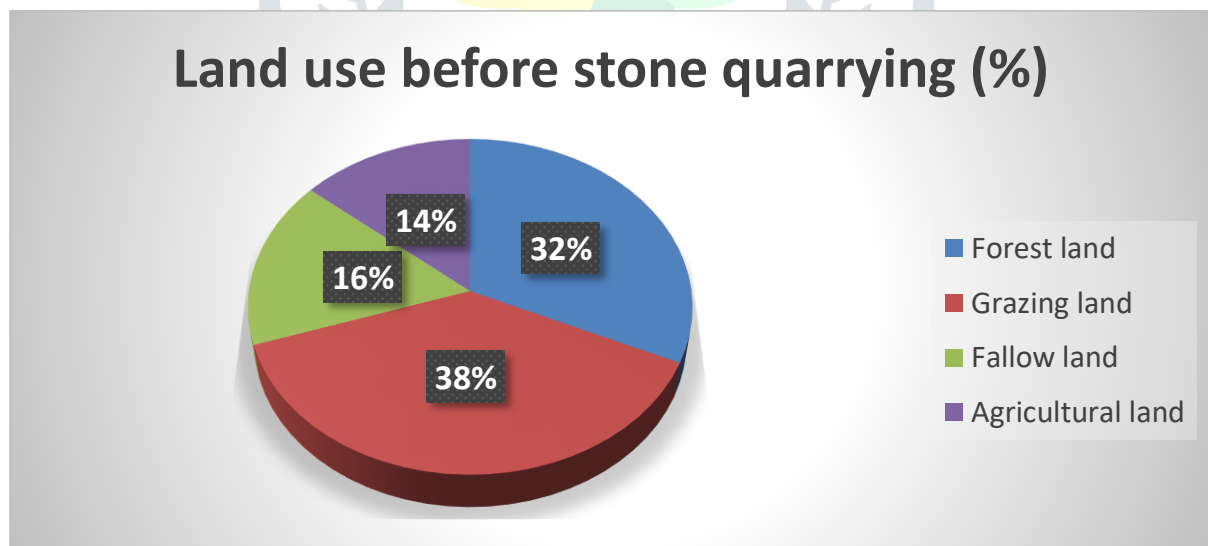


Figure 8: Land use pattern before stone quarrying

Source: Field Survey

It shows (Figure 8) the land use before stone quarrying in the area. Grazing land has highest percentage of land and it 38%. Agricultural land recorded as lowest percentage and it is 14% whereas forest land acquired a good concentration of land and it 32%. Whereas Fallow land recorded only 16% total land of that area. **Grazing Land Dominance:** Grazing land comprises the largest percentage, indicating that a significant portion of the land before quarrying was utilized for animal grazing. **Balanced Distribution:** Fallow land

and agricultural land are relatively evenly distributed, with fallow land accounting for 16.22% and agricultural land for 13.88%. **Forest Land Preservation:** Forest land represents a substantial but comparatively smaller percentage, suggesting an effort to preserve forested areas. The analysis indicates that before stone quarrying, the land was primarily used for grazing, with significant percentages allocated to fallow and agricultural land. Forest land, although present, was a smaller percentage, possibly indicating an effort to preserve forested areas.

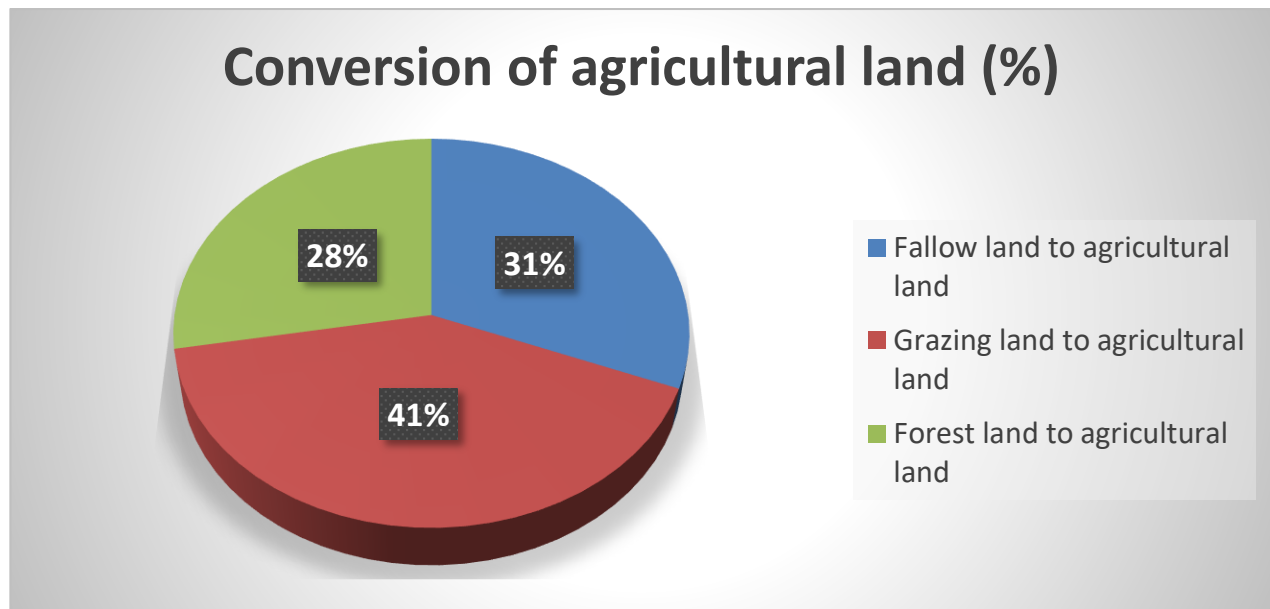


Figure 9: Conversion of agricultural land

Source: Field Survey

It shows (Figure 9) the conversion of agricultural land from fellow, grazing and forest land of the area. There has high rate of conversion from grazing land to agricultural land and it is 41%. It is followed by fellow land and percentage of conversion from fellow land to agricultural land is 31%. Only 28% of Forest land converted to agricultural and. The analysis indicates that there has been significant conversion from grazing land to agricultural land, suggesting a notable shift in land use. The conversion of fallow land and forest land to agricultural use is also observed but to a somewhat lesser extent. These changes highlight the dynamic nature of land use, with implications for biodiversity and agricultural expansion.

There has been a 41.67% decrease in forest areas due to stone quarrying, indicating a significant loss of natural habitat and biodiversity. The conversion of forest land to other uses may lead to ecological imbalances and potential long-term environmental consequences. The income distribution among quarry owners is concentrated in higher income brackets, suggesting economic success for a portion of the community. Quarry workers, on the other hand, exhibit diverse income levels, with a significant proportion in the middle-income range. There is a 65.42% decrease in areas allocated for NTFP extraction after stone quarrying. NTFP production has decreased by approximately 74.18%, indicating a negative impact on resources crucial for local communities. Grazing land, fallow land, and agricultural land

have been converted to varying extents to meet the demands of stone quarrying. The conversion of grazing land to agricultural land is particularly high at 41.25%.

IV. CONCLUSION AND RECOMMENDATION

In conclusion, the impact of stone quarrying in Golapara, Purulia District, West Bengal, encompasses environmental, economic, and social dimensions. Moderating these effects requires a cooperative exertion including local area partners, policymakers, and natural organizations to guarantee the long-haul prosperity of both the climate and the nearby networks. It is obvious from the conversation that the casual and unlawful limited scope stone quarrying exercises in Golapara village village is naturally unreasonable. It has unfavorably impacted the nearby climate and most certainly has improved the weakness of the neighborhood individuals.

It prompts corruption of land that presents serious danger to different assets. Atmospheric dust concentration coupled with the physical nature of the quarrying process creates negative health consequences. On contrary, the activity has provided employment and income opportunities for sustaining their livelihood. The reason for this paper was to analyze the effect of stone quarrying on the timberland and the work of networks in Golapara forest fringe village, Purulia.

- The Sustainable livelihood Framework was used as a guideline for answering this objective.
- It can be concluded that there is potential that stone quarrying may contribute significantly on the improvement of the financial social and physical capitals of stone quarrying communities.
- Stone quarrying can likewise influence the supportability of local area's normal capitals for model land and vegetation cover and human resources because of contamination subsequently influence their wellbeing.
- There is need to utilize advancements that are client and harmless to the ecosystem and restoration of quarries after use on the off chance that the networks should keep partaking in the further developed business because of stone quarrying.

V. ACKNOWLEDGMENT

I am indebted to the traditional leaders in Golapara forest fringe village for welcoming me in their villages. I further thank all the participants and interviewees who gave up their valuable time to wholeheartedly engage in this research.

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