INVESTIGATION OF SOCIOECONOMIC IMPACT ON MINING COMMUNITY DUE TO INTERMEDIATE CLOSURE OF MINES

Dhangeti Uma Venkata Vurga Prasad[1], Dr. S.C. Jain[2]

[1]M.Tech. Scholar, Dept of Mining Engineering, College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan, India
[2]Associate Professor, Dept of Mining Engineering, College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur Rajasthan, India

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Abstract - *The closure is the final destination for any mining project. Mining projects stimulate environmental and socioeconomic impacts on the community right from their commencement and continue throughout the life cycle of the mine, and even after their closure. In this study, an attempt was made to identify the various influencing parameters related to the temporary closing of mine and estimate their effects on the community. A mining community health path model was developed to estimate the pattern and strength of relationships amongst the dependent and independent socioeconomic variables after mine closure. The input data for the model was a correlation matrix of seven variables, which was collected from the study area. The constructs like economic status and poor social services have a significant effect on mining community health.*

Key Words*: *Intermediate mine closure; Structural equation modeling; Minin communities health.

1. INTRODUCTION

Mines are closed either when recourses turn into tired or when it becomes unachievable, from an economic point of view. At the time of closure, it is typical that well-deserved environmental conserved improves to moderate and reclaim the troubled areas. Conversely, very slight care is regularly focused on the socio-economic effects that the closure of the mine executes on governments, also especially on the community(Veiga et al., 2000, Kemp et al. 2008).

The issue of abandoned mines is important because it represents many thousands of former mining sites that continue to pose a real or possible risk to human welfare and health and environmental damage, the high cost of mine shutting has resulted in greater corporate awareness of closure. In the mine life cycle, historic mining operations that negatively impacted the environment, resulting in contaminated surface water and groundwater, unsightly and unstable tailing with acid rock drainage, and unsafe exposed audits must assume the mining industry an unsure status Mining companies have historically understood mine closure as involving the process of mine site rehabilitation and decommissioning (Allen, 1999).

From the government's perspective, mine closure presents a compound combination of eco-friendly, social, financial, and growth problems that the government must need to be certified that:

a. The manufacturing has sufficiently documented and arranged for finished the lifespan of the mining enterprise, and

b. That the closing design that approved ready to the fulfillment of the societies involved, another major stakeholder, and government at all levels.

Governments are now coming to realize that they have the most direct responsibility for defining and ensuring comprehensive mine closure within the broader context of the issues of " social-economic quality" and " sustainable development" the recognition of the boundary setting of mine closure has importantly long-drawn-out the choice of government errands and wanted activities (Clark,1999).

Mine closure takes, remains to have, and resolve continues to have a main influence diagonally the wide-ranging spectrum of worries of entirely the crowds that are straight and indirectly impacted by the closure. The somewhere to stay of all of these worries, to the degree probable, outcomes in "complete mine closure"(Clark,1999).

It is defined as terminating mining activity whether it might be temporary or permanent. Mine closure occurs as a result of the total extraction of the mineral reserves within the physical limits of a deposit or unworkability of the deposit due to technical/economic reasons. Mine closure must be undertaken in a planned and effective manner to avoid hazards and pollution in the future(Mallikarjun,2014). The legacy of abandoned mines and their associated adverse environmental and safety problems have led to an increased emphasis on mine closure planning in recent years. Both in the developed and developing countries, the mine closure issue has been a challenging and herculean task and requires good planning, monitoring, and execution as well financial commitments and hence to be exercised correctly(Tripathy, 2004).

Closure can be considered as the fourth stage of the mining-projects life cycle. Rehabilitation is often the most focused and costly part of a closure plan. However, other issues require equal planning attention. some of these include

community consultation and involvement, long-term responsibility, socio-economic considerations, planning alternate facility uses, personnel planning, records retention, cost estimation, and asset disposal(N C Saxena, 2008).

The closure of the mine serves to highlight and accelerate the already existing environmental and social consequences of mining and is undoubtedly a very important threat. Mine closure is multi-factorial and one can't assume that environmental issues are the only issues requiring focus from senior management. Unproductive mine closure activities in reality lead to disruption of social services, community cohesiveness, at the same time a decline in economic activities; it can also be a cause for the displacement of the community (Khanna, 2000; Singh, 2008). Displacement often leads to socioeconomic and environmental risks.

2. METHODOLOGY

Mine closure can have a positive and negative impact on both the physical environment and the socioeconomic structure of the region. From the government's perspective mine closure presents an intricate mixture of environmental, socio-economic, and development issues. The closure of the mine serves to highlight and accelerate the already existing environmental and social consequences of mining and is undoubtedly a very important threat. Mine closure remains multi-factorial and single can't assume that environmental problems remain the one issue requiring attention after senior management.

2.1 Factors Influenced to choose the Parameters

- Change in employment status
- Poor Social service
- Mining community Health
- Women and children status
- Crime rate
- Economic status
- Basic needs
- Alcoholism and addiction

2.2. Questionnaire Design

The design used in this research changed in employment pattern, social services, women and children status, crime rate, economic status, basic needs, and health. These designs were measured through the questionnaire survey. A design of a questionnaire gives a description that is quantitative of attitudes, views, and trends of a particular people using learning an example of it. The participant's responses on each item of the seven constructs were measured by a five-point Likert-type scale format.

In the questionnaire the five-point Likert scale was utilized, the reason being that the examiner felt that some of the participants may have feelings that are neutral about some issues which were being researched. That is why an odd number of categories were chosen on the scale. Likert scale was used because of some specific reasons:

a) it was felt by the examiner that the evaluation of the inconsistencies can be made more easily by using a Likert scale.

b) Scales also permit the researcher to evaluate the direction (e.g. yes/no scale) and the strength of the answers (e.g. "strongly agree" or "slightly agree").

c) The Likert scale also allows the use of various statistical tools for analyzing data as well as testing.

2.3. Mode of Questionnaire Development

The questionnaire comprised of queries. The deciding factor of the structure of the study methodology was created based on aspects such as age, gender, and profession, and the quantitative element was the key survey methodology. The survey questionnaire incorporated Multiple Choice Questions (MCQ) in the study procedure. Additionally, Likert Scales were further applied to allow the participants to convey their opinion concerning service conditions. The participants were requested to respond to the Likert Scale queries using a particular array of replies which might commence with 'Strongly Agree' and conclude with 'Strongly Disagree'. The structure of the survey questionnaire was formatted in a way wherein common data were gathered in the first phase and this was followed by queries that pertained to matters concerning contentment. Sample questionnaires are given in Table 2.1

Table 2.1 Sample questionnaires.

1. Do you think the welfare schemes which were provided by the company is continued after mine was closed?
2. Does the closing of the mines increase the unemployment status in the area?
3. Does closing of mine force the mine employees to lose their jobs?

2.2 Parameter Rating Procedure

For negative questionnaires descending order rating

Feedback	a] poor	b] moderate	c] good	d] satisfied	e] highly satisfied
Rating	5	4	3	2	1

For positive questionnaires ascending order rating

Feedback	a] yes	b] may be	c] can't say	d] may not	e] no
Rating	1	2	3	4	5

2.4. Survey process

Questionnaires for most of the respondents who were not fluent in reading and writing were read out and for those, who were fluent in reading and writing were filled by themself. It took 20-25 minutes to fill in the questionnaire forms for an individual participant. Out of these 150 surveys initially distributed in the study area, 132 were filled out and returned. Out of these, 128 were sufficiently complete to be included in data analysis, producing a usable response of 85.33 %.

The survey is seen as the best technique for gathering information from individuals by having a dialogue with them. The survey is described as communication among double or extra individuals concerning a specific subject. Qualitative Survey assists to comprehend the view of participants on a realistic as well as a significant level. In this research, the data was also collected by surveying EX-miners, Non-miners, and villagers to obtain their views on the socioeconomic impact.

3. Results and Discussion

The direct effects of change in employment status harm crime rate decreases (path coefficient: -0.25*) and it is also significant, decrease in crime rate has a positive impact on health (path coefficient:0.43**) which is also significant. Also, it has a positive impact on women and children status (path coefficient:0.37**) and it is significant at the level of 0.01, increase in women and children's status has a positive impact on health (path coefficient:0.07).

The direct effects of change in employment status have a positive impact on economic status, increases (path coefficient:0.51**) and it is significant at the level of 0.01, increase in economic status has a positive impact on health (path coefficient:0.80**). in turn, increase in economic status has a positive impact on women and children status (path coefficient:0.34*) and it is significant at the level of 0.05, increase in women and children status has a positive impact on health (path coefficient:0.07). and it also economic status has a positive impact on basic needs (path coefficient:0.38**) and it is significant at the level of 0.01.

The direct effect of poor social services harms women and children status, decreases (path coefficient: -0.18*) and it is significant at the level of 0.05, decrease in crime rate has a positive impact on health (path coefficient: 0.07).

The direct effect of poor social services has a direct negative impact on health decreases (path coefficient: -0.32**) and it is significant at the level of 0.01 probability. The direct effect of poor social services harms basic needs, decreases (path coefficient: -0.14) in turn, a decrease in basic need harms health decreases (path coefficient: -0.30**) and it is also significant at the level of 0.01. parameter with their standard errors and t- value and goodness of fit index for the structural model are given in table respectively.

* Indicates 0.05 probability level of significance.

** Indicates 0.01 probability level of significance.

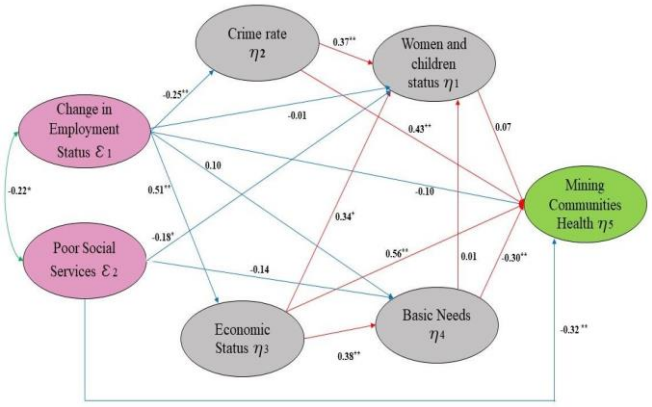

Figure 3.1 Mining Communities Health Path Model

Table 3.3 Linkages through which the indirect effect of employment pattern, basic needs, and economic status in mining community health path model were achieved

Construct	Indirect Linkages
Employment pattern	1) CES → CR → H 2) CES → CR → WCS → H 3) CES → WCS → H 4) CES → BN → WCS → H 5) CES → ES → WCS → H 6) CES → ES → BN → WCS → H 7) CES → BN → H 8) CES → ES → BN → H
Basic needs	1) BN → WCS → H 2) BN → H
Economic status	1) ES → WCS → H 2) ES → BN → WCS → H 3) ES → BN → H 4) ES → H

Table 3.4 Total effect of the significant variables on mining community health.

Variables	Direct	Indirect	Total	Rank order
Change in employment status	-0.10	0.22*	0.11*	4
Basic needs	-0.30**	-0.30**	-0.60**	3
Crime rate	0.43**	0.46**	0.89**	2
Economic status	0.80**	0.71**	1.51**	1

4. Conclusions

Mine closure has a potentially long-lasting impact on mining and local communities in the mining area. The major impact of mine closure like loss of employment, labor migration, discontinued social services and facilities, loss of community cohesiveness and environmental degradation have close relation with the health of the local and mining communities.

Mining activities improve the health of the mining and local communities since it contributes to direct and indirect employment, social services, local and national economic developments, but the health of mining and local communities may reduce when mining activities cease.

Health assessment is a widely used concept currently by common people as well as by governments and local and international organizations. It is usually referred to as a life that is considered as a good one, well-lived and being of value in recent years, health assessments have proved to be one of the best instruments towards sustainability.

4.1 Recommendations

- Economical supports on their employees and day by day workers and labours
- Applicable laws, regulations, standards, and norms.
- Un-employments workers, the government creates educational and training opportunities for them to acquire new skills for new jobs.

ACKNOWLEDGEMENT

I would like to thank my Head of the Department and my guide, Dr. S.C. Jain (HOD), Associate professor, for your valuable advice and technical assistance.

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BIOGRAPHIES

Dhangeti Uma Venkata Durga Prasad the B. Tech degree from JNTUH University, India, in 2017. He is currently a final year M.Tech student of College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan, India University.

Dr. S.C. Jain. Associate professor at College of Technology and Engineering, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan, India, Ph.D.(Mining Engineering), MPUAT, Udaipur, M.Tech. (Mine Planning), I.T. BHU, Varanasi.