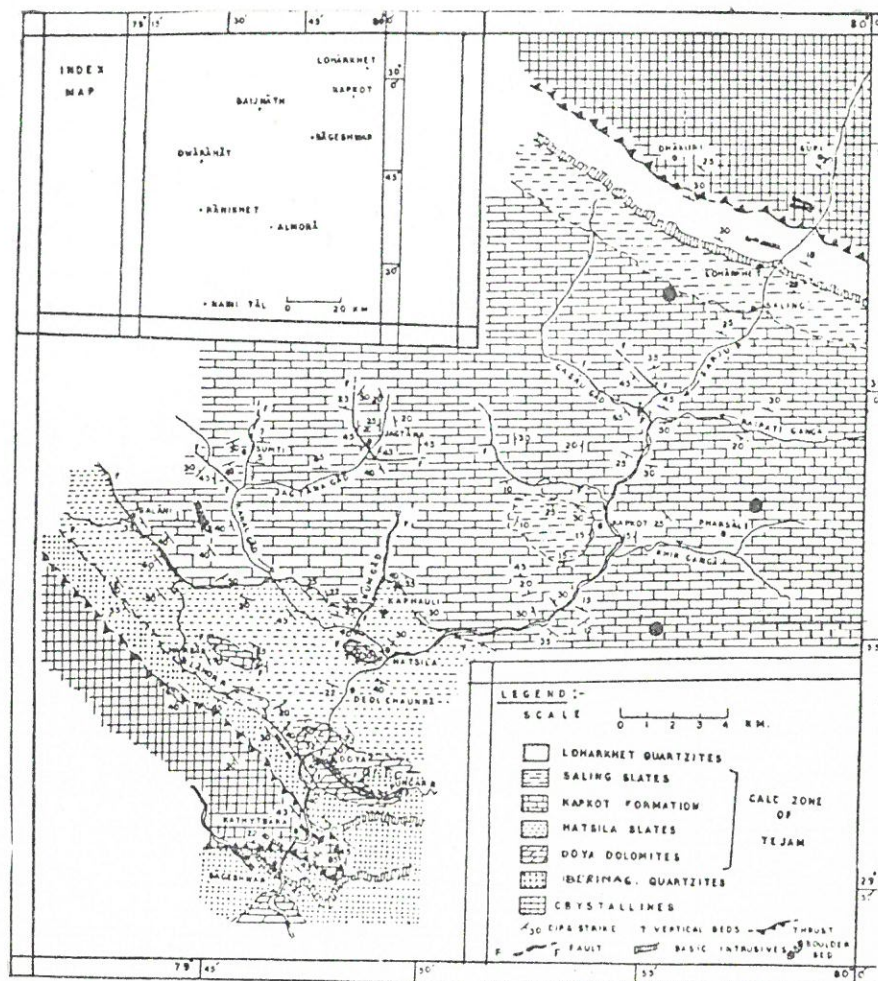


ENVIRONMENTAL ASSESSMENT
OF
THREE SOAPSTONE MINES
IN THE KAPKOT BLOCK OF
DISTRICT ALMORA, U.P., INDIA

ENVIRONMENTAL SYSTEMS DIVISION
DEVELOPMENT ALTERNATIVES
SEPTEMBER 1986

ENVIRONMENTAL ASSESSMENT OF THREE SOAPSTONE MINES
IN THE KAPKOT BLOCK OF DISTRICT ALMORA, U.P, INDIA



● Locations of Mines Studied

GEOLOGICAL MAP OF THE AREA AROUND KAPKOT,
DISTRICT ALMORA, UTTAR PRADESH.

(After Mishra and Bhattacharya, 1974.)

ENVIRONMENTAL SYSTEMS DIVISION
DEVELOPMENT ALTERNATIVES

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SUMMARY OVERVIEW

The Kumaon Region, comprising the districts of Almora, Nainital and Pithoragarh of Uttar Pradesh, has over 20 operational mines extracting Magnesite /Dolomite /Soapstone. These non-metallic minerals are being mined on leases granted both to private and joint-sector organisations and operate at various scales. The Kapkot block hosts six, all of which are open-cast soapstone mines.

Detailed assessment of the three mines (those at Pharsali, Gadera and Chaurasthal) indicate that the Pharsali mine has the least adverse impact on the environment. The Gadera and Chaurasthal mines have significant negative impacts - the morphostructural condition of the locality itself being a major constraint to the mining activity. The Pharsali mine can be operated with more environmental and safety controls to recover the material already exposed. The Gadera and Chaurasthal mine need to be closed. It is essential to understand the geo-ecological imperatives and also to find alternative sources of livelihood for the people.

Sustainability of the development process which utilises such scattered and sparse deposits is difficult in these ecologically fragile regions. It is essential to study these areas with some care to determine the kind and magnitude of activities that can be undertaken in these regions without serious risks. This study indicates clearly that mining is not a sustainable operation in these fragile areas and that it creates a serious environmental risk.

PARAMETER	PHARSALI	GADERA*	CHAURASTHAL**
GEOLOGICAL SITUATION	CONDUCTIVE	NOT CONDUCTIVE	NOT CONDUCTIVE
RESOURCE CONSERVATION PRACTICES	NONE	NONE	NONE
MINER-COMMUNITY INTERACTION	SMOOTH	TENSE	TENSE
AMENITIES ACCRUED	MINIMAL	NONE	NONE
ALTERNATIVES GENERATED	NIL	NIL	NIL
ASSESSOR'S CONCLUSION	CONTINUE TILL EXISTING EXPOSED FACE IS MINED	STOP MINING IMMEDIATELY	STOP MINING IMMEDIATELY

* Mine not fully operational

** Mine shut under executive order

IDEAL CONDITIONS FOR RESOURCE EXTRACTION ACTIVITIES

A STABLE MORPHOTECTONIC ENVIRONMENT.
 SIGNIFICANT QUANTITY OF RESOURCE AVAILABILITY.
 NATIONAL NEED FOR THE AVAILABLE RESOURCE.
 SIGNIFICANT IMPROVEMENT IN AMENITIES FOR LOCAL COMMUNITY.
 PSYCHO-CULTURALLY ACCEPTABLE TO THE LOCAL COMMUNITY.

RECOMMENDATIONS

1. THE PHARSALI MINE SHOULD BE CLOSED AFTER EXTRACTING SOAPSTONE FROM THE PRESENT STRATUM.
2. THE GADERA MINE SHOULD BE IMMEDIATELY CLOSED.
3. MINING ACTIVITY SHOULD NOT BE CONTINUED IN THIS AREA AND IMMEDIATE ACTIONS SHOULD ADDRESS THE NEED FOR ALTERNATIVE ECONOMIC ACTIVITIES IN THE AREA.

SECTION ONE

- * Summary Overview
- * Overview Table
- * Recommendations

SECTION TWO

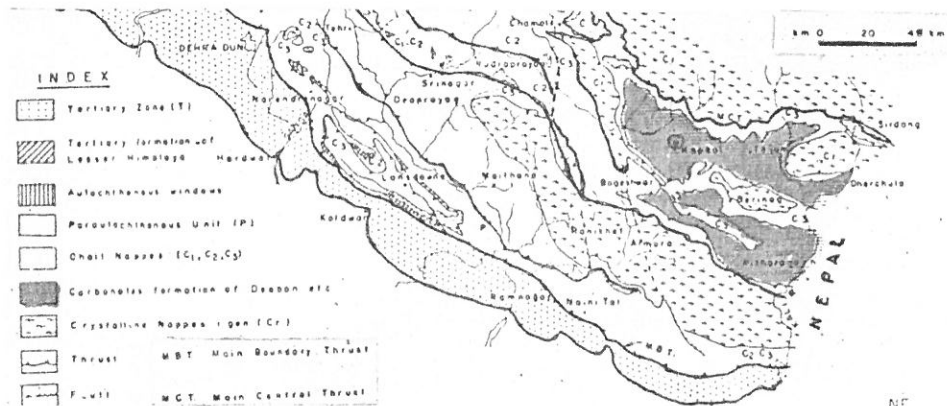
* Introduction
* Study Design
* Assessment

INTRODUCTION

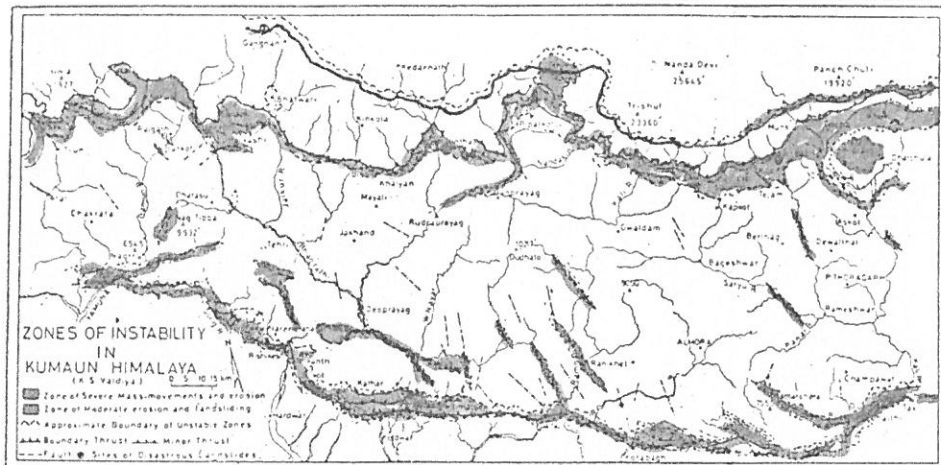
Himalayan Environment and Resource Extraction:

The Himalayas - about 2500 km long, 350 km wide, rising to a maximum of 8.8 km - is an arcuate belt with its concave face curving onto the Tibet Plateau. Three distinct litho-tectonic units are recognised from North to South and these latitudinal zones are called the Greater Himalaya, Lesser Himalaya and Outer Himalaya.

The mountain belt is still active and the movement is highly differential throughout the entire belt. The transitions from each of these zones is marked by distinct faults. Transverse dislocation elements are recognisable in the entire mountain belt. Seismic records, photo-tectonic and satellite lineament analyses indicate a strong correlation between the natural disturbances and the fault planes.

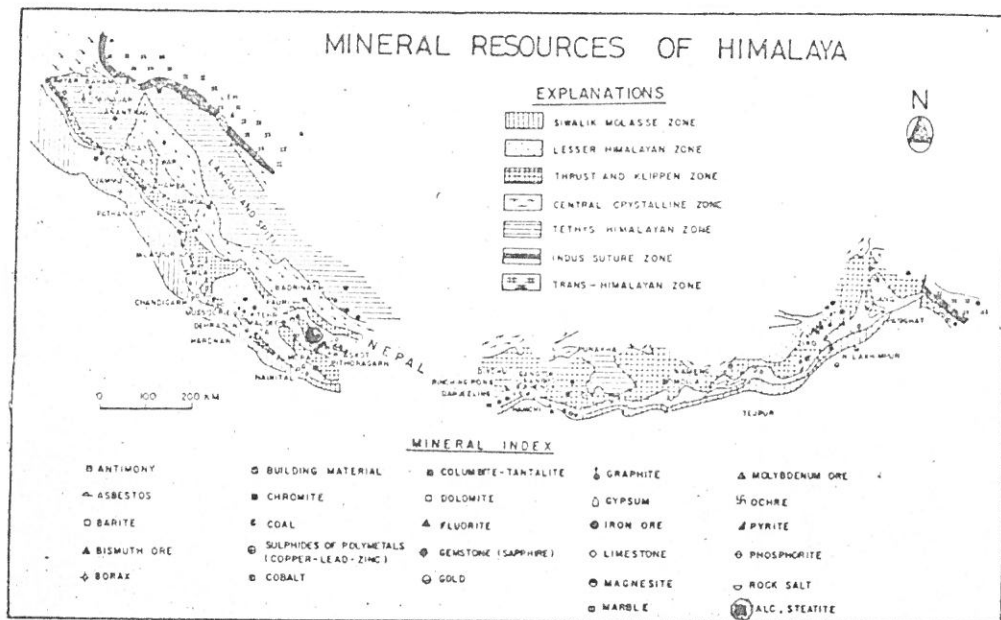


Further, the geomorphic modifiers are not able to equilibrate the rates at which tectonic changes are brought about. Thus the natural state of geoecosystems is fragile and unstable.



Human intervention in these hill ecosystems have been destabilizing the natural cycle and is rendering them ever more fragile. Deforestation, road construction, excessive grazing and extension of cultivation in the upslopes have increased the vulnerability of the life-support systems. The most recent addition to the list of activities is MINING.

The Himalaya is endowed with a variety of metallic and non-metallic minerals. There are indications of hydro-carbon accumulation. As the demand for minerals increase, more and more sensitive areas can be expected to be explored and the resources therein extracted. Mining in ecologically fragile areas requires a thorough analysis of all the possible alternatives. Unless planned for and designed right from the stages of exploration, remedial measures are bound to be costly and in many cases impossible.



Location of the Mining Area:

The eastern hill districts of Uttar Pradesh - Nainital, Almora and Pithoragarh - constitute the Kumaon region. Almora district (7023 sq. Km) is divided into 14 development blocks of which Kapkot block is the largest in area comprising about 34% of the District.

There are over twenty open cast non-metallic mines in Kumaon, six of which producing soapstone lie in the Kapkot Block. These mines are of different magnitudes and are worked by private organisations.

Kapkot is 28 km by road from Bageshwar on the river Saryu. The mines studied are located at Pharsali, Gadera and Chaurasthal.

Decision Entities:

Whichever way one defines development, the notion of change is inevitable. Decisions are causatives to change. At any particular situation a few entities (institution/individual) can influence the course of development. The distinct entities whose decisions will be causative to the alteration of development process in the area are listed here. Any recommendation on the mining activities would have different significance to each of these entities.

Proponent of the Study:

Kapkot Gramin Uththan Samithi, Kapkot is a voluntary agency working on Education, Relief Activity and Environmental Aspects of local development. They approached us through the Oxfam Trust, India at New Delhi.

Entrepreneurs:

Shri M.S. Aithani, (Swaraj Mineral Traders : Chaurasthal and Pharsali) is a business man from Bharari. He runs a variety of enterprises and has been the contractor for the civil supplies department supplying food grains to remote villages in Kapkot Block.

Shri Raj Narain, (Mount-Plain Minerals : Gadera) is based at Haldwani and is considered to have withdrawn from mining at Gadera. Presently, the mine is being operated by Shri Tiwari, who has a small field office and residence near Bagheli bridge at Kapkot.

State Government:

Directorate of Mines and Geology, Uttar Pradesh, is the principal agency to coordinate the state level mineral resource exploration and extraction activities. The Directorate has a regional mining officer stationed at Mainital.

Directorate of Environment and Ecology, Uttar Pradesh, is the agency which studies and/or regulates the environmental impacts of any development activity in the state. It has formed no opinion on these mines, due to non-availability of information. It is true that the mines were in existence before the directorate was established, but they are under its purview.

District Collectorate, Almora, is the local administrative and revenue collection agency and is also responsible for the implementation of various developmental programmes in the district. There is a subdivisional magistrate stationed at Bageshwar and a block development officer at Kapkot. Since the administrative machinery is also responsible for the overall law and justice in the district, decisions pertaining to the activities that can lead to disharmony among the people can be checked and altered by the district collector.

Central Government:

Indian Bureau of Mines, Nagpur, is the principal national agency to maintain mineral statistics and ensuring that mine development occurs in a systematic manner. Information on various aspects of mineral industry are collected through a 'complete enumeration' and the respondents are statutorily bound to render the statistical returns by the prescribed dates under Rule 14 of the MCDR 1958.

Directorate General of Mines Safety, Dhanbad, is the department that prescribes safety standards and is responsible for ensuring that these standards are maintained.

The Department of Environment, under the Ministry of Environment and Forests, is responsible at the national level to advise and aid decision making and to enhance the sustainability of development processes in the country. With the enactment of the Environment (Protection) Bill, 1986 the department through the article number 5(a) has empowered itself with the right to direct closure, prohibition or regulation of any industry, operation or process on environmental grounds.

Voluntary and Citizens Groups:

Community and Voluntary Groups have been supporting the citizens of the Kapkot Block in dealing with the issues arising out of the mining operations in the region.

Lok Chetna Manch, is a network of socio-environmental awareness group in Kumaon. There is a unit in Bageshwar which has provided the citizens of Chaurasthal with advice in dealing with the state administration.



STUDY DESIGN

Goal:

- o To identify possibilities for generating a sustainable development processes in Himalayas.

Project Objectives:

- o To make a qualitative assessment of the state of environment in Kapkot Block.
- o To conduct detailed assessment of the mines.
- o To identify some alternatives to the mining activities, if needed.

Database, variables and the process:

The range of issues to explore the nature of mining activities and their impacts on the region was listed in five major categories. The divisioning did not have any specific methodological bias but was essentially of problem solving nature. The five study categories initially identified are as follows:

- Introduction to the Place
- Introduction to the Problem
- Extent
- Effects and
- Attitude of the People.

Checklists were prepared to identify the type of information sought. A master table indicating the likely source and related reference points was designed. An exhaustive list of likely indicators was drawn up.

A questionnaire was designed and informal mock sessions of filling up the questionnaire helped to identify the variables that crucially affect any analysis of the mining activities in the region. This proved to be an effective method.

Initially this exercise was carried out by the study team and subsequently development workers and certain local citizens were asked to join in identifying the issues that were of relevance to the study area. The concept of inviting local citizens provided an opportunity for the people of the area to contribute to design the study.

Some of the salient features of the this aspect of the study design.

- It provided a good basis for communication with the proponents of the study and the local citizens.
- The variables that were required to be estimated and the mode of investigation could be detailed.

- In most cases direct recording on tapes of the interviews with people was sufficient.
- The variables identified could be categorised depending upon their utility as a descriptor of the state, an impact indicator or as a parameter directly influencing decisions.

The categories were to enable the use of this study as a decision-support tool rather than as a basis for confrontation among the different decision entities.

The key variables in each of these classes have been stated in the overview table which provides a quick qualitative appraisal of the project.

Some other features of the study design are:

- o Except for the geoscientific variables, quantitative evaluation was restricted to only those that were meaningfully quantifiable both intrinsically and within the constraints of the project resources.
- o Certain relevant information and documents have been interspersed within the report which can give some additional insight for all the decision entities with respect to the project and especially the proponent of the study.

The field work was undertaken in two stages. The mines at Pharsali and Gadera were studied between 21.3.85 and 28.3.85. The Chaurasthal mine was studied between 11.7.86 and 16.7.86.

ASSESSMENT OF THE MINES

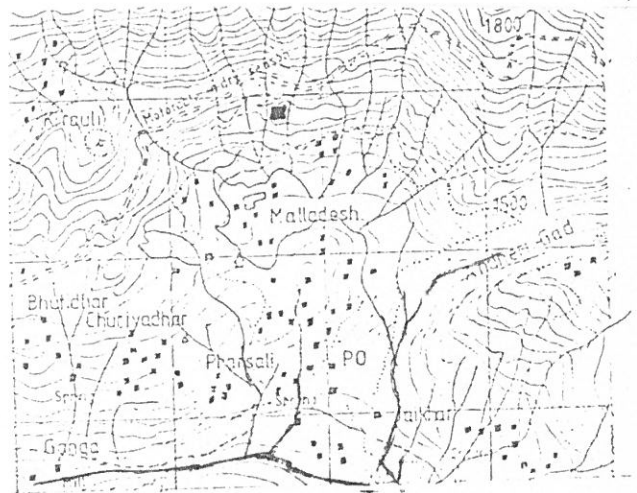
PHARSALI

SITE:

The Pharsali mine is close to the settlement of Malladesh, 200m below the Bharari-Sama Road. It falls within the catchment of Khir Ganga which joins Saryu near Kapkot.

The mine is on a convex slope dotted with pines. The bed rock is stable with a thin veneer of soil. The bed rock is essentially calc-arenaceous schist and some of them is more quartzitic. Soapstone occurs as a subvertical lens. Around the lens crenulated Talc-schists extend 2-3 meters. The axial planes of these crenulations dip 35-40 degrees in 240-245 degrees North. Their amplitudes range between 3 and 15 cms. The bedrock (quartzose calc-schist /arenaceous schist) generally low dipping (25-30 degrees in 160-170 degrees North).

The maximum width of the cut is 5-6 meters and the width of the exposed face of the soapstone lens is 1.5-2.5 meters.



The vertical profile as noticed from the exposed soapstone to the ground above (10-12 meters with 70-80 degree slope) is

Material	Description	Thickness(Max.)
Top Soil(A) -	Ferruginous, coarse grained, abundant biomass	2.0 meter
Top Soil(B) -	Unconsolidated, lumpy, coarse/medium grained	3.0 meter
Bed Rock -	Crenulated Talc schist, warped, fissile Quartzose calc-schists, brownish grey to pale white, splintery and hard.	5.0 meter
Soapstone -	White to pale greenish white, layered, clear, soft and elastic	1.5 meter

ACTIVITIES:

The production of soapstone from this mine has been continuing intermittently for more than 16 years. The activity has always been on a low key, especially as the lens is tapering out. The maximum width that has been mined is around 4 meters.

No scientific method is employed in delineating the lens and the mine has been developed through adhoc digging by the labourers. They are guided by a supervisor, a high school (+2) drop-out from Bharari. Two levels have been cut so far the lower one about 6-7 meter wide and the upper one 4-5 meter wide. Presently soapstone is being "dug into" from a small trough in the upper level.

The overburden as also the mined material is not stacked in any order. The soapstone mined is packed in small jute bags (appx.30 kgs) and carried manually to the road.

Most of the workers are farmers from neighbouring villages. During periods of intense farm activity these local villagers are not available for employment in the mines. Some of the Nepali labourers employed during the beginning of mining operations continue to work.

SETTLEMENTS:

The village Pharsali lies not much below the mine approximately 1400 metres above sea level. Pharsali is a comparatively well connected village. It is easily approachable from Churiadhar close to the Bharari-Sama road as well as from the mine. Buses ply regularly on the Bharari-Sama "kutchha" road. These are operated by the Kumaon Motor Owners Union Limited.

The people are mainly engaged in farming. They feel that the productivity of their land has improved over time. There is a primary school and a high school, primary health centre with a doctor who stays there occasionally, one private medical practitioner (an ex-service man and member of Block Planning Board) who belongs to the village. He has been practising in Almora but spends considerable part of the year in the Village. There is a defunct craft centre of sorts where carpet weaving was taught. Though no handloom cloth is sold, DCM and Jiyajee mills posters can be seen in shops advertising their products that are stocked, along with popular brands of soaps and oil. Much of the slopes close to the village are cultivable and the land available to each family seems to be sufficient to be able to grow enough for their needs.



The people of the village look to the mine as a source of employment that provides cash income. They are happy that the mine is close by and they do not have to travel long distances for work. Further, they can stay in their own houses and also look after their farming.

The villagers are convinced that the slope and direction of the mine is such that their fields will not be affected by any of the effects of the mining activity. They seem very eager to convince others that everything is all right, though there do exist some dissidents. These dissidents believe that the benefits and costs of the mining activity has not been satisfactorily evaluated.

INFERENCES

1. The mining activity in this location has to be properly designed extract the exposed face. Subsequent development of the mine should not be allowed.
2. There exists a high degree of risk for the workers. The mine face is vertical and the workers cannot even know of any boulder rolling down.
3. The amenities provided to the mine workers are minimal to none.
4. No Mine-Safety, Mining Bureau official seems to have visited the mine.
5. The low volume of water that can drain from the area will not affect the overall quality of water downstream.
6. Major segment of the people do seem to want the continuation of the mining activity as it provides the much needed cash income.
7. Alternative means of income generation needss to be planned since the mine will not sustain for longer period.

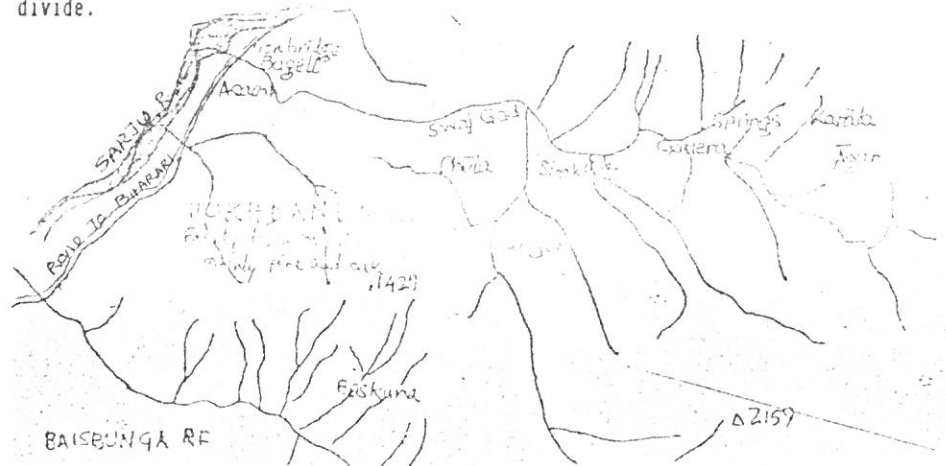
RECOMMENDATION

THE PHARSALI MINE SHOULD BE CLOSED AFTER EXTRACTING SOAPSTONE FROM THE PRESENT STRATUM.

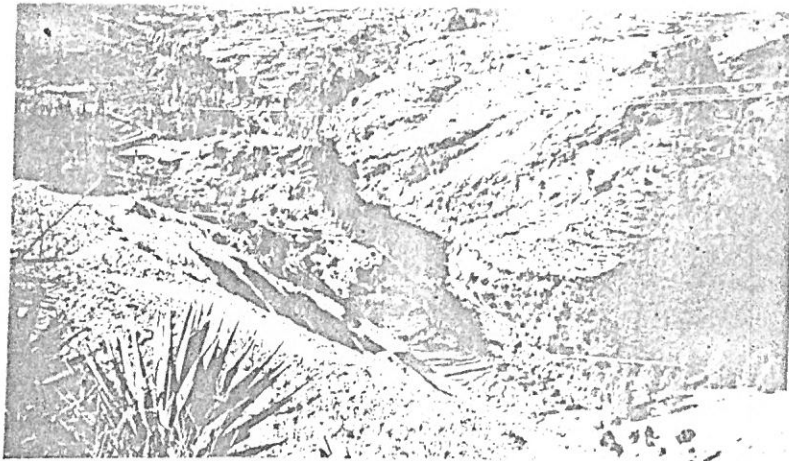
GADERA

SITE:

Gadera Mine lies at the head of the Swaj Gad stream. The area leased for mining is a strip of steep terrain on the right bank of the stream extending northeastward across the water divide.



The general topography of the valley is clearly indicative of the periglacial morphological processes that have been operative in the post Pliestocene period. The head of the valley comprises of a series of cryogenic or altiplain terraces, each raising a good 10-15 meters from the immediately lower one. The rise is steep, often greater than 30 degrees. The terraces are rugged and not very wide, 10 meters at the maximum.



The bed-rock is rarely exposed. Close to the village settlement and within the channel, near the beginning of the leased area, Schists are exposed. These have a higher component of arenaceous material compared to those seen at Pharsali and often contain shiny streaks of Talc layers. These schists dip 35-40 degrees in 165 degrees North direction.

About 300m above this exposure, is the soapstone mine. From this point the lower (comparatively flatter) ground is about 10 meters and the slope to that is about 35 degrees.

A similar terrace at the top, on which some quarrying has also been attempted, is at an angle of about 30 degrees. A huge boulder (greater than 200 cubic meter) precariously rests on this terrace, ready to roll off.

The mine quarry exposes only soapstone. The layers dip 35-40 degrees in 110 degree North direction. The site is cut into three steps each barely 3-4 meters. These steps are rough and slippery with the remnant soapstones that are haphazardly thrown. The soapstone exhibits certain ferruginous stains and erosional cavities.

The terraces are composed of coarse sediments and there is no marked regularity in grain-size variation. Large blocks which are embedded, are clearly not the deposits of the present day stream whose force and volume are much too limited less to transport these blocks. Glacial and colluvial material have been intermixed. Detailed analysis of these sediments to understand the periglacial processes that had been in operation in the geological past would be essential to any programme to stabilize the slopes. The morphogenetic changes resulting from the change of the principal modifying agent, such as from a glacial regime to a fluvial regime, are rapid until a new equilibrium is established.

SETTLEMENT:

There is no vehicular track leading to this place. There are two tracks by which the village and the mine can be reached. One of these tracks starts from the Bagheli Bridge on the Bageshwar-Bharari road and keeps close to the Northern water divide going over a series of ridges- an almost non-existent trekking-trail it takes about 2 1/2 to 3 hours of walking. The other starts opposite the Kapkot Block Office and enters the Swaj Gad valley due west of Karala village passing through Bhayun, Kaurapani and Jalekh. The former, though shorter, involves steep climbing. Both are used as mule tracks.

The village nestles approximately 700 metres below the on which the Soapstone is being mined. The stream that flows through the valley originates very near the mine and the village Gadera is at the head of the Swaj Gad. The settlements are on either bank and also on the streams that join SSW of the village.

There are about 300 settlers (mavasi) inhabiting the valley with their families and everyone has a plot of land for farming. The houses are fairly well spread out in little clusters and a person visiting the neighbours on a festival may have to trek for 30 minutes to reach a particular house.

All the families have a few heads of cattle, and they grow rice, wheat and a few vegetables (spinach etc.) and tobacco for personal use. The area of the land available for farming, the vagaries of the irrepressible Indian monsoon, the topography and low incomes, all contribute to just enough grain production for self-consumption. The question of selling the grain for income usually does not arise. They usually have to buy from the market 2 hours away.

The people of the village are very friendly, tough, hardworking, cheerful though worried. They are very worried about the mine which hangs on their heads like the proverbial sword. They are worried about the contamination of the stream that supplies them with water, about the sparks of internal disputes between the 10-15 villagers who work for the mine-contractor and the remaining majority who are against it, about their land that is already too little and too tough to maintain even a subsistence, and about the landslides which, they feel, may result from the mining if it is carried on.

Though no physical action has been taken against the miners as yet, especially against the local in-charge Tewari, the threats are many and the tempers are critical. The contention of the villagers is very simple - either stop the mining completely or resettle the village elsewhere with suitable compensations.



INFERENCES

1. Mining activity in the area is prone to destabilise the slopes.
2. Detailed study and analysis of the entire watershed is of immediate necessity to make any realistic plan.
3. The topography and the sediments forming the area close to the mine are indicative of highly unstable slopes.
4. The mine site is highly disorganised.
5. The soapstone is transported by mules which destroy the cropped terraces through which they move.
6. Citizens have almost made it impossible for the miner to continue any activity.
7. Local feuds are being created because of the mining activity and is being triggered by the local mining contractor.
8. Mining activity should be stopped forthwith and immediate steps for stabilising the slopes should be undertaken.
9. Means of generating cash income need to be planned and implemented.

RECOMMENDATION

THE CADERA MINE SHOULD BE IMMEDIATELY CLOSED.

CHAURASTHAL

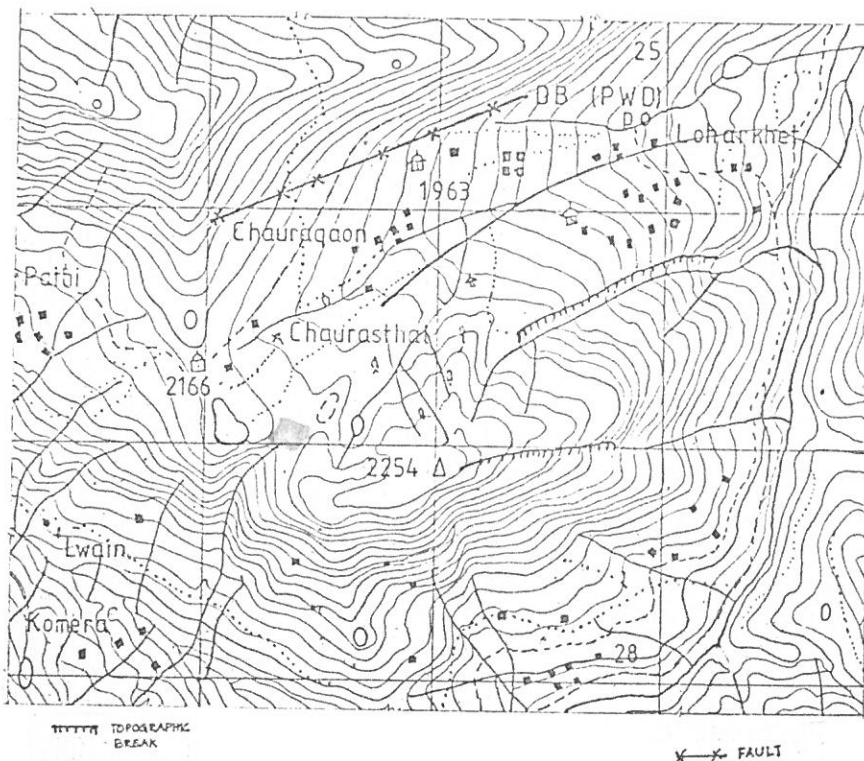
SITE:

Chaurasthal is 4 km from the end of the motor track (Song) towards Pindari Glacier, (2 day trek) an important trekking trail in the Higher Kumaon Himalayas. Between Bharari and Song the KMOU Ltd operates two services each day. The only other regular vehicles that ply on this seasonal road are the civil supplies distribution truck, a one-tonner converted to a useful passenger carrier and a jeep. Few spots on the track are landslide prone and during the period of visit, rains had started and the first land-slips had commenced.

The northern slopes of the watershed (Southern Slopes of Parthali Dhar) are clearly indicative of repeated slope movements. The lozenge shape that these paleo-slip zones have assumed are due to a combination of the initial gravity-fall movements as well as the creep processes that are on-going.

Neotectonic movements are indicated in the entire area around the water-shed and the streams show abrupt changes in their course before joining Saryu River.

Chaurasthal mine is situated on a meadow land, shouldered by peaks on the NW and SE directions. The mines are on the NE slopes (the meadow) and the SW face is high slope scarp.



Soapstone has been excavated from atleast three levels, each with a lateral shift of 3-5 meters. The lower 'pits' have been filled up with debris and the highest one could only be studied in detail. The profile along the slopes and the mine-face on the highest pit is given below.

Profile Length	Description
0.1 - 0.2 m	Top soil with biomass (grass/bushes)
1.0 - 1.5 m	Fairly consolidated soil with occasional inclusion of large irregular rock (calcareous or soapstones)
0.5 - 1.0 m	Intermixed soil and blocks of schistose rock (at the core soapstone of the outface)
3.0 - 4.0 m	Variously dipping soapstone - calc-schist intercalation. Strongest indicated direction 40-45 degree North / 90-110 degree North. (Anomalous) ~1150 degree North. Overburden fallen in rain. Soapstones 'fish like' moved in the debris. No clear mesoscopic shape. Occurrence on two levels does not suggest of any preferred shape.

ACTIVITIES:

The mining activities in Chaurasthal was at its peak during 1983-84 and had been employing directly at the mine site and through the peripheral activities about 25 persons. Discussions with one of the villagers who worked in the mine for over 8 months revealed that at the peak of its activity about 3-4 quintals of soapstone could be excavated, packed and transported to the road-head at Song each day.

The mining activities were closed by the district collector through an executive order, and since then the citizens have filled in some of the excavated pits with either soapstone which was not lifted from the mine-site or with the local schists. Also at the lowest pit level a blockade has been built in order to 'save' the soapstone from further slippage.

SETTLEMENT:

Landslips during the year in other catchments and continuation of slippages along some of the slopes of this watershed invited the attention of many of the villagers. The meadow was also lost for grazing activities and the chain of impacts were becoming obvious to the citizens of Chaurasthal, Chauragaon and Loharkhet all

lying within the watershed. The Karmi flood and landslide disaster (1983) had also triggered the sensitivities of the neighbouring village communities. The local people with the help of environmentally-conscious voluntary organisations launched a movement against the mining activities.

Mass hunger strike for two days displayed the concern of the citizens. The villagers formed 'Jan Chetna Manch' and presented a petition to the district collector after marching 50 km to the tehsil headquarters at Bageshwar.

They emphasised their fears about the implications of continuing mining activities to their life-support systems. The district administration decided to instruct the lease holder to stop mining activities in the area and cited the non-compliance of the lease-holder to certain regulations. (Annexure I)



INFERENCES

1. The mine-site is a meadow land and the run-off from the site is significant. The morphology of the watershed suggests a tectono-glacial origin.
2. The mining activities have taken place in a totally haphazard manner.
3. The northern slopes of the watershed (southern slope of Parthali Dhar) is faulted. The fault is active and the movement is indicated by the slippage masses at its base.
4. Creep and discrete slope movements coexist in the region and the course of Saryu river is itself faulted. Detailed investigations would be essential to determine the magnitude of movements.
5. It would be very essential to distinguish the tectonic and geomorphic components of slope movements to design any effective environmental activity in the region.
6. The local citizens are strictly not for mining.
7. The soapstone already mined has been wasted due to the lack of scientific planning at all stages.
8. The entire watershed needs to be carefully studied to identify various possible alternative economic activity.

RECOMMENDATION

THE MINING ACTIVITY SHOULD NOT BE CONTINUED IN THIS AREA AND IMMEDIATE ACTIONS SHOULD ADDRESS THE NEED FOR ALTERNATIVE ECONOMIC ACTIVITIES IN THE AREA.

SECTION THREE

- * Kumaon and the Himalayan Belt
- * Environment and the Citizens
- * Mining and the Environment
- * Recent Geology and Present Morphology
- * Soapstone Mineralogy and Economics
- * Ecologically Fragile Regions
- * Sustainable Development Prospects

1. Kumaon and the Himalayan Belt:

The Kumaon Himalayas spread across 51,000 sq km out of the total extent of 612,021 sq km of the entire Himalayan belt, constitutes 8.3 % of the total area and is the home of 4,815,326 people. The average density of population is 94.2 persons per sq km (Census '81). This is not indicative of the population pressure, since the land usually available for settlements is considerably lower. The topography itself precludes the possibility of the use of land for many human activities.

The cultivated land on which their subsistence is based, is 0.06 hectares per person. When the percentage growth rate of the population (55.01% between 1961-81) is kept in mind, it provides some idea about the real pressure on land today and the probable pressure in the future. The rudimentary understanding of 'carrying capacity' of the Himalayas compound the methodological obstacles in the mapping of the Himalayan environment.

The forests provide the survival needs, such as fuel, and the region has a low per capita forest land (0.05 hectares?). This indicates only a notional quantity, since the rights over the use of forest resources are severely constrained. It should be conceded, however, that these estimates of forest cover are not completely reliable. In the recent past, the order of magnitude errors have been admitted by monitoring agencies even in more simpler topographical regions in the other parts of the sub-continent. (Wood Substitution Committee Report '85)

If road length is considered to be a symbol of "modern economic development", then Kumaon with 7.40 km/100 sq km lies almost half-way between the Punjab Himalaya with 18.00 km/100sq km and Bhutan with 0.44 km/100sq km. It is however well known that most of the road building activity in the Kumaon Himalaya, as in Arunachal (11.00), was undertaken either during the 1962 war or immediately after it. Though time series data is not available for analysis, the continuation of road building over the last decades and the rates of economic growth have been varied. It is moreover not an important indicator in this terrain, as spatial data in terms of area is almost meaningless, though it may prove to be an effective ~~comparator~~ of inter-regional data, if only to estimate the amount of ecological destruction that would have occurred since this data has been compiled. (CSO, 1980)

Environment and the Citizens:

The environmental issues in these hills have generated significant community interest and people of the hills have demonstrated the value of community action on more than one occasion. However enlightened, public participation is possible and can be useful if it is on a sustained basis in the current institutional culture.

Such movements and actions can be valuable if backed up by scientific study and demonstration of viable and sustainable alternatives. During the last decade, movements like the "Chipko" which originated in the hills, have travelled far and have assumed almost international proportions (Shiva and Bandhopadhyay '86).

Ecologically conscious people in the region see mining as a severe threat to their life-support systems and they have begun to question the risks and benefits of this activity. Mining has a very visible impact has triggered the local peoples sensitivities, as much as the actual impacts have on the ecosystems. The action taken by local citizens in response to the mines in Kapkot block of Almora District Uttar Pradesh are clear pointers to what the community is capable of contributing to sustaining the development process in the context of their environment.

3. Mining and the Environment:

Mining is a site-specific extractive activity. When the environment is considered in its totality as both the supplier of biophysical resources and a place to enjoy living (implying the psychocultural resources), it is clear that unless mining is extremely well designed, it will undermine the sustainability of the psychocultural resources (De Laet '85). Mining in ecologically fragile regions like many parts of the Himalayas, present even more challenging situations for allowing the normal natural processes to go on.

Though it might seem very simplistic, it is worthwhile here to state that the goal of any resource extraction or utilization process is to create economic conditions for a more sustainable state of environment, and is often stated as a national goal. Even if we were to make a simple flow diagram of the most high demand mineral resource or hydrocarbons, it would be clear as to what are the real costs and who pays for them.

Experience with exploration organisations working in India (Environmental Management Plans for Oil operations- Development Alternatives working paper '85) shows that significant negative impacts are caused even at this stage. Exploration is indeed the most important pre-requisite for mining and the crucial stage to involve environmental values and planning. With the growing demand for mineral resources of various kinds, more and more fragile ecological regimes are put under great pressure.

Even from a purely qualitative point of view the essential variables for a high Cost - Benefit ratio is inescapable. These would include factors such as litigation and avoidance of public pressure, significant mitigative costs, clearance of regular governmental regulations and most of all, the image of the mining agency.

4. Recent Geology and Present Morphology:

The Geological aspects of the Recent period and particularly morphotectonic environment are among the questions that still remain unanswered. Indeed the interpretation of the regional geology of the Himalayas, which seem to show great continuity, depends largely on the efficacy of the present day theories of earth movements. Moreover, being one of the largest and the highest mountain belts decorating the global landscape, analysis of the Himalayas is critical for any new theory on geodynamics.

What has been surmised with the kind of prevailing data base does provide an excellent starting point for the establishment of more relevant and critical data. The Quarternary era began with a glacial regime much further south than the present day snow-line. In fact, glacial environment and associated processes have been hypothesised even for regions as far south as the Western Ghats. It is therefore reasonable to infer that regions presently close to the snow-line such as the present mining region in Kapkot (20 km aerial distance) must have been under glacial conditions. When the available rates of glacial retreat is studied (Vohra '84) we find, for example, that in the last 150 years Pindari Glacier is estimated to have retreated by about 1.73 km. Field studies indicate the distinct glacial landform that can still be recognised in this region.

The implications for present day sedimentation in such environments, which are complicated by the persistent earth tremors which alter the morphology of the area, are significant. The fluvial system which is the key geomorphic modifier, has to equilibrate the topography to its strengths and capacity. Changes in erosion and transportation also occur very rapidly and identification of paleoslopes and environment of deposition of individual sedimentation units across valleys could be cumbersome if not wholly impossible.

5. Soapstone Mineralogy and Economics:

Soapstone (Steatite = Talc), is a hydrated oxide of Magnesium and Silica ($Mg_6[Si_8O_{20}](OH)_4$), with a specific gravity ranging between 2.6 and 2.8. It has a monoclinic symmetry.

Two common parageneses of Talc are the hydrothermal alteration of ultrabasic rocks and low grade thermal metamorphism of siliceous dolomites. Talc is unstable at lower temperatures in the greenschist facies especially in the presence of CaO and CO_2 and is replaced by magnesite. (Deer, Howie and Zussman '76)

Soapstone is resistant to attack from most reagents and with its low solubility in water is not chemically harmful to handle, nor is it capable of chemical contamination of water.

The other properties that enhance the utility of soapstone are its low shrinkage coefficient and resistance to moderate heat. It is used in a

variety of industries- in leather dressing; toilet and dressing powders; in making certain marking pencils; in paint, paper and rubber as a filler; in insecticides as a carrier; in and as roofing materials.

Estimates of the quantity of soapstone in the Kumaon lesser himalayas is presently put at 0.9 Million Tonnes. The production from the Almora district in the year 1983 has been 6471 tonnes valued at 3.27 lakhs (CMIE Report 85). The current price ranges between Rs 27/30 kg and Rs 40/30 kg depending upon the quality. Normally pyritic inclusions lower the grade of soapstone.

6. Ecologically Fragile Regions: Sustainable Development Prospects

A great deal of interest has grown on the Himalayas and the whole focus until recently has been on identifying the state of the crises. Despite the absence of clear definitions and demarcation, it is possible to identify the regions which are ecologically fragile. A preliminary classification is provided here and the nature of the causal factors for fragility is identified.

CATEGORY I

- i. Transient Environments
 - eg. Periglacial regions (Glacial morphology and Fluvial Processes)
- ii. Transition Environments
 - eg. Bhabar - Tarai (Morphological controls undergo rapid change reflected in the change of sedimentation patterns)
- ii. Tectonic Environments
 - eg. Main Central Thrust Zone (Transverse Lineament separating the lesser Himalayas from the higher Himalayas)

CATEGORY II

- i. Denuded Environments
 - eg. Dehradun - Mussoorie Hills (A number of variables including Mining causing rapid loss of Biomass)
- ii. Built Environments
 - eg. RamGanga Dam Region (Massive Construction modifying the natural flow regimes)

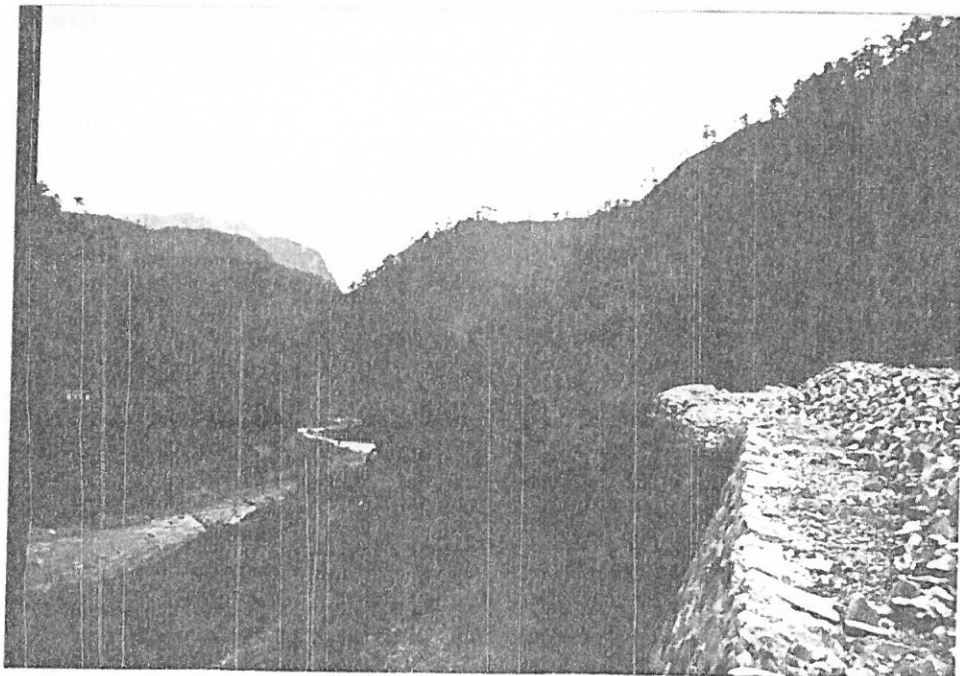
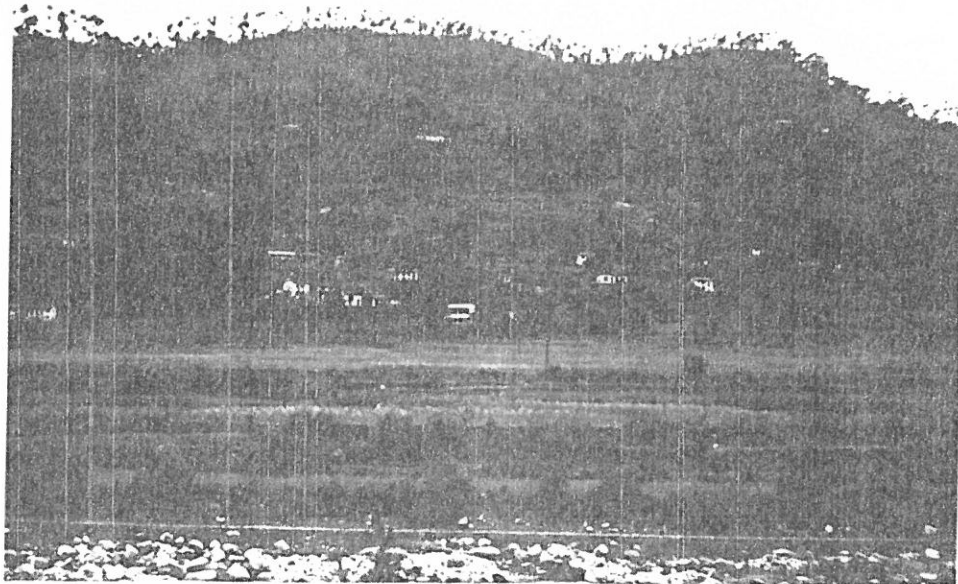
CATEGORY III

- i. Subsistence Environments
 - eg. Southern Slopes of Panjal Range, J & K (Low crop productivity and intense cash-flow problems)
- ii. Discontented Environments
 - eg. Garhwal Himalaya (Mass community action against callous Institutional management)

This is essentially a rudimentary classification since a number of factors influence and effect ecological fragility. To understand the various issues undermining the sustainability of the development process in the Himalayas, these would be the areas where the effects of different variables may be clearer.

These regions have significant visibility in terms of the different role-players in the "development game" and is atleast likely to evoke further thought. This could be used as an effective starting point for national development decision making processes. Development decision making itself is the most complex of processes since priorities and trade-offs are generally unclear.

The implications to the environment of the three mines in Kapkot Block to the different decision entities should however be clear from this assessment. This should enable the key institutions to react positively and provide the necessary support for evolving a sustainable development programme.



THE DANPUR REGION AND MINES AT PHARSALI AND GADERA

- A NOTE BY SHRI DARWAN SINGH KORANGA

(The Saryu watershed beyond Bageshwar is known as the Danpur region. Shri Darwan Singh Koranga accompanied the field team and provided his impressions. His notes in Hindi have been translated for this report.)



DANPUR'S STORY

Situated at the foot hills of Himalaya, in the district of Almora (UP), Danpur is crying on its own fate. There is nobody to look after the problems whereas on every step you can see "Khaddar Dhari" leaders and big industrialists who claim to have the thinking capacity and say that they have concern for the people. To say many people have sacrificed their lives for Danpur but regretablely these people are not even thinking about their home land. Even if they start doing anything at all these works will sleep under the files of bureaucracy.

Danpur is a very old area which is one of its kind. In this developed area, there is no facility for anything. Just by giving the name "Kapkot" to this region, won't solve the problems of Danpur. There is a road which was constructed 35 years ago. For a population of 70,000, there is just one primary health centre at Kapkot. There was a religious centre at the bank of Saryu river.

In 1939, a motor way was inaugurated from Bageshwar to Munsyari via Shama but there is no movement on this road till now. This is our fault. Whenever we write any letter to some department, they ignore it and we do not pursue them for long. There is no adequate facility for the motor way in Danpur region.

Near Saryu River, there is a drain flowing of urine. Will there ever be toilets in this area? With the change of season, mosquitoes have started breeding here. If proper care is not taken immediately, there will be a spread of many diseases. Bageshwar Municipal Corporation is in front of our Vidhayak's birth place, even there, is a drain flows of urine. If this is the condition at his place, what can be done outside?

At Bageshwar UPSRTC and KMOU bus-stations, there are urinals but they are not in good condition. KMOU is above the road and below flows a dirty drain. Tourists going to Pindari have to pass through Bageshwar, where due to inadequate facilities and unhygienic conditions, tourists get a bad impression about that place. One can see piles of waste material everywhere, dirty water from the drains also ever flows. Because of inadequate sanitary facilities, there is always a fear of dangerous diseases.

There is not enough water for drinking and bathing at Bageshwar Bharari and Shama, but we have to give tax. There is no hospital at Bageshwar and there is no main pipeline for drinking water at Kapkot and hence water is not available to the villagers. But they are paying water tax to the municipality which is two and half times more than the house tax they are paying. If Kumaon water works department cannot supply water to these municipalities they can at least impose the tax on them!

There is nobody to listen here, whether you are getting water to drink or not you have to pay the tax. Residents of Bharari and Bageshwar are facing the same problems. Nobody knows when the authorities will lay the main pipe line for supplying drinking water.

People living in Bharari are suffering a lot because of all these problems and inadequate facilities. Workers of this area should immediately look into these problems and try to find out some solutions.

PHARSALI MINE

Mining of soapstone has been continuing for more than 16 years at "Pharsali Malla Desh" which was started in 1970. According to the villagers and the people working there, it is evident that there has been no accident till now - human beings, animals, etc. Mining activities cannot lead to any accident because it is a rocky area. For mining soapstone, labourers first throw away the soil and then extract the material. If soapstone is not available, they cover the pits with the soil.

DEPTH OF THE MINE

At Pharsali, soapstone is at 10 to 50 feet depth and is not quite sufficient. According to the labourers, 20 years bond for this soapstone mine has been fixed. In 1986, 16 years has been completed and four years are left. If the mining is done for more than 50 feet, there will be danger for the road way. For this reason, people have conserved pine trees.

ADVANTAGES

Soapstone mining is the source of income for the villagers and labourers and if this mine is closed down, these people would have to go a far off distance for their livelihood and earnings. If the sources of income is at a far of place, women generally would not go for work because they have to look after their houses. They used to go for work in the mornings and in the evenings but now it would not be possible. It is more advantageous to have soapstone rather than having tree plantation at the sight of the mine. After the soapstone is extracted, if trees are planted at the same place, it will be useful for the villagers.

DISADVANTAGES

This mining activity which has been going on for last 16 years has not caused any damage to animals, plants, human beings, nor has there been any landslides. If this mining would have been on lower or upper reaches of the village, it would not have worked for more than 9 months. This mining activity was started with the agreement of all the villagers, hence there has not been any ill effect and any diseases. We cannot say anything of the future. Therefore, we request you to examine you this mine so that we do not have any problems in the future.

DISEASES

There are not as many diseases in the hilly region as in towns because there is a clean atmosphere and the sources of water are pure which keeps human beings healthy. Because of good water, the digestion system is good. This information was given by Dr. Goswami who is the native of this village. He said that in the earlier days people put ash on the forehead, sacrificed goats in temples and always believed in these rituals. The land of Uttara Khand is supposed to be that of Gods. For this reason, all the sacrifices were made in the name of God. But with time, people have started taking medicines, apart from believing in God. There was no doctor, nor do people recognise herbs. There is no medical center in this area, neither do they have herbal medicine which can be given to a patient. With time, the diseases are spreading all over for which there is no treatment. The atmosphere is getting polluted which leads to the spread of diseases. If there is any primary health center in this area then there is no doctor available, if the doctor is there, there is no medicine, if medicine is available there is no "Pharmasists". For all these reasons, Danpur region is quite backward, therefore, they have been requesting the Government to give some attention to the problem of health.

EDUCATION

50% of the people of this region are uneducated because of lack of educational facilities and hence this area is backward. Even the educated person is unemployed because when he finishes off with his high school or intermediate then the uneducated people at home think that we have done enough for the person. If that educated person has 100/- rupees he cannot go anywhere in the search of employment with that amount of money.

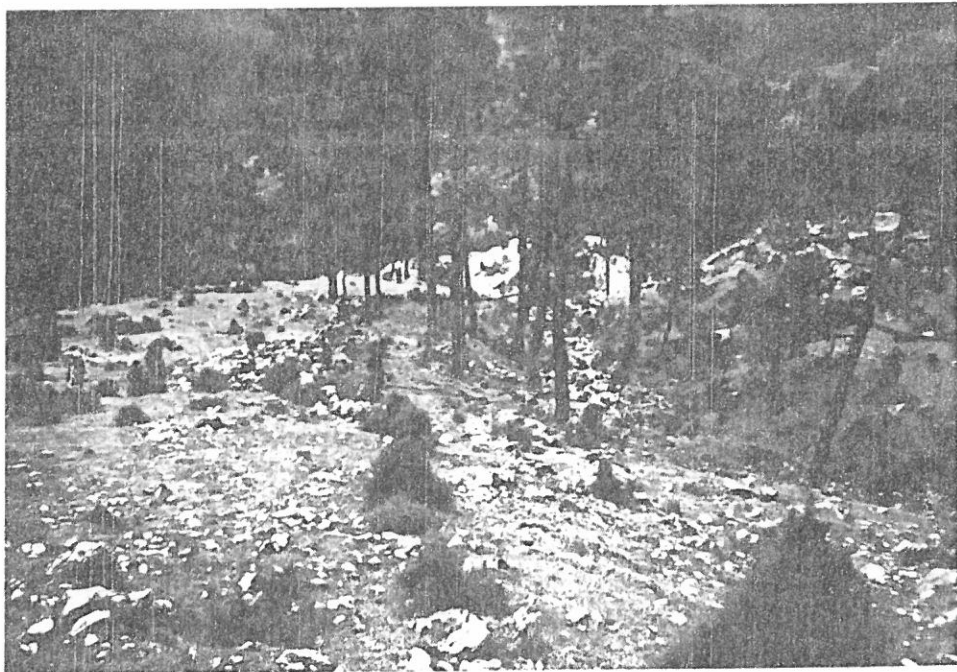
There is lack of primary education so people are uneducated. People in this area are always engaged in their agricultural activities but they are not getting sufficient food from their land and there is no other source of income at this place with which these people can improve their standard of living and educate their children. In the area of Danpurl, even the schools are quite at a distance which cause inconvenience for the children to commute because there is no adequate facility of transportation and even the roads are not very good.

In Danpur region, primary education can be very successful. In primary schools, children are not giving any fees but on every child the expenditure on books, clothing, etc. is around Rs.200/- When the person is not employed in this region, how can he manage to spend Rs.200/- every month on a child? If a man has four children, his expenditure comes to around Rs.800/- per month, he cannot spend that much money every month because there is not enough food to eat at home. Hence the Government is requested to look into the matter of child education.

ENVIRONMENTAL POLLUTION

Environmental pollution had not affected Danpur region but with time the effects of the environmental pollution is increasing because of the population growth. We do not have the reasons to stop the environmental pollution nor these can be arranged. For this, we request the Government to arrange the means to check the environmental pollution. With the growth of population, the effect of pollution is also increasing because man does not think that this can effect the coming generation. For this reason, the Danpur region is backward. Because of the environmental pollution, there is a continuous spread of diseases all over the hilly region. If this continues, we will not get clean air to breath, pure water to drink and because of this the atmosphere won't be clean.

If a person is willing to keep his region in balance, he has to live in cleanliness and he has to keep his region clean and healthy. If all the waste is put into a covered pit it will prevent the spread of diseases and will keep the atmosphere clean. With this our country can be in balance hence I request the workers of this region to look into this problem.



GADERA MINE

Four years ago, Shri Raj Narain had initiated the mining of this soapstone mine but the mine was not allowed to operate for more than one month because this endangered the village. It is obvious after looking at the map of this mining area that there are no trees at the mine site and the area is shown out of proportion. To stop the mining activities, the Head of the village and the Panchayat were bribed and threatened to force them into signing it. Still soapstone is being mined illegally and the danger to the village is increasing.

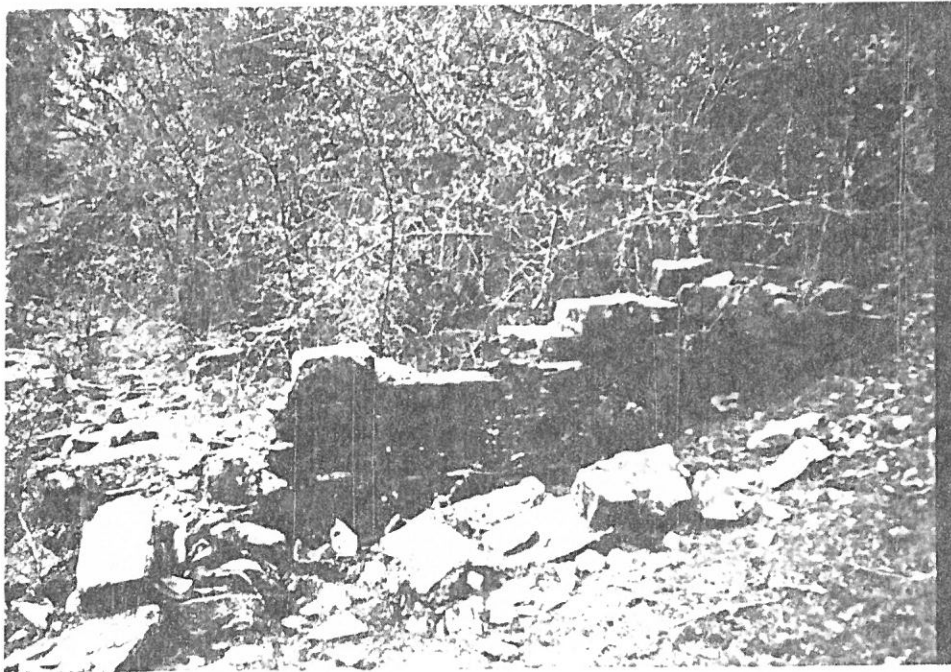
There is a village on the upper side of this soapstone mine. There are ruins in the nearby area which indicates that people resided in these ruins but because of inaccessibility, soapstone mining is carried on in this area. The person who had started this soapstone mine has said that I have wasted two and half lakh rupees on this hill, and if I get any profit I will leave this soapstone mine. But Mr. Tiwari, a temporary resident of Halwani, is acting as a middle man and is extracting soapstone. While the contractor, Mr. Raj Narain, had submitted in writing and his three years bond has also expired, he has been extracting soapstone with his own wish which is dangerous for his as well as for villager's life. If he carried on with the activity, it is quite likely that he will die very soon. Till now, we have requested Tiwari but now it is not going to work. When talking face to face he agrees not to extract soapstone any more but he still carries on. Tiwari is bribing two or three people to get his work done but it is not going to work like this any more.

ADVANTAGES

People of the Gadera village are not benefited from the soapstone mine hence they want this soapstone mine to be closed. This mine has not provided any employment to the people nor has it been of any use to them. Because of which people of "village assembly Gadera" wish to stop mining activities. For this activity here, more people are employed from the outer areas than from this area. This land is cultivable but man has not reached till now. Because of the high altitude, there is no advantage in this soapstone mining.

DISADVANTAGES

There has been no loss due to this soapstone mine at Gadera. But there are chances of mishappenings in the future. If this mine is not closed there can be loss of animals, plants, land. As such, there is a continuous degradation of land as this soapstone mine is located at the upper part of the village. People want this mine to be stopped. There is a drain which flows from this mine which passes through village and if the soil of the soapstone mine flows through, this drain can cause many damages to this village as well as to other nereby villages. According to the people, if the Government has to carry out the mining activity in this area then they should arrange for people's stay at other place and then they can take away even the soil of this area.



ANNEXURE-I
TABLE OF STATUTORY TIME LIMIT PRESCRIBED IN THE MINERAL CONCESSION RULES, 1960

Sl. No.	Rule No.	Item	Party concerned	Time limit
1	2	3	4	5
1.	-	For reporting discovery of Atomic minerals to the (State) Director of Geology and the Department of Atomic Energy	Licensee/Lessee	0 days from the date of discovery
2.	-	Submission of Consolidated annual return of all licences/leases	State Govt.	By 30th June of subsequent year
3.	10	To acknowledge receipt of applications for grant or renewal of prospecting licence	State Govt.	(i) Forthwith when delivered in person or by Regd. post (ii) 3 days in other cases
4.	11 (1)	To dispose of application for grant or renewal of prospecting licence	State Govt.	12 months
5.	11 (2)	To dispose of application for renewal of licence (which must be submitted at least 90 days before expiry of licence)	State Govt.	Before the date of expiry of licence
6.	14 (1) (ii)	To plug all bores and fill up or fence excavation in the area under licence	Licensee	Within 6 months of determination of licence, or abandonment of work
7.	14 (1) (v)	To report to State Government the discovery of any mineral not specified in licence	Licensee	Within 60 days discovery
8.	15 (1)	To execute licence deed	Licensee	Within 90 days of communication of order for grant of licence
9.	16	To report progress of prospecting work, and submission of full report on expiry or termination of licence	Licensee	Within 3 months of expiry of licence and every 3 months otherwise
10.	23	To acknowledge receipt of application for grant or renewal of mining lease	State Govt.	(i) Forthwith when delivered in person or by Regd. post (ii) 3 days in other cases
11.	24 (1)	To dispose of application for grant of lease	State Govt.	12 months
12.	24 (2)	To dispose of application for renewal of lease	State Govt.	6 months
13.	24 (5)	To apply for P.L. or M.L. for another mineral found in his lease hold area and notified to him	Leasee	Within 6 months of being notified by registered post
14.	27 (1) (f)	To commence mining operations	Leasee	One year from receipt of execution of lease

1	2	3	4	5
15.	27 (5)	To pay royalty or remedy the breach of terms and conditions	Leasee	60 days from receipt of notice.
16.	28 (1)	To apply for renewal of lease	Leasee	12 months before the date of expiry of lease
17.	29	To give notice to the State Government of determination of lease	Leasee	12 months
18.	31	To execute lease deed	Leasee	6 months from the order to grant lease
19.	37(1-A)	To dispose of application for transfer of lease	State Govt.	12 months from the date of receipt of application
20.	45 (iv)	To pay royalty or remedy the breach of terms and conditions	Leasee	60 days from date of receipt of notice.
21.	48	To inform State Government of the transfer or assignment of a licence or lease	Transferee/Assignee	Within 1 month of transfer/assignment
22.	54	Submission of Revision application to Central Government	Aggrieved Party	3 months of communication of the order being challenged
23.	55 (1)	To submit comment on Revision application	State Govt. and impleaded parties	One month of issue of further communication calling for comments
24.	55 (2)	To submit further comments in reply	- do -	One month of issue of further commun. calling for comments
25.	56	To correct errors and omissions in any order	State Govt.	2 years from date of order
26.	57	To send copies of every licence/lease granted or renewal to the Indian Bureau of Mines and Chief Inspector of Mines	Leasee	Within 2 months of grant/renewal