



NEED AND PROSPECT OF R&R IN JHARIA COALFIELD

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Abstract:

Unscientific and irregular development, extraction and abandonment of mine workings throughout Jharia Coalfield (JCF) since last 110 years, has led to mine fire and subsidence problem in this region. On the other hand, as the natural outcome of industrial growth, the township of Jharia started coming up with concentrated growth of dwellings. Impact of mine fire and subsidence has led to grave socioeconomic problems for the people residing and/or working here. Subsidence movement and mine fires have also reduced the chances of economic exploitation of the available virgin coal deposits in JCF. Therefore, for sustainable development of the coal mining industry in JCF, there is an urgent need of an appropriate and elaborate rehabilitation and resettlement (R&R) policy. In this paper, the present social and economic scenario of the coalfield under the threat of mine fire and subsidence has been studied. With the view of urgent need of an appropriate R&R plan, the prospects of displacement of the affected people in JCF have been analyzed. And ultimately, to realize the physical, psychological and humanitarian needs of the people residing here. Formulation of an appropriate R&R strategy has been attempted and a desirable approach of R&R program has been suggested.

Keywords: mine fire and subsidence, socioeconomic problems, sustainable development, displacement, rehabilitation and resettlement.

1.0 INTRODUCTION

Located between 23°39' N to 23°48' N latitude and 86°11' E to 86 ° 27' E longitudes on the north of the Damodar River in Dhanbad district in Jharkhand, the sickle shaped Jharia Coalfield (JCF) with an area of about 450 sq.km. is the only source of prime coking coal in India, and obviously it has very substantial implications for Jharkhand.

This coalfield belongs to Gondwana group of Permian age. It has a coal reserve of about 19,000 million tonnes, of which around 5,000 million tonnes of coal is of prime coking quality and the rest is of non-coking variety. Nearly 58% of this reserve is proved. JCF has one of the world's densest concentrations of thick coal seams at relatively shallow depth with 40 seams of 0.5 to 20 m thickness, out of which 18 seams, including the split ones, are workable. In spite of its favourable physical characteristics, long history of unscientific mining and rapid growth of human settlements has led to a situation where ecological balance has been disturbed in this region.

2.0 THE MINING

Though coal mining started in India about two centuries ago, commercial mining began in JCF in 1894 (Saxena, 1991). Mining picked up here at a fast pace due to availability of high quality coal at shallow depths and in thick seams. It played a significant role during the two World Wars by supplying an essential input to power and steel plants, and it continues to do so even today despite the sharp decline in its productivity and drastic deterioration of its environment in recent times, especially since late 1980s.

Since the beginning, mining in JCF was predominantly underground in spite of the shallow depth of coal seams. The mines were private, and mostly belonging to unorganised sector. Subsurface mines with depth of cover of 30 m or even less were common here. Mining was primarily labour intensive, and disregard towards safety and conservation was usual phenomenon. The concept of extensive surface mining was considered since late 1970s, but could never be truly adopted because of several techno-economic and social hindrances.

Nationalization of the coal industry in India started with the taking over of the collieries in JCF by the Government of India and subsequent formation of Bharat Coking Coal Ltd. (BCCL) in 1972 with all the collieries here, barring the captive ones of Indian Iron & Steel Co. Ltd. (IISCO) and Tata Iron & Steel Co. Ltd. (TISCO). After the formation of Coal India Ltd. (CIL) in 1974, BCCL became one of its subsidiaries. Now, BCCL, IISCO & TISCO are the only operating companies in JCF running about 100 mines, BCCL having the lion's share with a leasehold area of 270 sq. km. The exact number of running mines in JCF has varied in recent years mainly because of the re-delineation of BCCL mines from time to time.

In the initial period of the post-nationalisation era, with the introduction of mechanisation and trials of new technologies, the production from JCF attained new heights, but the productivity did not improve, nor was there any marked improvement in the standards of safety and law abidingness, mainly in underground mines. Consequently, the trend of production changed since late 1980s. In 1991-1992, India produced 46 million tonnes of coking coal, but in 2000-2001, the production dropped to 31 million tonnes. Due to this descending trend, these days a sizeable amount of foreign reserve is being regularly spent from the national coffer for importing coking coal to meet the increasing demand of steel plants. If the present-day techno-economic and socio-environmental situation continues to prevail, the production of coking coal is likely to plunge further in the years to come.

3.0 THE PEOPLE

As JCF came into prominence as a hub of coal mining activities, the township of Jharia started coming up around 1898 (CMRI, 1997). Concentrated growth of dwellings in this town and its suburbs were the natural outcome of industrial growth. The royal family of Jharia, who was the owner of this area at that period, legally inhabited the surface area of this coalfield over the years. Later, the zamindars, and after the abolition of zamindari system, the State was the owner of this area, and colonization on the land above coal bearing areas continued.

Mining companies having surface rights over their leasehold areas built office buildings, workshops, magazines, dispensaries and even residential quarters in the mine premises above coal bearing areas. This trend continued for some time after nationalisation as well.

The inhabitation on mineable land was promoted because of the lack of foresight on the rapid expansion of this industry, and its subsequent adverse effects on environment and in turn on the upcoming settlements and their people. Development and growth of this area as well as that of the whole Dhanbad district took place solely based on the coal mining in JCF.

While mining directly employs about 100,000 people, who comprise around 10% of the total population of the coalfield (Saxena, 2003), more than 85% of the working population of the whole of Dhanbad district depends on mining and related activities (Pan, 2003). JCF is one of the most densely populated areas in the world with more or less 2000 people living in each square kilometers (Saxena, 2004; Ravi, 2003).

JCF has a mixed population composed mainly of settlers who have migrated here from almost all states of India for their profession leading to a steady upsurge in the concentration of settlements. Whilst in 1925, dwelling land was only 9% of this mining belt; it was in excess of 30% in late 1980s or early 1990s (Saxena, 2003,ii; CMRI, 1997). Simultaneously, the share of agricultural land has come down from 70% in the early years to merely 40% in recent years (Saxena, 2003,i).

There are more than 100 urban and rural, organised and unorganised, legal as well as illegal settlements in this coalfield (Saxena, 2003,i). These settlements have been coming up unabated in spite of the Coal Bearing Area (Acquisition & Development) Act, 1957 and Mineral Area Development Authority (MADA) Regulations coming into being to restrict growth of structures over the mining land (Saxena, 2003, ii). Many of these constructions are unplanned and some have been built on mined out or active mining areas, which are either already affected or may be affected in immediate future, by fire and/or subsidence.

People from all economic cross-sections are available in JCF; and obviously, their abodes range widely in standards, from hutments to palaces. Based on the types of land ownership, these dwellings may be broadly classified as:

- (i) company quarters, colonies and office complexes;
- (ii) private buildings on legally acquired land;
- (iii) private structures on illegitimately occupied lands on the mining/mined out areas where the surface rights are with the mining companies; and
- (iv) illegal private constructions on the protected lands along roads, railway lines or streams.

Despite its rich mineral resources, the overall quality of life in JCF is far from satisfactory. It is perhaps one of the coalfields with the dirtiest environments in the world. Accident records of JCF over the years identify it as the most accident-prone coalfield in the country. Yet, this coalfield fetches large revenue for the state. The earning of Indian Railways from Dhanbad railway station is only second to that from Mumbai in the country. However, till the formation of the state of Jharkhand by splitting Bihar on 15 November 2000, neither the State Government nor the Central Government paid right attention to develop the basic infrastructural facilities like road, electricity, health care, education,

communication etc. in JCF for a considerable period. BCCL also failed miserably to rise to the expectation. This subsidiary has always been a financial liability to CIL by making huge losses year after year.

4.0 THE TECHNICAL CULTURE

As already mentioned, at the initial stage, mining in JCF was predominantly underground and labour intensive. The seams are gassy. Only about 20-25% of its reserve has been extracted or consumed by fire since inception of mining. The remaining 75% of coal is still available, but proper exploitation of coal reserves is being hindered in the coalfield due to the presence of:

- (i) large number of settlements and surface water bodies;
- (ii) large network of roads and railway lines on the surface;
- (iii) many mine fires in this coalfield; and
- (iv) water logged mine workings.

From the early days, mining has been carried out here with disregard towards safety, health and environment, either out of ignorance, carelessness, or greed. According to the Environmental Management Plan (EMP) of the coalfield prepared by Norwest Mine Services Ltd. in 1997, the entire coalfield has been disturbed by human activities for a long period of over 100 years. Most of the core and buffer zones of the coalfield suffer from excessive soil erosion as initial forest cover over them has been denuded due to mining activities. Air quality is very low due to coal dust and gases coming out from the cracks formed on the surface. Reclamation of degraded land due to mining and other human activities are ignored.

The coalfield has a large number of water bodies, i.e., rivers, jores, nallahs, ponds and lakes. They are seasonal and shallow, and often dry up in summer, resulting in water scarcity at places. However, in rainy season, they carry much water and in case of excess downpour, they sometimes get flooded. Moreover, there are many abandoned underground waterlogged mine workings, whether developed or worked out, which form subsurface water bodies. More often than none, the exact boundaries of these workings are, not available in mine plans due to either incorrect representation or inaccurate survey.

An area of about 35 sq. km. has subsided in JCF due to mining activities damaging the natural surface drainage pattern in and around the coalfield. More than 100 km of the first and second order streams have been lost and aquifers upto a depth of about 120-140 m have been affected. While rainfall has gone up here in the recent years, groundwater yield has reduced considerably over the years, especially during the summer months.

As already mentioned, JCF is the most disaster-prone mining belt in India. Majority of the disasters are caused by fire, explosion and inundation. In the last ninety years, 743 people have been killed in 19 mine inundation disasters in the country, of which 542 people (74%) have died in JCF alone from seven accidents. Chasnalla inundation was the biggest one where 375 persons died on 27 December 1975.

Because of unscientific and irregular development, extraction and abandonment of mine workings throughout JCF, it is facing the brunt of mine fire and subsidence. It has more than 70 mine fires spread over an area of about 17 sq. km (Saxena, 2003,i). These fires are not only polluting the atmosphere but are also not permitting proper mining of coal seams underneath and in their vicinity. According to a BCCL estimate made in 1991, the mine fires have affected half of their collieries and have already consumed about 40 million tonne of coal (Saxena, 2003,ii). These mine fire advances at the rate of 1 to 15 m per year (Singh, 1997). It is estimated that the rate of loss due to fire is 3 million tons/year. In addition, these fires have made about 1864 million tonnes of coking coal, worth about Rs.1864 billion, inaccessible and un-mineable (CMRI, 2002).

The amounts of coal locked up below townships, railway tracks and roads have been estimated to be around 550 million tonnes, 1160 million tonnes and about 500 million tonnes respectively (Vijh, 2003). It has been opined by some scholars that the left over reserves of coal should be declared as National Resources and appropriate measures should be adopted to extract these reserves (Saxena, 2003,i). A plan had been put forward by BCCL to work JCF by extensive opencast mining upto a depth of 300 m (Pan, 2003).

5.0 THE SOCIAL SCENARIO

Social and environmental status of an area highlights its quality of life (QOL). Mining in the last 110 years has made major changes in the overall social and environmental scenario in the coalfield. Today, the environmental status in JCF is far below the desired level and the overall QOL is *poor*.

In a study conducted by CMRI, the QOL of the Damodar River basin was evaluated based on income, food, clothing, housing, health, sanitation, education, and pollution level (CMRI & NEERI, 2001). Dhanbad district, in which Jharia lies, is a part of Damodar basin. It was assigned the value 0.4 to 0.6 on QOL index scale, indicating poor quality of life. There is no proper solid waste management system in the region for treating solid waste from mines and other mining related industries. Proper sanitation facilities are not provided to majority of the people in the coalfield. According to 1981 Census, Dhanbad has 100% of drinking water facilities. Present demographic profile of this district, as compiled from 2001 Census, is as follows:

Table 1. Demographic composition of Dhanbad district, 2001

Demographic Parameters		India	Dhanbad
Population	Total	1,027,015.247	2,394,434
	Male	531,277,078	1,277,516
	Female	495,738,169 -	1,116,918
Sex Ratio (No. of female/1000 male)		933	874
Literacy Rate (%)	Total	65.37	67.49
	Male	75.85	80.03
	Female	54.16	52.93
Child Population (0-6 age group)	Total	157,845,618	368,048
	Male	81,890,471 (51.88%)	188,486
	Female	75,955.147 (48.12%)	179,562
Decadal Growth Rate (1991-2001)		21.34	22.82
Density		324	1,167

Source: Census, 2001

The population of Dhanbad district decreased from 2,674,651 in 1991 to 2,394,434 in 2001. This is because of the formation of the district of Bokaro by splitting of Dhanbad. The decadal growth rate of population in this district increased slightly from 22.7% during 1981-91 to 22.82% in 1991-2001.

The population density of Dhanbad district has increased from 893 persons/sq. km. in 1991 to 1,167 persons/sq. km. in 2001. The sex ratio, i.e. number of females per thousand males is a vital indicator to assess the socio-economic environment. In Dhanbad, the sex ratio has increased from 826 in 1991 to 874 in 2001 compared to the increase in the national level from 927 in 1991 to 933 in 2001. The total child population in the age group 0-6 in 2001 is 3,68,048, out of this, 1,88,486 are males and 1,79,562 are females (Census of India, 1991 & 2001). This implies that among children aged 6 years or less, the sex ratio is 927 females per 1000 males.

Literacy rate in Dhanbad increased from 55.5% in 1991 to 67.49% in 2001, as compared to the rise in overall literacy rate at national level from 52.2% in 1991 to 65.37% in 2001. Among 1,367,678 literate persons in Dhanbad, 8,71,572 persons are males and only 4,96,106 persons are females. Among males, the literacy rate is 80.03% compared to 75.85% at the national level. On the other hand, only 52.93% of females are literate compared to the all-India average of 54.16%. Both male and female literacy rate has increased from 69.5% and 37.9% in 1991 to 80.03% and 52.93% in 2001, respectively (Census of India, 1991 & 2001). There are a number of schools and colleges in Dhanbad. For higher education, there is a medical college and two engineering colleges in the district. Apart from these, there are two national laboratories, namely, Central Mining Research Institute (CMRI) and Central Fuel Research Institute (CFRI) in Dhanbad. Despite the general improvement in literacy rate during the last decade, female literacy is a major area of concern in the district.

Mine fire, subsidence and accidents in the mines of JCF that have occurred in consequence of unscientific and unsystematic mining and rampant growth of dwelling in coal bearing areas, are also very much responsible for poor QOL of people here. There are *basties*; hutments and colonies in fire areas, sometimes located right above them. Noxious gases coming out from the fissures in the fire-affected areas make life miserable for the local inhabitants by its suffocating odour. Even during the rainy season, these fires continue burning. Fires have led to a rise in the air temperature in JCF. At certain inhabited sites over fire areas, oxygen content of the air is as low as 17-18%.

Another major problem in this coalfield is surface subsidence above old/abandoned mined out or fire areas. Some incidents of subsidence have taken place in the occupied areas destroying or inflicting severe damages to many buildings, roads, railway tracks and other structures making them too unsafe to use, thereby leading to grave socioeconomic problems for the people residing or working there. Some of the very recent instances are-

1. Dhanbad-Jharia main road subsided in 2001.
2. In July 2002, two important passenger trains on Dhanbad-Sindri-Patherdih section had to be withdrawn because the tracks caved in.
3. About 5.18 hectare of land in the locality of Kendua Bazar above the old underground workings of Kenduadih colliery of BCCL underwent a major subsidence in February 2003, damaging a number of houses, market, temple and other establishments.

Possibility of occurrence of many such incidents cannot be overruled in the near future in JCF. Some portions of Jharia town is said to be facing threat from subsidence. Raja Shiva Prasad College, the oldest college in the area is facing the risk of collapse as it is lying over burning coal in the underground. The townships of Kustore, Lodna, Bastacolla, Pootki, Kusunda, Sijua, Katras, Govindpur, Mahuda, wholly or partially, and many other rural settlements in this coalfield are endangered by fire or surface instability.

In 1997, CMRI conducted studies in 12 areas in JCF, namely, Kustore, Lodna, Bastacolla, Eastern Jharia, Pootki, Kusunda, Sijua, Katras, Katras Project Area, Chanch Victoria Area, Govindpur and Mahuda Area, to evaluate the stability status of dwellings. The stability of dwellings in JCF, ranging from huts to pucca houses, had been categorised

in four groups, based on status of different seams, position of fire and goaf and visible signs of instability. **Category I** denotes stable ground, **Category II** is *partly unstable* ground, that in **Category III** is *unstable*, and **Category IV** denotes *critically unstable* ground for dwelling. According to this study, the dwellings in the critically unstable areas of Category IV need immediate evacuation. Number of settlements under different categories, their respective areas, number of dwellings and estimated population involved are given in the table below:

Table 2 Stability status of dwellings in JCF

Category	No. of Settlements	No. of Dwellings	Area in sq. km.	Estimated Population
I	217 (52.8%)	50,185 (52.8%)	14,409.16 (43.21%)	200,740 (52.8%)
II	57 (13.9%)	21,098 (22.2%)	11,547.86 (34.63%)	84,392 (22.2%)
III	52 (12.6%)	10,057 (10.6%)	1,880.22 (05.64%)	40,228 (10.6%)
IV	85 (20.7%)	13,720 (14A%)	5,510.31 (16.52%)	54,880 (14.4%) 1
TOTAL	411 (100%)	95,060 (100%)	33,347.55 (100%)	380,240 (100%)

Source: CMRI, 1997

At the time of the study, nearly 52.8% of all the settlements in coal bearing regions, which covers around 43.2% of the total area of settlements in the coal bearing area of JCF, belonged to Category IV. On these lands, life and property of the inhabitants are in constant danger and are in need of immediate rehabilitation,

The dwellings under Category III would become unstable in course of time unless immediate adequate actions, if possible, are taken for ground stabilisation and control of fire. Eviction of these dwellings should be of second priority. Dwellings under Category II & I are stable but may face similar problems in future if adequate preventive measures are not taken timely.

In this study, population was conservatively estimated presuming only four persons living in each dwelling. The actual figure of population may be higher. After this study was conducted so many years have passed by, it may be assumed that in the meantime a few more settlements have attained the critical stage of instability. This has led to a situation where eviction of the inhabitants of these unstable areas has become urgent.

In fact, for efficient, deft and economic exploitation of the coal deposits of JCF, including those that are at this time irrecoverably locked up due to fire, waterlogging, subsidence, overlying built-up areas, or some other reason, if is essential to shift and rehabilitate all the people settled in coal bearing lands over the coal bearing areas. This is the only key for survival of the coal industry here. The places from where people are to be moved comprise many rural as well as urban settlements including Jharia town. Moreover, for an all-round sustainable development of the coal mining industry in JCF, there is an urgent need of an appropriate and elaborate rehabilitation and resettlement (R&R) policy. Otherwise, this industry has to die fast and soon, resulting in loss of millions of tonne of high-grade coal, livelihood and property of thousands of people in due course of time.

6.0 R&R - THE PRESENT STATUS

Displacement of native people by industries has become a common phenomenon more or less in every part of the globe since the Industrial Revolution in Europe, followed by the two World Wars. Earlier there was no definite principle or policy. The industrialists used to settle the score with the displaced or project affected persons (PAPs) by any means, the most common mean of settlement being the offer of money and/or service to the members of the affected families. In many socialist countries, where the government had the control of the industries and business. the privileges of the affected people were sometimes even overlooked.

Until early 1990s, the main rehabilitation approach of CIL, the leading coal mining company in the country, was to provide jobs to the members of the affected families. It was in tune with the then strategy of labour-intensive growth of the World Bank. From 1973 to 1993, 33,470 jobs were provided to the PAPs.

A draft national R&R policy was prepared in 1993 but it was never finalised. In April 1994, CIL approved a new corporate R&R policy. The policy is based on the formal World Bank principles of regaining the former status and/or improving the standard of living of the PAPs. It gives stress on employment opportunities, access to health care and education, provision of facilities like roads, power, water and electricity, and offers land, self-employment assistance, cash payments or jobs to different categories of affected people (World Bank, 1996).

The issue has drawn national attention since mid-1980s. On 19 August 1992, a discussion was held in Lok Sabha on fire and subsidence problems in Jharia and Raniganj coalfields: The prospect and viability of displacement of the people from the risk zones were also questioned. The then Minister of State of the Union Ministry of Coal, Mr. P. A. Sangma, informed that fire in the coalfields is now a matter of national concern and would be treated as a national disaster.

On 13 December 1996, the issue of fire and subsidence in JCF was once again raised in Lok Sabha. A report of the Standing Committee on Energy was presented, which stated that the coal companies have to take appropriate remedial and preventive measures in the areas that fall under their leasehold, irrespective of the fact that subsidence occurred due to pre-nationalization mining activities. The committee suggested that the coal companies should use the fund available under Coal Mines Safety & Conservation Act for this purpose.

Former Honourable President Dr. A. P. J. Abdul Kalam had showed concern when he visited Jharia in 2001 and asked the State Government to submit a proposal to safeguard Jharia (Bhattacharya, 2003). In October 2002, the then Minister of Coal, Ms. Uma Bharati, assured to send a committee of experts to find out ways to save JCF. A high-level committee on subsidence and fire, headed by the Secretary (Coal), cautioned in 2002, that there is a need for immediate resettlement of people from the most endangered areas of Jharia and Raniganj coalfields, failing which there may be a major *human disaster*.

In its attempt to minimize the loss faced due to mine fire and subsidence in JCF due to its mining activities, BCCL has undertaken a few projects on environmental and subsidence control measures. In the Xth Five Year Plan, there is a provision of Rs. 1.63 billion under Environmental Measures and Subsidence Control head to shift people from the most endangered areas of BCCL before March 2006. Following the recommendation of a high-level committee, BCCL undertook the shifting of 4600 houses from its most endangered areas with the total budget of Rs. 6.109 billion. With Rs. 1.342 billion disbursed till February 2004, expenditure was only Rs. 67.012 million. Out of a target of 1500 houses to be constructed for BCCL employees by March 2006, only 344 houses have been built till February 2004.

BCCL has undertaken projects costing Rs. 398.8 million to protect the railway tracks, roads and water bodies that are facing the brunt of mine fire and subsidence over their mines. Till February 2004, Rs. 211.052 million have been disbursed, but only Rs. 139.863 million have been spent on the proposed work, only 58% of sand stowing and 20.35% of earth filling and earth cutting have been completed so far, while surface blanketing for the control of mine fire has almost achieved the target. The delay in implementation of these projects ultimately led to the closure of Dhanbad-Patherdih railway line.

For reclamation of degraded land in JCF, projects of Rs. 13.387 million have been undertaken by BCCL. Of Rs. 11.737 million disbursed so far, Rs. 10.45 million only have actually been spent February 2004. It is obvious that the measures taken till date for the protection, displacement and R&R of people and reclamation of lands above mine workings of BCCL in JCF is unsatisfactory- and the issue needs immediate attention and sincere action.

Government of Bihar had constituted a sub-authority for construction of 3,100 houses for non-BCCL persons to be displaced. After the formation of the state of Jharkhand, a committee was formed to look into the matter but it has made little progress so far due to the lack of a proper R&R plan.

Since early 1980s, many mining experts have put forward diverse suggestions and ideas for techno-economic sustenance of the mining industry in JCF at different times in various technical forums, the last one being the national seminar on Reinventing Jharia Coalfield, held at Dhanbad in August 2003. Although these thoughts differed from one another with time in tune with the technological advancements, broadly every view, irrespective of its advocate, focused on the need of adoption of extensive large-scale surface mining as the prime method of exploitation of coal here, supplemented by underground mining of deep lying coal seams by selected methods ensuring high productivity and conservation.

All these approaches imply the requirement of total displacement of people from the bearing locales of JCF to allow large-scale, systematic operation without any hindrance. This lack of hindrance will not only lead to economic and productive mining, but also clean mining with much better retrieval of post-mining land compared to today's standard.

In his inaugural address at the 19th World Mining Congress in New Delhi on 1 November, 2003 Honorable President, Dr. A. P. J. Abdul Kalam reiterated his concern regarding the spreading fire in JCF and the resulting subsidence of densely populated coal bearing area. He asked the mining experts to find **a technological, cost-effective, safe and minimum disturbance solution** to this problem. Early this year, Ms. Mamata Banerjee, the then Minister of Coal & Mines, has promised an aid of Rs. 40 billion to BCCL to invigorate the mining industry in JCF.

It is evident that if this industry is not revitalized today, it cannot survive long suffering from huge loss that is consistently increasing year after year.

7.0 PEOPLE'S RESPONSE

By nature, no one would like to shift from one's own abode voluntarily until and unless one is assured of sizeable gain at the new location in terms of one's quality of life. It is not easy to motivate any individual to change his/her residence, and it is more difficult if he/she is self-employed or freelancer or entrepreneur and already established professionally at that site. That is why the success of implementation of any R&R policy exclusively depends on its acceptability to the people to be displaced. The records of accomplishment of earlier R&R projects matter a lot in building up of opinion of the people to be rehabilitated.

Unfortunately, in the past, R&R programs did not pay heed to these aspects. Consequently, the experience of the PAPs in the most of the earlier R&R projects is far from satisfactory. A government committee in 1985 found that less than 35% of all the people displaced by coal mining industries in India had ever been properly rehabilitated (World Bank, 1996). Lack of apt rehabilitation is a persistent problem in World Bank projects in India. Some of the important R&R policies in India, like the ones for Sardar Sarovar Project and Tehri Dam, did not work out effectively.

Apparently, these programs could not be worked out with much success due to the stiff resistance from the PAPs and political interventions, but these programmes failed to be unbiased and just. Most of the amenities promised to be provided to the PAPs under these R&R schemes never reached these people. This has led to movements and protests against such packages. People, in general, have lost faith on the promises made in any R&R proposal, and the feelings of the people in JCF are no different. Clearly, they are not ready to suffer from occupational degeneration, social disorientation, cultural shocks and/or loss in their dignity or to be cheated of their compensation money and lands.

The question of displacement and then rehabilitation and resettlement of the population from the coal bearing areas has been raised a number of times in the past. Awareness has aroused among the inhabitants of Jharia town to save the township. *Institute of National Amity of Jharia*, a non-government organisation is fighting against the rehabilitation of Jharia town. The populaces of JCF have formed associations like *Jharia Coalfield Bachao Samiti* and *Jharia Coalfield Bachao Abhiyaan Samiti* as well to voice their feelings in this regard.

However, JCF and its surrounding areas have a politically sensitive society that has raised concern and resisted the very concept of R&R, as it would affect over one-lakh dwellings with about four lakh residents. Out of this, at least 20% are unauthorised but also an indissoluble part of the life of JCF. However, mining experts feel that if the right measures are not taken in time, very soon Jharia may cease to exist as a significant coal town in the map of India and would become a subterranean entity within a decade.

8.0 REHABILITATION AND RESETTLEMENT PROSPECT

Unquestionably, if the coal mining industry in JCF has to live its full life with the best use of its riches, rehabilitation and resettlement of the people currently living in the coal bearing zones are inevitable. Or else, this industry, along with the society in and around it, will perish prematurely with a colossal loss of natural wealth that, in all probability, may be too dear for the economy of India in long run. This has become evident to the PAPs as well. It is clear that for the sustainable growth of the coal mining industry in JCF, as well as, of the people living in it, the evacuation of a number of well-established settlements in this coalfield is an absolute necessity of the day.

In spite of this understanding by the people at all levels, right initiative in this direction is utterly lacking from all angles, i.e., the Government at the State or in the Centre, the coal industry, the PAPs, or political leaders/social workers/NGOs. In fact, neither has anybody really studied the problem in depth, nor has anyone ever seriously worked out its dimensions in totality. Occasionally, some experts, researchers and academicians from the fields of mining and environment have talked about this issue in isolation in different technical forums (Saxena, 2003; Thapar, 2003; Singh, 2003; Samanta & Samaddar, 2003; Raju & Ghosh, 2003; Erady & Prasad, 2004; Arya & Ghosh, 2004; Ghosh et al, 2004). Integrated technical programmes for better mining in JCF have been put forward by the coal industry from time to time (Pan, 2003; Jawed, 2000; Sen et al. 2003); but these proposals did not duly address the socioeconomic dimension of the issue, without which the execution of these programmes is not viable at all.

At present there are three alternatives for JCF:

Choice 1: *Evaluate* the people from the affected areas in JCF, resettle them and mine out the coal resources extensively and economically in well planned scientific ways with an effective post-mining land use planning of the area. Until today, it appears to be a practicable proposition from technical, fiscal, social and environmental standpoints. Tomorrow may be too late.

Choice 2: Let the current situation prevail. JCF coal mining industry will suffocate and slowly die out, bringing about the gradual collapse of the societies in and around it which had developed and exists because of this mining industry. The collapse of the economy will not only be restricted to the affected zone but will also affect the surrounding area. Besides, there will be colossal waste of coal and land that may be proved too costly in future.

At this juncture, one should bear in mind that those who are living in the affected areas will have to evacuate their habitats of their own in days to come, as the ground condition will gradually deteriorate, either because of the spread of fire or due to the slow but sure loss of stability in the existing subsurface openings. However, such delayed self-resettlement of people will beget no socio-economic development whether locally, regionally or nationally. On the contrary, at that point of time they will rather be a burden to the society where they will take refuge.

Choice 3: Stabilise the endangered populated areas. This choice is technically doubtful and economically unjustifiable as it does not offer any sustainability to the mining industry and thus to the society in JCF. Hence, this choice is not really worthy of consideration though the politicians and social workers often draw attention to this option to lure the PAPs.

From the practical point of view, the third alternative may be called off. Therefore, JCF is left with two options, either to grow sustainably, or to perish fast. There is not much time left to think if we select the first choice, which definitely is the most lucrative and productive for the interest of this coalfield, the region, the state and the nation as well.

This is the time to work out an approach to devise a practicable R&R strategy for JCF, which will be publicly acceptable, technically feasible, economically viable and environmentally compatible. Such an R&R policy would be possible, if and only if it is formulated taking all the stakeholders i.e. the PAPs, the mining companies, the local administration, the concerned departments of the Governments at the State and in Centre, in confidence. Support of wisdom, expertise and technical services of the competent institutions and individuals in the relevant professional, R&D and academic fields should also be taken.

While devising an R&R policy for JCF, the following aspects should be kept in mind:

- ❖ R&R strategies designed so far have rarely led to improvements in the livelihood of the PAPs as the approach of those strategies was of a welfare operation rather than being a part of the entire development plan. This outlook needs a drastic change.
- ❖ The R&R programme for JCF should not be taken up in isolation. It must be treated as an integral and indispensable part of the reconstruction of this coalfield to revive the industry to a self-sustaining one.
- ❖ The economics of the R&R programme must be critically planned in minute details, and it should be taken into account in all stages of the fiscal evaluation of the reconstruction of JCF, from the stage of assessment of its economic viability, through budgeting to finally the profit-loss accounting during execution. While the socio-economists will plan the R&R strategy along with the estimate of the expected expenditure on this account, mine planners and designers must provide the likely return from the large-scale, well-planned mining that would be possible due to this R&R.
- ❖ The problem must be taken up in totality, and not part by part. The solution should be planned in one go and executed continuously as a single job though it would certainly involve a large volume of work. Priority of different sub-tasks and the sequence of their execution should be logically decided at the planning stage, and accordingly a work flow-chart should be prepared which must be rigidly followed.
- ❖ The PAPs should actively participate in the R&R process right from planning to execution. They should be taken into confidence while preparing the R&R plan and their justified views and demands should be incorporated in it. A positive and co-operative approach from them is essential. Their cooperation will make the whole process a developmental activity, and not a welfare service.
- ❖ The R&R plan must be transparent to the PAPs and they should be well informed about every phase and status of its realisation. Communication gaps may mislead the PAPs and give rise to rumours and misinformation. The intermediaries may use such opportunities in a biased way in their own privilege making the situation complex.

- ❖ The estimation of PAPs must be done very carefully and rather on humanitarian ground than on the legal basis. During this calculation, the illegal unauthorised or otherwise unaccounted residents, who reside in the affected zones, must also be considered. In JCF, they are expected to be too large in number to be ignored.

Numerous business establishments, ranging from small tea stalls to branches/agencies of reputed and well-established public and private sector companies and MNCs, operate in JCF, and many of them are in the affected areas. A few of these units may be licensed and registered, but the majority of the smaller units, which are pretty large in number and typically belong to unorganised private entrepreneurs, may not be on any official role. It is astonishing but true that even the smallest individual entrepreneurship of a *pheriwalla*, or a tailor, or a cobbler, or a piece-rated or daily wage-based contract worker, or a porter who sells his labour, directly supports a family of 5 people on average, who may or may not reside in the affected areas in JCF. Assessment of the size of PAPs should take into account such unauthorised entrepreneurship, however tiny they are.

Similarly, agriculture, poultry, dairy and cattle farming, brick manufacturing and such other industries which run on illegally occupied lands in the affected zones, should also be acknowledged during the accounting of PAPs.

In the past cases of R&R, the policies were restricted only to the legal occupants. The illegal occupants, who were either local people or permanent migrants, were ignored. Many of the illegal occupants might be living for generations together, and each of them play a definite role in the society of the affected locales. In case of evacuation, they are the worst sufferers.

With no alternative livelihood being available to them, these illegal occupants voice their demand for social justice and easily earn public sympathy. Commonly, the concerned authorities i.e. at first the local administration, and then the relevant departments of the Governments at State or in Centre, initially disregard their demands based on statutory justifications until these people unite and start movements.

Often, political leaders, social workers, and/or NGOs grab the opportunity to lead such movements. In such occasions, the issue readily finds the media attention, but often gets prolonged and blown out of proportion, and the people, actually affected, may get little at the end. Meanwhile, the implementation of the R&R policy that was originally adopted is hindered and may even be ultimately dropped, proving the whole effort to be a failure.

Therefore, R&R policy for JCF should be rational and smart enough to accommodate such illegal PAPs in the programme.

- ❖ The area to be chosen for the resettlement of a given volume of PAPs must have enough carrying capacity to accommodate not only the society to be shifted, but also the forthcoming growth in its population and the subsequent socioeconomic development that are supposed to take place there in course of time.
- ❖ The psychological dimension of an R&R cannot be denied. It is desirable to shift a complete habitation from an affected area to a single site. It would psychologically help the PAPs to accept the transformations rather easily with already known people around.

❖ Displacement leads to eviction of the entire society from a place comprising of people from different sections, occupations and culture. Rehabilitation should not merely mean monetary compensation or providing some means of living. It must be multidimensional including financial, occupational, educational, social, cultural, environmental and physical aspects. The programme should aim at the reduction of hardships of PAPs during the process of rehabilitation. To achieve this:

- PAPs should receive individually as well as collectively adequate compensation for all their losses including lands, trees and natural resources, houses, earnings, community properties/amenities/ services etc.
- In all probability, the provision to shift in built-up houses in a well-planned township with basic infrastructures and civic amenities will further motivate the PAPs to resettle from their old habitats.
- During resettlement, the PAPs should have suitable job opportunities in tune with their knowledge and skill, so that their income, and thus the quality of life (QOL) remain unaffected, if not enhanced. Unskilled and semi-skilled jobs need to be reserved for the PAPs. A thorough and advanced job planning would be necessary for absorption of displaced workers with provisions of technical education and training for self-employment, and this must be completed before the beginning of the actual eviction process.

❖ In accomplishment of an R&R scheme, the PAPs play the prime role. While a little co-operation from PAPs can make a scheme successful, their careless attitude may put it into deep trouble. The duty of every PAP is to –

- ✓ adopt a realistic, rational, philanthropic (sharing & caring), unselfish, optimistic, open and flexible approach, with no rigid bias, but with definite responsibility
- ✓ learn and understand the reality and gravity of the situation, and the need of R&R from authentic and knowledgeable sources only
- ✓ visualise the issue on long-term basis with an open, analytical mind, share and propagate the genuinely acquired knowledge and information among his/her neighbours and other PAPs
- ✓ play a decision-making role in the rational and realistic identification of the basic criteria of the R&R policy for his/her area, properly addressing the fiscal aspects and social, physical and emotional aspirations
- ✓ keep himself/herself and other PAPs in his/her area aware of the actual status of progress at each stage of the formulation and execution of the R&R policy for that area, and consequently keeping a watch on it
- ✓ co-operate with the planners and developers in every step from the generation of the base data on the affected area to shifting to the new abode
- ✓ select or elect sensible, truthful and trustworthy members to represent the PAPs in planning, execution and monitoring of R&R
- ✓ prepare himself/herself mentally, financially as well as materially, to withstand the difficulties that may be encountered at the transition period between shifting to the new site and complete resettlement
- ✓ analyze the prospect and alternatives of livelihood at the new site beforehand, and plan his/her living considering change in occupation if needed
- ✓ form co-operative societies to organise resettlement
- ✓ strictly thwart any spreading of gossips or rumours
- ✓ prevent intermediaries to take any uncalled-for advantage of the situation for the narrow interests of politics or such other issues, and
- ✓ inspire and instigate neighbors and other fellow PAPs to follow these steps.

❖ Regular monitoring is an essential activity in project implementation in order to ensure its timely execution and completion. The R&R project monitoring team of JCF should consist of the members/representatives from all sections of the stakeholders including PAPs, mining companies, local administration, and the concerned government departments. Monitoring should be conducted on actual scrutiny of records and field visits, and should not depend on the secondary sources of information.

❖ Political and social leaders, self-styled free-lance protectors of environment, and NGOs play an important role of communication medium and information storehouse for the affected people. They serve as intermediaries between the project and the PAPs, and have enough say in the decision-making process, as they represent these people. If they unite with a positive intention, they can contribute in a big way in successful R&R of JCF.

9.0 THE ECONOMIC ASPECT

As estimated by CMRI, approximately 735.697 million tonnes of coal is locked-up below the unstable arms of Kustore, Lodna, Bastacolla, Eastern Jharia, PootkiBalihari, Kusunda, Sijua, Katras, and Katras Project Area. As a result, the coal production in JCF has dropped. Consequently, to meet the demand, India imports about 4 to 5 million tonnes of coking coal per year costing around Rs. 7.5 billion. In contrast, due to spontaneous combustion about 37 million tonnes of coal has already been lost that costs about Rs. 10 billion (Lok Sabha, 1992). Therefore, to restrict further loss in terms of reserve of coal and money, it is essential to control fire in JCF, which is possible only after evacuation of its surface areas. The R&R of people from these areas seems worthwhile in terms of the value of coal.

According to mining experts, underground operation is no more a viable option for profitable and extensive coal mining in JCF. For techno-economically feasible solution, widespread adoption of surface mining is utmost essential in this coalfield. However, surface operation can be planned only if mass R&R of the people in the coalfield to a suitable location occurs. 8.55 billion tonnes of coal of various qualities are available in the coalfield that is worth about Rs. 8.55 trillion at the rate of Rs.1000 per tonne. As indicated in an estimate, the R&R of JCF will cost Rs. 300 to 500 billion approximately, which constitutes only 3.51% to 5.84% of the total cost of the coal reserve (Saxena, 2003).

Another school of thought believes that dousing the fire will be economically viable compared to R&R of the affected people and then mining. According to this estimate, the mineable coal reserve in JCF would worth about Rs. 300 billion, whereas the cost of R&R of the entire population of Jharia township would be about Rs. 180 billion and that of dousing the fire is about Rs. 80 billion (Thapar, 2003).

Nonetheless, while the first guesstimate seems to be too optimistic, the second one does not take into consideration all the areas and aspects involved, The economic prospect of the programme needs to be precisely worked out in terms of:

1. the realistic estimation of investments on R&R,
2. the return expected from productive, extensive, large-scale and scientific exploitation of coal reserve in JCF (which would not be possible without the R&R of its people), including mine closure with sustainable post-mining land use, making allowances for all the likely losses in the process,
3. the total cost/loss, including all externalities, that the society would have to bear in the long run, in case the R&R is not implemented, and
4. the revenue that will be generated to the government coffers through the systematic growth, socioeconomic and environmental developments in new localities.

So far, no agency or individual has done this exercise with enough seriousness. The figures published in this regard in technical literatures are educated guesses by different experts, scholars and researchers. With natural deterioration of ground condition and continuous loss of coal, the estimate is varying day by day, and it is perhaps not yet too late to make it viable.

10.0 R&RSTRATEGY` FOR JCF — THE BASIC POLICY

To realise the R&R of people presently settled in the mining or mineable areas of JCF, it is necessary to adopt practicable policies and practices with appropriate emphasis on the psychological and humanitarian aspects to make it acceptable to the PAPs. The R&R of JCF cannot be a simple process, as it would involve people from all classes, communities, creeds, social, economic and legal status. All of them need to be equally addressed in the policy.

The areas in JCF from where people are to be rehabilitated, can be broadly categorised into two groups:

1. those who are already in endangered areas where ground is gradually losing its stability because of existing mine workings, fire etc. in the coal seam/s below; and
2. those who are in coal bearing areas but in stable/virgin ground, but need to be shifted for productively mining the coal reserves below.

A schematic flowchart of the approach of the R&R programme for JCF is given in Fig. I,

While some secondary data on the areas coming within the first category and their inhabitants are available from the CMRI report (1997), the locales and population to be shifted under the second category may be initially estimated from the Census data and the mining plan for JCF reconstruction. These secondary data and information should then be verified, updated, and if necessary corrected, by field visits and study of relevant original official documents to prepare a primary working database.

Based on these pieces of information, all the localities identified for evacuation in JCF will be prioritised, followed by the generation of primary data on the QOL of PAPs in each site with emphasis on [a] demographic composition, [b] source and means of livelihood, [c] financial status, [d] educational facilities and status, and [e] authenticity status. This will lead to the identification of basic criteria of R&R, and decision on the models of compensation to PAPs.

It has been observed that from the viewpoint of the fulfillment of an R&R, cash compensation to PAPs for their losses is not a welcome solution. It is often of common preference to have a dwelling for a dwelling, a land for a land, a shop for a shop, compared to have money instead. Hence, the R&R policy of JCF should accentuate and promote this feature. A PAP should preferably be remunerated with a facility, same or similar to the one he/she loses in course of migration, and should be made available at the new site before his/her shifting.

The identification of R&R sites and estimation of their carrying capacity will follow these activities. As already mentioned, an R&R site selected for shifting a given volume of PAPs should have enough carry ink capacity to contain the population and socioeconomic growth that would take place there in future.

The rehabilitation sites should rather be located in areas not far from JCF and Dhanbad, and must be well connected with these places as well as Bokaro by road or train. All such areas around JCF are to be identified at a very early stage of R&R planning. There are certain areas, which are officially declared as forestlands, but in reality, they are barren or already deforested. Such forestlands may be re-delineated and the barren/deforested areas may be denotified for habitation and cultivation under this RTR project. In such areas, vegetation will surely increase by many folds compared to the present level with the growth of habitats there.

Every R&R site should be professionally planned for township. As far as possible, the PAPs who have lost their legally owned abodes and/or business offices/outlets should be provided with suitable pre-constructed houses/flats/shops/offices/chambers at decent locations in the township. Nevertheless, in every occasion, such replacement may not be possible, and there a combination of sets and money may be provided to compensate the PAPs. However, the basic amenities and services should be developed at R&R sites before the shifting of PAPs. Financial compensation regarding these aspects cannot be acceptable.

Prior to the shifting of PAPs, the facilities that must be well developed at an R&R site are:

Water Supply & Drainage	Road & rail transport	Housing	Electricity
Shops & market	Communication	Education	Social Security

The facilities mentioned here are the very fundamental ones in the present outlook. Already built houses are of prime necessity for accommodating the PAPs in the rehabilitated site. Water scarcity is a common problem in and around JCF, whereas thousands of liters of mine water is daily pumped into the streams, nallahs and rivers. Water resource management should be given top priority in planning of R&R sites considering the scopes of usage of mine water, water harvesting, groundwater recharge etc.

R&R sites should be well connected by road/rail with JCF, Dhanbad and Bokaro. Electricity, shops, market, communication and education are the basic needs of life. Bearing in mind the prevailing disturbed and/or sensitive socio-political situation and acts of terrorism in the state, the assurance of social security of PAPs at R&R sites is also necessary.

Once the basic criteria of R&R and the models of compensation to PAPs are decided, based on them alternative R&R models should be developed with an aim to economically minimise the trouble of PAPs. Then, depending on the availability of fund, the best model should be chosen, reassessed and finalized by improving it further within the given fiscal limits.

The activities concerned with R&R planning should be kept transparent to all its stakeholders in general and PAPs in particular. Like many other environment management plans, the selected R&R plan should be publicly notified, and public opinion, especially of PAPs should be invited in an open public hearing, organised officially. Worthwhile suggestions of public should be considered to formulate the ultimate R&R plan. The implementation programme will be reorganised accommodating the modifications made. Accordingly, the detailed work schedule with job networking will be formulated for each site, following the order of priority. Simultaneously, monitoring procedure has to be determined. The monitoring team should consist of the members/representatives from all sections of the stakeholders and should be conducted on actual scrutiny of records and field visits, and should not depend on the secondary sources of information. Finally, the R&R programme has to be implemented through continuous operation, regular supervision and periodic monitoring, ensuring work quality and resource utilisation and avoiding time or cost overrun.

11.0 CONCLUSION

For sustainability of JCF, a long-term plan with proper economic perspective is very much necessary. Lack of such a plan would lead to an untimely termination of this coalfield, not alone from the mining standpoint, but also from social, economic and environmental points of view. This issue requires immediate attention or else, with the passage of time, the geo-mining condition in this coalfield will spontaneously deteriorate beyond human control. To reconstruct JCF, formulation of an appropriate R&R strategy is a vital need. This should be based on a pragmatic policy involving all the stakeholders in the issue. It should be rational, balanced, unbiased, and transparent and must be smart enough to accommodate the so-called unauthorised and illegal PAPs as well in the programme. They form a large share of the total affected people, and without their shifting, the project will not be successful. The displacement, resettlement and rehabilitation of the inhabitants of JCF is an important part of the whole reconstruction plan of this coalfield. The reconstruction plan should not only be technologically sound, socially beneficial, environmentally acceptable and economically viable, but also focus on the post-mining land use in the coalfield to make sure of the sustainability of its socioeconomic setups even after the depletion of its coal reserve.

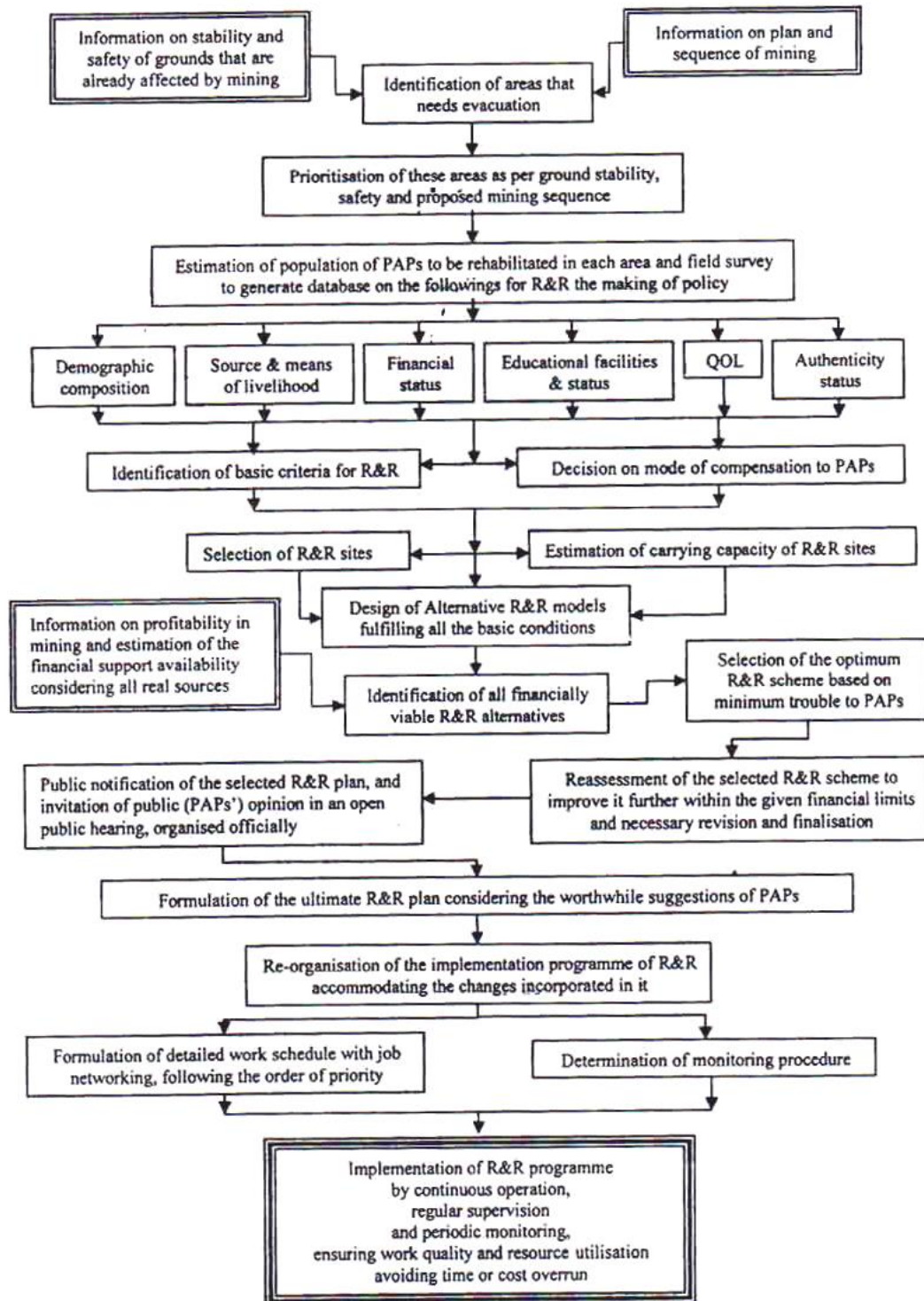


Fig.1.Approach of R&R program for Jharia

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