कार्यालय प्रधान मुख्य वन संरक्षक (कक्ष भू–प्रबंध), सतपुड़ा भवन, मध्यप्रदेश, भोपाल

क्रमांक / एफ–5 / 859 / 2019 / 10–11 / 4120 भोपाल, दिनांक 05/12/22

प्रेषक :–

सुनील अग्रवाल (भा.व.से.)
प्रधान मुख्य वन संरक्षक (भू–प्रबंध) एवं
नोडल अधिकारी वन (संरक्षण) अधिनियम, 1980
मध्यप्रदेश, भोपाल।

प्रति,

वन महानिरीक्षक,
भारत सरकार, पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय,
इंदिरा पर्यावरण भवन, अलीगंज, जोरबाग रोड,
नई दिल्ली–110003

विषयः– सिंगरौली जिले में जयंत माइन्स से मोरबा रेलवे साइडिंग तक कोयला परिवहन के लिये मार्ग निर्माण हेतु 7.448 हेक्टेयर वन भूमि नॉर्दर्न कोलफील्ड्स लिमिटेड सिंगरौली को उपयोग पर देने बाबत्।

संदर्भः– आपका पत्र क्रमांक / 8-67/2002-FC (vol.) दिनांक 18.11.2022

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कृपया उपरोक्त विषयांतर्गत संदर्भित पत्र का अवलोकन करने का कष्ट करें। संदर्भित पत्र के द्वारा प्रकरण में औपचारिक स्वीकृति जारी करने के पूर्व 03 बिन्दुओं पर जानकारी चाही गई है। बिन्दुवार जानकारी निम्नानुसार हैः–

क्र.	बिन्दु	प्रतिवेदन
i.	In view of condition No. A(i) of the Stage-I approval the State Government informed that draft proposal from AIIMS, Bhopal and ICFRE Dehradun has been received. However, the copy of said draft proposals have not been submitted.	इस बिन्दु के संबंध में आवेदक संस्थान ने सैद्धांतिक स्वीकृति की अधिरोपित शर्त A(i) के पालन में AIIMS, Bhopal and ICFRE Dehradun का ड्राफ्ट प्रस्तुत किया गया है, परिशिष्ट–I में संलग्न है।
ii.	The State Govt. was asked to submit the detailed proposal including the NOC as per condition no.A (ii) of the Stage-I approval. However, the copy of NOC from the user agencies of both the projects have not been submitted.	इस बिन्दु के संबंध में आवेदक संस्थान ने सैद्धांतिक स्वीकृति की अधिरोपित शर्त A(ii) के पालन में NOC प्रस्तुत की गई है, परिशिष्ट–II में संलग्न है।

iii.	As per the details in the agenda item for the Board meeting of Northern Coalfields Limited held on 21.06.2018 regarding approval for Mining Plan with Mine Plan for Nigahi Expansion OCP and as per Para (iv) it has been mentioned that the Jayant OCP is in a position to mine in the 18 ha area considering the safety zone of Jayant OCP. The State Govt shall ensure that the area of the safety zone is not being proposed for mining and detailed justification in this regard shall be submitted.	इस बिन्दु के पालन में आवेदक संस्थान ने अवगत कराया है कि 0.9525 हेक्टेयर क्षेत्र सेफ्टीजोन के रूप में सुरक्षित रहेगा, जिसमें किसी प्रकार का उत्खन्न नहीं किया जावेगा, जिसका पालन सुनिश्चित किया जावेगा।

अतः प्रकरण में आपके द्वारा चाही गई जानकारी की पूर्ति हो गई है। कृपया प्रकरण की औपचारिक स्वीकृति जारी करने का कष्ट करें।

संलग्नः–उपरोक्तानुसार।

भवदीय

05/12/2022

(सुनील अग्रवाल)

पृ. क्रमांक/एफ–5/859/2019/10–11/4121 भोपाल, दिनांक 05/12/22

प्रतिलिपिः–

1. मुख्य वन संरक्षक, (क्षेत्रीय) रीवा वृत्त, रीवा, मध्यप्रदेश।
2. वन मण्डलाधिकारी, सामान्य वन मण्डल, सिंगरौली, मध्यप्रदेश।
3. महाप्रबंधक, जयंत परियोजना, नॉर्दर्न कोलफील्ड्स लिमिटेड, सिंगरौली, मध्यप्रदेश।

की ओर सूचनार्थ प्रेषित।

05/12/2022

प्रधान मुख्य वन संरक्षक (भू–प्रबंध)
मध्यप्रदेश, भोपाल

नॉर्दर्न कोलफील्ड्स लिमिटेड
(मिनिरत्न कंपनी)
(कोल इण्डिया लिमिटेड की अनुषंगी कंपनी)

एन सी एल
NCL

Northern Coalfields Limited
(AMiniratna Company)
(A subsidiary of Coal India Limited)

Office of the General Manager,Jayant

Digital India
Power To Empower

स्वच्छ भारत
एक कदम स्वच्छता की ओर

CIN- U10102MP1985GOI003160

An ISO: 9001, ISO: 14001 & OHSAS: 18001 Certified Company
Post- Jayant Colliery, Distt- Singrauli, M.P. PIN-486890
Phone: 07805- 222435, (FAX) 222228 email: gmjnt.ncl@coalindia.inwebsite : www.nclcil.in

No. JNT/Env./F-46/22/492

Date : 01.12.2022

To,
The PCCF,
Nodal Officer (LM)
Bhopal, (M.P.)

Subject : Diversion of 7.448 Ha reserved forest land for construction of coal transportation road from Jayant to Morwa railway siding, Singrauli (M.P.).

Reference : Letter No F-5/859/2019/10-11/3878, Bhopal dtd 21/11/2022
Online proposal no. FP/MP/Road/30989/2017.

Dear Sir,

Stage –I FC for the diversion of 7.448 Ha of reserved forest land for construction of coal transportation road from Jayant to Morwa railway siding was issued vide letter no 8-67/2002/FC VoI. dtd. 06.09.2021.

In continuation, the above referred letter dated 21/11/2022 was received and the point wise reply of shortcoming in the instant proposal as per enclosed letter from the AIG (Forest), MOEF&CC, New Delhi dated 18/11/2022 are as follows :

i. The copy of draft proposal received from AIIMS, Bhopal and ICFRE, Dehradun is attached herewith as **Annexure - I.**

ii. The copy of NOC from Nigahi and Jayant Project, NCL is attached herewith as **Annexure - II.**

iii. The details regarding safety zone in the 18 ha diverted forest land which was transferred to Jayant Project from Nigahi Project is given below :

The 0.9525 ha area (1270 M Length and 7.5 M width) out of total 18 Ha forest land is demarcated as safety zone, inside the existing leasehold boundary (3177.171 ha) of Jayant Project, as per the existing guideline for safety zone and no mining activity will be carried out in this safety zone area.

Rakesh

This is for your kind information and onward submission to MOEF&CC, New Delhi for issuance of Stage-II approval of 7.448 ha forest land at the earliest.

Thanking you,

Yours faithfully,

01/12/2022

Area General Manager
Jayant Project

Rakesh

Copy to :

1. The DFO, Singrauli (M.P.)
2. The General Manager (Envt./Forest), NCL

Draft Proposal Received from AIIMS, BHOPAL | Annexure-I

Title: A part multidisciplinary comprehensive study to assess the impact of change in the composition of forest flora and fauna, and its impact on general and mental health well-being of forest fringe communities of the area demarcated for construction of coal transportation road from Jayant to Morwa under NCL

Background:

Development and urbanization impact the ecosystem of inhabitants of particular geographical areas(Srivastava, 2009). The Forest Fringe Population (FFP) is completely dependent on their immediate ecosystem for basic needs such as food, water, and shelter. Besides the livelihood, the possible income opportunities are ingrained within their ecosystem and inseparable to a certain extent(Clayton, 2021). The development of highways, railroads, and associated afforestation could predispose for short- and long-term changes in the ecosystem that may potentially affect the health of FFP. The transition from the previous environment and adaptation to the new ecosystem can be a stressful event and associated with an anticipatory anxiety about climate change, source of food, water, etc (Moratis, 2021). In long term, it can impact the general as well as mental health conditions predisposing them vulnerable to climate anxiety, Post Traumatic Stress Disorder, anxiety, and depression (Cianconi et al., 2020).

Though research has identified a few dimensions in this area, the evidence is lacking for various health hazards including mental health concerns (Yadava & Sinha, 2020)(Comtesse et al., 2021). The direct and indirect effect of climate change and the associated practice of harvesting for reasons of food security requires special attention in the context of FFP (Bolton et al., 2021). Failure to meet these basic demands unlike most of the urbanized population predisposes to vulnerability to developing unavoidable health conditions such as anemia, diabetes, malnutrition, depression, toxicity associated with

inadvertent consumption of newly harvested food options, alcohol use, and excessive tobacco consumption, etc. The term solastalgia describes the distress associated with the displacement in the circumstances of an external untoward event that affects the immediate ecosystem of the population (Albrecht et al., 2007; Testoni et al., 2019). In addition, due to the use of heavy construction machinery on roads for a longer period, soil erosion and dirt/dust pollutants imbalance the normal ecosystem. It is also required to understand that, the process of development in such an area could only be encouraged if the balance of an ecosystem is maintained through the provision of adequate opportunities and time for the natural flora of the forest reserve including animals, and birds, trees and human beings to sustain (States, 2011). The rapid change in the subset of the collective ecosystem and its impact on the mental health of inhabitants of such places requires scientific inquiry in the dearth of available research. There is the possibility of faster adaptation to development among FFP or on the flipside, there could be adverse effects leading to poor coping and depression due to such a change. Both the dimensions of change are inherently accommodated by an individual resilience to a stressful life event, coping with previous life stressors, outlook toward positive growth, and epigenetic mental health vulnerability (Comtesse et al., 2021; Moratis, 2021).

According to United Nations World Urbanization Prospects- 2008, nearly, 28% of India's population lives in cities and the figure is expected to increase to 41% by the year 2020. In this context, a Northern coal field limited timely proposed a research collaboration of Indian Council of Forestry Research and Education (ICFRE), Dehradun with All India Institute of Medical Sciences Bhopal (AIIMS Bhopal) to study the impact of change in both components of the Forest flora-fauna, area impacted, and health and well-being, including mental health, of the forest fringe communities. The study is primarily focused to assess the impact due to resultant changes in forest-based food, nutrition, and drinking water availability/consumption patterns and the institutions of local governance that ensure the

conservation of forest resources on the overall human health and well-being including mental health needs of the forest-fringe communities of the area. Development such as urbanization is a natural part of the growth of the state, thus balancing it with the growth of mental health should be looked at from a scientific lens especially when common mental disorders are rising and their under treatment is a health concern. Eventually, mental health directly or indirectly facilitates the growth of the economy. (Murray & Lopez, 1997)(Montgomery, 2008). Recently the effect of green spaces on mental health is being explored and the definitions associated with the term 'Greenspace' are being relooked (Taylor & Hochuli, 2017)Loss of cohabitation, carbon markets. Furthermore, the research on this aspect examining the accessibility of FFP to general healthcare services and mental health services is scarce, therefore this also opens up an avenue to generate the baseline records for such services in affected areas.

It has been also observed that changing dietary habits also affect the gut health of the migratory populations. The research on human microbiota got momentum with the evolution of sequencing techniques and bioinformatics. After the human microbiome project on a large population created an avenue of research on understanding the microbial diversities, inter-microbial communities link axes in our body, and potential links to health and diseases(*Milestones in Human Microbiota Research*, n.d.). The human body contains a few symbiotic microbial communities or ecosystems such as Gut Microbiota (GM), lung microbiota, skin microbiota, and urogenital microbiota. The GM reflects the entire microbiota and is responsible for all microbial activity in our body. In a large number, many bioactive compounds are produced by the gut microbes which can influence health; some vitamins are beneficial, but some products are toxic to the body. The maintenance of a various and flourishing population of beneficial gut bacteria helps to keep harmful bacteria at bay by competing for nutrients and sites of colonization. Dietary means, particularly the use of a

range of fibers, maybe the best way of maintaining a healthy gut microbiota population. Strategies such as ingestion of live beneficial bacteria (probiotics) may also assist in maintaining health. Moreover, the role of gut microbiota in regulating the functions of the central nervous system is getting established in disorders of mental health such as anxiety, depression, irritable bowel syndrome, and autism (Mayer et al., 2015; O'Mahony et al., 2015) . In this project, we will expand upon these subjects relating to diet and lifestyle, the gut microbiota, and health, and provide some indication of opportunities and knowledge gaps in this area on the particular population.

The Ion AmpliSeq™ Microbiome Health Research Assay (MHRA) is a next-generation sequencing (NGS) assay that allows cost-effective yet comprehensive profiling of microbial diversity of the human gut microbiome. This assay offers increased resolution and specificity of species-level detection compared with traditional 16S rRNA sequencing for key organisms associated with immunological conditions like cancer, diabetes, autoimmune diseases, gastrointestinal (GI) disorders, and infectious disease research, such as SARS-CoV-2.

The rationale of the study: Jayant opencast coal mine (a subsidiary of Northern Coalfield Limited) is operating with a 25 MTPA (Metric Tonne Per Acre) production capacity. For transport of its mined-out coal, the construction of a new coal transportation road from Jayant OCP to Morwa railway siding is proposed. For this purpose, the FC (Financial Concurrence) Stage-I approval for diversion of non-forest use of 7.448 ha reserved forest land has been granted vide Forest Clearance letter F. no. 8-67/2002/FC Vol. dated 06th Sept. 2021 by Forest Advisory Committee (FAC) of MoEF & CC on recommendations of State Government.

The rationale for the study of biochemical and metabolomics changes is based on the analysis of metabolites for the basic growth and survival after the utilization of heavy metals in food,

soil, water, and surrounding ecosystem for a healthy lifestyle in the rural area. So, it is very important to study the complete metabolomics in these subjects in this study (Armitage et al., 2015; Li et al., 2020).

1. **Aim:** To study the health effects of construction activity related to coal mining in Jayant on the nearby affected Forest Fringe Population (FFP).
2. **Objectives:**

   Primary Objectives:

   1. To assess the nutritive value of forest-based foods being consumed by FFC and also to find out the presence of heavy metals in these foods and to find out the impact of these on gut microbiota.
   2. To assess the quality of drinking water and the presence of heavy metals in the communities of the area demarcated for construction of a coal transportation road from Jayant to Morwa
   3. To assess the general health and mental health of FFC before and after the construction activities
   4. To find the impact of consumption of polluted water and polluted forest-based foods on the general health and mental health of FFC
   5. To investigate and assess the biochemical and metabolite profiles in blood samples of FFP
   6. To find out the ways of mitigation of the adverse effects of consumption of polluted water and food on FFC

   - **Secondary Objectives:**

     To find out the correlation of gut microbiota and biochemical parameters with the mental health aspects of the FFP

3. Study Outcomes

- List of forest-based foods consumed by FFC; mean levels of carbohydrate/ protein/ fats/ vitamin B complex/ vitamin C/ iron/ zinc/ iodine/ calcium/ phosphate etc in these food items; mean levels of selected heavy metals (eg Hg, As, Cadmium, etc) in these foods
- The proportion of drinking water sources that are safe (levels of microbial/ inorganic/ physical impurities within acceptable ranges as per BIS); mean levels of selected heavy metals (eg Hg, As, Cadmium, etc) in the drinking water sources
- The proportion of the total population free from common acute illnesses (eg ARI, acute diarrhoeal diseases, acute skin infection, skin parasitic infestations, urinary tract infection, acute hepatitis, etc) and chronic illnesses (hypertension, diabetes mellitus, COPD, bronchial asthma, migraine, OA knee, mechanical back pain, cervical spondylosis, FD, IBS, Coronary artery disease, chronic kidney disease, cataract and refractive errors, chronic liver diseases, etc); the proportion of adults having nutritional disorders (eg anemia, overweight/obese, undernutrition, etc); mean BMI of adults
- The proportion of adults/ adolescents/ women of reproductive age group having any mental disorders; the proportion with specific mental disorders, substance use disorders
- The proportion of the population which reported illness in the last 30 days; health-seeking behaviours; the reason(s) for poor health-seeking for acute/chronic illnesses; mean out-of-pocket expenditure on health-seeking (for OPD/inpatient care)
- Incidence of new mental illnesses; relative risk of mental illnesses due to displacement

4. Materials and method:

4.1. Study design: We would conduct a sequential exploratory mixed methods study. The qualitative part would involve a mix of phenomenological, narrative, and document-analysis approaches. We would also explore the possibility of an ethnographical study of dietary and water consumption behaviours as well as health-seeking behaviours during illness episodes as well as for chronic illnesses. We would conduct the document analysis for arriving at operational definitions of exposure, outcome measures, and other related determinants (eg risk and protective factors, effect modifiers, etc). The quantitative part of the design would be a prospective cohort study in which the construction of the road from Jayant to Morwa is assumed as the exposure.

4.2. **Study setting:** Singrauli became the 50th district of Madhya Pradesh (MP) on 24th May 2008 with an area of 5675 square km. It is famous for its rich reserves of minerals and natural flora/ fauna. Approximately 11841 hectares (ie nearly 2.96% of the total area) have a dense canopied forest. Sagan, Mahua, Chironjee, Tendu, etc are the major forest resources for the livelihood of the nearby population, especially forest-fringe groups. Though paddy is the principal crop, people also grow other food crops like wheat, maize, jowar, barley, kodon, Bengal gram, tur (chickpea), ramtil, sesamum, urad (green gram), and soybean. The district had a population of nearly 11 lakhs (80.8% rural) according to Census 2011, with a male preponderance (sex ratio 920). The population density was mere 208 inhabitants per square km and the literacy rate was 60.4%. The majority of the population is of the age group 15-59 years (54.5%), followed by those less than 14 years (39.1%). The population of scheduled caste and tribes constitute 12.8% and 32.6% of the total population. There are 48 scheduled castes and 43 scheduled tribes. Gonds and Kols are the largest

tribes. There are 3 blocks, 6 tehsils, 316-gram panchayats, 744 villages (727 inhabited, of which 11 are forest villages), and 243,925 households with an average size of 4.8. Out of total 727 inhabited villages, 70 (10 %) villages have population less than 200; 114 villages (16 %)have population 200-499 persons;171 villages (24 %)have population of 500-999; 230 villages (32 %) have population of 1000-1999; 130 villages (18 %) have population of 2000-4999; and 12 villages (2 %) have population of 5000-9999. 45.27 %of the district population is indulged as either main workers (30.53 %) or marginal workers (14.74%). 22% of the dwellings have medical facilities with a higher proportion of villages (39.3%) having such facilities. The district has four hospitals with a bed-population ratio of 10 per 10,000. These are the district hospital Waidhan, Nehru Shatabdi Chikitshalaya Singrauli, NTPC Hospital Vindhyanagar and District AYUSH hospital Waidhan. Out of a total of 727 villages, folks from 481 have to travel more than 10 kilometers to seek medical care as per the 2011 census. (a sentence or two about geography, population number, and administrative structure including rural/ urban, health care delivery system, etc of Singrauli). Often it is called 'Urjanchal' due to the innumerable electrical power plants located in the district. Northern Coalfields Limited (NCL), established in 1984, is the major subsidiary of Coal India Limited, the largest coal-producing global company. Currently, coal accounts for approximately 55% of the country's primary energy consumption, and CIL accounts for about 83% of the country's coal production. NCL produces coal through mechanized opencast mines. The Jayant opencast coal mine of Northern Coalfield Limited (NCL) is one of these. **Figures 1A and B**. Geographical location of district Singrauli and Northern Coal Field Limited led the development of a coal transportation road from Jayant to Morwa. Jayant Opencast mine project is located (in village Churkee/Garda in Waidhan tehsil).

Figure: 1A

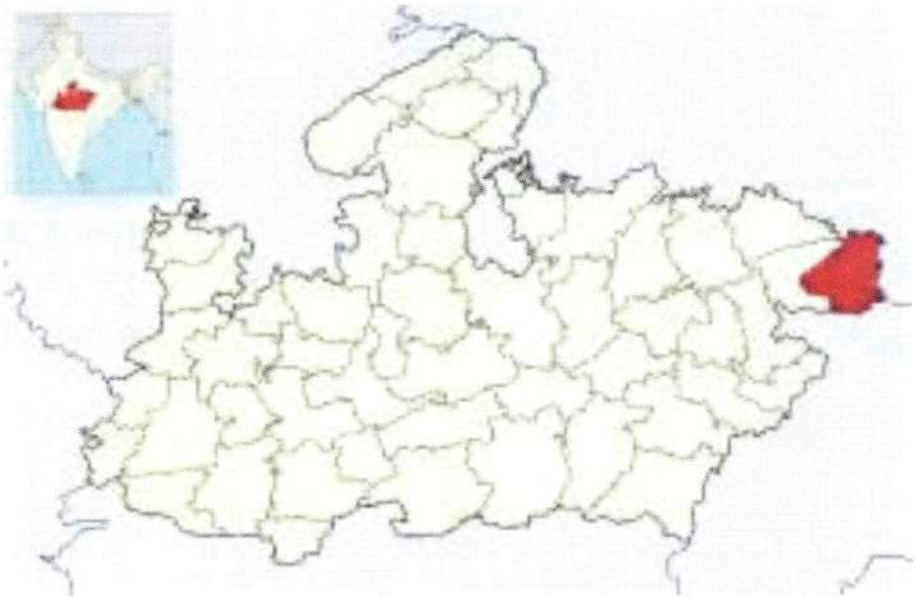

Figure: 1B

4.3. Study Population: Our study population includes both the inhabitants living near the diverted forest land for coal transportation road from Jayant OCP to Morwa railway siding and surrounding buffer area and officials from NCL as well as local health/

forest department officials of Singrauli.For the qualitative part of the study, we need to include the NCL, forest department, and health department officials.

- **Inclusion criteria:**
  - **a.** All inhabitants of the selected villages who have been residing for the most part of the last 6 months.
  - **b.** All NCL, forest department, and health department officials who are working in the study setting (i.e., Singrauli) or were working in the last 2 years.
- **Exclusion criteria**
  - a. Those inhabitants, who are not able to communicate with the study team due to difficulty in speech (mutism), hearing (deafness), sight (blindness), or mental derangement.
  - b. Migrated population for the labour residing in the catchment area

4.4. Sample selection: We shall adopt a multistage sampling approach for the selection of eligible participants from the FFP. The first stage of selection would be blocked, followed by village panchayat, followed by villages, and finally households. The list of blocks, gram panchayats, and villages that are affected by the Jayant to Morwa Road would be obtained from local NCL and forest officials. Gram Panchayat would be selected randomly from the selected blocks. Villages would be selected by stratified cluster random sampling method, in which population size would be the strata. We would stratify the gram panchayats into two strata: FFP within 500 meters of the proposed construction zone (Zone-1), and those beyond 500 meters of the proposed construction zone (Zone-2). In each stratum, we would select a required number of villages (clusters) by using probability proportionate to size sampling. In each of the selected villages, households would be selected by quota sampling

technique. For this, we would select a predecided number of participants belonging to age groups 6- 17years, 18- 65 years, and > 65 years from all sexes. In each household, all the members would be eligible for selection for objective numbers 3, while only the head of household would be recruited for objective numbers 1-2 and 4. For objective number 5, we would enroll key informants from both FFP and official groups.

4.5. **Sample size for Quantitative Part of Study:** According to the India Forest Report 2018-19, nearly 20% of FFPs use forest-based foods exclusively. Considering 95% confidence limits, 20% relative precision, a design effect of 1.5, and a non-response rate of 15%, we need to enroll 676 households for the baseline cross-sectional study. We shall strive to enroll these participants in 30 clusters, thus having a cluster size (number of participants to be enrolled in each selected village) of 23. We are assuming a relative risk of 1.5 for change in the dietary pattern after the construction of roads among FFPs. For a power of 80% and 20% loss to follow-up and with the above parameters of confidence-limit, exclusive forest food use among non-displaced (unexposed group), **we need to enrol 358 households from the exposed (displaced FFP) group for cohort study. Another 358 households need to be enlisted from the non-exposed nearby population.** We will use census method for estimation of the common nutrients in food and heavy metals in water. For this study team will map all the related sources from forest and house. We will also take sample from cooked food.

According to the National Family Health Survey-5 Report (2019-21), nearly 12% of adult population were overweight in Singrauli district. Considering 95% confidence limits, 20% relative precision, a design effect of 1.2, and a non-response rate of 5%, we need to enroll 905 individuals for the baseline cross-sectional study.

Similarly, for any mental health morbidity and substance use disorders, the prevalence of which being relatively more than the 12%, therefore the estimated sample would be adequate for the estimation of other general and physical mental health morbidities. For those condition where burden is less than 12%, we can not increase the sample size due to increase in cost and operational issue.

We shall strive to enrol these participants in 30 clusters, thus having a cluster size (number of participants to be enrolled in each selected village) of 23. We are assuming a relative risk of 1.5 for change in the dietary pattern after the construction of roads among FFPs. For a power of 80% and 20% loss to follow-up and with the above parameters of confidence-limit, exclusive forest food use among non-displaced (unexposed group), we need to enrol 358 households from the exposed (displaced FFP) group for cohort study. Another 358 households need to be enlisted from the non-exposed nearby population.

4.6. Sample size for Qualitative Part of the Study

For the qualitative part of the study, we shall continue to sample eligible participants from the pool of officials including NCL, forest, local health staff (both Govt. & private setting) etc. as well as other key informants till saturation of themes (especially ways of mitigation of adverse effects of consumption of polluted water/ food on FFP). We shall conduct a mix of Key informant interviews, In-depth interviews, Focused group discussions, and participant observation for this phase of the study.

- **Inclusion criteria**

Born and brought up in the said geographical zones or residing in the catchment area for more than 24 months.

- **Exclusion criteria**

  Migrated population for the labor residing in the catchment area

4.7. Data collection tools

- Participant Information Sheets (for adult/ child FFP separately, officials, other key informants)
- Informed Consent Form
- Mapping Sheet
- House listing sheet
- Interview Tracking Sheet
- Topic Guides (KII/ IDIs/FGDs/ Participant Observation)
- Baseline data collection tool
  (1) Sociodemographic datasheet
  (2) Accessibility to physicians and mental health professionals as well as Health care seeking behaviour in the last 3 months
  (3) Other determinants of dietary behaviours, general health and mental health
  (4) Geolocation-mapping
  (5) Anthropometric measurements- Height, weight, waist circumference, Head circumference, BMI, blood pressure, pulse/ heart rate
  (6) Clinical parameters
    (a) Pallor/ icterus/ edema/ lymphadenopathy/ rash/ signs of malnutrition
    (b) Dietary Assessment Sheet (24 hour recollection OR Food diary OR FFQs?)
- Psychological tools

(1) The MINI 7.0.2 for assessment of mental morbidity (including suicidal risk): Mental health morbidity was assessed using the MINI 7.0.2 for adult respondents (18+ years) and MINI Kid for adolescents (13–17 years). MINI kid between 6 and 17 years of age designed to assess the presence of mental illness over the past 6 months, according to the

(2) The Fagerstrom questionnaires for tobacco use disorders-

(3) As epilepsy is routinely included in care delivery of mental health programs, the WHO-SEARO screening questionnaire for Generalized Tonic-Clonic seizures in the community.

(4) Environmental Distress Scale (EDS) adaptation and validation to be carried out in the Hindi language.

(5) Insomnia severity index/ PSQI- Hindi version.

(6) Brief Resilient Coping Scale (BRCS)

(7) WHOQOL- bref

(8) MINI cog

- Sample collection camp instruction pamphlet
- Sample Collection Sheet
- Laboratory measures (participant blood)

(1) Complete blood count

(2) Blood sugar levels (Random/Fasting)

(3) Thyroid hormone (T3, T4, TSH)

(4) Lipid profile

(5) MP antigen & antibody

(6) Widal test

(7) Hemoglobin

(8) Liver function test

(9) Renal function test

(10) Serum cortisol

(11) Serum trace elements- Zinc, Iodine, Iron, calcium, phosphorus, magnesium

(12) Serum heavy metal assay- Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Mercury (Hg), Iron (Fe), Selenium (Se), Silver (Ag), Zinc (Zn), Nickel (Ni) and Lead (Pb), Manganese (Mn), Cobalt (Co), and Thallium (Tl).

(13) Stool samples for ova/ cyst and gut-microbiome genome sequencing.

(14) NK cell markers for immunity-IL and TNF

i) Food sample for nutrient and heavy metals

ii) Water sample for heavy metal testing

iii) Sample Tracking Sheet

iv) Supervisor monitoring Format

v) Investigator Monitoring Format

- **Operational Definitions**

i) Village

ii) Town

iii) Census enumeration block

iv) **Building**: A 'Building' is generally a single structure on the ground. In some scenarios, a structure with an entrance devoid of any walls would also be considered a building. Usually, a structure will have four walls and a roof. A building may be used as dwellings (residences) or establishments such as shops,

business houses, offices, factories, workshops, work sheds, Schools, places of entertainment, places of worship, godowns, stores, etc.

v) **Household:** usually a group of persons who normally live together and take their meals from a common kitchen unless the exigencies of work prevent any of them from doing so. Persons in a household may be related or unrelated or a mix of both.

Workflow and data collection plan:

- We would submit the proposal to the institutional ethics committee once technical approval is received from NCL
- After receipt of the approval from NCL and sanction letter for funding, we shall start the preparatory phase of the study. We need to open a separate bank account and obtain the necessary institute administrative approval for the operationalization of funds. We shall list and purchase necessary equipment and other consumables. We shall complete the process of recruitment of research staff.
- We shall continue to fine-tune our study tools and develop a written SOP for staff training, data collection, quality control, supervision/ monitoring, etc.
- We shall conduct training of research staff with the study tool and obtain necessary reliability data if required.
- Then we shall pilot test the tool and perform validation exercises with selected experts to finalize the same.
- We shall prepare a written micro plan for travel, data collection, and monitoring/ supervision for quality control.
- We shall liaise with NCL to identify potential participants for qualitative data collection (IDI/ KII/ FGDs/ POs). A team of trained research staff would conduct

qualitative data collection exercises among eligible study participants. The research staff would audiotape the conversations.

- We shall also identify the key documents for the document analysis part of a qualitative study.
- Data analysis from the above two steps would provide insights into problems associated with FFP. This information will be used to develop the final baseline data collection tool for the cohort study. We would also develop final operational definitions to be used in the study after these steps.
- Next, the study team would enrol FFP participants for baseline data collection. General health would be measured using anthropometry, body mass index, blood pressure, and heart rate. The mental health assessment would include depression, anxiety, tobacco use, distress, coping, trauma perception, and anticipatory solastalgia. The subsequent assessment would be started after the completion of road construction and completed within eight months thereafter. The nutritional assessment will incorporate the RDA of consumed food by the 24-hours recall of diet.
- Research staff would provide written and verbal instructions to study participants and family members for the collection of food, water, and blood samples on a subsequent visit.
- A subsequent visit would be made to the selected household to collect food, water, and blood/ other biological samples. The samples would be marked accurately in the sample collection format.
- The field team would store the samples in a nearby safe place till several samples are adequate for transport to the institute laboratory.

- Transport of samples would be done either through empanelled courier or with an accompanying research staff taking care of all cold-chain precautions. A tracking sheet would be filled and shared with the technical support unit at AIIMS Bhopal.
- All baseline data would be verified by the supervisor on daily basis before submission to the online data collection platform.
- The indigenous tool to measure the mental health impact related to solastalgia in the Indian context will be developed and validated in the displaced population of Bhopal district.
- The first six months of baseline data collected by using the indigenous new tool and other mental health assessments provided in the tools section would be followed by phase 2 of the NCL proposed construction of the road from Jayant to Morwa. The procedure would same as baseline data collection. Three attempts would be made to trace and enroll all the previously enrolled participants. Post-construction assessments would be accompanied by the measurement of clinical parameters such as stress, depression, anxiety, resilience, spirituality, and laboratory measurement of micronutrients, heavy metals, immune markers, and gut microbiota. The effect of a traumatic event is known to cause disturbances in the cognitive functions of vulnerable individuals, therefore immediate and recent memory will be assessed at both the time points.
- Both baseline and end-line samples will be stored and part of which would be analyzed for the present study while the remaining samples will be stored for the secondary analysis to find out the correlation of different clinical and laboratory measures that could be vital for the evidence generation such as vulnerability to develop mental health issues, biomarkers of stress, etc.

- To establish the after-service care, the teleconsultation services would be established by networking in proximity with general and mental health professionals in the area mapped by geolocation application. This will facilitate the service delivery and clinical care of FFP.

Workflow of Genome sequencing-

Workflow

Sequencing Workflow: Targeted Sequencing for ~150 samples will be performed by Ion AmpliSeq Microbiome Health Research Assay for the analyses of mixed microbial populations using an Ion GeneStudio™ S5 Plus System (Thermo Fisher Scientific, Waltham, MA, USA): The concentration and quality of the DNA will be measured using Qubit™ 4 Fluorometer (Invitrogen®). Library preparation, clonal amplification, and sequencing will be performed according to the manufacturer's instructions. The Ion Plus Fragment Library will be used for library preparation according to the manufacturer's protocol. The Library Kit covers DNA fragmentation for 15 min, adapter ligation, and final purification of the samples using AMPure XP beads (Beckman-Coulter). Library DNA content will be reanalyzed using a Qubit 3.0 fluorometer. In brief, the libraries will be made using Ion AmpliSeq Library kits (Thermo Fisher Scientific) and labeled by Ion Xpress Barcode Adapter kits (Thermo Fisher Scientific). After purification, the library will be amplified using emulsion PCR in an Ion Chef instrument (Thermo Fisher Scientific) and sequenced by an ion-semiconductor sequencer Ion GeneStudio™ S5 Plus System. Read lengths of up to 400 bp can be produced with 530 semiconductor chips that produce up to 5, 20, or 80 million reads. The amplicon reads are then analyse computationally for assembly, Gene Prediction, Contig binning and Taxonomic classification.

Statistical analysis:

The transcripts of the qualitative phase of the study would be used for framework analysis to populate the domains and themes. We would also conduct a factor analysis of the cohort baseline data collection tool to generate content validity. For quantitative phase, the statistical analysis of categorical parameters will be carried out using frequency and percentage. The continuous variables will be computed using mean, standard deviation, and interquartile range. The association between clinical and laboratory parameters would be calculated using paired t-test. Based on the distribution of the data in FFP, the parametric or non-parametric test will be used for finding the association between clinical and laboratory variables of interest.

1) **Expected Outcome:**

1. Generating evidence for the general health and mental health of FFP
2. Assessing the resultant change in general health and mental health after afforestation
3. Correlating biomarkers for the resultant change

2) **Implications:**

1. The findings of this multidisciplinary comprehensive project would be the first of its kind in the country that will directly help the researchers and policymakers in the field to plan out similar activities based on the findings
2. The findings would help to improve the general health and mental health of affected FFP

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3) Timeline:

Activity/Months	1	2	3	4	5	6	7	8	9	10	11	12	ROAD CONSTRUCTION	1	2	3	4	5	6	7	8
Administrative approval, procurements and recruitment of staff																					
Training of the staff and pilot testing of tools and standardization																					
Baseline data collection																					
Data cleaning, analysis and interim report																					
Post road-construction data collection																					
Data cleaning, analysis and final report																					
Health linkage and report dissemination																					

***Part-A-Before start of construction activity, *Part-B-Following the construction activity i.e. construction of road from Jayant to Morwa**

4) Budget:

S. No	Head	Unit	No. of units	Duration	Unit Cost	Subtotal	Total (INR)	Remarks
1. Recurring (Human Resources)								
1)	Project Coordinator/Equivalent to consultant (non-medical)	Person	1	20 months*	70000 + 12% HRA	78400*20	15,68,000	Part A- 12 months Part B- 8 months
2)	Consultant (Non-medical)	Person	1	20 months	67000 + 12% HRA	75040*20	15,00,800	Part A- 12 months Part B- 8 months
3)	Project technical Officer (Junior Medical Officer)	Person	1	20 months	60000 + 12% HRA	67200*20	13,44,000	Part A- 12 months Part B- 8 months
4)	SRF (Psychologist/social worker)	Person	2	20 months	35000 + 12% HRA	2*39200*20	15,68,000	Part A- 12 months Part B- 8 months
5)	JRF (Msc Biochemistry OR other life sciences)*	Person	1	30 months	31000 + 12% HRA	34720*30	10,41,600	Overall project coordination from beginning till end (Including period before during and after road-construction)
6)	Laboratory technician	Person	1	20 months	18000	360000	360000	Part A- 12 months Part B- 8 months
7)	Data entry operator (Grade-B)	Person	1	20 months	18000	360000	360000	Part A- 12 months Part B- 8 months

8)	Multi-tasking staff (Field lab assistant/nursing assistant/peon`)	Person	2	20 months	15800	2*316000	632000	Part A- 12 months Part B- 8 months
Sub-total							**83,74,400**	
2. **Non-recurring**								
2A. Data Collection Equipments								
1)	Digital Tablet		2	-	15000	30000	30000	For data collection, entry, analysis, report writing etc.
2)	Desktop (16 GB RAM, 500 SSD)		1	-	70000	70000	70000	
3)	All in one Printer cum high speed scanner		1	-	50000	50000	50000	
4)	Portable Hard disk/drive 2 TB		1	-	7000	7000	7000	
5)	Audio-recorder with headphone and mic	Recorder	2	-	15000	30000	30000	
6)	DSLR Camera to capture the dermatological and oral manifestations of micronutrient deficiency or heavy metal toxicity		1	-	150000	150000	150000	
7)	350-400 L Ultra low temperature laboratory deep freezer		1	-	800000	800000	800000	For storage of body Fluids for longer periods
Sub-total							**11,37,000**	
2b. Sample collection devices								
8)	Peak flowmeter (AS)		4	-	2000	8000	8000	Medical assessment and measurements for General health conditions
9)	Pulse oximeter to measure the blood oxygen saturation due to effect of air pollution		2	-	2000	4000	4000	
10)	Glucometer (AS)		2	-	1000	2000	2000	
11)	Weighing machine		4	-	4500	10000	10000	

12)	Portable Stadiometer (SECA)		2	-	15000	30000	30000	
13)	Measuring tape (SECA)		2	-	1000	2000	2000	
14)	Digital Blood Pressure monitoring apparatus		2	-	1800	3600	3600	
15)	Battery charger		2	-	1500	30000	3000	
16)	Digital infrared thermometer		2		2000	4000	4000	
Sub-total							**66,600**	
2c. Consumables								
1)	AAA rechargeable batteries Set		5	-	4000	20000	20000	Required for day to day functioning in field data collection
2)	AA rechargeable batteries Set		5	-	4000	20000	20000	
3)	Disposable set of mouthpieces for peak flowmeter		10	-	2000	20000	20000	
4)	Glucometer strips		20	-	2000	40000	40000	
5)	Psychological tools- MINI, MINI kid and MINIcog	Tool	500	-	1670 (two point assessment)	835000	835000	Copyright cost of the psychological tools
6)	Laboratory kits for heavy metal detection	Kit	2	-	100000	200000	200000	Laboratory sample collection equipment
7)	Laboratory kits for biochemical and metabolite detection	Kit	2	-	100000	200000	200000	
8)	Reagents including AMPLISEQ MICROBIOME HEALTH 540 Ion Library TaqMan™ Quantitation Kit Qubit dsDNA HS assay kit Qubit assay tubes Agencourt® AMPure® XP Kit Plasticwares	-	-	-	5193666	5193666	5193666	
9)	Infection control measures/devices		4	1000 per head per month	40000	400000	400000	

10)	Sample carrying box		2		20000	20000	20000	
11)	Vaccutainers (for sample collection)		2000		10	200000	20000	
Sub-total							**69,68,666**	
3	**Other Recurring Expenses**							
1)	Living expenses for field staff (Part- A)		4	150 days	(200 RS per day)	120000	120000	Required for smooth execution of Part-A and Part-B of study
2)	Living expenses for field staff (Part- B)		4	100 days	200 RS per day	80000	80000	
3)	Communication charges for staff (phone and internet)		2	-	3000	36000	36000	
Sub-total							**2,36,000**	
4	**Travel**							
1)	Local travel for field staff Data collection	Hired vehicle	1	9 months	65000	585000 +10% extra Km	650000	Above 3000 kms/month, all extra kilometres @ 15 km INR per Km
2)	Supervision	Hired vehicle	1	20 days	5000	100000	100000	20 days including both phases of project
3)	TA/DA for investigator (PI and Co-Is)	Travel fares	6	16 person-visits to and from	6000	576000	576000	**For Training, supervision, administration of Qualitative part of study and coordination with local authorities**
4)	Stay/ accommodation for investigator (PI, Co-Is and project coordinator)		6	-	7500 for Professor, 5000 for others	30000 + 40000	70000	
Sub-total							**13,96,000**	

5	**Training of project staff**							
1)	Training for Psychological tools (MINI and MINIkid)		10	-	7602	76020	76020	Essential for effective implementation of study
2)	Training	Session	3	One time	5000	15000	15000	
Sub-total							**91,020**	
6	**Research specific logistics**							
1)	Compensation for subjects	Person	358 *3	2 times for subjects & once for controls	250 per head	250*1074	2,68,500	As compensation for their work days lost
2)	Meeting/ group discussions/FGD	Event	4	Per event	10000	40000	40000	As part of Qualitative Methods and preparation for quantitative semi-structured tools
3)	Field office site	Office Room furnished (20ft &20ft)	1	Monthly rent for 20 months	10000	200000	200000	For smooth functioning and supervision of project, office work, data storage, meetings
4)	Coordination meetings online and on site	-	-	Thrice in a year	5000	15000	30000	Project implementation and progress including data quality
5)	Statistician honorarium	Professional Fees	2	-	40000	80000	80000	Statistical analysis of data sets
Sub-total							**6,18,500**	
7	**Report printing**					100000	**100000**	
8	**Publication fees**					320000	**320000**	
9	**Stationary**	For field site				40000	**40000**	
10	**Contingencies**						**250000**	
Total (1-10)							**1,95,98,186**	

Institutional Overhead (5%)		**9,79,909**
	Grand Total	**2,05,78,095.00 (INR)**
	Rupees Two Crore Five Lakh Seventy Eight Thousands Ninety Five Only	

*JRF will be considered for a period of 30 months for storage of biological samples, maintaining records, writing report and publication

As mentioned in the timeline, as this study will be carried out in 2 parts, Part-A: before initiation of construction work and Part-B: After at least 3 months of completion Construction work and resettlement of FFP

Accordingly, the larger part of the budget will be utilised towards Part-A of the study

Justifications for different budget heads

1. Project Coordinator/Equivalent to consultant (non-medical): Required for overall supervision of the team, supervising data collection, data entry, data cleaning and proper record keeping and coordination work

2. Consultant (Non-medical)- Maximum work will be carried out at our laboratory. Consultant from life science background is required to carry out the wet lab advanced molecular experiments and bioinformatics analysis. He/she will be responsible for Metagenomics data analysis, sequence alignment, bioinformatics software handling and analysis of the genome sequence.

3. Project technical Officer (Junior Medical Officer): Being a medical officer, he/she will carry out physical examination & anthropometric assessment of the study participants, collection of samples for blood investigations, ensuring aseptic precautions, advising basic treatment to persons who need it in field during data collection

4. SRF (Psychologist/social worker): After training, he/she will administer psychological instruments and semi-structured performa in the field. He/she will provide basic counselling in study participants who may require it as per assessment.

5. JRF (Msc Biochemistry OR other life sciences)*- JRF will be trained & will be required to carry out metagenomics work and DNA extraction for the molecular works.

6. Laboratory technician: Required to run the analysers to carry out the lab tests required as per study protocol.

7. Data entry operator (Grade-B): Required to maintain data entry, data cleaning upon advice, day to day office assistance related to study.

8. Multi-tasking staff (Field lab assistant/nursing assistant/peon`): Required to assist the field team for day to day field operations, file movement, office assistance and dak entry and records etc.

9. Targeted Sequencing kits reagents/ (NGS) reagents: Library Preparation kits, Template Preparation kits, Sequencing chip/kits, primers, molecular biology reagents, enzymes and chemicals etc will be highly costly. Therefore, the budget for consumables is most genuine.

10. Plastic glass wares required for molecular experiments, DNase/RNase free tubes and tips will be highly required and are costly. Therefore, the budget for consumables is most genuine.

Draft Proposal Recieved from ICFRE, DEHRADUN

Annexure-I

Draft Proposal for

Part comprehensive study to assess the impact of changes in composition of the forest flora and fauna, impacted area and the forest fringe communities surrounding diverted forest land for coal transportation road wrt. Jayant Opencast Coal mine of NCL, Singrauli, Madhya Pradesh

1. Background

The Jayant opencast coal mine of Northern Coalfield Limited (NCL) is situated in Singrauli district of Madhya Pradesh. Presently, Jayant opencast coal mine is operating with 25 MTPA production capacity. For transport of its mined-out coal, construction of a new coal transportation road from Jayant OCP to Morwa railway siding is proposed. For this purpose, the FC Stage-I approval for diversion of non-forest use of 7.448 ha reserved forest land has been granted *vide* Forest Clearance letter F. no. 8-67/2002/FC Vol. dated 06th Sept., 2021 by Forest Advisory Committee (FAC) of MoEF&CC on recommendations of State Government.

While granting FC Stage -I approval, however, FAC has imposed a condition *vide* point no. 2 A (i) that *"A comprehensive study will be undertaken regarding the impact of change in both composition of the Forest flora-fauna, area impacted, and health and well-being, including mental health, of the forest fringe communities. This study should especially assess the impact due to resultant changes in forest- based food, nutrition and drinking water availability/consumption patterns and the institutions of local governance that ensure conservation of forest resources on the overall human health and well-being including mental health needs of the forest-fringe communities of the area. A Multidisciplinary study shall be commissioned by the user agency by reputed institutes like AIIMS, New Delhi and ICFRE, Dehradun in a collaborative mode within three months of Final (Stage-II) Approval and shall be completed within maximum 3 years. The outcomes of this study would guide overall planning and management of forests and coal mining in the area respectively by State Forest Department and the User Agency."*

Due to this FC condition, the GM(Forest), NCL *vide* e-mail dated 16.10.2021 has requested Indian Council of Forestry Research and Education (ICFRE), Dehradun to submit a budgetary proposal for a part comprehensive study to assess the impact of change in both composition of the forest flora and fauna, area impacted, impact on the forest fringe communities in terms of changes in forest-based food and impact on institutions of local governance that ensure conservation of forest resources surrounding Jayant Opencast Coal mine. With this background the proposal has been prepared for the study.

2. Study area:

The diverted forest land for coal transportation road from Jayant OCP to Morwa railway siding and surrounding buffer area.

3. Objectives

- To assess the change in composition of forest flora and fauna in the impacted area.
- To assess the resultant changes in forest-based food availability and consumption pattern of the forest fringe communities.
- To assess the impact of resultant changes in drinking water availability/consumption patterns of the forest fringe communities.
- To assess the impact of resultant changes on the institutions of local governance that ensures conservation of forest resources.

4. Scope of Works:

- Delineation and characterization of the mine lease landscape for the studies.
- Identification of forest fringe communities surrounding the diverted forest land for coal transportation road.
- Inventorization of herbs, shrubs and trees from the study area.
- Working out of the abundance and diversity of different vegetation groups.
- Identification of species of conservation importance *i.e.* endemic, rare, endangered and threatened category species (RET) out of the recorded flora referring to the Red Data Book of Botanical Survey of India, IUCN Red data list and other available literatures.
- Identification and enlisting of the plants with NTFP with emphasis on food value and their socio-economic importance.
- Assessment of terrestrial faunal diversity (mammals, reptiles, amphibians, birds and butterfly) from the study area.
- Identification of corridor of the large wildlife, if any and assessment of likely impact on the corridors enroute.
- Assessment of impact of diversion on terrestrial floral and faunal diversity due to proposed construction of new coal transportation road from Jayant to Morwa railway siding.
- Assessment of availability of forest-based food and consumption by forest fringe communities.
- Assessment of availability of drinking water and consumption by forest fringe communities.
- Identification of institutions of local governance that ensures conservation of forest resources and impact on them due to resultant changes in the landscape.

5. Approach and methodology

The review of literatures relevant to the study will be done from the available secondary sources. Desk review of available forest working plans/wildlife management plans, EIA/EMP report, and other relevant study reports or data bases will be done.

The real time three seasons (pre-monsoon, monsoon and winter) primary baseline data will be collected for terrestrial floral (angiosperms, gymnosperms, pteridophytes, bryophytes, lichens, and fungi) and faunal (mammals, reptiles, amphibians, birds and butterfly) diversity considering the key parameters with appropriate sampling methods.

Species diversity and population estimates of above said floral, faunal and avi faunal groups will be worked out following standard scientific methodologies. For this purpose, multi-disciplinary expert's team consisting of ecologists, taxonomists, wildlife experts and social expert will be roped in for baseline data collection from the field and preparation of related report. Analysis of impact of resultant changes in flora and fauna in the impacted area will be worked out by comparing the present findings with baseline information provided in EIA/EMP report of Jayant OCP.

Species of NTFP value including food value will be shortlisted from the available literatures and from primary studies on the subjects and will be cross checked from the forest officials and forest fringe communities. Availability and consumption pattern of forest-based food and drinking water among the fringe communities will be carried out through survey with structured questionnaire. Analysis of impact of resultant changes in forest-based food and drinking water in the impacted area will be worked out by comparing the present findings with baseline information generated by the study carried out by AIIMS, New Delhi.

Information on role of local governance that ensures conservation of forest resources will be collected from the forest department and village panchayats and will be analyzed following due methodologies. Gaps in conservation of important species, if any will be identified and appropriated conservation measures will be suggested.

6. Information and other logistics support required from the project authority

Copy of the following reports/data/information are required to be provided to the ICFRE, Dehradun:

i. EIA/EMP report
ii. Progressive Mine Closure Plan
iii. Meteorological data (max and min temperature, relative humidity, rainfall, frequency *etc.*) from nearest IMD meteorological station(s) for immediately preceding five years.
iv. Boundary shape file of mine leases and proposed coal transportation road from Jayant to Morwa railway siding.
v. Details of key persons and associated staff.
vi. Necessary permissions from State Forest Department, if any.
vii. Any other documents relevant to the mine.

7. Time schedule

The proposed time schedule for completing the task will be **15 months from the receipt of Ist installment**. The tentative schedule of the works is provided in Table 1.

Table 1: Schedule of work activities month wise

SN	Work Component	Time schedule (Month)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Desk Review and discussion with project officials															
2.	Field primary baseline data collection on terrestrial flora & fauna for three seasons, interaction with fringe communities and forest department, etc.															
3.	Analysis and interpretation of data															
4.	Preparation of report															
5.	Submission of draft report															
6.	Final report submission															

Note- The above time schedule will depend upon the availability of data and accessibility to the Project site as well as COVID-19 pandemic situation in the concerned areas of study.

8. Budget Estimate

An estimated cost of **Rs. 57.19** excluding GST is proposed along with breakup as following:

Sl. No.	Component	Amount (Rs. Lakh)
1.	Cost of man-days of officials deployed from the ICFRE	10.00
2.	Cost of physical inputs/services/utilities/ consumables/raw materials, engagement of project staff and skilled, office expenses and report printing etc.)	15.00
3.	Engagement of Domain experts	5.00
4.	Travel Expenses	12.00
5.	Contingencies	1.00
6.	**Sub Total (1 to 6)**	**43.00**
7.	Intellectual fee @ of 33% of above	14.19
8.	**Sub Total (7 to 8)**	**57.19**
9.	**GST@18% or as applicable**	

Apart from the above, the local accommodation and transport facility to the visiting experts from the ICFRE needs to be provided by the project authorities during the field visits.

9. Payment Schedule

The payment schedule will be as under:

SN.	Work attributes	Installment No.	% of Installment
1	Acceptance of proposal and award of study	1st	75
2	On the submission of draft report	2nd	15
3	On the submission of final report	3rd	10

10. Deliverables

Part comprehensive study to assess the impact of changes in composition of the forest flora and fauna, impacted area and the forest fringe communities surrounding diverted forest land for coal transportation road wrt. Jayant Opencast Coal mine of NCL, Singrauli, Madhya Pradesh will be submitted both in hard and soft copy as per scope of works.

11. Tentative Scope of Work for AIIMS, New Delhi*

1. Assessment of nutritional value of forest-based food being consumed by forest fringe communities.
2. Analysis of forest- based food being consumed by forest fringe communities for presence of heavy metals.
3. Assessment of drinking water quality being consumed by forest fringe communities.
4. Analysis of drinking water being consumed by forest fringe communities for presence of heavy metals.
5. Assessment of general and mental health of forest fringe communities.
6. Analysis of impact of consumption of polluted drinking water and forest-based food on general well-being including mental health of the communities.
7. Suggestive mitigative measures to contain pollution of drinking water and forest-based food in relation to general well-being including mental health of the communities.

***Above scope of work may be fine-tuned in consultation with concerned officials of AIIMS, New Delhi in the light of FAC comment by the NCL.**

Further, Approach and methodology for scope of works for AIIMS, New Delhi, time schedule for study and estimated cost for study may be obtained from AIIMS, New Delhi. On getting the same from AIIMS, the same may be provided to ICFRE for making of the comprehensive final proposal.

Action for the above: NCL

Annexure-II

Northern Coalfields Limited

(AMiniRatna Company)

(A subsidiary of Coal India Limited)

एन सी एल
NCL

Northern Coalfields Limited

(AMiniRatna Company)

(A subsidiary of Coal India Limited)

Office of the General Manager, Nigahi Project
CIN- U10102MP1985GOI003160
An ISO: 9001, ISO: 14001 & OHSAS: 18001 Certified Company
486884/ Post- Nigahi Project, Distt- Singrauli, M.P. PIN-486884
Phone: 07805-276306, (FAX) 276306 email: cgmngh.ncl@coalindia.inwebsite : www.nclcil.in

No.: NGH/GM/SO(M)/Env./21-22/ 1268 Date: 18.02.2022

Undertaking / NOC for transfer of forest land

With reference to the MoEF's F.No. 8-67/2002-FCVol. dated 03.02.2022, I, Area General Manager, Nigahi Opencast Project, hereby undertake that I have no objection in transfer of 18.00 Ha Forest Land out of 424.517 Ha diverted Forest Land (vide MoEF's F.No. 8-26/2015-FC dated 12.04.2018) from Nigahi Opencast Project to the adjoining Jayant Opencast Project of the same company i.e., M/s Northern Coalfields Limited. Application for the same has already been submitted from Nigahi OCP to the Nodal Officer (FC/LM), vide letter no. NGH/GM/SO(M)/Env./21-22/1242 dated 26.10.2021 (copy enclosed) for transfer of 18.00 Ha Forest Area from Nigahi Opencast Project to Jayant Opencast Project.

18/02/2022

(Harish Duhan)
Area General Manager
Nigahi Area, NCL

General Manager
NCL NIGAHI PROJECT

Annexure-II

नॉर्दर्न कोलफील्ड्स लिमिटेड
(मिनिरत्न कंपनी)
(कोल इण्डिया लिमिटेड की अनुषंगी कंपनी)

Northern Coalfields Limited
(A Miniratna Company)
(A subsidiary of Coal India Limited)

Office of General Manager, Jayant Project

CIN- U10102MP1985GOI003160
An ISO: 9001, ISO: 14001 & OHSAS: 18001 Certified Company
Post- Jayant , Distt- Singrauli, M.P. PIN-486890
Phone: 07805- 222435, (FAX) 222228
email: gmint.ncl@coalindia.in website : www.nclcil.in

Date 26.10.2021

Undertaking for Compliance of stage-I/II conditions.

Undertaking is hereby submitted for the transfer of 18.00 Ha Forest Land from Nigahi OCP to Jayant OCP, NCL :

- Jayant Expansion Project (25 MTPA) was approved in NCL board and further EC was granted by MoEF&CC vide J-11015/12/2017-IA.II (M) dated 29.08.2018.
- The EC of Jayant Project includes 18.00 Ha Forest Land of 424.517 Ha Forest Land earlier diverted to Nigahi Project. Land use plan including 18.00 Ha Forest Land has already been prepared and submitted to MoEF&CC.
- It is certified that all the conditions stated in the stage-I and Stage-II letters of diversion of the 424.517 Ha forest land of Nigahi OCP (containing 18.00 Ha) will be complied .

26/10/21

(R.B.Prasad)
Area General Manager
Jayant Project