

INDICATIVE PLAN
DISTRICT MINERAL FOUNDATION
ANGUL, ODISHA



Centre for Science and Environment



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Preface

District Mineral Foundation (DMF) Rules of various states as well as Pradhan Mantri Khanij Khestra Kalyan Yojana (PMKKKY) specify that DMFs in every district should go through an annual planning exercise for identifying and prioritizing projects and works to be undertaken with DMF funds. Two clear issues have been underscored for DMF planning: districts should practice a bottom-up planning approach involving Gram Sabhas, and intervention should focus on certain “high priority” issues in mining-affected areas to maximize the welfare and benefit of the affected people.

Both of these specifications are given to ensure optimal deployment of financial resources available with DMFs for the “interest and benefit” of people affected by mining-related operations. For this, districts need to develop DMF plans adopting a systematic approach. This will also help to reduce ad hoc and reactive planning, poor investments and chances of special-interest interference.

To this effect, an indicative DMF plan for Angul district is proposed. The purpose of this exercise is to provide a template for identifying priorities and setting plan targets by DMFs based on an output-outcome oriented approach, which can be considered by the district in line with its annual district and DMF budgets. It is also as an attempt to enable more stable investments, as the indicative plan takes into account the opinions people from mining-affected areas, members of Gram Panchayats/wards, civil society representatives and officials at the block and district levels, the stakeholders who are in direct charge of the various bits of the economy.

Section 1: Introduction and overview

1.1 Context of Indicative District Mineral Foundation Plan

Planning and budget allocation of DMFs should happen as per provisions of the Mines and Minerals (Development and Regulation) Act (MMDR), 1957, as amended in 2015, and the Odisha DMF Rules, 2015 (as amended in February 2016). The provisions under both of these emphasize on developing human capital, making people employable, and providing security for the future. The state DMF Rules also specify the requirement of a planning exercise that DMFs in every district should go through for identifying and investing on works and schemes that will benefit the people and areas affected by mining related operations. Districts should practice a bottom-up planning approach to understand people's needs and include such considerations in the DMF plan. There are also some clear directions in the state DMF Rules, aligned with the Government of India (GOI) scheme, the Pradhan Mantri Khanij Khestra Kalyan Yojana (PMKKKY) guidelines, which all DMFs are required to follow while developing plans and preparing budgets. These include:

- Undertaking a bottom-up planning approach involving Gram- Sabhas of mining affected areas.
- Focusing on certain “high priority areas” such as, drinking water supply, sanitation, health, education, welfare of women and children, welfare of aged and disabled, skill development, environment preservation and pollution control measures.
- It has been specified that at least 60 per cent of the DMF budget should be earmarked towards addressing and mitigating the “high priority” issues.
- Limiting allocation on physical infrastructure and other big projects which already have funds from the state coffers: The Rules clarify that for areas such as physical infrastructure, irrigation, energy, watershed development etc, no more than 40 per cent of the money should be used.

Besides outlining the intervention issues, the DMF Rules and PMKKKY also emphasize on certain important factors that should be considered in DMF budgets:

- In the case of schemes or projects which already enjoy financial support from the Central or the state government, the developmental and welfare activities to be taken up by the DMF should complement those schemes and projects. This means there is a clear need to review the status of, and the gaps in, the Central/state schemes and projects which are operational in the districts.
- It has been clearly mentioned that a reasonable sum of the annual receipts should be kept as endowment fund for providing sustainable livelihood.

The indicative DMF plan as proposed for Angul district, takes all of these into consideration to provide a template for identifying issues and prioritizing investments that can serve the best interest of the people and areas affected by mining.

1.2 Planning approach

An ‘output and outcome’ oriented approach has been followed for developing the indicative DMF plan. In this approach, outputs are time-bound measurable products of investments and activities that can often be expressed in physical terms or units. The intended outcomes are collective results of the measurable outputs, which are qualitative improvements and sustainable over long-term.

The merit of an output and outcome oriented approach is that it ensures “accountable, pro-active and purposeful” planning as per the defined objective of a particular scheme. For DMF planning, this means fulfilling the objectives of the DMF law, as well as PMKKKY, which has been aligned to DMF.

The GOI has also emphasized on such approach in the latest budget of 2017-18. The GOI has noted that budget outlays need to be presented along with outputs and outcomes in measurable terms, to bring in greater accountability for the agencies involved in the execution of the schemes and projects¹.

1.3 Method

The method followed for developing the indicative plan involved the following two major steps:

- i. Gap analysis of key socio-economic, human development and environmental parameters.
- ii. Prioritizing issues and identifying approaches for intervention based on DMF objectives.

For both of these steps a bottom-up approach has been followed alongside evaluating factual and recorded information by the government.

i. Gap analysis: The deficiencies in intervention on the priority socio economic, human development and environmental issues in the district has been determined through gap analysis, taking into account quantitative and qualitative information, as well as resources. The gap analysis for various parameters was done through the following steps:

- a. Collecting data/information:** Collecting data and information on various parameters constitute of both quantitative and qualitative components.
 - The quantitative part is based on a stock-taking exercise on information pertaining to various socio-economic, human development and environmental parameters for the district, and specifically for mining-affected areas.
 - The qualitative part is based on the approach of participatory rural appraisal (PRA), to capture people’s perception and aspiration. The main PRA methods used for this exercise are focus group discussions (FGD), and semi structured interviews (SSI). For the purpose of this

study, FGDs have been conducted through randomized sampling in village(s)/ settlements, particularly in the mining-affected areas. With respect to SSI, discussions/ interviews were held with district and block officials and people in the mining-affected areas (*Refer to section 4 for detail on FGD and SSI process and observations*).

- b. Data collation and processing:** The quantitative and qualitative data/ information collected is collated and compiled in a prescribed format. The data has also to be checked for accuracy, errors, incompleteness and gaps.

Once the data is collated, it is important to analyze the situation. The collated data (both quantitative and qualitative) is thus used to describe the basic characteristics/features (descriptive statistics), and to draw broader inferences (inferential statistics).

- c. Resource mapping:** This involved identifying the resource envelop(s) to address the priority issues of the district. Since districts have budgets and allocations for every financial year, therefore the finances and allocations for only the last financial (2016-17) has been considered to understand the investments.

ii. Prioritizing issues and identifying approaches for intervention based on DMF objectives: Based on the gap-analysis, finally priority issues have been determined that DMFs need to focus on for intervention through a perspective planning approach. This will help to address issues immediately as well as plan for long-term investments.

Considering the output-outcome approach, a framework has been developed as the final step of the indicative planning exercise. In the framework, against each of the intended outcomes, a number of output factors have been identified which are considered to be crucial for achieving the target outcomes. It is intended that these outputs will be met through short-term, medium-term and long-term investments to achieve the final outcome.

Section 2: Background of the district

2.1 Location and geographical area

Angul district is located in the central part of Odisha between 20° 31' N & 21° 40' N latitude, and 84° 15' E & 85° 23' E longitude. The district is surrounded by Cuttack and Dhenkanal on the east, Sambalpur and Deogarh on the west, Sundargarh and Keonjhar on the north and Phulbani on the south. The district covers an area of about 6374 square kilometers (sq.km) or 637,437 hectares (ha), out of which 97 per cent is rural (6198 sq km.)². Area wise it is the eleventh largest district of Odisha.

2.2 Administrative areas

The administrative headquarters of the Angul district is located at Angul town. There are four subdivisions with eight blocks and nine census towns. Total number of Gram Panchayats (GP) in the district is 225 and two municipalities. The eight blocks of the district are Angul, Chhendipada, Kaniha, Talcher, Palalahada, Kishorenagar, Banarpal and Athamalik. The two municipalities are Angul and Talcher, and Athamalik is a notified area council (NAC) (See figure 1: Administrative map of Angul district).

2.3 Land use/land cover

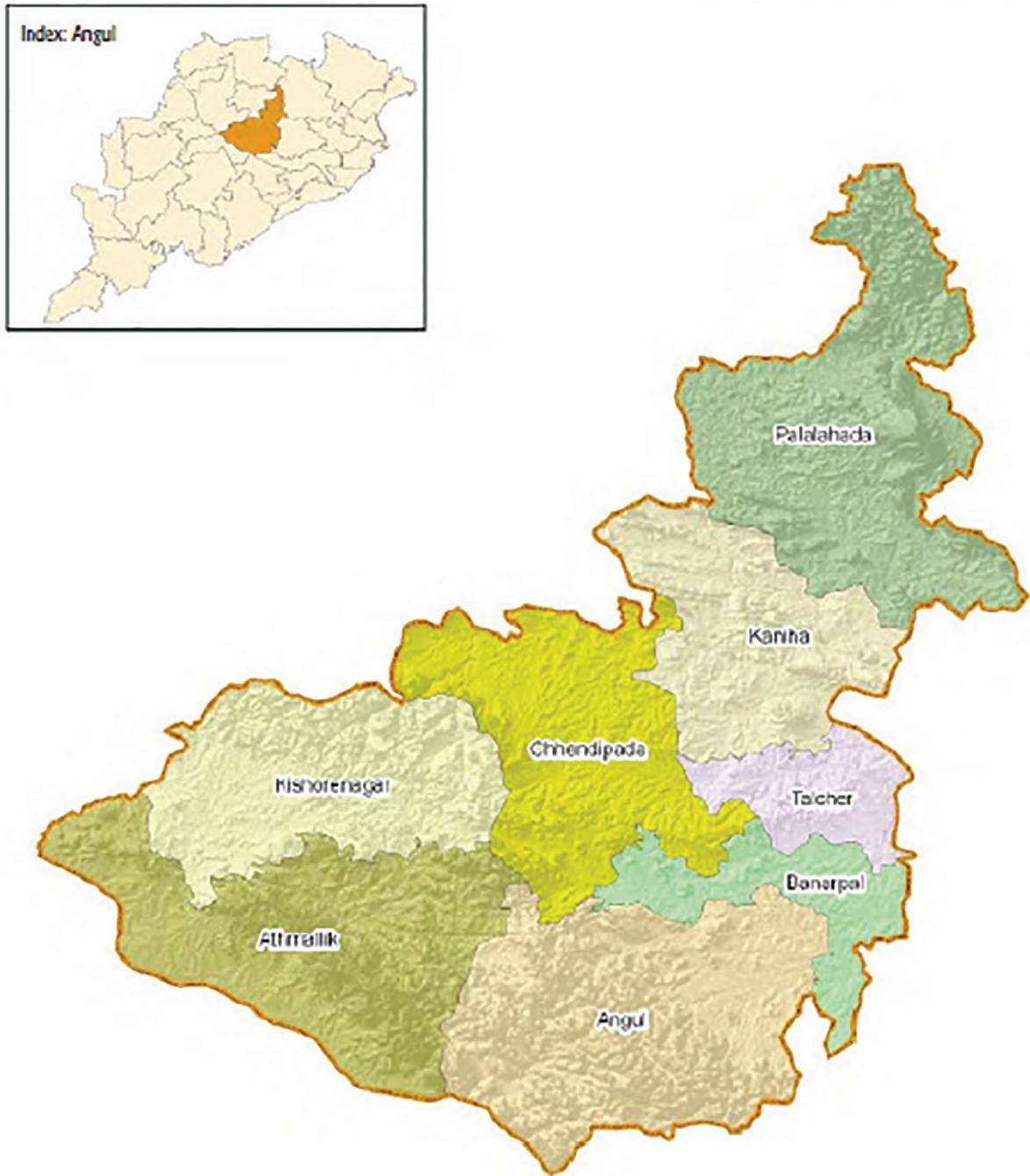
The land use/land cover of Angul district is dominated by forests, which accounts for about 42.6 per cent of the total geographical area (See table 1: Land use/ land cover in Angul district). There are also vast areas of cultivable land/ agricultural land, which is nearly 30 per cent (combining net sown area and fallow land) of the total land area (See figure 2: Land use/Land cover map of Angul district)³.

Brahmani and Mahanadi are two main rivers flowing through the district along with their tributaries. Brahmani river basin covers an area of about 4226 sq.km (422,600 ha) in Talcher, Palalahada and Angul sub-divisions. The basin of Mahanadi is spread over Athamalik and parts of Angul sub-divisions⁴.

Land use/ land cover of Talcher coalfield

The Talcher coalfield dominates the mining landscape in Angul district. According to mapping of the coalfield as done by the Central Mine Planning and Design Institute (CMPDI), the Talcher coalfield covers an area of more than 2.34 lakh hectares⁶.

Figure 1: Administrative map of Angul district



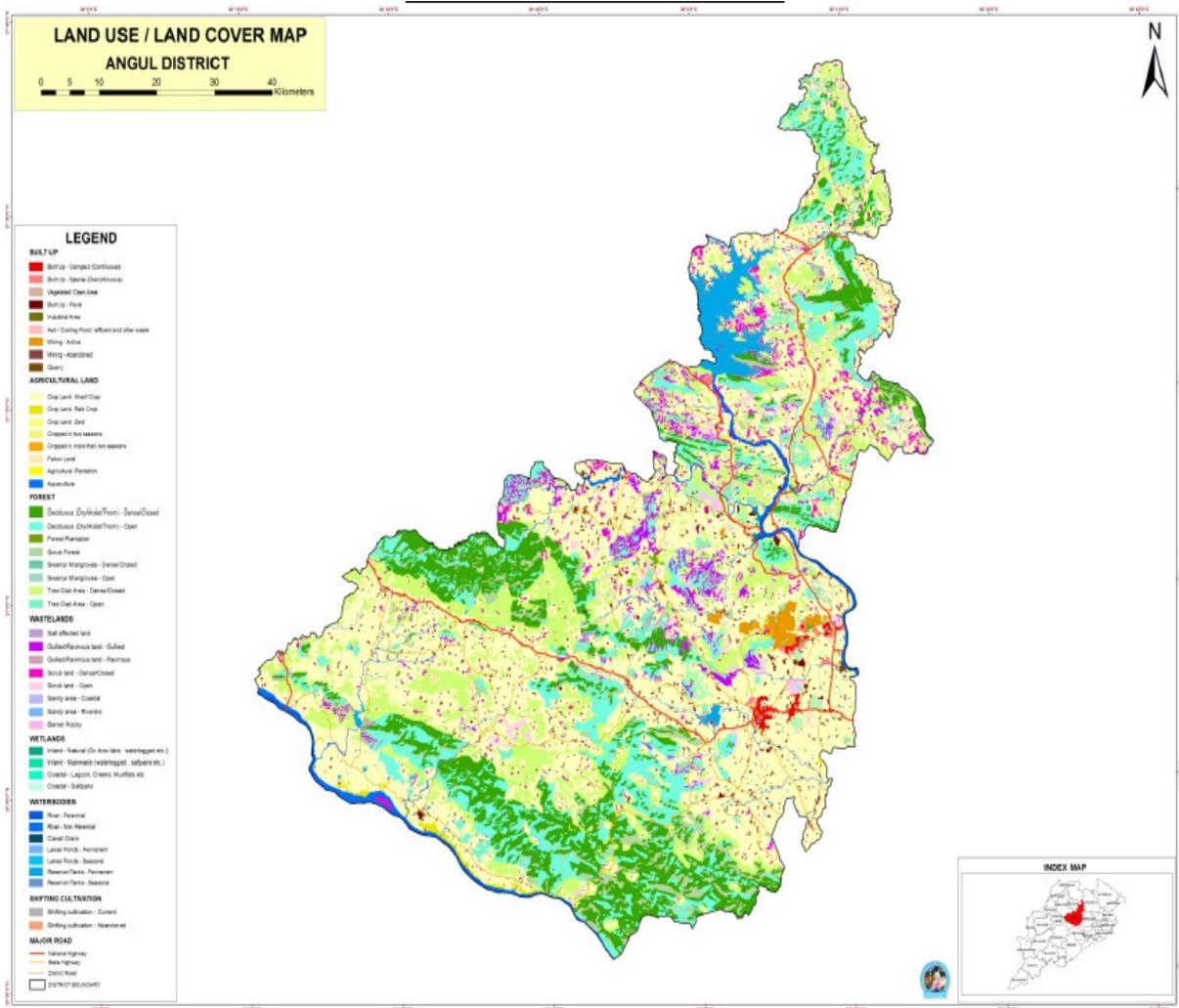
Source: District portal Angul (Report on atlas of development trends)

Table 1: Land use/ land cover in Angul district¹

Land use/Land cover classes	Area (ha)	% of total area
Forest cover	271,682	42.6
Misc. trees and groves	4,854	0.8
Net sown	113,493	17.8
Permanent Pastures	17,964	2.8
Culturable waste	17,982	2.8
Land put to non-agricultural use	37,216	5.8
Barren and uncultivated land	21,666	3.4
Current Fallow	44,901	7
Other Fallow	31,817	5
Other	75,862	11.9

Source: District irrigation plan, Angul (2016)

Figure 2: Land use/Land cover map of Angul district



Source: Odisha Space Application Centre

Table 2: Land use/ land cover of Talcher coalfield

Land use/Land cover classes	Area (ha)	% of total area
Forest cover	1,48,089	63.24
Mining area	2,254	0.96
Agricultural land	52,365	22.36
Waste land	21,657	9.25
Settlement area	5,106	2.18
Water bodies	4,716	2.01
Total	2,34,187	

Source: CMPDI (2013)

Like Angul district, the predominant land cover in the Talcher coalfield constitutes of forests (dense/open/ scrubs and plantations), which covers more than 63 per cent of the coalfield. This is followed by agricultural land which is more than 22 per cent. The mining area constitutes about 1 per cent of the coalfield (*See table 2: Land use/ land cover of Talcher coalfield*).

2.4 Mining activities and mining-affected areas

Coal is the primary mineral resource of the district. Situated on the right bank of the river Brahmani, the Talcher coalfield in Angul district has about 50,968.5 million tonnes (MT) or about 51 billion tonnes of coal reserves⁷. Other minerals include chormite, graphite, maganese, mica, keyanite, granite, laterite, sand (stow), quartz etc .

There are 11 working coal mines in the district operated by Mahanadi Coalfield Limited (MCL), a subsidiary of Coal India Limited (CIL). A total of nine mines, combining open cast (OCP) and underground (UG), are there in Talcher block. Besides there is one in Kaniha and one in Chhendipada blocks (*See table 3: Coal mines in Angul district*). As per latest statistics of MCL, in 2016-17 coal production by the company stood at 139.21 MT (combining Talcher and IB valley coalfields), about 57 per cent of which was from Talcher⁸.

Table 3: Coal mines in Angul district

Name of mine	Company	Location	Type of mining	Area (ha)
Lingaraj	MCL	Talcher	Open cast	148.3
Anant	MCL	Talcher	Open cast	236.4
Jagannath	MCL	Talcher	Open cast	120
Bharatpur	MCL	Talcher	Open cast	653.6
Kalinga	MCL	Talcher	Open cast	89
Hingula	MCL	Talcher	Open cast	136
Bhubaneswari	MCL	Talcher	Open cast	193
Nandira	MCL	Talcher	Underground	136.4
Talcher	MCL	Talcher	Underground	122.7
Kaniha	MCL	Kaniha	Open cast	16.5
Chhendipada	MCL	Chhendipada	Open cast	24.3

Source: Department of Steel and Mines, Odisha

Table 4: Mining-affected areas in Angul district

Block name	Total no. of panchayats	Affected panchayats
Talcher*	21	21
Kaniha	27	13
Chhendipada	34	5
Angul	34	0
Kishorenagar	23	0
Palalahada	27	0
Atthamallik	24	0
Banarpal	35	0
Total	225	39

*Talcher municipality with 23 wards is also 100 per cent mining-affected.

Talcher, Kaniha, and Chhendipada, are also the three mining-affected blocks of the district as identified by officials. Out of these evidently Talcher is the worst one, identified as 100 per cent mining-affected given the large concentration of mines in this area (*See table 4: Mining-affected areas in Angul district*). Talcher municipality with 23 wards, has also been identified as completely affected since the mines are in the immediate vicinity of it.

2.5 Demographic profile

As per Census 2011, the population of Angul district is about 12.74 lakhs, of which 51.5 per cent is male and 48.5 per cent female respectively (*See table 5: Overall demographic profile of Angul district*). The observed decadal population growth rate for the district between 2001 and 2011 was about 11.74 per cent. The district is predominantly rural in nature with nearly 84 per cent of the population residing in rural areas⁹. The rural areas are also economically distressed, with about 90 per cent of rural households highest earning member getting below Rs. 10,000 per month¹⁰.

The block-wise (including municipal areas and NAC), demographic distribution reveals that most of them are predominantly rural, except for Talcher. Among the three mining-affected areas identified by the district, Chhendipada has 100 per cent rural inhabitants, while the proportion in Kaniha is 93.5 per cent. In Talcher (including the population of municipal area) about 53.5 per cent people live in rural areas (*See table 6: Population distribution*)¹¹.

As per distribution across caste, while general category is predominant, but there is considerable representation of Scheduled Caste (SC) and Scheduled Tribes (ST) in the mining-affected areas. In all three affected areas, Chhendipada, Kaniha and Talcher, SC and ST combined constitute about 30 per cent of the population¹².

Table 5: Overall demographic profile of Angul district

Total district population	Male (%)	Female (%)	Urban (%)	Rural (%)	SC (%)	ST (%)
12,738,21	51.5	48.5	16.2	83.8	18.8	14.1
Sex Ratio	943 (Rural- 953; Urban- 889)					
Density of Population (per sq.km)	200					
Decadal population growth (2001-2011) %	11.74					
Total households	300105 (Rural- 93.5%; Urban- 6.5%)					
Below Poverty Line Population (%)	22					
Households (highest earning member) in rural areas earning below Rs. 10,000 per month (%)	90					

Source: Census of India (2011); Socio-Economic Caste Census (2011)

Table 6: Population distribution

Block including municipal area	Total population	Rural population (%)	Urban population (%)	SC Population (%)	ST population (%)
Talcher (including Talcher municipality)	183,463	53.5	46.5	18.6	8.1
Chhendipada	166,751	100	NA	21.5	10.7
Kaniha	143,109	93.5	6.5	21.5	8.4
Angul (including Angul municipality)	210,556	79.2	20.8	17.9	9.2
Kishorenagar	107,821	100	NA	14.9	20.1
Palalahada	129,806	95.6	4.4	15.4	39.2
Atthamallik (including Atthamallik NAC)	122,850	90.0	10.0	17.5	22.3
Banarpal	209,465	76.1	23.9	20.7	7.3

Source: Census of India (2011)

Section 3: Situation analysis through stock-taking

The stock-taking exercise of various socio-economic, human development and environmental parameters has been done by analyzing district and block level data/information pertaining to these. The main sources of the data, including contextual information, include various Government documents and reports as published by accredited agencies. Some key sources from where data has been obtained include-

- Census of India reports- District Census handbook, Angul, 2011.
- National Sample Survey (NSS) data, Ministry of Statistics and Program Implementation.
- Socio Economic Caste Census data, Ministry of Rural Development.
- Rural Health Statistics Report (2014-15), Ministry of Health and Family Welfare.
- District Information System for Education (DISE): School Reports maintained by National University of Educational Planning and Administration (NUEPA).
- Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) MIS Reports for districts, Ministry of Rural Development.
- District level authorities and departments- such as District Rural Development Agency, health department, education department, water supply and sanitation department, social welfare department etc.
- Reports prepared by Government, accredited institutions/ agencies (latest ones).
 - National Family Health Survey of India.
 - Census of India, Annual Health Survey.
 - Ministry of Drinking Water and Sanitation, reports on Swachh Bharat Mission.
 - Central Ground Water Board (CGWB), District ground water brochures.

3.1 Analysis of human development parameters

Human development indicators typically reflect average achievement with respect to three key dimensions of human development. These include¹³:

- A long and healthy life.
- Having education and being knowledgeable.
- Having a decent standard of living.

Therefore, for a district, the key parameters of measure of human-development include the status of public health, nutrition and concerns of food security and livelihood of people. To ascertain the status of each of these a situation analysis was done through stocking-taking of data/ information at the district and the block levels.

3.1.1 Public Health

The Talcher coalfield has been identified as one of the most polluted areas in the country. In 2009, the Central Pollution Control Boards identified the Angul-Talcher area as “critically polluted”¹⁴. Poorly regulated and managed large industrial activities as related to coal mining, thermal power, aluminum smelting, iron and steel, sponge iron and ferro-alloys has contributed to the pollution in this region. This in turn has taken a toll on public health.

The public health and healthcare status of Angul district, and particularly the mining-affected blocks has been reviewed on the basis of the following key parameters:

- a. Disease prevalence.
- b. Existing healthcare infrastructure and accessibility.
- c. Status of available health care staff – doctors, health workers etc.

Based on the situation on each of these, the overall gaps in public healthcare have been identified.

A. Review of public healthcare parameters

a. Disease prevalence

The data of disease prevalence at the district-level and particularly at the block-level is poor. The situation has been largely captured through reviews of Annual Health Survey Report of the GOI (2012-2013), and through interviews with health officials, health centre visits and interaction with communities in mining affected areas. Reportedly, the most common diseases in the mining-affected blocks are gastro-intestinal problems such as diarrhea and dysentery, malaria and various respiratory ailments including tuberculosis.

With respect to waterborne diseases such as diarrhoea and malaria, statistics of the Ministry of Health and Family Welfare (2017), indicates that children below the age of 5 years are particularly vulnerable to these. (*See table 7: Percentage of diarrhea, dehydration, and malaria in children 0-5 years of age to total reported childhood diseases of 0-5 years*). A primary reason for such illnesses is unavailability of clean drinking water and sanitation facilities¹⁵.

These conditions also have a strong bearing on the development of children, as identified in the Global Hunger Index Report (2017), that has identified lack of proper sanitation has a strong effect on child health and their nutrition absorption capacity¹⁶.

Besides children below five years, overall prevalence of diarrhoea/dysentery is high in the district. More than 830 people per one lakh population suffer from these ailments, which is higher than the state average. People also

Table 7: Percentage of diarrhea, dehydration, and malaria in children 0-5 years of age to total reported childhood diseases of 0-5 years (2016-17)

Block	% diarrhoea and dehydration	% malaria
Talcher	99.2	0.6
Chhendipada	83.2	16.8
Kaniha	99.5	NA
Angul	73.1	25.7
Athamallik	60.2	37.3
Banarapal	46.2	53.4
Pallahara	38.2	61.4
Kishore Nagar	81.7	18.2

Source: Ministry of Health and Family Welfare (August 2017)

Table 8: Some key health conditions in Angul district

Illnesses (per lakh people)	Person in Odisha			Person in Angul district		
	Total	Rural	Urban	Total	Rural	Urban
Diarrhoea/Dysentery	762	821	457	831	896	511
Chronic symptoms of Diabetes	1047	733	2676	1233	939	2690
Tuberculosis (TB)	185	193	141	126	136	75

Source: Ministry of Health and Family Welfare, Annual Health Survey (2012-13)

suffer from other nutrition disorders such as diabetes, the prevalence of which is particularly high in municipal areas (See table 8: Some key health conditions in Angul district)¹⁷.

Besides, there are also significant reported cases of respiratory ailments, particularly tuberculosis (TB). In Angul the TB prevalence is 193 per one lakh population in rural areas, which is as per the national average (195 per one lakh population)¹⁸. However, it is to be noted here, that the India average is extremely problematic as the country has been identified as one of the countries with a high TB burden and has a target of eradicating TB by 2030 under the Sustainable Development Goals (SDG)¹⁹.

Another notable problem in the district is high proportion of disabled people. As per the Annual Health Survey Report (2012-13), 2524 people per one lakh population suffer from disability, higher than the state average of 2358 per one lakh.

b. Healthcare infrastructure and resources

Given the severity of pollution and poor health conditions of people as reported during ground interaction, the available healthcare infrastructure, along with qualified health staff at the facilities, is critical. Considering these factors, in this section review has been done separately for primary and secondary healthcare facilities.

Table 9: Number of primary healthcare facilities (Government) and staff strength

Block Name	Sub centres		PHC		CHC (block hospitals)		Mobile medical units
	No.	Staff strength	No.	Staff strength	No.	Staff strength	No.
Chhendipada	25	45	4	18	2	46	2
Kaniha	20	32	4	16	1	15	2
Talcher	21	39	3	12	1	9	2
Angul	27	40	5	24	1	13	2
Kishorenagar	16	23	3	15	1	11	1
Palalahada	20	40	5	15	1	16	2
Atthamallik	26	39	3	12	1	11	2
Banarpal	20	37	4	13	1	10	1

Source: District Health Department, Angul

Primary healthcare: Sub Centres, Primary Health Centres (PHC) and Community Health Centres (CHC), together constitute primary healthcare facilities. Besides, mobile medical units also supplement for primary healthcare facilities particularly in rural areas.

Data as obtained from district and block levels gives an overall understanding of the number of these facilities in every block and the health staff available there (*See table 9: Number of primary healthcare facilities and staff strength*).

The Indian Public Health Standard (IPHS), as provided under the National Health Mission (NHM), stipulates the minimum requirements of public healthcare facilities in rural areas. Considering that Angul district is primarily rural in nature, the IPHS norm has been considered as the overall benchmark. According to IPHS, in the rural areas, there should be at least one sub-centre for every 5000 people, one PHC per 30,000 people, and one CHC per 1,20,000 people²⁰.

Considering this, if the health care facilities in rural mining-affected areas are reviewed, it shows that on an average there is one SC per 7,000 people, one PHC per 45,000 people, and just one CHC for about 1.4 lakh people. This clearly indicates a shortfall of all basic healthcare facilities across blocks.

For urban areas, the situation is comparatively better. According to National Urban Health Mission (NUHM), there should be one urban PHC per 50,000 to 60,000 population. Considering urbanized areas, this proportion is satisfied.

The poor status of primary healthcare becomes much more pronounced when healthcare staff is considered. For example, according to IPHS²¹, there should be atleast (“essential”) 3 health workers in sub centres, 15-20 health staff at

PHCs (depending on the PHC type A or B), and 35- 40 health staff of various competence, specializations and responsibilities at CHCs²². Taking this as a benchmark, if the overall number of health workers and health staff as made available for various primary healthcare facilities are compared, it clearly shows that the average staff strength falls far below that what is required. The problem is particularly acute in PHCs and CHCs, where in most places not even 50 per cent of the staff requirement is met.

Secondary healthcare: The secondary healthcare system constitutes of sub-district/sub-divisional hospitals and district hospital. They both are important components of more specialized and comprehensive healthcare facilities for a district's rural as well as the urban population.

The sub-district/ sub-divisional hospitals also form an important link between SC, PHC and CHC on one end and district hospitals on other end, and are the first referral units for the tehsil/ taluk/ block population in which they are located. The National Health Mission (NHM), also identifies sub-divisional hospitals to be significant for bringing down the Maternal Mortality Rate (MMR) and Infant Mortality Rate (IMR) as these facilities are meant to provide emergency obstetrics care and neonatal care²³.

The district hospital on the other hand functions as a secondary level referral centre. While all district hospitals are required to be equipped to provide all basic specialty services, but they should also be developed into super-specialty services gradually, particularly for bigger districts identifies the NHM²⁴.

In Angul district there is one district hospital in the district headquarter Angul, and three sub-divisional hospitals in Talcher, Athamallik and Palalahada.

One of the key concerns for these facilities is the bed capacity. This has also been repeatedly highlighted in the FGDs and SSIs (*Refer to section 4*). As per available information from the district, there are 72 beds in the district hospital, 42 beds in Talcher sub-divisional hospital and 30 beds each in Athamallik and Pallahara sub-divisional hospitals²⁵.

B. Gaps in the public healthcare

The status of the health sector in the mining-affected areas as identified from analysis of the official data shows gaps/deficits both in infrastructure as well as resources. The key deficits include:

- a. Inadequate number of primary healthcare facilities- sub centres, PHC, CHCs.
- b. Inadequate human resources – doctors and health workers etc.
- c. Lack of human resources and supporting infrastructure in hospitals.

a. Inadequate number of primary healthcare facilities

The primary healthcare infrastructure is clearly sub-optimal in Angul district, including mining-affected areas. Most sub centre and PHCs are serving close to 1.5 times their capacity and reach, as compared against IPHS norms (*See table 10: Deficits in primary healthcare facilities and staff*).

b. Inadequate human resources

The shortage of healthcare facilities is compounded by the lack of adequate number of healthcare personnel at these facilities. Across the district, there is a huge deficit in all sanctioned positions of the government, including doctors, nurses, specialists and health staff at various primary healthcare facilities. The reliance is high on contractual staff in almost all facilities offering primary and

Table 10: Deficits in primary healthcare facilities and staff

Sub centre				
Block Name	Average no. of people served per sub-centre	Serving over IPHS norm (1 SC/ 5000 people)	Average staff strength per sub-centre	Shortfall in no. of health staff compared to IPHS norm (3 nos.)
Chhendipada	6,670	1.3 times	2	1
Kaniha	7,188	1.5 times	1.6	1
Talcher	6,791	1.4 times	2	1
Angul	6,178	1.2 times	1.5	1
Kishorenagar	6,739	1.3 times	1.4	1
Palalahada	6,490	1.3 times	2	1
Atthamallik	4,252	NA	1.5	1
Banarpal	10,471	2.1 times	2	1
PHC				
Block Name	Average no. of people served per PHC	Serving over IPHS norm (1 PHC/ 30,000 people)	Average staff strength per PHC	Shortfall in no. of health staff compared to IPHS norm (15-20 nos.)
Chhendipada	41,688	1.3 times	4.5	10
Kaniha	35,939	NA	4	11
Talcher*	47,536	1.4 times	4	11
Angul	33,360	NA	5	10
Kishorenagar	35,940	1.1 times	5	10
Palalahada	25,961	NA	3	12
Atthamallik	36,851	NA	4	11
Banarpal	52,356	1.6 times	3	12
CHC				
Block Name	Average no. of people served per CHC	Serving over IPHS norm (1 CHC/ 1,20,000 people)	Average staff strength per CHC	Shortfall in no. of health staff compared to IPHS norm (35-40ns.)
Chhendipada	83,376	NA	23	12
Kaniha	1,43,756	1.2 times	15	10
Talcher	1,42,608	1.1 times	9	26
Angul	1,66,802	1.3 times	13	22
Kishorenagar	1,07,821	NA	11	14
Palalahada	1,29,806	NA	16	19
Atthamallik	1,10,552	NA	11	24
Banarpal	2,09,424	1.7 times	10	25

*In urban area however the PHC coverage is satisfactory and meets the NUHM norms.

Table 11: Overall deficit in health staff in Angul district

Type of healthcare personnel and facility	Sanctioned (government positions)	In position regular (government positions)	Contractual through other sources
Total Health workers at sub centers (male)	87	11	61
Total Health workers at sub centers (female)	175	161	18
Total Health workers at sub centers	262	172	79
Total Health workers at PHCs (male)	0	0	0
Total Health workers at PHCs (female)	18	13	12
Total Health workers at PHCs	18	13	12
Total number specialists at CHCs	18	9	0
Total doctors at CHCs	27	13	5
Total staff nurses in CHCs	69	12	28
Total doctors in sub-divisional and district hospital	93	58	6
Total nurses in sub-divisional and district hospital	139	36	30
ASHA	1157	NA	1141

Source: District Health Department, Angul

secondary healthcare (See table 10: Deficits in primary healthcare facilities and staff; and table 11: Overall deficit in health staff in Angul district).

For example, in CHCs, overall there is a deficit of 50 per cent doctors and 80 per cent staff nurses. In district and sub-district hospitals, the deficit in sanctioned government positions is 40 per cent in case of doctors and about 75 per cent for staff nurses.

c. Lack of human resources and supporting infrastructure in hospitals

When compared against the IPHS, the beds at these various hospitals are grossly inadequate. As a thumb-rule in IPHS, it is estimated that the number of beds required at a district hospital for a district having a population of 10 lakhs will be around 300. This is based on the general assumption of the average annual rate of admission as one per 50 people, and the average length of stay in a hospital- five days for a person. Similarly for sub-divisional hospitals, it is estimated that the number of beds required at one hospital for a sub-division having a population of five lakhs will be around 100-150.

Given the vulnerability of population to various diseases due to poor environmental and socio-economic conditions, this estimations will however me more stringent for Angul. However, even going by the thumb-rule, for

Angul district with a population of 12.7 lakh, the total number of beds required at the district hospital will be about 380. The current availability is then only about one-fifth of the requirement.

3.1.2 Nutrition and food security

With respect to nutrition and food security, the primary parameters looked at include:

- a. Infant mortality, under five mortality and malnourishment.
- b. Coverage under Integrated Child Development Services.
- c. Coverage under National Food Security Act (public distribution system).

Based on the situation on each of these, the overall gaps with respect to nutrition and food security have been identified.

A. Review of nutrition and food security parameters

a. Infant mortality, under five mortality and malnourishment

In Angul district the average infant mortality rate (IMR) is 48 and the the under five mortality rate (U5MR) is 59. Both of these indicators are worse for the rural parts of the districts, where IMR is 50 and U5MR is 62 (*See table 12: Mortality rates among various groups in Angul district*)²⁶. The indicators fall far short of what is envisioned against international benchmarks, such as the Sustainable Development Goals (SDG) necessitating serious intervention²⁷. Under SDG, the target for U5MR is 25 by the year 2030.

Table 12: Mortality rates among various groups in Angul district

Indicators	Total	Rural	Urban
IMR	48	50	38
U5MR	59	62	44

Source: Annual Health Survey (2012-2013)

The infant mortality rate (IMR) in rural parts of the district is 50 (average 48), while the under five mortality rate (U5MR) in rural parts is 62 (average 59).

Besides, mortality indicators, growth and weight indicators are also critical for good health. Various malnutrition symptoms are important in this respect. The most prominent symptoms of malnutrition in Angul district are stunted growth and underweight. On an average more than 46 per cent of the male child below five years of age are stunted and more than 33 per cent of them are underweight (*See table 13: Symptoms of malnutrition below five years age*)²⁸.

The National Family Health Survey (2015-16), further shows that more than 37 per cent of children between the age of six to 59 months (i.e., about six months to five years age group), suffer from are anaemic. The condition is largely related to high prevalence of anaemia among pregnant women. About 58 per cent of pregnant women within 15-49 years of age are anaemic²⁹.

Table 13: Symptoms of malnutrition below five years age

Nutritional status	Male	Female
Below -2 SD Wasting (%)	20.4	14.3
Below -3 SD Wasting (%)	6.2	5.3
Below -2 SD Stunting (%)	46.6	26.7
Below -3SD Stunting (%)	18.6	12.4
Below -2 SD Underweight (%)	33.6	28.2
Below -3 SD Underweight (%)	8.9	5.9
Below -2 SD Undernourished (%)	21.3	13.3
Below -3 SD Undernourished (%)	7.1	5.5

Source: Annual Health Survey (2012-2013); Clinical, Anthropometric and Biochemical (2014)

b. Coverage under Integrated Child Development Services

The primary goal of Integrated Child Development Services (ICDS) as identified by the GOI is to reduce malnutrition, and morbidity and mortality caused by nutritional deficiencies. To achieve this, the government identifies six services that must be assured. These include- supplementary nutrition, health and nutrition education, non-formal pre-school education, immunization, health check-up and monitoring, and referral services. Among these the former three are required to be provided and supported by the network of AWCs, while the later three are designed to be delivered through the primary health care infrastructure³⁰.

The status of AWCs has been looked into through three parameters, the adequacy of AWCs, staff at AWCs and availability of other infrastructure facilities such as drinking water and toilet.

All children below six years of age constitute the target group of ICDS. Further the government has stipulated coverage norms for ICDS for this age group. This requires that in non-tribal areas each AWC should cover 40 beneficiaries, and in tribal areas each AWC should cover 42 beneficiaries.

When analyzed against such benchmark, all the mining-affected blocks (and others as well), appear to have inadequate number of AWCs showing poor implementation of ICDS. In each of the three mining-affected blocks, the AWCs are catering to two to three times the number of children they are equipped to support (See table 14: Status of existing AWCs and average number of children covered).

The problem is compounded by the lack of proper infrastructure at these facilities. Two particular aspects which are evident from the official data include, AWCs without permanent structures, and lack of sanitation/ toilet facilities (See table 15: Status of infrastructure at AWCs). In mining-affected areas such as Talcher and Chhendipada, on an average 50 per cent of AWCs have permanent structure and 15 to 20 per cent have toilet facilities with premises.

Table 14: Status of existing AWCs and average number of children covered

Block Name	Total number of AWCs	Children below 6 yrs	Average number of children presumably covered by one AWC
Talcher	237	19,969	84
Chhendipada	191	20,055	105
Kaniha	176	15,832	90
Angul	264	24,966	95
Kishorenagar	148	13,209	89
Palalahada	188	18,128	96
Atthamallik	226	14,711	65
Banarpal	224	24,101	108

Source: District Rural Development Department, Angul

Table 15: Status of infrastructure at AWCs

Block Name	Total number of AWCs	AWCs with permanent structure	AWCs with drinking water facility	AWCs with toilet facilities	Functional toilet
Talcher	237	151	237	42	11
Chhendipada	191	106	191	28	17
Kaniha	176	130	176	50	9
Angul	264	133	264	88	33
Kishorenagar	148	104	148	48	21
Palalahada	188	135	188	99	32
Atthamallik	226	119	226	22	1
Banarpal	224	110	224	58	4

Source: District Rural Development Department, Angul

c. Coverage under National Food Security Act

The coverage of people under the National Food Security Act (NFSA), 2013, is satisfactory as per official information. The NFSA aims to ensure people's access to adequate quantity of quality food at affordable prices through public distribution system³¹.

In Odisha, the NFSA implementation has been made more targeted by including "inclusion and exclusion criteria" for identification of beneficiaries based on economic well being. There are six auto inclusion criteria to cover particularly all vulnerable people through public distribution system. There include, household without shelter, household with destitute who is living on alms, all households of Primitive Tribal Groups (PTG), household having a widow pension holder, household having a person with disabilities of 40 per cent or more and any transgender person.

On the other hand, nine exclusion criteria have also been provided to determine the beneficiaries. Families covered under any of the eight criteria are excluded

Table 16: Beneficiaries under NFSA in Angul district

Block name	No. of fair price shops	No. beneficiaries
Chhendipada	84	147,177
Kaniha	52	107,409
Talcher	44	85,813
Angul	99	164,070
Athmallik	76	103,074
Banarpal	102	141,459
Kishorenagar	86	96,305
Palalahada	86	114,000
Total	629	959,307

Source: NFSA database (November, 2017)

from being a beneficiary under NFSA. These include, household owning motorized three wheeler (two or more) / a four wheeler/ a heavy vehicle/ a fishing boat (requiring registration), household owning mechanized agricultural equipment (such as tractors or harvesters), household with any member who is a regular employee- gazetted or non-gazetted- of Central or State Government, Public Sector Undertaking (PSU), Government aided autonomous bodies and local bodies (excludes incentive and other honorarium based workers), household with any member in the family earning more than Rs. 10,000 per month in rural areas and Rs. 15,000 per month in urban areas, pensioners with monthly income of more than Rs. 10,000 per month in rural areas and Rs. 15,000 per month in urban areas, household with enterprisers (other than micro-enterprisers) registered with the Government for manufacturing and services, households paying income tax or professional tax, household having domestic electric connection with a load of two kilowatt or more and consuming an average of 300 units of energy (kilowatt hour) per month and household with three or more rooms with pucca walls and pucca roof⁹².

In Angul district, the total number of beneficiaries covered under the NFSA is about 9.6 lakhs, which is about 75 per cent of the total population (*See table 16: Beneficiaries under NFSA in Angul*). The coverage is also close to the state's target of beneficiary coverage under NFSA which is about 9.9 lakhs. In rural mining-affected areas such as Chhendipada, the coverage is nearly 90 per cent. As per the beneficiary criteria the coverage in rural areas is particularly important, as 90 per cent of the rural households earn below Rs. 10,000 per month. Moreover, under most Government pension schemes, such as the Indira Gandhi National Old Age Pension and the Indira Gandhi National Disability Pension, the coverage per beneficiary is only Rs. 300 per month. Ground level interaction suggested satisfaction with delivery of the system.

Table 17: Overall infrastructure gap in AWCs

Block Name	Coverage of children exceeding capacity	AWCs lacking permanent structure (%)	AWCs lacking toilet facilities (%)	AWCs lacking functional toilet (%)
Chhendipada	2.6 times	45	85	91
Kaniha	2.3 times	26	72	95
Talcher	2.1 times	36	82	95
Angul	2.4 times	50	67	88
Kishorenagar	2.2 times	30	68	86
Palalahada	2.4 times	28	47	83
Atthamallik	1.6 times	47	90	100
Banarpal	2.7 times	51	74	98

B. Gaps in nutrition and food security

The gaps or deficits with respect to nutrition related issues and supporting infrastructure in the mining- affected areas as identified from analysis of the official data shows deficits both in infrastructure as well as resources. The key deficits include:

- Inadequate number of AWCs as compared to the population to be served.
- AWCs not having a permanent structure.
- AWCs lacking toilet facilities.

a. Inadequate number of AWCs as compared to the population to be served

As analyzed, on an average, AWCs in all mining-affected areas are serving two to three times the stipulated capacity (*See table 17: Overall infrastructure gap in AWCs*).

b. AWCs not having a permanent structure

The data also clearly reveals that not only the number of AWCs is of concern, but even in the existing ones do not have permanent structures. In extensively affected areas such as Talcher, Chhendipada and Kaniha, categorically about 30 to 50 per cent of the AWCs lack permanent structure.

c. AWCs lacking toilet facilities

With respect to availability of proper sanitation facilities, which are critical for children, about 80 per cent AWCs lack toilet facilities within premises. Further in places where toilets are present they are barely usable as a high percentage of them, as high as 95 per cent in rural mining-affected areas such as Chhendipada and Kaniha are not functional.

3.1.3 Education

The education status of Angul district, particularly of the mining-affected areas has been reviewed on the basis of the following parameters:

- Status of literacy and level of education.
- Educational infrastructure- number of schools for various grades, availability of basic amenities in schools-drinking water, toilets and electricity.
- Enrollment and dropout at various education levels.
- Pupil teacher ratio (PTR).

Based on the situation on each of these, the overall gaps in the education sector have been identified.

Table 18: Literacy in Angul district

Category	Total literates (%)	SC literates (%)	ST literates (%)
Total	77.53	18.81	14.10
Male	85.98	18.52	13.72
Female	68.64	19.11	14.50

Source: Census of India (2011)

Table 19: Block-wise literacy

Block name	Literate population* (%)
Talcher	82.5
Kaniha	78.5
Chhendipada	64.7
Angul	78.2
Kishorenagar	78.0
Palalahada	68.6
Atthamallik	75.7
Banarpal	80.8

*For calculating literate population, people of seven plus years have been considered

Source: Adapted from Census of India (2011)

A. Review of educational parameters

a. Status of literacy and level of education

The literacy rate of Angul district is 77.5 per cent, which is better than the state's average of 72.9 per cent³³. Among the literate population, the male literacy (nearly 86 per cent) is better than the female literacy (about 68.6 per cent). However, for the marginalized sections the literacy rate is very poor. It is about 19 per cent for SC and about 14 per cent for ST populations (See table 18: Literacy in Angul district).

Table 20: Level of education in Angul district

Age group	18-19	20-39	40-59
Illiterates (%)	8.6	18	35.1
Literates (%)	91.4	82	64.9
Literates without education level (%)	2.1	2.5	2.4
Below primary (%)	5.8	10.5	16.8
Primary (%)	20.7	19.9	20
Middle (%)	22.8	17.6	7.7
Matric/Secondary (%)	15.3	11.6	7.9
Higher Secondary (%)	20	9.4	2.9
Graduate & above (%)	0	8.3	5.9

Census of India (2011)

Among the mining-affected areas, Talcher has highest literacy of about 82.5 per cent, while it is lowest in Chhendipada with 64.7 per cent, which is also the lowest in the district (*See table 19: Block-wise literacy*).

While the percentage of literate population is high, the education level that is required for securing a decent employment (such as at least higher secondary or graduate level education) is far from impressive. For example, among the 20-39 years age group, which is the most employable age, while 82 per cent of the people are literate, only about 9.4 per cent have completed higher secondary education, and 8.3 cent have completed graduation (*See table 20: Level of education in Angul district*).

b. Educational infrastructure

The educational infrastructure has been evaluated with respect to some key infrastructural issues such as, number of schools of various grades (including schools for marginalized groups), availability of classrooms, and schools with basic amenities such as tap water supply, toilet facilities and electricity.

Number of schools for various grades: Official statistics show the presence of all levels of schools for elementary, secondary and higher secondary education³⁴. However, the numbers of schools for various levels vary (*See table 21: Distribution of schools*).

In all blocks and municipalities, including mining affected areas, the number of schools providing elementary education (primary and upper primary levels) is considerably more than the number of secondary and higher secondary schools. During ground level interaction as well (*Refer to section 4*), most people pointed out the shortage of secondary and higher secondary schools (including their poor accessibility), often leading to drop-outs.

Table 21: Distribution of schools

Block name (including municipal areas)	Pr.	Pr.+UP	Pr. + UP+ Sec. + HS	UP	Pr. UP+ Sec.	UP+ Sec.	UP+ Sec. + HS	Sec	Sec. + HS	HS	Total
Chhendipada	128	63	0	17	7	33	0	0	0	4	252
Kaniha	107	81	2	9	5	31	0	1	0	4	240
Talcher	82	64	3	12	5	32	1	0	0	4	203
Angul	144	67	2	17	8	34	0	1	0	7	280
Kishorenagar	116	66	0	14	0	24	0	0	0	3	223
Palalahada	162	88	0	12	5	29	0	0	0	2	298
Atthamallik	138	75	0	14	0	26	0	0	0	3	256
Banarpal	93	73	2	9	6	27	0	1	0	4	215

Source: DISE Report (2015-16)

Beside the regular schools, there are some schools exclusively for SC/ST students in the district, including mining affected blocks. These schools, the ashram and sevashram, provide education from primary to Class X level³⁵ (See table 22: *Ashram and Sevashram schools*).

Availability of basic amenities in schools - drinking water, toilet, electricity:

Guidelines under both Right to Education (RTE) Act (2009) and the Rashtriya Madhyamik Shiksha Abhiyan (RMSA) stipulate the need for infrastructure support to enhance access and provide quality education. Supporting infrastructure include, having toilets for boys and girls at all levels of education, availability of clean drinking water at premises and electricity supply in schools.

The data on these basic amenities shows that while toilets are present in most of the schools across the district, the access to tap water and the coverage of electricity is extremely limited (See table 23: *Schools with tap water, toilet and electricity facilities*). The status of access to clean tap water is particularly alarming considering that ground water in highly polluted in the mining areas³⁶.

c. Enrollment and dropout at various education levels

The assessment of student enrolment is done through Gross Enrolment Ratio (GER) and Net Enrolment Ratio (NER) which are two key indicators for the number of children attending school. GER is the number of children enrolled (irrespective of the age) at a particular level (elementary or secondary school), in comparison to the population of the age group who should “officially” be studying at that level. NER on the other hand records age and education level specific enrollment. It is the number of children enrolled belonging to a particular age group at a particular level (elementary or secondary), in comparison to the population of the age group who should “officially” be studying at that level.

As per information made available by district officials and reports, the overall enrollment status at elementary level in the district is satisfactory, being around 99 per cent. The GER at elementary level is about 95 per cent, while NER is 87 per cent. The dropout rate is around 2.4 per cent³⁷.

Table 22: Ashram and Sevashram schools

Block Name	Sevashram school	Ashram school	High school
Chhendipada	4		
Kaniha	2	3	1
Talcher	2	3	1
Angul	8	2	
Kishorenagar	2		1
Palalahada	4	5	2
Atthamallik	2	2	
Banarpal	4	1	

Source: Angul District Gazetteers (2016-17)

Table 23: Schools with tap water, toilet and electricity facilities

Name of block (including municipality areas)	Total no. of schools	Schools with tap water facility (%)	Schools with toilets (%)	Schools with electricity (%)
Chhendipada	252	1.6	98.8	41.7
Kaniha	240	8.3	99.2	29.6
Talcher	203	24.6	82.3	32.5
Angul	280	4.2	85	20.3
Kishore Nagar	223	8.1	99.6	30.5
Pallahara	298	3.4	98.3	28.2
Athmallik	256	0.8	93.4	16.8
Banarpal	215	8.8	97.7	31.6

Source: DISE Report (2015-16)

However, the indicators are not satisfactory at the secondary level when compared to elementary levels. The GER at the secondary level is about 79 per cent, while NER is about 76.6 per cent. Not only enrollment drops by nearly 20 per cent, the dropout rate at this level also increases, which is about six per cent (See table 24: Enrollment and dropout at elementary and secondary levels).

Table 24: Enrollment and dropout rate at elementary and secondary levels

Education indicators	Elementary level	Secondary level
GER	95.2	78.9
NER	88.6	76.6
Dropout rate	2.4	5.9

Source: District Education Department, and Odisha Primary Education Programme Authority (2016)

Table 25: Status of PTR at elementary, secondary and higher secondary schools

Block name (including municipal areas)	Elementary schools with PTR < 30 (%)	Secondary schools with PTR < 30 (%)	Higher secondary schools with PTR < 30 (%)
Chhendipada	71	23	
Kaniha	89	62	
Talcher	89	22	50
Angul	73	44	22
Kishorenagar	50	50	
Palalahada	86	50	50
Atthamallik	80	38	
Banarpal	64	42	

Source: DISE Report (2015-16)

The problem has also been captured through FGDs and SSI (*Refer to section 4*). Interactions with the community suggests that distance to schools, poor quality of education, shortage of teachers, as well as financial situation of the family are big contributors to lower proportions of enrollment and dropouts in secondary levels. This also indicates that there is a serious deficit in creating an educated workforce for procuring employment and livelihood opportunities.

d. Pupil Teacher Ratio

Pupil teacher ratio (PTR) is described as average number of pupils/students per teacher at a given level of education, based on headcounts of both pupils and teachers³⁸. As per standards (RTE for elementary and RMSA for secondary), the PTR for primary level should not exceed 30:1, for upper primary 35:1 and for secondary level 30:1.

For the purpose of this analysis, PTR of 30:1 has been taken as a uniform benchmark for both elementary and secondary education. The availability of adequate teachers at various grades vary significantly. For elementary levels (considering schools offering primary and upper primary education), about 90 per cent of schools in the mining affected blocks of Talcher and Kahina meet the 30:1 benchmark. In most other areas too it, 70 to 80 per cent of elementary schools fulfill the 30:1 ratio (*See table 25: Status of PTR at elementary, secondary and higher secondary schools*).

However, the situation changes drastically when schools beyond elementary level are considered. In mining-affected areas such as Talcher and Chhendipada, a slightly over 20 per cent schools meet the stipulated benchmark. In all other areas also on an average only about 40 per cent meet the teacher requirement.

As captured from ground level observations, the number and availability of qualified teachers in secondary and higher secondary institutions also are a major concern. This has affected quality education and learning outcomes in the district (particularly poor and distressed areas) including the mining affected areas. It also has bearing on enrollment at the secondary levels.

B. Gaps in the education sector

The gaps or deficits in the education sector in Angul district as identified from analysis of the official data shows deficits both in infrastructure as well as resources. The key deficits include:

- a. Inadequate number of secondary and higher secondary schools.
- b. Inadequate teachers in schools, particularly at secondary and higher secondary levels.
- c. Lack of clean drinking water (tap water) and electricity in schools.
- d. Lower enrollment in secondary level schools as compared to elementary level.

a. Inadequate number of secondary and higher secondary schools

The comparative account between facilities providing elementary education versus facilities providing secondary and higher secondary education clearly shows that secondary and higher secondary schools are much less (*See table 26: Comparison of educational facilities offering various grades of education*). In most areas, including mining affected areas, the number of secondary schooling facilities is only 10 to 20 per cent of elementary education facilities. For higher secondary it is further low, as low as one to four per cent.

Table 26: Comparison of educational facilities offering various grades of education

Block Name	Elementary	Secondary	Higher secondary
Chhendipada	248	40	4
Kaniha	235	39	6
Talcher	199	41	8
Angul	244	17	9
Kishorenagar	220	24	3
Palalahada	296	34	2
Atthamallik	253	26	3
Banarpal	210	36	6

Source: As adapted from DISE Report (2015-16)

The shortage is also heavily emphasized by the members of the community as well as district officials during ground interactions (*Refer to section 4*).

b. Inadequate teachers in schools, particularly at secondary and higher secondary levels

There is a dearth of teachers across the district when it comes to secondary and higher secondary level education. In mining-affected areas such as Talcher and Chhendipada, nearly 80 per cent of secondary level institutions do not have the required number of teacher, i.e., not fulfilling the required PTR of 30:1 as stipulated under RMSA (*See table 27: Deficits in human resources*). In other parts too, more than 50 to 60 per cent of schools do not have adequate teachers at secondary and higher secondary levels.

Table 27: Deficits in human resources

Block name (including municipal areas)	Elementary schools with PTR >30 (%)	Secondary schools with PTR >30 (%)	Higher secondary schools with PTR >30 (%)
Chhendipada	29	77	
Kaniha	11	38	
Talcher	11	78	50
Angul	27	56	78
Kishorenagar	50	50	
Palalahada	14	50	50
Atthamallik	20	62	
Banarpal	36	58	

Table 28: Deficit in basic amenities in schools

Name of block (including municipality areas)	Schools without tap water (%)	Schools without electricity (%)
Chhendipada	98.4	58.3
Kaniha	91.7	70.4
Talcher	75.4	67.5
Angul	95.8	77.4
Kishore Nagar	91.9	69.5
Pallahara	96.6	79.7
Athmallik	99.2	83.2
Banarpal	91.2	68.4

c. Lack of clean drinking water (tap water) and electricity in schools

Tap water availability in schools is one of the most severe infrastructure deficits all across the district. In mining-affected areas, such as Chhendipada, more than 98 per cent schools lack tap water facility. In Kaniha the deficit stands at 92 per cent. In critically polluted area like Talcher, more than 75 per cent of schools do not have tap water facilities.

The other deficit is with respect to electricity access. In all mining-affected areas on an average 60 to 70 per cent of schools do not have electricity (*See table 28: Deficit in basic amenities in schools*).

d. Lower enrollment in secondary level schools as compared to elementary level

An analysis of the enrolment data for the district shows a clear drop in enrollment for secondary level education as compared to elementary. The GER at secondary level drops by nearly 20 per cent as compared to elementary levels. The dropout also increases simultaneously at secondary level as indicated earlier.

3.1.4 Employment and Livelihood

Employment and livelihood is a key factor that is often related to the well-being of a population. A significant population being engaged in secure and safe livelihood is therefore important. In Angul district, the employment and livelihood situation has been analyzed on basis of the following:

- a. Distribution of population employment wise.
- b. Income distribution.
- c. Key sources of employment and livelihood.
- d. Intervention through other schemes to ensure livelihoods- Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Self Help Groups (SHGs) as promoted under National Rural Livelihoods Mission (NRLM).

A. Review of employment and livelihood parameters

a. Distribution of population employment wise

In Angul district, the proportion of working population constitutes about 41 per cent of the total population, while about 59 per cent fall under the non-working category. Among the total working population, about 60 per cent are main workers, and nearly 40 per cent are marginal workers. Therefore, considering the proportion of non-working population and marginal workers, income uncertainty is high among a significant section.

The proportion of non-working population drops by about 14 per cent, when people falling within the working age group are considered (15-59 years). As per Census (2011), among this age group, the proportion of non-working population is about 43 per cent (*See table 29: Distribution of working and non-working population in Angul district*).

Therefore, considering the high percentage of people still falling in the non-working or marginal worker category, the concern of employment and livelihood security for a major part of the population is very high.

The employment ratio is also skewed between sexes. The female participation in the workforce is extremely less, about 26.8 per cent, which is nearly half of the male participation. Besides, majority of female workers are marginal workers.

Table 29: Distribution of working and non-working population in Angul district

Category	Total workers (% of total population)	Main workers (%)	Marginal workers (%)	Non-Worker (%)	Non- workers 15-59 years (%)
Total	41.33	60.3	39.7	58.67	43
Male	55.05	71.4	28.6	44.95	23
Female	26.79	36.1	63.9	73.21	53

Source: Census of India (2011)

Table 30: Block-wise (including municipal areas) distribution of working and non-working population

Block Name	Total working population (%)	Main workers (%)	Marginal workers (%)	Total non-working population (%)
Talcher*	33.1	25.9	7.3	66.9
Chhendipada	46.7	28.8	17.9	53.3
Kaniha	37.8	18.5	19.3	61.7
Angul*	38.4	26.8	11.5	61.5
Kishorenagar	50.3	22.7	27.6	49.7
Palalahada	47.1	20.0	27.1	52.9
Atthamallik	48.1	24.0	24.0	41.9
Banarpal	35.0	26.7	8.3	65.1

*Talcher and Angul working population represents total of block and municipal area

Source: Census of India, 2011

Among the mining-affected areas, in Talcher, which is the most significantly affected area, the proportional non-working population (about 67 per cent) is nearly double the working population. The same trend is evident in Kaniha, another key mining-affected (See table 30: Block-wise distribution of working and non-working population). Therefore, it is clear that mining activities have not been able to provide livelihoods and secured employment to people living in those areas.

b. Income distribution

Angul is one of the better performance districts in Odisha when considering the proportion of people living below poverty line (BPL). About 22 per cent people fall in the BPL category, which much better than the stage average of 32.5 per cent.

However, lower proportion of BPL people does not mean that others have a decent earning. The poor earning status among people in the district becomes evident when income distribution among rural households is considered. Since, rural households constitute 93.5 per cent of total households in the district, and also reflect a major proportion of mining-affected people, therefore for this study the income distribution among this population (as per data of SECC of India) has been evaluated.

In rural areas, about in 84 per cent households, highest earning member earn less than Rs. 5000 per month, which is extremely low earning (See table 31: Income distribution in rural areas of Angul district). Further, a majority of the rural households (59.5 per cent) are dependent on manual or casual labor for earning a living, reflecting income uncertainty and instability (See table 32: Main sources of income for households in rural areas in Angul district.) Therefore, securing a stable and decent livelihood for people in rural areas is of utmost importance.

Table 31: Income distribution in rural areas of Angul district

Income/ Earnings	Proportion of households earning heads (%)
With salaried job	11.8
Earning less than Rs. 5,000 per month	83.8
Earning Rs. 5,000 to Rs. 10,000 per month	6.5
Earning more than Rs. 10,000 per month	9.7

Source: Socio Economic Caste Census (2011)

Table 32: Main sources of income for households in rural areas of Angul district

Main sources of income	Proportion of dependent households (%)
Cultivation	17.1
Manual/casual labor	59.5
Domestic service, part time/ full time	3.6
Non-agricultural own account enterprise	0.9
Begging/alms collection/charity support	0.5
Foraging/rag picking	0.3
Other (unspecified) sources	18.1

Source: Socio Economic Caste Census (2011)

c. Key sources of employment and livelihood

Considering sector-wise distribution of the working population, specifically main workers, it can be seen that there is a clear distinction between predominantly rural areas of the districts and areas with municipalities and urban population. In areas with considerable proportion of urban population such as Talcher, a majority of the main workers fall under the category “other workers”. This category includes employments related to construction, mining, trade, government workers teachers etc. On the contrary, in rural areas, including mining-affected areas, a high proportion is dependent on agriculture related activities. For example, in Chhendipada, about 65 per cent main workers are related to agriculture (combining cultivators and agricultural laborers); in Kaniha, another rural mining area, this is about 29 per cent (See table 33: Categorization of main workers).

Industries related employment: Angul district is an industrial hub for Odisha particularly considering the Angul-Talcher industrial area. Among industrial activities, coal mining and thermal power plants dominate the region. Other significant industrial activities include production of sponge iron and aluminium. The major companies include, Mahanadi Coalfield Limited (MCL), National Thermal Power Corporation (NTPC), Talcher Thermal Power Station, National Aluminium Company Limited (NALCO), Jindal Steel and Power Limited (JSPL). A significant proportion of the population depends on these industries directly or indirectly, for procuring livelihoods.

Table 33: Categorization of main workers

Block including municipal areas	Proportion of main workers among total workers (%)	Categories of main workers			
		Cultivators (%)	Agricultural laborers (%)	Household industry (%)	Other workers (%)
Talcher	25.9	6.3	4.1	4.7	87.7
Chhendipada	28.8	42.4	23.5	7.8	26.2
Kaniha	18.5	25.0	13.5	6.3	55.2
Angul	26.8	20.6	17.9	6.1	55.3
Kishorenagar	22.7	35.8	23.5	10.8	29.8
Palalahada	20	28.3	33.6	4.4	33.7
Atthamallik	24	37.7	29.3	6.2	26.7
Banarpal	26.7	18.7	11.5	5.3	64.5

Source: Census of India (2011)

Table 34: Micro and small scale industries and employment

Types of Industry	No. of units	No. of people employed
Food and allied	337	1111
Chemical and allied	21	194
Engineering and metal based	315	1475
Glass and ceramics	118	1460
Forest and wood based	37	165
Paper and paper products	40	156
Textile	67	238
Rubber and plastics	17	98
Electrical and electronics	5	18
Livestock and leather	1	5
Miscellaneous manufacturing	173	865
Repairing and servicing	2452	11,870
Total	3583	17,655

Source: Department of MSME Report (2016-17)

Besides these industries, there are various micro and small scale enterprises in the district. This category include enterprises and manufactures related to food and allied, chemical, metal based, ceramics, textile, various repairing and services etc. (See table 34: Micro and small scale industries and employment).

Agriculture related livelihood: A significant proportion of the district's population, particularly in the rural areas, is dependent on agriculture for livelihoods. For instance, in the mining-affected block Chhendipada, which has 100 per cent rural population, about 65 per cent of main workers are agriculture dependent. The same is evident in other rural areas such as Kishorenagar and Palalahada ³⁹.

Table 35: Distribution of main land use pattern

Block name	Net sown area (%)	Forest area (%)	Wasteland area (%)	Other uses (%)
Talcher	52.9	14.7	4.5	27.3
Kaniha	37.1	39.2	12.4	10.5
Chhendipada	46.1	37.2	11.0	5.1
Angul	30.5	65.2	1.3	3.0
Kishorenagar	43.3	52.6	1.2	2.4
Palalahada	31.6	45.8	10.1	12.4
Atthamallik	42.6	48.5	2.2	6.3
Banarpal	76.6	4.7	3.2	14.4

Source: District Irrigation Plan of Angul, Odisha (March, 2016)

Table 36: Categories of farmers and land holdings in Angul district

Agrarian Structure	No. of farmers as per various categories	Farmers as per various categories (%)	Area of holdings (in hectares)
Big Farmers	20,184	13	6,920
Semi medium	14,813	10	38,993
Medium	3,565	2	19,961
Small	42,185	27	49,720
Marginal	74,244	48	41,822
Total number	154,991	100	157,416

Source: District irrigation plan, Angul (2016)

In most rural blocks of the district, on an average 40 to 50 per cent of the geographical area comes under area put to agricultural use, i.e., net sown areas (See table 35: *Distribution of main land use pattern*). Paddy is the main crop in the district. More than 90 per cent of the area is being cultivated with early medium and late variety of paddy. Other cultivations include groundnut, sugarcane, maize, kulthi, bengal gram, coriander, field pea and vegetables.

However, in some rural areas, such as Kaniha, mining activities have affected agriculture, reducing the proportion of people who can depend on a livelihood for agriculture. This has also been captured through FGDs (Refer to section 4).

Among the farming community, nearly half are marginal farmers, and more than one-fourth are small farmers. (See table 36: *Categories of farmers and land holdings in Angul district*).

Forest-based livelihood: Besides agriculture, forest is an important sector on which local people particularly tribal communities and forest dwellers, depend on for augmenting their incomes and meeting other needs. Sal is the main species in the area. Among other species, Piasal, Sisoo, Bandhan, Gambhar, Kurum are reducing fast while Char, Salai, Karada and Barabakalia are increasing in proportion. Besides, there are teak plantations. Some of the major non-timber forest products (NTFP) include, tendu leaves, lodha, medha, phenphena, siali fibre, mahua flower, honey, myrobalanmango kernel and gillo⁴⁰.

The enumeration of livelihoods based on forest resources is very poor. The poor status can be owed to the fractional settlement of forest rights under the provisions of Forest Rights Act (FRA, 2006). For example, under community forest rights (CFR) only about 4.6 per cent of the rights have been settled out of the total number of claims received in Angul district. Such low percentages seriously undermine the potential of forest based livelihoods and the earnings that communities can derive from forest resources.

The FRA recognizes and emphasizes on community-based governance of forests. The Act specifically provides for the recognition of forestlands as community forest resource areas and exercising community rights over it. This offers two crucial benefits for the forest-dwelling communities. First it gives communities the right to manage forest resources, and secondly to secure livelihoods from such resources.

The recognition CFR rights thus have enormous potential for decentralized management of forest resources and improvement of ecological and economic services in CFR areas, contributing to well-being of communities. However, the success remains far away from the potential due to poor settlement of rights. If CFR is awarded appropriately to forest communities, they would be entitled for better management of forest resources for productive use, support from the government in terms value addition for their products, improved market linkages and get better pricing for their products etc.

Similarly, under individual forest rights (IFR) the proportion of settlement is about 33 per cent. The settlement of rights under IFR would have given communities the opportunity to avail of agricultural subsidies, loans and other schemes for development of their agricultural lands (*See table 37: Settlement of individual and community forest rights*).

Also if the implementation of CFR and IFR is converged with other government schemes and worked upon properly, the economic conditions of tribals and people who are dependent on and derive livelihoods from forest resources can change significantly.

Table 37: Settlement of individual and community forest rights

Items	Individual Forest Rights	Community Forest Rights
No. of claims received by the District Level Committee under FRA (as of 30 April 2017)	8,360	600
No. of title deeds issued by the District Level Committee under FRA (as of 30 April 2017)	2,727	28

Source: District Forest Department, Angul

c. Intervention through other schemes to ensure livelihoods

The MGNREGS is aimed at improving livelihood security of the rural and ensure wage employment of at least 100 days per household annually. However, MGNREGS has not been very successful in securing wage employment in the mining affected areas. The viability of this scheme is largely compromised

Table 38: Average days of employment generated and completed under MGNREGS

Block name	Average days of employment generated	Total no. of households worked	Total no. of households completed 100 days of wage employment
Talcher	7	1,796	3
Chhendipada	27	7,710	10
Kaniha	9	3,443	3
Angul	31	4,728	26
Kishorenagar	NA	5,916	43
Pallalahada	NA	7,813	49
Atthamallik	NA	7,202	8
Banarpal	NA	2,887	2

Source: District Rural Development Department, Angul

by the availability of land in the mining areas. Additionally, there have been challenges of sufficiently available works, availability of work as per skills of people, accessibility/ distance to work, timely payment of wages etc.

In the mining-affected areas of the district- Talcher, Chhendipada and Kaniha, only a fraction of the households who had taken up work under MGNREGS in 2016-17, has completed 100 days of employment. The proportion is less than 0.1 per cent (*See table 38: Average days of employment generated and completed under MGNREGS*).

However, the kinds of work taken up under MGNREGS if envisioned well, and converged with the prospects of other schemes, can create better earning opportunities and also create sustainable assets. For example, in rural blocks such as Chhendipada and Kaniha, rural drinking water projects can be a key area to focus on. Also increasing scope of micro irrigation works, food grain storage etc., can help to secure agriculture-based livelihoods in these areas (*See Table 39: Type of work generated under MGNREGS in mining-affected areas*).

The NRLM aims at reducing rural poverty by enabling poor households to access gainful self-employment and skilled wage employment opportunities through women SHGs. The Mission has been designed to bring about a sustainable improvement in the livelihoods of the poor through building strong community institutions. A central objective of the Mission is to establish efficient and effective institutional platforms of the rural poor that can enable them to increase household incomes through livelihood enhancements and improved access to financial and public services.

In Angul, latest (as of November, 2017) official data shows that there are about 15,082 women SHGs in the district. The engagement of women population in the rural areas in these SHGs varies between 22 to over 40 per cent in various blocks. Among the mining-affected areas, Chhendipada has the highest number of SHGs with nearly 33.5 per cent of women in the block engaged in them (*See table 40: SHGs in various blocks in Angul district*). As per official information available from the district, most of the women SHGs have bank linkages.

Table 39: Type of work generated under MGNREGS in mining-affected areas (2016-17)

Work types	Works/projects in terms of numbers		
	Chhendipada	Kaniha	Talcher
AWC/ Other rural infrastructure	47	16	2
Bharat Nirman Rajeev Gandhi Sewa Kendra	25		11
Drought proofing	342	211	34
Fisheries	2	13	
Flood control and protection		1	
Land Development	147	181	3
Micro irrigation works	36	71	19
Renovation of traditional water bodies	157	105	55
Rural connectivity	134	180	66
Rural drinking water		3	
Rural sanitation	2		1
Water conservation and water harvesting	21	233	7
Works on individual lands (Category IV)	4159	2581	1379
Playground	9	16	
Other works	21	2	4

Source: MGNREGA MIS report (2016-17)

Table 40: SHGs in various blocks in Angul district

Name of the Block	Total No of SHGs	Total No of Members	Female rural population	SHG members (%)
Talcher	1095	11,112	46,890	23.7
Chhendipada	2364	27,487	81,451	33.5
Kaniha	1417	14,439	63,910	22.6
Angul	3139	35,268	81,838	42.8
Kishorenagar	1391	14,798	53,483	27.5
Palalahada	2197	23,472	61,029	38.5
Athmallik	2013	21,348	55,316	38.2
Banarpal	1466	16,718	76,973	21.7

Source: NRLM database (November 2017) and Census of India (2011)

B. Gaps in employment and livelihood

Considering the overall employment situation and livelihood opportunities in the district, the following outstanding issues emerge which needs attention:

- About 43 per cent of people within the working age-group are non-workers.
- Earnings are significantly low, about 84 per cent of highest earning member of rural households earn less than Rs. 5000 per month. Income insecurity is also high, about 60 per cent rural households are dependent on manual or casual labor.
- Lack of diversity in livelihood opportunity particularly in mining-affected areas; opportunities of livelihood enhancement around local resources undermined, particularly agriculture-related and forest-based resources.
- Rural livelihood schemes (MGNREGS) ineffective in enhancing earnings.

All of this together contributes to insecurity in employment and livelihood, particularly for the poor and vulnerable sections of the society.

3.2 Public amenities and infrastructure

The status of basic public amenities in Angul district, and particularly the mining-affected blocks has been reviewed on the basis of the following key parameters:

- a. Access of households to clean drinking water.
- b. Sanitation/latrines facilities.
- c. Access to electricity.
- d. Road connectivity.

The data on all of these parameters has been reviewed sub-district wise, as available from the Census of India (2011). Additional information as made available by district officials has also been taken into account. Based on the situation on each of these, the overall gaps in basic amenities have been identified.

A. Review of public amenities and infrastructure

a. Access of households to clean drinking water

Availability of clean drinking water is a major challenge in the district. Given the high levels of pollution, only treated tap water/treated piped water supply can be assumed to be relatively safe. However, most of the households rely heavily on untreated groundwater sourced through hand pumps or uncovered wells. The access is particularly poor in all rural areas of the district, including mining-affected areas.

Overall, only 4.8 per cent of the rural households in the district have access to treated tap water. In rural mining-affected areas such as in Chhendipada, the proportion is less than three per cent. Kaniha, which is another mining-affected area, the proportion is a negligible 0.4 per cent (*See table 41: Households by main source of drinking water*). The access to treated tap water is slightly better for households living in urban parts of the district such as in industrial colonies or municipal areas. On an average in urban areas, about 42 per cent households have access to this. In the colliery areas of Talcher, which is also a mining-affected area, 43.2 per cent households of access to treated tap water.

The coverage of households with piped water supply under the National Rural Drinking Water Program (NRDWP) is also low. As per the latest information available from the district, about 1.8 per cent of households in the mining-affected block of Chhendipada, and about 3.5 per cent in another affected block Kaniha have piped water supply (*See table 42: Households with piped water supply*).

b. Sanitation/ latrine facilities

Open defecation has been observed to be very high particularly in the rural areas of Angul district (*see table 43: Households by type of latrine facility*). For example, in mining-affected areas such as Kaniha and Chhendipada, on an average 85 to 90 per cent of households respectively, defecate in open.

There has been some progress in the district for making villages and towns open defecation free (ODF) through funds available under Swachh Bharat Mission (SBM). As per latest statistics of Government of India, the district has managed to make about 43.4 per cent households ODF of the target households⁴¹.

Table 41: Households by main source of drinking water

Sub-district name	Tap water from treated source (%)	Tap water from untreated source (%)	Covered well (%)	Uncovered well (%)	Handpump (%)	Borehole (%)	Others (%)
Palalahada	2.7	2.7	3.0	9.3	49.2	23.6	9.5
Khamar	4.0	2.2	1.4	14.6	49.9	24.3	3.6
Rengali Damsite	11.4	7.5	0.8	15.6	7.6	48.2	8.9
Kaniha	0.5	1.4	1.1	39.7	15.1	23.3	18.9
N.T.P.C.	30.6	4.6	1.6	11.5	11.1	34.3	6.3
Samal Barrage	13.2	0.6	1.2	17.3	28.2	27.5	12.1
Talcher Sadar	35.2	5.0	4.4	33.0	2.2	12.0	8.2
Colliery	43.2	7.4	5.0	27.6	0.7	10.3	5.8
Bikrampur	20.4	1.2	4.8	54.9	0.4	9.3	9.0
Nalco	34.2	6.2	3.2	27.6	7.7	20.5	0.5
Banarpal	9.9	6.7	2.4	28.3	7.4	40.5	4.8
Bhusan Steel Limited	NA	NA	NA	NA	NA	NA	NA
Angul	7.6	2.9	5.0	32.5	13.9	34.9	3.2
Jarapada	4.0	1.6	1.6	39.7	13.2	36.3	3.5
Industrial	3.0	1.8	1.1	42.9	12.6	27.5	11.1
Chhendipada	2.8	2.1	2.0	70.3	4.7	13.2	5.0
Handapa	1.6	1.3	1.4	46.0	15.7	28.8	5.2
Kishorenagar	2.6	5.6	0.6	37.8	31.3	18.8	3.2
Athmallik	6.0	5.5	1.1	25.6	28.7	29.2	4.1
Kiakata	0.2	0.1	2.6	30.4	29.9	27.8	9.1
Thakurgarh	2.3	1.4	1.8	33.6	25.7	29.8	5.6
Purunakot	0.5	0.4	2.9	38.6	21.3	30.5	5.8
Bantala	2.6	1.5	1.9	40.0	18.4	33.1	2.5

Source: Census of India (2011)

Table 42: Households with piped water supply

Name of block	Households with piped water supply (%)
Chhendipada	1.84
Kaniha	3.47
Talcher	2.39
Angul	0.56
Kishorenagar	0.02
Palalahada	3.10
Atthamallik	0.05
Banarpal	0.30

Source: Department of Drinking Water and Sanitation (2017)

Table 43: Households by type of latrine facility

Sub-district	Flush/Pour latrine (%)	Pit latrine (%)	Night soil disposed into open drain (%)	Service latrines (%)	Public latrines (%)	Open (%)
Palalahada	7.5	4.8	0.9	1.0	1.8	84.7
Khamar	4.9	1.1	0.6	0.2	2.5	90.7
Rengali Damsite	13.9	3.5	0.4	2.6	2.0	77.6
Kaniha	7.4	1.8	0.3	0.2	1.3	89.0
N.T.P.C.	50.1	1.3	0.2	0.0	0.3	48.2
Samal Barrage	14.0	2.0	0.1	1.7	1.1	81.1
Talcher Sadar	36.7	2.5	0.2	0.1	1.1	59.5
Colliery	54.5	3.2	0.5	0.8	1.0	40.0
Bikrampur	44.6	3.8	0.1	0.3	1.2	50.0
Nalco	48.3	2.4	0.1	1.6	0.8	47.0
Banarpal	15.7	4.2	0.2	2.2	1.2	50.0
Bhusan Steel Limited	13.6	9.6	0.0	0.0	0.0	76.8
Angul	34.8	4.0	0.1	0.7	0.9	59.6
Jarapada	6.8	4.5	0.2	0.4	2.1	86.0
Industrial	11.8	3.7	0.1	0.1	2.9	81.3
Chhendipada	10.0	3.4	0.3	0.3	1.5	84.6
Handapa	9.8	7.6	0.1	1.3	0.9	80.4
Kishorenagar	10.9	3.4	0.1	0.0	0.1	85.6
Athmallik	9.2	2.2	0.1	0.3	2.0	86.2
Kiakata	0.0	0.0	0.0	0.0	0.0	0.0
Thakurgarh	7.8	4.4	0.2	0.7	1.0	85.8
Purunakot	5.6	1.6	0.1	0.2	0.3	92.3
Bantala	15.8	5.6	0.2	1.4	1.3	75.5

Source: Census of India (2011)

However, the coverage of households under SBM vary widely within blocks. For instance, as per latest official information, in the mining-affected block of Chhendipada, the coverage is only about 22 per cent. In other two affected areas, Kaniha and Talcher, the coverage is about 36 per cent and 32 per cent respectively (See table 44: Households provided individual latrine under SBM).

The responses of communities captured through FGDs in these mining-affected areas, also reflect the low coverage so far and problems with functional latrines. The responses typically brought out that about 70 per cent of households in the mining-affected areas either do not have toilets or have dysfunctional toilets (Refer to section 4).

c. Access to electricity

As is the case with other public amenities, electricity availability and reliability is particularly a concern in rural parts of the district including mining-affected areas. On an average, about 38 per cent households in rural areas have electricity access. In the mining-affected areas such as Chhendipada and Kaniha, on

Table 44: Households provided individual latrine under SBM

Name of block	Households with IHHL (%)
Chhendipada	22.2
Kaniha	35.9
Talcher	32.2
Angul	88.6
Kishorenagar	63.9
Palalahada	32.9
Atthamallik	23.9
Banarpal	16.6

Source: Department of Drinking Water and Sanitation, Odisha (2017)

an average about 35 to 48 per cent of households respectively have access to electricity (See table 45: Households by main source of lighting). The reliable availability of electricity is also a major concern. This has been particularly captured through FGDs and interviews with various stakeholders (Refer to section 4).

There has been some progress with respect to improving electricity access in rural areas under Government's rural electrification initiatives. However, as per latest Government statistics, about 35.7 per cent of rural households in Angul district are yet to be covered⁴².

d. Road network and connectivity

There are primarily three categories of road that constitute the road network of the district. These include national highways (NH), state highways (SH), and (other) district roads. There are 4 NHs passing through the district covering a today length of 235.5 kms. There are also 4 SHs covering a total length of about 186 kms. Besides, there are 42 district roads (See table 46: Road network in Angul district).

All the mining affected blocks are almost well connected to the district headquarters by major thorough fares. However, the problem lies with rural connectivity, particularly as areas become remote. Ground observations suggest that at various places, particularly rural and mining areas, there is lack of all weather roads, which limits people's access to basic facilities such as healthcare, education etc.

B. Gaps in access to basic public amenities

The key gaps or deficits with respect to access of basic public amenities in mining-affected areas as identified from analysis of the official data include:

- a. Poor access to treated tap water.
- b. High levels of open defecation due to lack of proper sanitation facilities.
- c. Access and reliability of electricity in rural areas.
- d. Connectivity in rural areas (all-weather roads).

Table 45: Households by main source of lighting

Sub-district	Electricity (%)	Kerosene (%)	Others (%)
Palalahada	27.29	70.91	1.8
Khamar	42.05	56.53	1.42
Rengali Damsite	58.88	39.68	1.44
Kaniha	47.75	48.56	3.69
N.T.P.C.	70.28	26.56	3.16
Samal Barrage	41	56.46	2.54
Talcher Sadar	72.58	24.88	2.54
Colliery	82.81	16.16	1.03
Bikrampur	72.86	20.43	6.71
Nalco	69.39	28.56	2.05
Banarpal	42.28	53.2	4.52
Bhusan Steel Limited	34.56	64.34	1.1
Angul	58.12	40.29	1.59
Jarapada	24.88	72.84	2.28
Industrial	35.04	64.51	0.45
Chhendipada	34.62	63.64	1.74
Handapa	39.61	57.71	2.68
Kishorenagar	35.11	63.9	0.99
Athmallik	24.7	74.11	1.19
Kiakata	16.36	82.32	1.32
Thakurgarh	16.87	81.63	1.5
Purunakot	11.73	86.91	1.36
Bantala	27.78	69.33	2.89

Source: Census of India (2011)

Table 46: Road network in Angul district

Road category	Name/ district	Length (kms)
National Highway	NH55	96
	NH23	84.5
	NH6	11.5
	NH200	43.4
State Highway	SH 23	42.5
	SH 62	72.5
	SH 63	51.5
	SH 64	55
District roads	Chhendipada	716.8
	Kaniha	718.3
	Talcher	552.9
	Angul	469.2
	Banarpal	511.4
	Athamallik	1251.2
	Kishorenagar	674.3
	Pallahara	680.2

Source: Angul District Gazetteer (2016-17)

a. Poor access to treated tap water

Access to clean water is a pressing problem in the mining-affected areas. All rural mining areas have very poor access to treated tap water. In Chhendipada and Kaniha area, less than three per cent and 0.5 per cent households respectively have access to this. Even the coverage of households in these areas through piped water supply as per latest statistics of the district is extremely low.

In Talcher while households have somewhat better access to treated tap water, about 35 per cent, but the concentration of mining and industrial activity in this area is considered, the coverage falls far short than what should be the actual case. In these areas, high pollution calls for 100 per cent supply and consumption of treated water. Availability of clean water is also one of the most pressing points highlighted by local communities, Gram Panchayat (GP) functionaries, and officials during ground interactions (*Refer to section 4*).

b. High levels of open defecation due to lack of proper sanitation facilities

Open defecation is a major challenge in various parts of the district due to lack of toilets, and more particularly functional toilets. The problem is particularly evident in rural mining-affected areas such as Kaniha and Chhendipada, where on an average 85 to 90 per cent of households defecate in open. While the district has made progress with respect to providing IHHL facilities under SBM, but much needs to be done. In Chhendipada and Kahina, the coverage so far is about 22 and 36 per cent respectively. During FGDs, people have pointed to lack of water as an impediment towards using toilets.

c. Access and reliability of electricity in rural areas

While Angul district, particularly Talcher area has a number of major thermal power plants, in the rural areas electricity access still remain a big concern. In mining-affected areas such as Chhendipada, only about 35 per cent of households have electricity access.

Besides household electricity supply, a challenge also remains with respect to electricity availability in important places such as schools and healthcare facilities. The poor reach of electricity in schools is evident from the analysis of data as available through DISE Report in earlier sections. In mining-affected area such as Chhendipada, about 60 per cent schools do not have electricity, in Kaniha the proportion is about 70 per cent. The problem at healthcare facilities has been captured through ground level interactions.

d. Connectivity in rural areas

This has been particularly captured during ground interactions and FGDs. People have indicated poor connectivity in rural areas.

3.3 Environmental pollution and degradation

The Angul-Talcher coalfields have been identified as critically polluted area by the CPCB. The area was given a comprehensive environmental pollution index (CEPI) score of 82.09, which quantifies the environmental health of the area in terms of ambient air, water and soil pollution. A CEPI score of 70 and above is considered to be alarming⁴³.

The two pollution factors considered to gauge the status of environmental pollution and degradation in the mining-affected areas are:

- a. Air pollution/ Ambient air quality (AAQ).
- b. Water pollution and groundwater depletion.

However, necessary baseline environmental data could not be obtained for this study for a comprehensive analysis due to the paucity of data⁴⁴. Also soil pollution though identified as a significant problem through FGDs and ground interaction, baseline pollution data were not available. Overall, the severity of environmental concerns has also been captured through perception observations (*Refer to section 4*).

a. Air pollution/ Ambient air quality

Air pollution is particularly evident in the Angul-Talcher coalfields. The severe pollution in the area is due to open-cast mining, blasting, transportation etc. However, the recorded data on air-quality captures little of the perceived situation.

The AAQ data as made available by the Odisha State Pollution Control Board (SPCB) provides information on the Talcher coal-field area⁴⁵. The average level of PM_{2.5} is 108.6 $\mu\text{g}/\text{m}^3$ which is nearly three times the prescribed average of 40 $\mu\text{g}/\text{m}^3$ (24 hr time weighted average), as per national ambient air quality standard; for PM₁₀, the value is double the prescribed average of 60 $\mu\text{g}/\text{m}^3$ (*See table 47: Ambient Air Quality in Talcher coalfield*).

Table 47: Ambient Air Quality in Talcher coalfield

Data recorded during	Parameters			
	PM _{2.5}	PM ₁₀	SO _x	NO _x
Pre-monsoon	106.8	117	12	31.2
Post-monsoon	65.3	102	11	29

Source: State Pollution Control Board, Odisha (2016)

b. Water pollution and groundwater depletion

Angul district, including the mining-affected areas, has severe problems of water pollution and ground water depletion/stress owing to various industrial activities. Scientific studies in the Talcher coalfield on surface and ground water quality has repeatedly indicated pollution problem.

When compared against the National Sanitation Foundation (NSF) water quality index and drinking water quality standard IS: 10500, scientific studies have found that drinking water procured from sources such as tube wells, have significant levels of sodium, dissolved oxygen, total solids, alkalinity, chloride, hardness, nitrate and fluoride⁴⁶.

Various industrial activities in the Angul-Talcher industrial area also is a significant cause for surface water pollution, particularly of tributaries of Brahmani river. Pollution sources include effluent discharge and ash pond overflow. This is besides the existing pollution problems from mining related activities, agricultural activities and surface runoffs⁴⁷.

Besides water pollution, water stress is critical in various parts of the district. The evaluation of the situation by the district irrigation committee clearly brings out the problem. All the mining-affected areas- Talcher, Chhendipada and Kaniha, fall within poor or poor to moderate categories in terms of water stress (See figure 3: Groundwater prospects map of Angul district).

The situation will also worsen owing to increasing demand for water for industry purposes, agriculture, livestock, power generation and domestic use. Taking into account all these factors, a review of the water budget of the district shows that the existing water availability for all these purposes is 1.71673billion cubic meter (BCM), combining surface and ground water resources, and the projected water demand by 2020 is 2.14591 BCM⁴⁸.

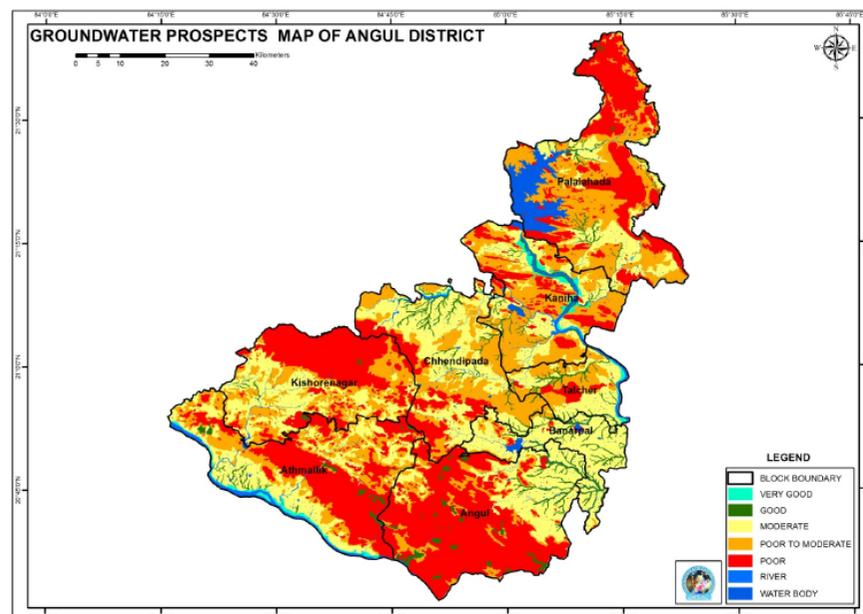
The situation evidently is going to worsen in all mining-affected areas, which are already water stressed. This is considering all potential water uses such as for industry purposes, domestic use, agriculture, livestock and power generation (See table 48: Water availability and projected demand in the mining-affected blocks). An integrated and sustainable approach needs to be adopted to address the scarcity and meet the demand, particularly pertaining to domestic needs and livelihoods.

Table 48: Water availability and projected demand in the mining-affected blocks

Block name	Existing Water Availability (BCM)			Water demand by 2020 (BCM)
	Surface water	Ground water	Total (BCM)	
Talcher	0.10230	0.02913	0.13143	0.16429
Chhendipada	0.16379	0.06377	0.22756	0.28445
Kaniha	0.14787	0.06033	0.20820	0.26025

Source: District irrigation plan of Angul (2016)

Figure 3: Groundwater prospects map of Angul district



Source: District irrigation plan of Angul (2016)

Section 4: Situation analysis through Participatory Rural Appraisal

4.1 Background of process

To complement the quantitative data and to understand the status of various socio-economic, human development and environmental issues further, a process of Participatory Rural Appraisal (PRA) was followed by engaging with concerned stakeholders. This constituted of conducting Focus Group Discussions (FGD) with various demographic groups and holding semi-structures interviews (SSI).

Focus Group Discussion (FGD): FGD is a 'structured group review' process, conducted to stimulate participants to reveal their views, beliefs, and perceptions about particular issue(s) and capture their understanding and opinion objectively.

For the purpose of this study, FGDs has been conducted through randomized sampling of representative population in seven village(s)/habitations in three mining-affected areas – Talcher, Chennipada and Kaniha, along with block panchayat functionaries and block development officials (*See table 49: Focus Group Discussions in mining-affected areas*). One FGD was also done with people residing in a non-affected area of Angul block as a control group. The total sample size considering all FGDs conducted in mining-affected areas is 327. Additionally the number of participants for discussions conducted in the control area of Angul block (in Kulasingha and Gurang villages) is 38.

To capture the maximum possible diversity in people's perceptions and needs, the following types of FGDs were conducted in each mining-affected area:

1. **Various demographic group FGD-** This was held with three constituencies, including:
 - i. **General populace FGD** - This included representative population- both male and female, from various demographic groups including, Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC).
 - ii. **Women FGD** - Held with women separately to understand their specific issues. This had representation from teachers, SHG representatives, and various frontline workers such as ASHAs and AWC workers.
 - iii. **Scheduled group FGD-** Held with the scheduled populace.
2. **Block panchayat FGD-** Held with block panchayat functionaries.
3. **Block development official FGD-** Held with various block development officials.

Table 49: Focus Group Discussions in mining-affected areas

Name of block	Place where focus group was held with communities	Type of focus group	No. of total participants	Composition of participants
Talcher	Balugaon	General	41	M: 22; F: 19 OBC: 38; SC: 3
	Balugaon	Women	26	
	Chitalapur	Scheduled Caste	40	
	Talcher block panchayat	Block panchayat members	6	
		Block development officials	6	
Chhendipada	Mundamalasahi and Gopiballabhpur	General	45	M: 23; F:22 OBC: 41; SC:4
	Mundamalasahi	Women	28	
	Chhotabarani	Scheduled Caste	33	
	Chhendipada block panchayat	Block panchayat members	12	
		Block development officials	6	
Kaniha	Jarada	General	20	M:15; F:5 OBC: 19; SC:1
	Jarada	Women	12	
	Kansamunda	Scheduled Caste	37	
	Kaniha block panchayat	Block panchayat members	8	
		Block development officials	7	

Semi structured interviews (SSI): SSI is a method of social evaluation and collecting information which is done on the basis of predetermined but open-ended questions. It provides an opportunity to receive information from (as well as give information to) the interviewees in a conversational but focused manner⁴⁹. For the purpose of this exercise, SSI was particularly held with communities during site visits, civil society organization (CSO) representatives, and concerned district and block officials. The total sample consulted through SSIs is about 60.

Therefore between all FGDs and SSIs held in the mining-affected areas, and also the group discussion held in the control block, **a total of 425 people have been consulted through the process of PRA.**

4.2 Observations from Focus Group Discussions

The FGDs as held with various socio-demographic groups in the mining-affected area brings out the key challenges with respect to various socio-economic, human-development and environmental conditions as perceived by the communities. It also provides an understanding on the key issues that DMFs should consider for intervention so that the needs of the people are appropriately addressed.

For the purpose of concise representation, the key issues/ problems identified by the people and those need to be addressed have been highlighted. The issues also capture the opinion of the majority, that represents the observation and opinion of at least 50 per cent or more of the representative sample. However, in most cases the majority opinion reflects the response of 70 to 90 per cent of participants/ respondents.

In the sector-wise observation tables of FGDs, the majority response (70 per cent and above where people identified it as a major problem/issue) is denoted as “very poor” as applicable for respective mining-affected blocks. A mid range response of 50 to 70 per cent of participants is denoted as “poor”. Where only a handful number of people have mentioned a problem it has been noted as “not significant”, and an absence of a response by the participants has been denoted as “no response”.

4.3 Key issues highlighted by community for improvement

To capture the perception and need of mining-affected people in a comprehensive fashion, FGDs were held separately with various constituencies. The key issues highlighted by communities which they consider improvement is required on in outlined below (*See table 50: Key issues highlighted by communities in mining-affected areas*).

Table 50: Key issues highlighted by communities in mining-affected areas

Block name	Constituency	Key issues
Talcher	General	Clean drinking water and adequate water Resettlement and livelihood Lack of quality education Pollution
	Women	Clean drinking water and adequate water Livelihood Lack of healthcare Pollution
	Scheduled Group	Clean drinking water and adequate water Livelihood Lack of healthcare Electricity access
	Block Panchayat	Clean drinking water Pollution Road conditions/connectivity
	Block officials	Clean drinking water Pollution Agricultural loss due to pollution Quality healthcare Quality education Road conditions/connectivity

Chhendipada	General	Clean drinking water and adequate water Quality education and good teachers Healthcare Household toilets and usable facilities Cooking fuel/LPG
	Women	Clean drinking water and adequate water Secondary education and good teachers Healthcare Connectivity Market for products
	Scheduled Group	Clean drinking water and adequate water Lack of healthcare Education facility and quality (including issues of mid-day meal) Pollution affecting agriculture productivity Enhancement of livelihood opportunities
	Block Panchayat	Clean drinking water Lack of healthcare Quality education
	Block officials	Clean drinking water Lack of healthcare Quality education
Kaniha	General	Livelihood and employment Clean drinking water Lack of healthcare Quality of education
	Women	Clean drinking water Livelihood and skill training Sanitation access Knowledge on nutrition issues and sufficient food
	Scheduled Group	Clean drinking water and adequate water Livelihood Lack of healthcare Quality of teachers and basic infrastructure in school Pollution
	Block Panchayat	Clean drinking water Agriculture productivity and irrigation Hospital and doctors Qualified and full-time teachers Pollution
	Block officials	Doctors and paramedical staff Qualified and full-time teachers particularly for secondary and higher secondary schools Basic infrastructure in schools such as toilets, electricity, clean water Full-time employment for wage laborers Clean drinking water and supply of water for sanitation purposes

4.4 Perception on issues sector-wise

a. Perception on health and public healthcare system

Most people in the mining-affected areas suffer from various poor health conditions particularly related to gastrointestinal diseases, malaria and respiratory ailments. Heavy pollution in the mining areas contributes to the health burden. Further, poor healthcare infrastructure and inadequate financial resources or solvency of the people are major shortfalls contributing to poor healthcare access.

Table 51: Key concerns and factors regarding public health

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
Disease burden	Malaria	Moderate	High	High
	Gastro-intestinal diseases	High	High	High
	Tuberculosis	High	Not significant	Not significant
Infrastructure	Number of primary healthcare facilities	Very poor	Very poor	Very poor
	Poor health infrastructure- beds, ambulances	Very poor	Very poor	Very poor
Resources and access	Lack of paramedical staff including full time doctors	Very poor	Very poor	Very poor
	Poor access to nearest health facility (average distance travelled about 5-10 kms)	Very poor	Very poor	Very poor
	No or inadequate health coverage	Very poor	Very poor	Very poor

Among health infrastructure, the key shortfalls include inadequacy of primary healthcare facilities, water connection and reliable electricity in health centres including in hospitals, and supporting infrastructure such as beds, ambulances, supply of medicines. Among soft resources there is lack of skilled and full-time healthcare personnel such as doctors, paramedics and nurses (*See table 51: Key concerns and factors regarding public health*).

b. Perception on nutrition and food security

The concerns regarding nutrition are primarily focused on availability and reach of various resources. These include, irregularities in receiving ICDS support, inadequate supply of nutritional foods, poor understanding of nutrition issues among women, infrequent or no visits by AWC workers to villages to speak to women groups, lack of health monitoring (*See table 52: Key concerns and factors regarding nutrition and food security*). Women particularly feel that improvement on these fronts can help to improve nutrition issues.

c. Perception on education

The key problems with education involve both infrastructure and resource issues (*See table 53: Key concerns and factors regarding education*).

On the infrastructure front, the problem lies with availability of basic resources such as toilet facilities, electricity and drinking water in schools across all grades. There is also concern about adequacy of schools for secondary education.

However, the problem across all levels is particularly about soft resources. A key problem is adequacy of full-time teachers. Even when teachers are there, at various times they are teachers involved in different activities such as preparation of mid meal, doing voter correction, engaged in government data enumerations etc. These all have affected the enrollment of students in schools and their faith in public education. This has prompted parents to send students to private schools, even with difficulty with tuitions.

Table 52: Key concerns and factors regarding nutrition and food security

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
ICDS related	Irregularity of ICDS support	Not significant	Not significant	Poor
	Inadequate nutrition supply	Poor	No response	Poor
	Nutrition education	Poor	Poor	Poor
	Lack of monitoring	Poor	Poor	Poor
PDS related	Timely ration	Not significant	Not significant	Poor
Others	Education and awareness to avail benefits of schemes	Required	No response	No response

Table 53: Key concerns and factors regarding education

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
Infrastructure	Inadequate schools for elementary education	Not significant	Poor	Not significant
	Inadequate schools for secondary education	Not significant	Very poor	Very poor
	Basic infrastructure in schools; particularly toilet and electricity	Very poor	Very poor	Very poor
Resources and access	Quality of teacher	Very poor	Very poor	Very poor
	Inadequate teachers in school	Not significant	Not significant	Poor
	Access to schools (particularly secondary level)	No response	Poor	No response

d. Perception on employment and livelihood

Livelihood is a key concern across communities in the mining affected areas. The local people lack full-time employment. In Talcher and Kaniha, people are predominantly day laborers involved in mining-related work, drivers, construction activities (helpers) etc. (See table 54: Key concerns and factors regarding employment and livelihood).

Given the predominantly rural nature of the mining areas, people are mostly skilled and knowledgeable of agricultural activities. However, employment in the agricultural sector remains a major challenge. This is due to acquisition of land, degradation of cultivable lands, degrading in environmental conditions, poor financial support.

Most of the villagers feel the need of safeguarding their livelihood opportunities and also also creating new opportunities considering their skills.

e. Perception on welfare support available for vulnerable groups

The key concern that emerged is regarding the pension of the old people (See table 55: Key concerns and factors regarding welfare support to vulnerable groups). The money that people currently get is clearly inadequate to meet their basic needs, such as the pension support which is as low as Rs. 300 per month.

Receiving the pension amount is also a challenge in the rural areas. In Chhendipada and Kaniha, people have to go to the panchayat to secure their pension, which is clearly a challenge for many old people.

Table 54: Key concerns and factors regarding employment and livelihood

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
Employment	Full-time employments, mostly day laborers	Very poor	Not significant	Very poor
	Work training that provides job	Poor	Poor	Poor
	Loan support	Poor	Poor	Poor
	Support for small businesses (handloom, dairy farming)	No response	No response	Poor
Livelihood around local resources	Support for agriculture based livelihoods	No response	Poor	Poor
	Support for forest based livelihoods (MFP such as mahua, kendu leaves)	No response	Very poor	Not significant
	Market support of products	No response	Poor	Not significant
Government schemes	Work availability under MGNREGA	Not relevant, as not much land available for work	Poor	Poor

Table 55: Key concerns and factors regarding welfare support to vulnerable groups

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
Pension funds and delivery	Adequate pension	Very poor	Very poor	Very poor
	Delayed pension	Not significant	Poor	Poor
	Difficulty in receiving pension due to access issues, no doorstep delivery of pension	Not significant	Very poor	Very poor

f. Perception on supply of and access to public amenities

Particularly two issues came up as challenges with respect to basic public amenities. These include drinking water and sanitation (*See table 56: Key concerns and factors regarding public amenities*).

Water availability: The main concern with respect to basic public amenities is of availability of clean and adequate water. This is particularly due to low and receding water tables, polluted water and low supply to treated water by authorities. The acute problem with receding water table is evident from information as obtained from block functionaries in Kaniha. At instances, the water table is so low that even 400 feet bore wells are unable to provide sufficient water. In Talcher, most of the tube wells and dug wells are not functioning due to reduction water table.

Discussions with block officials also bring out the problem. The need for a comprehensive plan to ensure adequate and clean water supply from the river Brahmani was highlighted.

Table 56: Key concerns and factors regarding public amenities

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
Clean drinking water	Availability of treated clean water	Very poor	Very poor	Very poor
	Reliable and adequate supply	Very poor	Very poor	Very poor
	Delivery by government intervention/ schemes	Poor	Poor	Poor
Sanitation	Toilet facilities and with water supply to toilets, SBM implementation poor.	Poor	Very poor	Very poor
Electricity	Electricity supply specially at night	Not significant	Poor	Poor

Table 57: Key concerns and factors regarding environmental pollution

Issues	Key challenges and factors identified	Block name		
		Talcher	Chhendipada	Kaniha
Air pollution	Pollution related health problems	Very poor	Very poor	Very poor
	Working ability reduction	Poor	No response	No response
Water pollution and water table depletion	Water availability for drinking	Very poor	Very poor	Very poor
	Water availability for agriculture affecting productivity	Very poor	Very poor	Very poor
Soil pollution	Agricultural productivity and livelihood	Very poor	Very poor	Very poor

Sanitation: On sanitation issues, a key need of people is of toilet facilities in household premises. However, the usability of the toilets is a challenge as identified. The supply and availability of water has prevented people from using toilets, even when they have been constructed.

g. Perception on environmental pollution

In all FGDs, the major concern was about environmental pollution, including of air, water and soil (*See table 57: Key concerns and factors regarding environmental pollution*). The respondents expressed overwhelming concerns about the poor status of environmental management by mining companies and authorities.

Regarding air pollution, people are highly affected by coal dust in the mining areas. This has affected their health conditions such as lung problems and eye irritations. It has also affected their ability to work, a concern particularly expressed by people in Talcher.

The problem of water pollution is also pervasive. Both water contamination (from mine discharge, discharge from ash ponds), and receding water tables in the mining areas has affected the availability of clean potable water and agricultural productivity. This has impacted the health of people, as well as livelihoods. The pollution of soil in the mining areas adds to the water problems and effects on agricultural productivity.

In all the cases people have asked for action on improvement on all pollution issues by mining companies as well as authorities.

Section 5: Resource mapping

5.1 Background of analysis

The funds accrued to DMF and that estimated to be coming per annum in the near future is substantial. The broad heads that the use of the funds should focus on are also clearly outlined. However, many of the sectors that DMF should focus on, are also the ones which are financed by the districts own financial resources, as well as through Centre and State government schemes. In many aspects, thus DMF funds are potentially add-ons to the various socio-economic and human-development works that are undertaken in the district.

For identifying the issues for which DMF funds must be directed and to what extent, a review of the existing resource envelopes is therefore important. Such review of financial resources, alongside the stocktaking exercise of district and block data on various parameters, and the PRA process followed to capture people's perception, will help to identify and prioritize on factors for DMF fund investments in the most efficient manner.

For the purpose of this exercise, two sources of resources have been considered. These include:

- The proposed outlay for various sectors/heads in the district annual plan (including funds received through various flagship schemes/programs)
- Spending under corporate social responsibility (CSR) by key industries.

5.2 District annual budget and major schemes

A review of the financial allocation for various heads under the district annual budget of 2016-17, has been done to understand the allocation for sectors/issues which also fall under the ambit of DMF investments. Overall, out of the total budget of Rs. 1056.16 crores, the highest proportion of stand-alone allocation is for the transportation sector, more than 32 per cent of the total allocations. Beside this, another significant proportion in the budget is the combined allocation for various heads under "social services" sector which is about 33.6 per cent. However, the allocations for various issues under this has varied thrust (*See table 58: Sectoral outlay in district annual plan*).

Most of the major sub-heads under the social services sector are also the ones which are priority areas under the DMF law. These include education, public health, water supply and sanitation and housing (which in DMF law are pucca houses for the poor). Among these the share of education allocation is by far the most significant, which is about 38 per cent of the social sector budget. However, pressing issues in the district such as clean drinking water and sanitation, public health, child development received a far lower allocation.

Besides heads under social services, two other important sectors for consideration are rural development and special area programmes, which also pertains to mining-affected communities. Barring the administrative expenses (DRDA administration) under rural development, the combined fund available from these two sectors for investments in various development issues is about Rs. 103 crores, nearly 9.8 per cent of the budget.

Many of the heads are supported by fund flow from Centre and State Government schemes, in varied proportions. Some of the key ones pertaining to human development, social services, rural development and alike include, Gopabandhu GraminYojana (GGY) for overall district development programs such rural electrification, water supply and roads; ICDS, Midday Meal Scheme and School Nutrition program from improving nutrition among children; Sarva Siksha Abhiyan (SSA), RMSA, block grants for education; MGNREGS and NRLM for livelihood enhancement; National Rural Drinking Water Programme (NRDWP) for water supply; Swachh Bharat Mission (SBM) for sanitation; Pradhan Mantri Awas Yojana and Biju Pucca Ghar Yojana for housing; and Madhubabu Pension Yojana (State scheme aligned to Indira Gandhi National Old Age Pension) for social welfare.

Table 58: Sectoral outlay in district annual plan (2016-17)

Heads/ Sectors	Subsectors/ areas covered	Fund outlay (Rs. crore)	% of outlay
Agriculture and allied activities	Crop husbandry	32.35	6.3
	Horticulture	6.74	
	Soil and water conservation	14.15	
	Animal Resource Development	3.29	
	Fisheries	2.09	
	Total agriculture and allied activities	66.12	
Rural development	Special programmes for rural development		5.5
	(a) 13 th Finance Commission	13.8	
	(b) DRDA administration	1.77	
	(c) State Finance Commission	6.45	
	Rural Employment Schemes		
	(a) SGSY / NRLM	0.97	
	(b) MGNREGS	34.82	
	Total rural development	57.80	
Special Area Programmes	Gopabandhu Gramin Yojana	35.61	4.5
	Western Odisha Development Council	5.72	
	Subsidy under bankable IGS (SC)	0.76	
	Subsidy under bankable IGS (ST)	0.32	
	Grants under Proviso to Article 275(i)- for tribal areas	0.97	
	Special central assistance to Tribal Sub Plan (TSP)	0.59	
	Conservation cum Development Plan (CCDP)	3.13	
	Total Special Area Programmes	47.10	

Irrigation and flood control	Minor Irrigation	30.16	7.5
	Lift Irrigation	46.40	
	Odisha Agro Industries Corporation Limited (OAIC)	3.00	
	Total irrigation and flood control	79.60	
Energy	Biju Gramin Jyoti Yojana	4.00	4.3
	Biju Saharanchal Vidyutikaran Yojana	1.30	
	Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)	36.99	
	Non-conventional Sources of Energy	3.48	
	Total energy	45.77	
Industry	Handicraft and Cottage Industries	0.93	0.1
	Handloom and Sericulture	0.15	
	Total industry	1.08	
Transport	Roads		32.3
	(a) Urban Road	0.32	
	(b) Rural Roads	123.29	
	(c) Other Roads	116.77	
	Bridges	38.88	
	Buildings	61.57	
	Total transport	340.84	
Science, Technology and Environment	Forestry and wildlife (Satakosia, Deogarh and Athamallik forest divisions)	48.81	4.6
	Total science, technology and environment	48.81	
General Economic Services	District planning and other development programmes	13.69	1.3
	Civil supplies	0.11	
	Total general economic services	13.80	
Social Services	Primary education	60.83	33.6
	Elementary education	2.14	
	Secondary education	71.33	
	Total general education	134.30	
	Sports, Art & Culture	5.92	
	Medical and public health	32.00	
	Rural water supply and sanitation	22.45	
	Urban water supply and sanitation	3.58	
	Housing- Mo Kudia	11.01	
	Housing-Pradhan Mantri Awas Yojana	17.77	
	Urban development (Talcher and Angul municipality, Atthamallik NAC)	34.60	
	Welfare of SC, ST and OBC	2.61	
	Social Security & Social Welfare		
	(a) Social Security Assistance	45.29	
	(b) Empowerment of Women	7.59	
	(c) Development of Children	38.14	
	Social Services Total	355.25	

5.3 Corporate Social Responsibility funds

Angul district also receives a significant amount of investments in various social services through Corporate Social Responsibility (CSR) funds. In Angul the major share of CSR comes from four companies including MCL, NTPC, NALCO, JSPL (See table 59: CSR funds spent in Angul district by major industries). The total spending by the companies in 2016-17 through CSR in the district was about Rs. 38.6 crore. Investments were in the areas of rural development, health care, education, environment, mostly oriented around construction⁵⁰.

Table 59: CSR funds spent in Angul district by major industries (2016-17)

Name of Company	Amount (Rs. crore)
MCL (Talcher area)	14.44
MCL (Kaniha area)	1.08
NTPC (including TTPS)	10.83
NALCO	7.62
JSPL	4.58
Total	38.55

Source: CSR Cell, Angul (2017)

Considering the accrual of funds in DMF Trust in Angul district, which stands at more than Rs. 500 crore, and a yearly estimated flow of about Rs. 250 crore, the potential for investments through DMF on key socio-economic, human development and related environmental issues is enormous.

Taking into account the gaps in various sectors, and the financial resources as currently available and deployed to address them, the issues where DMF investment is necessary include public health and nutrition, clean drinking water supply, secondary and higher education, enhancing employment and livelihood opportunities. Intervention on these areas can be optimized through convergence with schemes that are in place, and also earmarking standalone investments in issues for which there are no such allocations.

Section 6: Prioritizing issues and approaches for intervention through an outcome-output framework

The MMDR Act (1957), under which DMF has been instituted through an amendment in 2015, specifies that the objective of the DMF is to “*work for the interest and benefit of persons and areas affected by mining related operations*”.

The PMKKKY, a scheme launched in September 2015 by the GOI to for the welfare of people in mining-affected areas, and aligned to DMF funds for implementation, also outlines three objectives to guide the appropriate use of DMF funds. These include:

- To implement various developmental and welfare projects/programs in mining affected areas that complement the existing ongoing schemes/projects of State and Central Government.
- To minimize/mitigate the adverse impacts, during and after mining, on the environment, health and socio-economics of people in mining districts.
- To ensure long-term sustainable livelihoods for the affected people in mining areas.

The sector and issues that have been analyzed in this document for identifying the critical gaps and capturing the need of the people are corresponding to the objectives of the DMF law and the PMKKKY objectives. Based on such analysis and observation, priority issues have been identified for DMF investments for effective intervention.

6.1 Identifying priority issues

The priority issue for DMF investments is determined on the basis of a participatory approach, as well as through analysis of baseline information. Considering the qualitative and the quantitative information together, helps to capture the complete perspective on issues. It also makes the planning exercise purposeful, optimizes allocations, and can ensure that critical issues are addressed in the most effective manner.

6.2 Output-outcome framework for investments

As noted, the indicative planning exercise is based on an output and outcome oriented approach. In the proposed framework based on this approach, the intended outcomes have been determined on basis of the following:

- Critical needs as identified through participatory approach.
- Government and scientific information as analyzed.
- With reference to government and internationally accepted benchmarks as appropriate.

The outputs against each outcome have been determined on basis of the following:

- Are related to and representative of the condition(s) in question.
- Are based on the best available information of acceptable quality, and that can be collected or monitored with a reasonable time.
- Relevant for policy and planning purposes.
- Easily understood and applied by potential users.
- Acceptable by stakeholders.

6.3 Priority sectors for DMF investments in Angul district

The sectors that DMF should focus on for investments in Angul district over the next five years have been determined on the basis of deficits in these sectors, their contribution in human development and creating long- term development dividend and sustainable assets. The deficits in each of these sector takes into consideration the observations based on official data/information, as well as people's perception as captured through the process of PRA (*Refer to sections 3 and 4*).

For each of these priority sectors/issues, some target outcomes has been identified that DMF should aim to achieve. A number of intermediary outputs have also been identified that can help to achieve the target outcome. The outputs have been given against specific timeframes to ensure time-bound results and improve on intervention mechanisms. The framework also takes into consideration investments in simultaneous/parallel sectors that will help optimize the outcome for a specific issue.

The sectors/issues as prioritized for intervention include:

- a. Nutrition and public health.
- b. Clean drinking water supply and enhancement of water quality and availability.
- c. Education, particularly post elementary level.
- d. Employment and livelihood enhancement.

a. Nutrition and public health

Improving nutrition and public health status are crucial for maximizing demographic dividend and increasing economic productivity of a population. The two need to be considered simultaneously for effective investments and achieving desired outcomes.

In Angul, both IMR and U5MR are concerns particularly for rural parts of the district including mining-affected areas. Also there are serious problems of various chronic illnesses due to pollution exposure. However, the public healthcare infrastructure and availability of staff and other resources are sub-optimal. Affordability of decent healthcare offered by private facilities is not a viable option for the poor as observed during ground interactions.

Investments in nutrition and healthcare need to consider all of these collectively. Also simultaneous investments will be necessary in ensuring better nutrition, clean drinking water, sanitation and hygiene, which influence health in a number of direct and indirect ways as has been suggested in various epidemiological and scientific studies on effective health investments¹.

Considering the district budget and availability of funds from various schemes related to health and nutrition, the resource envelop is very thin. Therefore, given the ground situation, there can be three effective mechanisms to improve nutrition status and healthcare delivery and access.

These include:

- Building on existing government programmes/schemes.
- Adopting a public private partnership (PPP) model to improve and augment resources and delivery of services.

Outcome (projected)	Output	
	1-3 years	3-5 years
Reduction of neonatal and IMR to 12 by 2030, and U5MR to 25 by 2030, following targets of SDG	<p>a. Add on financial grant for ICDS to improve intervention.</p> <ol style="list-style-type: none"> 1. Increase the number of AWCs to twice the existing numbers to meet the stipulated Government standards, which is one AWC per 40 children. 2. Ensure clean drinking water, toilet facilities within premises of all AWCs. 3. Fill in food supply and supplementary nutrition gaps through proper assessment and considering locally available nutritious food resources. 4. Improve nutrition education, health monitoring by capacity building of existing ASHA and AWCs. In the initial phase a PPP model can be adopted by 'contracting in' private parties for such services. <p>b. Augment primary healthcare facilities and resources (with focus on neonatal and pediatric care) to meet at least IPHS norms adopting PPP model and through demand side financing.</p> <ol style="list-style-type: none"> 1. A PPP model can be adopted to improve and augment resources at primary healthcare facilities. This should focus on adequate numbers of trained staff, diagnosis and monitoring facilities, providing ambulances and mobile healthcare infrastructure. 	<p>a. Investments shall be continued building upon achievements of the previous three years.</p> <p>b. Direct transfer of stipend to women/ mothers of BPL households, who are widows or living without family support to improve nutrition and health of mother and child.</p>

Outcome (projected)	Output	
	1-3 years	3-5 years
	<p>2. Provide 'health vouchers' to women/mothers to avail treatments and check-ups at both public and private facilities, to improve on the existing service as provided under Janani Shishu Suraksha Karyakram (JSSK).</p>	
Primary and secondary healthcare as per IPHS norms and affordable healthcare for vulnerable sections	<p>a. Increase primary and secondary healthcare facilities to meet at least IPHS norms.</p> <ol style="list-style-type: none"> 1. Increase sub-centre capacity by 30 per cent in all mining-affected areas. 2. Increase PHC capacity by 30 per cent in all mining-affected areas. 3. In cases where private clinics already exist in the underserved areas, the government could also contract with those clinics (through PPP) in a way that allows them to expand capacity to provide more primary care. 4. The bed capacity in the sub-district and district hospitals should be made at least as per IPHS norms, for district hospital the bed capacity must be increased five times. <p>b. Fill in deficits of healthcare personnel and improve delivery of services through PPP model.</p> <ol style="list-style-type: none"> 1. 'Contracting-in' can be done to fill vacant positions in health units. Doctors, nurses, technicians and other staff as required can be recruited on contracts for a stipulated time period. 2. A 'management contract' can be arranged to expand health services. In this, obligation for service provision will remain with the public sector, while daily management and delivery will be the responsibility of the private partner. Public institutions will also be responsible for establishing performance standards and ensuring compliance. <p>c. Improve health access through demand side financing</p> <ol style="list-style-type: none"> 1. A 'voucher system' can be introduced to improve health access at public as well as private facilities. The voucher can be exchanged for defined goods or services as a token of payment. Vouchers can be provided against health packages for various common ailments / conditions, which can be bought by the people at specific intervals (2 or 3 times a year). These vouchers can then be redeemed for receiving a set of services such as consultations, lab tests, and procedures, from accredited hospitals / partner clinics. 2. For treatments that entail higher costs, a standard deductible can be stipulated (payable by the voucher user/patient), to cover part of the extra cost. 	<p>a. Investments shall be continued building upon achievements of the previous three years.</p> <p>b. Build on coverage of national health insurance schemes, such as Rashtriya Swasthiya Bima Yojana (RSBY) providing coverage to BPL families, Aam Aadmi Bima Yojana (AABY) providing coverage for rural landless households, for people in mining-affected areas.</p>

- Support ‘demand side financing’ to improve access to and utilization of health services, particularly among the poor².

The output outcome oriented investment framework takes these mechanisms into account to suggest the outputs and corresponding necessary actions.

b. Clean drinking water supply and enhancement of water quality and availability

Drinking water is closely related to the health and well-being of people. The outstanding concerns with respect to clean drinking water supply and availability include high percentages of households without treated tap water accessibility, lack of tap water facilities within premises of majority AWCs, lack of treated tap water facilities in schools across all levels.

While these problems and deficits need to be tackled on an immediate basis, but given vast surface and ground water pollution in mining areas and water distress in the region, a long term ‘watershed approach’ must be adopted. A watershed approach has been adopted as best water management practice by international regulatory agencies such as the US Environment Protection Agency (US EPA). Such approach can help in drinking water protection, pollution control, agriculture enhancement, fish and wildlife habitat protection and preservation of native vegetation. It is also economic and efficient as it builds upon existing resources and saves management costs, improves coordination and reduces duplication among management practices and creates opportunities for long-term community development³.

The proposed framework for augmenting clean drinking water supply and enhancement of water quality and availability, takes into consideration the immediate needs and the initiation of long term investment.

Outcome (projected)	Output	
	1-3 years	3-5 years
Safe and adequate drinking water for all households and service facilities in mining-affected areas	a. Ensure treated clean water supply and availability in all panchayats (and wards) in the mining-affected areas. b. A mechanism of PPP can be initially adopted. In this, the contracted enterprise can be the technology provider and the management body for the delivery of services. The public partner can provide the infrastructure component such as land and any construction work that is required to be undertaken.	a. Investments to be continued building upon achievements of the previous three years.
Enhancement of water quality and water availability through watershed based approach	Initiation of a long term approach for watershed management in convergence with various concerned departments and through public private efforts, as a coordinating framework for environmental management and augmenting water resources.	The approach to be continued as a long term measure.

c. Education

Continuation of education beyond the elementary level is a challenge in the district. There exists big disparity in terms of number of schools offering elementary and secondary education (secondary schools being 10 to 20 per cent of elementary education facilities, and higher secondary less than five per cent of elementary), adequate number of teacher in secondary schools, supporting infrastructure in schools, and financial constraints among a big section of people to continue higher education. These all need to be addressed through targeted investments in education that will contribute to completion of secondary and higher secondary education, improve employability, empower the vulnerable sections such as girls and women, and reduce overall financial insecurity.

Considering the district budget and availability of funds from various schemes, there is particularly scope of convergence with RMSA to improve education and secondary and higher secondary levels. In 2016-17 the funds available from RMSA was about Rs. 48.5 crore. The second major source has been the block grant amounting to about Rs. 11 crore. However, there is also much necessity to build up on scholarship schemes to improve support and incentivize education at higher levels, for which the flow of funds was a mere Rs. 20 lakhs in 2016-17.

Outcome (projected)	Output	
	1-3 years	3-5 years
Improvement of gross enrollment and completion for secondary education as per RMSA goals (GER of 100 per cent from current 80 per cent; and universal retention by 2020)	<p>a. Increase the number of secondary schools as per RMSA standards This can be done by up gradation of at least 50 per cent of the existing 246 primary +upper primary, and upper primary school facilities in the mining-affected areas of Talcher, Chhendipada and Kaniha.</p> <p>b. Strengthening of existing secondary education facilities by augmenting resources</p> <ol style="list-style-type: none"> 1. Strength resources in the existing education facilities offering secondary education by ensuring adequate teachers in secondary schools in mining-affected areas. The target for filling gaps is about 30 schools each in Talcher (including municipal area) and Chhendipada, and about 15 schools in Kaniha, where the PTR is more than 30:1 (the stipulated norm under RMSA). 2. Competitive remunerations need to be provided particularly for rural/ distressed areas. <p>c. Build on existing scholarships for higher education. Considerations include-</p>	<p>a. Fill in infrastructure and resource gaps for secondary secondary education as per RMSA norms building on from first three years.</p> <p>b. Increase the scope of education scholarships by building on existing schemes for higher education.</p>

Outcome (projected)	Output	
	1-3 years	3-5 years
	<ol style="list-style-type: none"> 1. To reduce overall dropout: National Means-cum-Merit Scholarship Scheme (NMMSS). 2. To improve girl education- National Scheme of Incentives to Girls for Secondary Education. 3. To support education for children with disability between VIIIth to XIIth grade- Inclusive Education for Disabled at Secondary Stage.\ 4. For SC/ST children- Pre-matric scholarships for SC/ST; ANWESHA(to provide quality education to ST & SC students in partnership with urban educational institutions). 	
Clean/treated water facilities in all schools	Ensure treated drinking water facilities in all schools in the mining-affected areas. Currently the deficit is about 98 per cent in Chhendipada, 92 per cent in Kaniha and 75 per cent in Talcher.	

d. Employment and livelihood enhancement

Improving the status of employment and livelihood in Angul will require a multi-pronged approach considering education and skill levels among youth people within employable age, the potential of local resources (such as agricultural land and forest resources) and the traditional knowledge of the local communities. Therefore, improving employment and livelihood opportunities are also simultaneously dependent on other areas of investments such as in education, watershed management, and also the Government's action in effective implementation of certain regulations/policies as related to forest rights.

The budget for skill development for promoting entrepreneurship is extremely limiting. As per the flagship scheme Pradhan Mantri Kaushal Vikas Yojana (PMKVY), the total training target between 2017-2020, in all of Odisha is for about 58,000 people. The total budget for three years for the entire state is about Rs. 89 crore. However, in Angul itself, with 15-39 age groups, there are 2.5 lakhs non-workers. Therefore, convergence in this area is an utmost requirement to improve people's employability and earning opportunity.

For agriculture sector, the major focus should be soil and water conservation and enhancement of their quality, for which in 2016-17, the district allocation was only slightly above Rs. 14 crore. The issue needs to be tackled with a long-term focus adopting a watershed based approach for improving agricultural productivity.

With respect to livelihoods around forest based resources supporting implementation of Minimum Support Price for Minor Forest Produce Scheme (MSP for MFP), can be of significance to help communities procure a better price for their products.

Outcome (projected)	Output	
	1-3 years	3-5 years
Progress towards universal livelihood within employment age of 15-59 years, with focus on women and SC/ST	<ul style="list-style-type: none"> a. Education support <ul style="list-style-type: none"> 1. For completing secondary and higher secondary to ensure eligibility for secured wage employment. Special education support should be provided for women. (Refer to recommendation on education section). 2. Augmenting the assistance as provided under post-metric scholarship to SC/ST/OBC to incentivize higher education. b. Skill development <ul style="list-style-type: none"> 1. Increase training for unemployed people/ non-workers falling within working age group of 15-39 as per provisions of PMKVY to increase the number of skilled people⁴. Of this 50 per cent should be SC/ST and women. 2. Given the local resources and socio-economic profile of Angul district, training can be focused around sectors such as agriculture, food-processing, green jobs, healthcare, tourism and hospitality (also identified as target sectors by PMKVY for Odisha). 	<ul style="list-style-type: none"> a. Increase the number of people trained and areas requiring skill development based on assessment of previous years. b. Improve on education support to increase people's employment from building on previous years.
Enhancement of agriculture-based livelihood and income	<ul style="list-style-type: none"> a. Initiate a long term approach for watershed management in convergence with various concerned departments, to improve water and soil availability and relieve distress for the agricultural communities. b. Build on Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), to improve enhance recharge of aquifers and introduce sustainable water conservation practices. 	
Enhancement of forest-based livelihood particularly for SC/ST communities	Augment implementation of Minimum Support Price for Minor Forest Produce Scheme (MSP for MFP), by increasing the MSP by 10 per cent (in line with the guidelines provided by the Ministry of Tribal Affairs) ⁵ .	

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