

Ecological Transformation and the Reconfiguration of Adivasi Livelihoods: The Kodingamali Bauxite Mining Experience in Odisha

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Abstract

Mining-led development can reshape the ecological and social foundations of Adivasi livelihoods in mineral-rich regions. This article examines the reconfiguration of Adivasi livelihoods in the Kodingamali bauxite mining region of Odisha, India, based on qualitative field research in seven mining-affected and mining-influenced Adivasi-dominated villages of Laxmipur region, Koraput district. Data were collected through household interactions, qualitative interviews and field observations focusing on agriculture, forest resources, water, livestock, employment and changing livelihood practices. The study finds that livelihoods were traditionally organised around cultivation, forests, streams and livestock, with these resources supporting household subsistence and seasonal economic activities. Mining development has introduced improved connectivity, transport, institutional interventions and employment aspirations, particularly among youth, while also generating concerns regarding water quality, agricultural productivity, forest-resource access, dust, runoff, livestock safety and everyday mobility. Households have responded by combining agriculture, forest-based activities, wage labour, pensions and aspirations for formal employment, while women remain important contributors to household livelihood strategies. The Kodingamali experience therefore indicates a process of livelihood reconfiguration without complete physical displacement. The article argues that mining-led development changes not only patterns of resource use but also the social and ecological conditions through which Adivasi livelihoods are sustained.

Keywords: Adivasi Livelihoods; Bauxite Mining; Ecological Transformation; Livelihood Reconfiguration; Political Ecology; Odisha.

1. Introduction

Mineral extraction has occupied an important place in India's development trajectory. Mineral-rich regions are frequently represented as spaces of economic opportunity, industrial growth, employment generation and infrastructure development. However, many mineral-bearing regions are also inhabited by Adivasi communities whose livelihoods have historically been closely connected with land, forests, water, livestock and common ecological resources. Consequently, mining development can produce changes that extend beyond the immediate extraction of minerals. It can transform the ecological conditions, economic practices and social relations through which local livelihoods are reproduced.

The relationship between mining and Adivasi livelihoods is particularly significant in Odisha. The state is one of India's major mineral-producing regions and contains extensive Adivasi settlements, including areas covered by the Fifth Schedule. In such areas, land and natural resources are not simply economic assets. They are also connected with food security, cultural

practices, social relations and everyday subsistence. The conversion of an ecological landscape into an extractive landscape therefore involves a broader transformation of livelihood relations.

This article examines these processes through the case of the Kodingamali bauxite mining region in the Laxmipur area of Koraput district, Odisha. The Kodingamali bauxite mine is operated by the Odisha Mining Corporation Limited (OMC). The mining landscape extends across the Koraput and Rayagada region and is connected to wider industrial and transport networks. The development of the mine has also been accompanied by roads, transportation, institutional interventions, employment opportunities and community-oriented infrastructure.

The significance of the Kodingamali case, however, lies not only in the existence of mining infrastructure. The surrounding villages continue to depend, to varying degrees, on agriculture, forests, water and livestock. Field interactions indicate that the Kodingamali hill and its surrounding ecological resources historically formed an important basis of livelihood. Paddy, millet, green gram, black gram, pigeon pea, and vegetables were cultivated, while forest resources such as mangoes, jackfruit, tamarind, wild mushroom, honey, Tendu, mahua flowers, date palm, Ceylon oak, Bauhinia vahlii, Pongamia pinnata and medicinal plants contributed to household subsistence and income. Streams and other water sources were important for agriculture, domestic activities and livestock.

The mining process has introduced a different set of economic and institutional possibilities. Roads have improved physical connectivity in some locations, mining-related employment has generated new aspirations and institutional interventions have introduced new facilities. At the same time, field evidence indicates concerns about changes in water quality, agricultural productivity, dust, runoff, transport and access to ecological resources.

The central argument of this article is that mining-induced livelihood transformation should not be understood only through the conventional categories of displacement and rehabilitation. In Kodingamali, the transformation is also visible in villages where households remain physically located in their original settlements. The more significant change is the transformation of the ecological basis of livelihood reproduction. A household may continue to cultivate land while increasingly depending on wage labour. It may continue to collect forest products while purchasing more goods from the market. Young people may aspire to formal employment even when older members continue agriculture and NTFP collection. Thus, livelihood change occurs through a gradual combination of continuity, adaptation and emerging dependence.

The article addresses four questions. First, what constituted the ecology-based livelihood system of the communities surrounding Kodingamali? Second, what forms of ecological transformation are experienced in everyday livelihood practices? Third, how have households responded to these changes? Finally, how has mining contributed to the reconfiguration of livelihood strategies and aspirations without necessarily producing complete physical displacement?

The article is based on original qualitative field research and uses political ecology and the sustainable livelihoods approach as complementary analytical perspectives.

2. Literature Review and Theoretical Framework

2.1 Mining and Adivasi livelihoods

Mining in Adivasi regions involves more than the extraction of mineral resources. It frequently alters the relationship between communities and the ecological resources on which subsistence

depends. Land, forests, water and common resources may simultaneously constitute economic resources for mining and livelihood resources for local communities.

Padel and Das (2010) demonstrate the wider social and ecological contradictions associated with aluminium development in eastern India. Their work illustrates how mineral extraction can generate conflicts over land, resources, development priorities and the distribution of costs and benefits. The significance of such research for the Kodingamali case lies in understanding mineral-bearing landscapes as socially differentiated spaces rather than as empty economic territories.

Meher (2026) similarly draws attention to the consequences of mining for tribal communities in India and demonstrates how mineral extraction can undermine the material and social foundations of tribal life. Such scholarship challenges the assumption that the economic benefits associated with mineral development are automatically translated into secure local livelihoods. From a livelihood perspective, mining can simultaneously create and destroy opportunities. It can provide wage employment, roads, markets and institutional facilities while reducing access to agricultural land, forest products, water and common resources. The outcome is therefore not necessarily a complete transition from traditional livelihood to industrial employment. Instead, households may develop mixed livelihood strategies.

2.2 Political ecology

Political ecology provides a useful framework for examining the relationship between environmental transformation and social relations. Blaikie and Brookfield (1987) argue that environmental degradation cannot be understood independently of the political and economic processes through which resources are accessed and used. Environmental change is therefore not simply a physical process; it is also connected with questions of power, institutions, resource control and social differentiation.

This perspective is important for analysing mining because the same landscape can carry different meanings for different actors. For the mining institution, Kodingamali is a mineral-bearing landscape. For local households, however, the same landscape can be a source of agricultural production, forest products, water, livestock grazing, cultural meaning and social reproduction.

The political-ecological question is therefore not simply whether mining produces environmental change. It is also necessary to ask what happens to the relationship between people and ecological resources when a livelihood landscape becomes an extractive landscape.

2.3 Sustainable livelihoods

The sustainable livelihoods approach provides a complementary perspective. Scoones (1998) conceptualises livelihoods through the interaction of different forms of capital and livelihood strategies. Natural resources constitute an important part of the livelihood asset base of rural households.

Leach, Mearns and Scoones (1999) further demonstrate that access to environmental resources is mediated by institutions and social relations. Environmental resources therefore cannot be separated from the social arrangements through which households obtain and use them.

In the Kodingamali context, agriculture, forests, water and livestock were not independent livelihood components. They were interconnected. Water supported cultivation and livestock; forests supplied food and NTFPs; livestock contributed to household production; agricultural

residues and forest materials supported other activities. Changes in one component could therefore affect the wider livelihood system.

2.4 Analytical framework

The article brings political ecology and sustainable livelihoods together. Political ecology helps explain the transformation of the ecological landscape and the unequal distribution of environmental costs and benefits, while the sustainable livelihoods approach helps examine how households respond through diversification, adaptation and changing livelihood strategies.

The analytical framework can therefore be represented as:

Ecology-based livelihood → Mining intervention → Ecological transformation → Changing resource access → Livelihood adaptation and diversification → Emerging livelihood insecurity and new aspirations

This framework does not assume that traditional livelihoods disappear immediately. Instead, it examines the coexistence of old and emerging livelihood practices.

3. Research Methodology

3.1 Research design and study area

This article is based on qualitative field research conducted in seven Adivasi-dominated villages located in the Kodingamali bauxite mining region of the Laxmipur area of Koraput district, Odisha. The villages include Talakaipadar, Narsikhaipadar, Marbaiguda, Biriguda, Biriguda Colony, Jhalaguda and Kodinga. The study area is characterised by close interaction between settlements and natural resources. Agriculture, forest resources, water and livestock historically constituted important components of household livelihood systems. The region is also experiencing increasing interaction with mining institutions, transport networks, markets and employment opportunities.

3.2 Data collection

The study used qualitative interviews, household interactions and direct field observations. Particular attention was given to livelihood practices before and after the expansion of mining-related activities, ecological changes, household responses, employment aspirations and changing relationships with natural resources. Field interactions focused on the everyday experiences of residents rather than treating ecological transformation as an exclusively technical issue. Respondents discussed agriculture, water sources, forest products, livestock, transport, employment and the changing availability and quality of natural resources.

3.3 Data analysis

The field material was organised thematically around ecology-based livelihoods, ecological transformation and livelihood reconfiguration. Particular cases were used analytically to demonstrate broader patterns. The analysis distinguishes between respondents' perceptions and observations and independently established environmental or institutional facts.

3.4 Ethical considerations

The research was conducted with attention to informed participation, confidentiality and respect for participants' experiences. Individual respondents are not identified in the article where identification could compromise privacy.

Results & Discussion

4. The Ecology-Based Livelihood in Study Area

4.1 Agriculture and food security

The villagers in the Kodingamali peripheral region primarily depend on agriculture and forest-based resources for subsistence. Respondents described Kodingamali Hill as the lifeline of their livelihoods. Several villages are located around its foothills, where numerous large and small streams flow throughout the year. These perennial water sources supported the cultivation of paddy, vegetables, pulses and other seasonal crops. Villagers also cultivated small patches of land on and around the hill slopes and depended on the hill ecosystem for food production and livelihood security.

Unlike people living in nearby plain areas, who generally possessed comparatively larger and more cultivable tracts of land, many households in the peripheral villages had limited agricultural land. Consequently, the hill and surrounding forests provided an important livelihood base beyond cultivation. Villagers collected tubers, mushrooms, honey, mahua, tamarind, kendu leaves, medicinal plants and other non-timber forest products (NTFPs) for household consumption and supplementary income. Land, water and forest resources were therefore closely interconnected in everyday livelihood practices.

Respondents explained that agricultural land was cultivated throughout the year, with crops harvested in three seasons. Paddy, millet, pulses and vegetables were important components of household production. Cultivation was closely connected with local ecological knowledge and the availability of forest and water resources. Soil fertility was maintained largely through natural ecological processes rather than external agricultural inputs. One respondent explained:

“During the dry season, the leaves of forest trees dry, fall to the ground, and gradually decompose into natural compost. With the arrival of the monsoon, rainwater carries this organic matter into our fields, enriching the soil and making it fertile for cultivation. That is why our crops grew well. We never used chemical fertilizers in our land.”

This account illustrates how forest ecology directly contributed to agricultural production. Forest biomass, seasonal rainfall and cultivated land formed an interconnected system that supported soil fertility. Agriculture consequently provided food and limited opportunities for surplus exchange and cash income, reducing dependence on market purchases.

Respondents, however, perceived considerable changes following the commencement and intensification of mining-related activities. They reported that red mining dust from mining operations and transportation settles on crops, trees, leaves and surrounding areas, particularly during the dry season. During the rainy season, they stated that the dust is carried through runoff into nearby streams and agricultural fields. Villagers associated these changes with declining crop productivity and changes in soil and water conditions.

A field account from Talakaipadar provides a specific illustration:

A respondent from Talakaipadar recalled, “Earlier, turmeric production was around 10 to 15 quintals, but now it has come down to about 4 to 5 quintals.”

This account represents the respondent’s field-based experience rather than independently measured production data. Nevertheless, it illustrates how villagers interpret ecological changes through their experiences of agricultural productivity.

The relationship between agriculture and water was also repeatedly emphasised during field interactions. Respondents from Talakaipadar, Jhalaguda, Raulipadar and Marabaiguda reported muddy or reddish water in local streams, while respondents in Jhalaguda and Raulipadar

reported drying borewells and changes in water quality. These experiences have implications for cultivation, livestock and other livelihood activities. In Biriguda, respondents reported that when piped water appeared reddish, households sometimes relied on filtered rainwater for domestic use, demonstrating local adaptation to changing environmental conditions.

4.2 Forest resources and NTFPs

Forest resources constituted an important component of the traditional livelihood system in the Kodingamali peripheral villages. Respondents described the forest as an integral part of everyday livelihood and household subsistence rather than merely a source of supplementary income. Households collected various non-timber forest products (NTFPs), including wild tubers, mushrooms, honey, kendu leaves, mahua flowers, tamarind, date palm, *siadi*, *Bauhinia vahlii*, *Pongamia* and medicinal plants. These products were consumed within households or sold in local markets, contributing to food security and cash income.

The importance of NTFPs was particularly evident among households with limited agricultural land. Forest products provided food and other necessities with little monetary expenditure and complemented agricultural production. Their collection and sale helped households meet everyday needs during periods of limited agricultural returns.

Women played an important role in this forest-based livelihood system through collection, processing, storage, food preparation and marketing. Income from these activities contributed to household consumption, children's education and healthcare. A woman respondent recalled:

"We used to go to the forest and collect mahul, tamarind, mushrooms and other forest products. Some we kept for our family and some we sold in the market. The money helped us with household needs and our children's requirements."

This account illustrates the multiple functions of NTFPs within household livelihoods, providing food and income while enabling families to combine forest collection with cultivation, livestock rearing and other activities.

The importance of forest resources was closely associated with the ecological condition of Kodingamali Hill and its surrounding areas. Respondents described the hill, forests and streams as interconnected components of the livelihood landscape. Forests provided food and NTFPs, streams supported agriculture and livestock, while agricultural land supplied cereals, pulses and vegetables.

Respondents increasingly reported environmental changes associated with mining activities. Dust deposition, runoff and changes in water conditions were perceived as affecting the surrounding environment and access to forest-based resources. Rather than referring only to the disappearance of particular products, respondents described a gradual decline in the quality and accessibility of resources on which they had traditionally depended.

An elderly woman respondent described this change:

"After mining started, many of the things we used to collect from the forest have disappeared. Earlier we earned something from selling forest products and vegetables. Now those opportunities have reduced, and we have become more dependent on others. Our role in supporting the household economy has become much smaller."

This account connects ecological change with changing household economic relations, as reduced access to forest-based resources may increase dependence on purchased goods and other income sources.

The changing relationship with forest resources also reflects generational differences. Older residents continue to attach considerable livelihood and cultural importance to forest collection, while younger people increasingly aspire to wage labour, company jobs and other market-oriented occupations. Traditional activities therefore increasingly coexist with new employment aspirations and sources of cash income.

4.3 Water, livestock and ecological interdependence

Water was another important foundation of the ecology-based livelihood system in the Kodingamali peripheral villages. Respondents described perennial streams, springs and other local water sources as essential to agriculture, livestock rearing and everyday household activities. These sources supported cultivation, bathing, washing, livestock care and, during appropriate seasons, the collection of fish and crabs. Naturally available green leafy vegetables and other food resources also supplemented household consumption. Water therefore functioned as a multifunctional livelihood resource rather than merely an input for agriculture.

One respondent from Talakaipadar recalled:

“Earlier, the stream was used for many things. We used the water for cultivation, bathing and washing, and our animals also depended on it. We could also catch fish and crabs from the stream. These things helped us in our daily life.”

This account illustrates how households derived multiple livelihood benefits from local water sources. Fish, crabs and naturally available vegetables supplemented household diets, while access to water reduced dependence on purchased resources. Such practices were particularly important for households with limited cash income.

Livestock formed another closely connected component of this livelihood system. Cattle, buffaloes and goats were maintained for agricultural work, milk, food and economic security. Their maintenance depended on water, crop residues, grazing areas and locally available fodder. Livestock consequently connected agriculture with the wider ecological system, enabling households to combine cultivation, livestock rearing, fishing, forest collection and other activities within a single livelihood system.

Respondents, however, reported changes in the condition and availability of local water sources in the context of mining-related environmental changes. In Talakaipadar, villagers described stream water becoming muddy or reddish during periods of runoff. Similar concerns were reported in Jhalaguda and Raulipadar, where respondents referred to drying or muddy borewells. Such changes were significant because they could affect domestic use, cultivation, livestock management and the collection of aquatic resources simultaneously.

A respondent from Biriguda described the household response to changing water quality:

“During the rainy season, when the pipe water becomes red, we have to depend on rainwater. We collect it and filter it before using it.”

This account illustrates a practical household response to changing water conditions and the additional effort required to secure usable water. Changes in water availability also have implications for livestock, as animals require regular access to water and remain closely connected with household economic security.

The ecological significance of water is therefore best understood through its connections with other livelihood resources. Forests provided food, fodder and organic matter; streams supported agriculture, livestock and aquatic food resources; agricultural fields provided crops and residues; and livestock contributed to household production and economic security. These

relationships formed an interconnected livelihood system in which changes in one resource could affect several others.

4.4 Kodingamali as an ecological and cultural landscape

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This account illustrates the multiple livelihood benefits derived from local water sources. Fish, crabs and naturally available vegetables supplemented household diets, while access to water reduced dependence on purchased resources, particularly among households with limited cash income.

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The reported changes in streams and borewells consequently have wider implications for livelihood security. When water becomes muddy, reddish or less available, households may face difficulties in cultivation, livestock management, domestic use and the collection of fish and other aquatic resources. They may consequently become more dependent on alternative water sources, external infrastructure, purchased goods and institutional support.

5. Ecological Transformation under Mining Development

5.1 Changing water conditions:

Water emerged as one of the significant concerns during field interactions. Respondents reported that some water sources previously used for drinking, bathing, washing, livestock and agricultural activities had changed in quality. Springs and streams were described as becoming muddy or reddish following mining-related activities, particularly after blasting and during periods of rainfall and runoff. Since water was closely connected with several aspects of everyday livelihood, these changes were perceived as affecting more than domestic water use.

In Jhalaguda and Raulipadar, respondents reported problems with borewells, including drying and the availability of muddy water. In some locations, households also reported changes in the colour and usability of water from local sources. A respondent from Biriguda explained the household's response to changing water quality:

“During the rainy season, when the pipe water becomes red, we have to depend on rainwater. We collect it and filter it before using it.”

This account illustrates how changes in water quality can require households to modify their everyday practices. Rainwater collection and filtration become necessary alternatives when piped water is perceived as unsuitable for use. Such adaptation also involves additional time and household labour.

The problem was not limited to drinking water. Local streams and other water sources traditionally supported bathing, washing, livestock and cultivation, while also providing access to fish, crabs and other naturally available resources. As one respondent from Talakaipadar recalled:

“Earlier, the stream was used for many things. We used the water for cultivation, bathing and washing, and our animals also depended on it. We could also catch fish and crabs from the stream. These things helped us in our daily life.”

The statement demonstrates the multifunctional role of local water sources within the traditional livelihood system. A single stream supported domestic activities, agriculture, livestock and food collection. Consequently, changes in its condition could affect several components of household livelihood simultaneously.

The experience of households in Jhalaguda further illustrates how environmental change can become a livelihood concern. When a water source becomes less reliable or usable, households may need to seek alternative sources and modify established practices. This can increase the time and labour required for securing water, while also creating difficulties for livestock management, household hygiene and agricultural activities. Similar concerns were reported in Raulipadar, where respondents referred to drying or muddy borewell water.

5.2 Agricultural productivity:

Agricultural productivity emerged as another important dimension of ecological transformation in the study area. Respondents described changes in crop production, particularly in

Talakaipadar, where agriculture had previously provided both food and cash income for households. These changes were significant because agricultural land continued to remain under household cultivation, while its perceived productive capacity had declined.

A 52-year-old woman farmer from Talakaipadar described how mining had affected her agricultural livelihood. Before mining operations began, turmeric cultivation was one of her family's major sources of income. She reported harvesting 10–15 quintals of turmeric annually from the same piece of land and selling the surplus in the local market for approximately ₹20,000–₹25,000. According to her, this income helped meet the family's basic needs throughout the year. She explained:

“Before mining, I harvested 10 to 15 quintals of turmeric every year and earned ₹20,000 to ₹25,000 by selling it. That income was enough to run my household comfortably. Now, from the same field, I get only 4 to 5 quintals. Mining dust settles on the plants and damages them. Even after applying traditional medicines, the crops do not recover. When the flowering stage arrives, the flowers dry up and fall, and the plants become weak. Now we have no reliable source of income. It has become difficult even to sustain our family.”

She further explained that the decline was not limited to turmeric. Paddy and finger millet, which had previously provided adequate food for the household, were also perceived to have declined in productivity:

“Earlier, paddy and millet produced very well, and we never worried about food. Now their production has also declined. We are afraid to sell all our harvest because we do not know what we will eat later. Earlier, I always had some money in my hands from selling turmeric. Today, I do not even have that small amount of cash. Life has become very difficult.”

The agricultural experience of Talakaipadar therefore indicates that ecological transformation is experienced not only through changes in the physical environment but also through changes in crop productivity and household income. Respondents associated declining yields with mining-related dust and changing environmental conditions. The reported reduction in turmeric production from approximately 10–15 quintals to 4–5 quintals is particularly significant because the crop had served both subsistence and cash-income functions.

5.3 Dust, runoff and everyday environmental experience

Dust, runoff and the changing physical condition of the surrounding environment emerged as important aspects of respondents' everyday experience of mining development. Unlike environmental changes visible only at the mining site, respondents described dust and runoff as entering everyday spaces, including agricultural fields, roads, streams and residential areas. These experiences show how ecological transformation is encountered through ordinary livelihood and household activities.

Villagers in Talakaipadar described a significant transformation in their agricultural landscape after mining began. They recalled that before mining, the post-monsoon months of October and November were marked by abundant cultivation of vegetables and maize. As one villager explained:

“Before mining, our village was full of vegetables and maize. During October and November, the entire area looked green. Wherever you looked, crops were growing. These fields that you see today were once full of vegetables. Now, whatever we plant here gets damaged. The plants become diseased, wither away, and fail to produce healthy flowers or fruits.”

When asked about the reasons for this change, villagers attributed it to mining water and mining dust. According to them, dust settles on crop leaves and flowers, while runoff affects the soil and surrounding agricultural areas. As another respondent stated:

“It is because of mining water and mining dust. No matter what medicine we apply, the crops do not improve. The plants become weak, dry up, and the fruits remain small. We are no longer able to grow vegetables as we did before.”

Respondents also expressed concerns about changing food quality and health. One villager remarked:

“Earlier, we ate natural and healthy food grown in our own fields. Now, we are eating poisoned food. We do not know what kinds of diseases these foods are causing us.”

This statement represents the respondent’s perception of changing food and environmental conditions and should not be interpreted as independent medical evidence. It is nevertheless significant for understanding how environmental change is perceived and experienced in everyday village life.

Mining activities also affected the sensory and everyday experience of the environment. Respondents described red dust associated with mining and transport activities and reported runoff affecting local water sources and surrounding areas. These changes are particularly important for households whose livelihoods continue to depend on agriculture, water and other ecological resources. A field interaction from Marbaiguda further illustrates this changing relationship with local water resources. A girl reportedly experienced a skin problem after bathing in a stream. This account should not be treated as independent medical evidence establishing mining as the cause, but it demonstrates residents’ concerns about the quality and safety of local water resources.

5.4 Changing Access to Ecological Resources

Mining development has gradually changed the ways in which Adivasi households access and use the ecological resources surrounding their villages. Earlier, land, forests, streams and grazing spaces were closely integrated with everyday livelihood practices. Households cultivated agricultural land, collected NTFPs, gathered fish and crabs from streams, grazed livestock and used locally available resources according to seasonal requirements. Access to these resources formed an important basis of livelihood security.

Field interactions indicate that this relationship has become increasingly constrained with the expansion of mining activities, roads and associated infrastructure. Respondents emphasised that the issue was not simply the physical loss of resources but also changes in their accessibility and usability. As one respondent explained:

“Earlier, we could freely go to the forest, collect forest products, take our animals for grazing and use the streams. These things were part of our daily life. Now, because of mining and the movement of vehicles, the situation has changed and we cannot use the surrounding resources in the same way as before.”

This account illustrates how changes in the surrounding landscape can affect livelihood practices even when households continue to live in their original villages. Forests, water sources and agricultural spaces may remain physically present, but their use is increasingly influenced by mining-related activities and environmental changes.

The experience of Biriguda Colony provides another important case. Respondents recalled that land acquisition took place in 2008, with compensation reported at approximately ₹3 lakh per

acre. They also recalled expectations regarding employment, education, medical facilities, resettlement and transport. One respondent recalled:

“They told us that our children would get education and medical facilities like rich people, and that we would get employment where the company works.”

For affected households, changes in access to land were therefore accompanied by expectations of new livelihood opportunities and development benefits.

Changes in water access further demonstrate this transformation. Respondents from Jhalaguda and Raulipadar reported drying or muddy borewells, while villagers in Talakaipadar described stream water becoming muddy or reddish during periods of runoff. In Biriguda, when piped water became red or unsuitable for use, households sometimes depended on filtered rainwater. These experiences show that a resource may remain physically available while becoming less usable for traditional livelihood purposes.

Changes also extend to water-based livelihood resources. Villagers reported that streams and springs traditionally provided fish, crabs and edible aquatic vegetation, which supplemented household food and reduced dependence on market purchases. An elderly villager explained:

“Around our village there were many small and large streams. Earlier, we collected fish, crabs, and edible aquatic plants from these streams. These were an important part of our daily livelihood and food. But because of continuous mining blasting, many streams have dried up. The remaining streams are covered with red mining dust, and the fish, crabs, and aquatic plants have either died or become scarce. Even if some are still found, we are afraid to consume them because the water has become polluted. The crabs have turned reddish and many die in the contaminated water.”

Villagers associated these changes with blasting, excavation, mining dust and runoff. As these resources became scarce or were perceived as unsafe, households reduced their use and increasingly depended on purchased food and alternative income sources.

Ecological transformation does not necessarily require the complete disappearance of a resource. A stream may continue to exist while changes in its condition reduce the availability of fish, crabs and aquatic plants. Similarly, forests, agricultural land and grazing spaces may remain physically present but become more difficult or less reliable to access and use.

6. Reconfiguration of Adivasi Livelihoods

6.1 From ecology-based livelihoods to mixed strategies

The ecological changes associated with mining development have contributed to a gradual reconfiguration of Adivasi livelihoods in the Kodingamali peripheral villages. Earlier, household livelihoods were largely organised around a combination of agriculture, forests, streams, livestock and other locally available ecological resources. Households cultivated paddy, pulses and vegetables, collected NTFPs, gathered fish and crabs, reared livestock and depended on local water sources. These activities were interconnected components of an ecology-based livelihood system.

Field interactions indicate that this earlier pattern has increasingly changed into a combination of traditional and emerging livelihood strategies. Households continue to cultivate land and collect forest products where possible, but they are also increasingly dependent on wage labour, casual employment, markets and other cash-based activities. The result is therefore not a complete shift away from traditional livelihoods but the emergence of a mixed livelihood strategy.

One respondent described this change:

“Earlier, our main dependence was on our land, forest and water. We could get food from cultivation and the forest and also keep animals. Now we have to depend on different sources. We cultivate when possible, but we also need wage work and money from outside.”

This changing pattern is particularly visible among households where agricultural production and access to ecological resources have become less reliable. As another respondent explained:

“Earlier, we could manage many of our needs from our own land and the forest. Now, if cultivation is not enough, we have to buy things from the market and look for other work.”

The field evidence suggests a movement from a predominantly ecology-based livelihood system towards a mixed livelihood structure. Agriculture and forest activities continue, but households increasingly combine them with wage labour and other income sources. A household may cultivate crops while one member seeks wage employment, another continues collecting NTFPs, while younger members aspire to formal employment and older people may depend on pensions.

The changing livelihood pattern is also associated with growing employment aspirations among younger people. Respondents from Biriguda Colony and Adia Penta recalled that during the land acquisition process in 2008, families expected employment and other development benefits. One respondent recalled:

“At the time of land acquisition, we were told that there would be employment, education, medical facilities and other facilities for our families. We thought our children’s future would become better.”

Such expectations have contributed to a changing orientation towards formal and company-related employment. Younger respondents increasingly associate livelihood security with regular wages and formal employment rather than relying exclusively on agriculture and forest resources. At the same time, older household members may continue cultivation, forest collection and livestock rearing, while younger members seek wage labour or other employment opportunities.

6.2 Youth employment aspirations

One important change identified through field interactions is the growing aspiration among young people for formal employment and regular income. Earlier, livelihoods in the Kodingamali peripheral villages were closely connected with agriculture, forests, water and livestock. However, younger generations increasingly associate livelihood security with salaried employment, company jobs and other forms of regular wage income, reflecting an important social dimension of livelihood reconfiguration.

The experience of respondents from Biriguda Colony and Adia Penta illustrates this changing aspiration. Respondents recalled that at the time of land acquisition in 2008, the company assured affected families of proper resettlement, employment, educational and medical facilities, and improved transportation and communication. When compensation was paid at approximately ₹3 lakh per acre, company representatives reportedly assured them:

“Where the children of rich people study, your children will also study. Where rich people receive medical facilities, you will also receive the same facilities. Where we work, you will also get employment.”

These assurances created strong expectations regarding the future of their children. Employment was viewed not only as a source of income but also as an opportunity for a more secure future. One respondent recalled:

“When our land was taken, we were told that our children would get education and medical facilities like rich people and that there would be employment where the company works. We thought our children’s future would become better.”

For families affected by changes in access to agricultural land, the promise of employment became closely connected with their understanding of development. During focus group discussions, participants reported that many local youths had completed ITI, diploma and other vocational courses, while others were still undergoing training. According to them, the company had supported these skill-development programmes, creating expectations of employment in the mining company. One participant explained:

“Our land has been acquired, so we hope the company will provide us with jobs. That is why some of us have already completed ITI and diploma courses, while others are still in training. We believe these qualifications will help us get good positions in the company.”

These aspirations do not mean that younger people have completely abandoned traditional livelihoods. Agriculture, livestock rearing and forest-based activities continue to be practiced by many households. Nevertheless, local youth increasingly seek formal company employment, wage labour and other cash-based opportunities. As one respondent observed:

“The youth want to earn more with less labour, so they see company jobs as a better option.”

Another respondent similarly explained:

“Our children do not want to depend only on farming. They want a company job because they think that a regular salary will give them a better future.”

These changing aspirations are linked to the wider livelihood transformation in the study area. As ecological resources become less reliable and household needs increasingly require cash income, regular employment appears more attractive to younger generations. Thus, the transition is not simply occupational; it also reflects a changing understanding of livelihood security. For the older generation, security was closely associated with land, forests, water and livestock, whereas younger people increasingly associate it with education, formal employment and stable cash income.

6.3 Women and changing livelihood contributions

Women have traditionally made an important contribution to household livelihoods in the Kodingamali peripheral villages through agriculture, forest collection, livestock care, food gathering and household work. Their contribution was closely connected with the local ecology. Women collected NTFPs such as wild tubers, mushrooms, honey, tendu leaves, mahua flowers, siali leaves, pongamia seeds and medicinal plants, while also participating in cultivation, livestock management and the collection of water and food resources. These activities supported household consumption and provided important sources of cash income.

A woman respondent described the earlier importance of forest-based activities:

“We used to go to the forest and collect mahua flowers, tamarind, mushrooms and other forest products. Some we kept for our family and some we sold in the market. The money helped us with household needs and our children’s requirements.”

Women's contribution was therefore not limited to unpaid domestic labour. Forest collection, food preparation, livestock care and cultivation formed an important part of household livelihood and food security. NTFPs also provided income for household consumption, children's education and healthcare.

However, changes in the surrounding ecological environment have affected these livelihood contributions. Respondents reported concerns regarding water sources, agricultural productivity and access to forest resources. As some resources have become less reliable or more difficult to access, women have had to adjust their everyday livelihood practices. One respondent explained:

"Earlier, many things were available around us. We could collect from the forest and use the stream, and there was enough work in our own fields. Now we have to spend more time managing things and buying what we earlier got from our surroundings."

An elderly woman further described the changing availability of forest-based livelihood opportunities:

"After mining started, many of the things we used to collect from the forest have disappeared. Earlier we earned something from selling forest products and vegetables. Now those opportunities have reduced, and we have become more dependent on others. Our role in supporting the household economy has become much smaller."

Where traditional forest and agricultural activities provide less reliable returns, households increasingly depend on wage labour and market purchases. Women's livelihood activities have also expanded to include self-help groups, wage work and other income-generating activities where opportunities are available. Nevertheless, women continue to participate in agriculture, NTFP collection, livestock care and household management.

A woman from Biriguda explained the broader significance of women's economic contribution:

"People think only men earn, but women run the household. We collected forest products, cultivated crops, sold vegetables and forest produce in the weekly market, and used that money to educate our children, buy medicines, and manage the household. We were always connected with the forest because it provided our livelihood."

This account indicates that women's work extended beyond household care and included direct participation in the local economy. Through collecting and selling forest products, cultivating crops and marketing vegetables and other produce, women contributed to household income and expenditure while connecting ecological resources with everyday needs.

The transformation is therefore gendered. The weakening of forest-based livelihood opportunities affects women in particular because they have historically been involved in collection, cultivation, livestock care, processing and household management. Changes in forests, water and agricultural productivity consequently affect both resource availability and the organisation of women's everyday work.

6.4 Market dependence and institutional intervention

The reconfiguration of Adivasi livelihoods in the Kodingamali peripheral villages is reflected in the growing orientation towards market-oriented employment and the increasing influence of industrial and institutional interventions. This transformation has not resulted in the disappearance of traditional livelihood practices. Agriculture, forest collection, livestock rearing and the use of local water resources continue to provide food, income and livelihood

security. Alongside these practices, wage employment, company jobs and other market-oriented occupations are becoming increasingly important, particularly among younger people.

Earlier, livelihood security was largely associated with direct access to land, forests, water, livestock and other ecological resources. Agriculture supplied food, forests provided NTFPs, livestock supported household needs, and streams supported fishing and other water-based activities. These practices continue to remain important in the study area. However, mining expansion, transport activities and infrastructure development have introduced new economic possibilities and increased exposure to wage employment and formal work.

One respondent explained:

“We still have our land and we continue farming, but farming alone is not enough for today’s needs. If there is a permanent job in the company, it can give our family a more secure future.”

The attraction towards market-oriented employment does not represent a complete rejection of traditional livelihoods. Rather, households increasingly combine different livelihood sources. As another respondent explained:

“We do not want to leave our farming and forest work completely. These are still important for us. But if someone in the family gets a secure job, it will help us manage our children’s education, medical expenses and other needs.”

The experience of land-acquired families further illustrates the relationship between industrial development and employment aspirations. Respondents from Biriguda Colony and Adia Penta recalled that employment was an important expectation associated with land acquisition and mining development. One respondent recalled:

“Where the children of rich people study, your children will also study. Where rich people receive medical facilities, you will also receive the same facilities. Where we work, you will also get employment.”

These expectations have influenced how local people perceive industrial development and the future of younger generations. During focus group discussions, participants from land-acquired families reported that local youths had completed ITI, diploma and other vocational courses, while some were still undergoing training. One participant explained:

“Our land has been acquired, so we hope the company will provide us with jobs. That is why some of us have already completed ITI and diploma courses, while others are still in training. We believe these qualifications will help us get good positions in the company.”

This indicates that institutional intervention extends beyond physical infrastructure and welfare services. Skill development, technical education and employment expectations also influence local livelihood aspirations and connect communities with the emerging market-oriented livelihood structure.

At the household level, these changes also have a generational dimension. Older members may continue cultivation, forest-based activities and livestock rearing, while younger members seek wage employment, vocational training or industrial opportunities. Thus, different generations within the same household may participate in different livelihood activities.

8. Conclusion

This article examined ecological transformation and livelihood reconfiguration among Adivasi communities surrounding the Kodingamali bauxite mining region of Odisha. The findings show that pre-mining livelihoods were closely connected with agriculture, forests, water,

livestock and NTFPs, which together formed an interconnected foundation of subsistence and income. Mining development has introduced infrastructure, transport networks, market opportunities and employment aspirations, while field evidence indicates concerns regarding water conditions, agricultural productivity, dust, runoff, livestock safety and access to ecological resources. Traditional livelihoods, however, have not disappeared. Households continue to combine agriculture, forest products and livestock with wage labour, pensions, market-based income and emerging employment opportunities. The central finding is that mining development has produced livelihood reconfiguration rather than a simple transition from traditional livelihoods to industrial employment. This transformation occurs through changing ecological conditions, livelihood diversification, market dependence and new employment aspirations. The Kodingamali case also shows that mining-induced displacement need not involve physical relocation alone. Even when households remain in their original settlements, changes in ecological resources and livelihood conditions can transform their relationship with the environment. Kodingamali is therefore simultaneously a source of mineral wealth, a livelihood environment and a culturally meaningful landscape. The study highlights the importance of understanding mining development through both ecological transformation and everyday livelihood experiences. Its broader sociological significance lies in demonstrating how development can reshape the foundations of livelihood and social reproduction even without complete physical displacement.

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