

### **3ie Policy Brief for Impact Evaluations**

## **EVALUATING THE IMPACT OF INFRASTRUCTURE DEVELOPMENT: CASE STUDY OF THE KONKAN RAILWAY IN INDIA**

### **1. Key Messages for Policymakers and Influencers**

- The impact evaluation of the Konkan Railway, a controversial infrastructure project in the ecologically sensitive Western Ghats is an attempt towards bridging the gap in evidence on the impact of large infrastructure projects.
- While, migration studies have increasingly identified the role of better transport and communication facilities in enabling workers to respond better to income opportunities generated by migration, this study is among the few that quantifies the changes in population and workforce composition brought about by migration and daily commute to work in response to improved transport infrastructure.
- By doing so it encourages transport and development planners in both migrant sending and receiving regions to take into consideration how transport infrastructure helps in diversification of workplace and economic activities
- Contrary to the initial expectations that the Konkan Railway project will usher in an era of industrial development and transform the migration and remittance dependant character of the regional economy, our findings suggest that the Konkan Railway has not contributed directly to such an outcome. Transport infrastructure may, therefore, may not be sufficient by themselves in changing the geography of industrial location.
- Large scale project, which may cause disturbances in the ecosystem of a region in the short run can well be environmentally stable and indeed prove environmentally sustainable in the long run if adequate measures for environmental management are implemented

### **2. Overview**

Large infrastructure projects usually defined as large, complex projects, costing a billion US dollars or more, have lately been controversial around the world, but more so in developing countries. They have been criticized for cost overruns, for being constantly behind schedule and have also faced public resistance for their alleged impact on the environment, for causing displacement and the loss of livelihood of the local population. In India as well, several infrastructure projects have been mired in controversy in which concerns of environmental conservation have been pitted against development imperatives. This is especially so in the case of megaprojects requiring significant public investment such as dams, highways, railways, airports, nuclear and thermal power plants in regions considered to be ecologically sensitive such as the Western Ghats.

Regrettably, despite the continuing debate on how large infrastructure projects affect the well-being of people and whether they are ecologically damaging, there is a lack of systematic research on their long term impact. There is also limited understanding of the role of institutional, economic and social factors in a large infrastructure project's attainment or non-attainment of the desired effects and projected outcomes. The absence of such empirical evidence on currently operational large infrastructure projects creates obstacles in the way of policymakers and stakeholders when it comes to planning for future developmental activities.

In this context, we undertook a socio-economic and environmental impact evaluation of a controversial large transport project in the Western Ghats, the Konkan Railway.

### **3. Main summary of the study**

The Konkan Railway is one of the biggest railway construction endeavours in independent India. Operational since 1998, the railway stretches over 760 km along the Konkan region of three West Indian states of Maharashtra, Goa and Karnataka. However, the region is also known to be ecologically sensitive, which is why this infrastructure project was frequently contested for its potential impacts on the local ecosystem. A defining feature of the historical development experience of the Konkan region is the high level of male outmigration for better economic opportunities. The region's migratory links with Mumbai, goes as far back as the 19<sup>th</sup> century in certain instances. The early migrants travelled by steamships, which remained a competitive mode of transport till early 20<sup>th</sup> century. After the stoppage of steamer services in 1980's, road was the only means of long distance transport for most of the region. The Konkan Railway therefore forms a part of a much longer history of labour mobility in this region.

We employed a theory-based evaluation approach that relied on a plurality of techniques, a combination of quantitative and qualitative strategies across disciplines to answer the following research questions: What are the socioeconomic impacts of the Konkan Railway such as on population and workforce composition? What has been the effect of Konkan Railway on the land use pattern in the region? Have the stated project objectives of the Konkan Railway been achieved? Specifically, we applied quasi-experimental techniques to study the impact on population composition, workforce composition and land use changes using census and satellite data. We also carried out an analysis of the operational performance of the Konkan Railway and used information retrieved from document and archival analyses and interviews to explain our findings.

We learnt that the Konkan Railway has played an important role in improving the connectivity between Mumbai and Mangalore, the stations at either end of the Konkan Railway system. By cutting down the distance and travel time, and by providing a cheap and safe means of transport, it has improved the overall accessibility to and from the region and has also improved connectivity within the region. It has amplified the already existing pattern of travel in the region, most importantly to Mumbai. At the same time, it has enhanced the available choice of destinations by connecting the region to the rest of country, namely Gujarat, New Delhi, and Kerala.

The Konkan Railway has emerged as the preferred mode of transport as compared to the highway due to two major factors. Firstly, the subsidized train fare and lack of seasonal fluctuation in fare makes it more affordable than bus transport. The railways in India have been playing the role of meeting the transportation needs of the economically disadvantaged sections of the society, by keeping train fares low. In India therefore, public policy, plays a significant role in shaping people's choice for rail as the preferred mode of transport. Secondly, over and above the monetary factor, for the travelers the railway provides a tangibly different experience in terms of comfort, on board-facilities and safety which buses or an expanded highway network may not be able to match.

The patronage from passengers is in stark contrast with the performance of freight. Despite, the considerable savings in distance and travel time offered by the Konkan Railway, the freight traffic fell short of the traffic projections. One of the key learnings from the analysis of the operating performance of Konkan Railway was that political and regulatory uncertainties concerning mining and environmental conservation, resistance to industrial development, and changing macro-economic conditions affected the industrial development of the region and in turn impacted the demand for freight services of the Konkan Railway. It is important to note that it is intrinsic to the nature of infrastructure projects that by sinking present resources in exchange for future benefits, they are affected by uncertainty and risks. The demand for freight transport is an outcome of derived demand; that is, it occurs as a result of demand from other sectors. The Konkan Railway experience, thus, illustrates that there are uncertainties in the benefits to be derived from infrastructure projects when external factors play a key role in determining the viability of the project. Therefore, contrary to the initial expectations that the Konkan Railway project will usher in an era of industrial development and transform the migration and remittance dependant character of the regional economy, our findings suggest that the Konkan Railway has not contributed directly to such an outcome.

In our quasi-experimental analysis, we found that between 1991-2011, the Konkan Railway had a positive effect on the percentage of male main workers (defined as those who work for more than six months a year) to total workers declined and the sex ratio between females and males increased. Historically, this region has had a higher female to male sex ratio because of male migration. Therefore, we can plausibly conclude from our results on male main workers and female to male sex ratio that the railway access has reinforced the pre-existing pattern of high levels of male migration. The improved accessibility makes it easier to undertake frequent trips, thereby helping in maintaining social links with the place of origin. Our findings are in line with those of studies from developing countries that find that enhanced transport connectivity has an important role to play in the decision to migrate for work.

In addition to an increase in population, we also find an increase in crude workforce participation rate for villages and towns closer to the railway station than those further away. We also found an increase in other (main) workers defined as those who engage in non-agricultural activities for more than six months a year and insignificant results for cultivators and agricultural labour for villages and towns in closer to the railway station than those further away. These results led us to conclude that the Konkan Railway has encouraged diversification into non-agricultural economic activities and also encouraged daily commutes between rural and urban areas for accessing employment opportunities and seasonal migration. The socioeconomic and employment profiles of the seasonal and commuting workers are an interesting subject of further research.

During the time of its construction, environmentalists had also argued that the railway would generally be detrimental to ecosystem and ecological balance of the region. However, the forest cover results from the census data which captures village-wise land use changes show that between 1991-2011, there was no significant change in forest cover for villages closer to the railway station than those further away. The satellite data captured land use changes along 2 km on either side of the railway line. The satellite data shows that there is a decrease in total forest cover between 1991 and 2003, plausibly due to the construction of the track and stations. Between 2003 to 2014 it shows an increase in forest cover along the railway line surpassing the forest cover in 1991, a result which can be plausibly attributed to the extensive

afforestation activity undertaken by the Konkan Railway Corporation Limited (KRCL). The analysis could hence not substantiate the concerns raised during the time of the construction of the Konkan Railway about the environmental degradation it might bring in its wake, at least not at a larger scale.

#### **4. Recommendation**

- The study highlights the role improved transport infrastructure can play in promoting migration as a livelihood diversification and income enhancing strategy by households. It encourages policy-makers to turn their attention to understanding the ways in which workers can take advantage of improved access to avail work opportunities outside the place of residence and how transport policy can be formulated to facilitate this.
- Though contested projects continue to be referred in subsequent debates about environmental impacts, they are rarely systematically studied later for their long-term impact. In light of the absence of such detailed long-term assessments of various large infrastructure projects stakeholders are left with no empirical evidence on which to base their decisions regarding future developmental activities in the Western Ghats or more widely in developing countries. The findings from this study are also useful for transport and environment ministries, urban planners and environmentalists to better understand the role of the railway in present developing country circumstances. It can enable them to make more informed decisions regarding policy and investment in infrastructure in the Western Ghats and in India in general.
- Significantly, we can conclude that new transport infrastructure is by itself unlikely to generate new industrial investments, especially in lagging regions. Transport infrastructure may, therefore, may not be sufficient by themselves in changing the geography of industrial location. In the case of the Konkan Railway, the regulatory uncertainties, changing macro-economic conditions and consequent the fall in output of several industrial units, affected the demand for freight services of Konkan Railway. Any ex-post evaluation of this particular project must take into account this factor. Serious considerations must be given to the knock-on effects of individual regulatory decisions can have on the overall viability and health of the regional economy.
- Large projects, which may cause disturbances in the ecosystem of a region in the short run can well be environmentally stable and indeed prove environmentally sustainable in the long run if adequate measures for environmental management are implemented. The broad land-use change analysis carried out is useful in contextualize future micro-studies. Such micro-studies can focus on the impact of the railway track on drainage patterns in particular locations; the impact in terms of fragmentation of forests and villages and detailed land-use change analysis for villages in Goa where specific concerns regarding environmental degradation were raised.

#### **5. Quotes**

People also prefer to travel to Goa by train rather than the bus. For Bombay also people prefer the train. Also, during monsoon, bus transport is affected due to damage to roads. That time people prefer the train...It is very comfortable and much cheaper compared to buses. I have travelled twice to Goa by train. It's good. In a bus, you have to sit in the same place, on the train you can get up, walk around, use the washroom. That's the main thing for women. Cleanliness wise and food wise it has improved from before. (*Panchayat Development Officer, 80 Badagabettu Panchayat, Udupi*)

Even before the Konkan Railway, people from the village were settled in Mumbai and would keep coming back to their villages, especially during festivals such as Ganpati and Diwali. After the railway, the people are making more trips to their villages. Earlier they used to come once every six months. Now they come fortnightly and sometimes every weekend. They have farming land here. Farming is seasonal ... so they come only to supervise... they employ labourer- local labourers- *adivasis*- who don't have their own land and cultivate on other's land. (*Sarpanch, Warak Gram Panchayat, Raigarh*)

Most people work in companies in Goa. I don't know exactly in which companies, but people from the villages in this Panchayat go there to work. They take the train to go. 80 percent of people here work in Goa. They travel up and down daily, using the morning local train and the evening local train.

...Earlier very few people would work in Goa. Actually, none at all. In my opinion, I don't think anyone went earlier by bus to work in Goa every day. I have grown up in this village and according to me, people would not take the bus to Goa to work. After the trains started running, it's become much easier to go to work in companies in Goa and come back. This is very beneficial. (*Sarpanch, Shirwad Panchayat, Uttara Kannada*)

People can go for work to Goa and come back the same day. This has benefited the local people a lot. If one had to stay in Goa, it will turn out to be very expensive. The accommodation rents in Goa are quite high. So if the people come back it saves them money. They can go and come back the same day and not worry about accommodation. (*Panchayat Development Officer, Mudgeri Panchayat, Uttara Kannada*)

## **Key Resources**

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