Policy brief
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Connecting the red corridor

In brief

- There is little evidence that infrastructure programmes in India intentionally targeted or intentionally avoided vallages affected by Maoist violence. Maoist affected villages were not targeted differentially for flagship programmes, but did attract more flexible small-scale infrastructure (IAP) projects.
- Rural electrification (RGGVY) projects took a longer time to complete in Maoist-affected villages and districts.
- Roads constructed under PMGSY projects took longer to complete in Maoist-affected villages and districts.
- The relationship between conflict intensity and the quality of infrastructure appears to be complex. Programme completion is sometimes faster (in the case of USOF mobile phone connectivity projects) or cheaper (PMGSY rural roads projects and IAP small-scale infrastructure projects) in Maoist affected areas, suggesting that quality may be lower in these areas or that officials may be selecting technically simpler projects in these areas.

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Unprecedented investment in infrastructure has been at the heart of the Government of India's strategy to bring economic development to India's rural population. These development efforts have gained particular importance in the around 90 districts that are affected by Left Wing Extremism (LWE). The affected regions are among India's poorest: they are characterised by a large share of scheduled tribes, and they suffer from severe gaps in rural infrastructure provision. In this context, understanding the ingredients of successful infrastructure development and its relationship with the conflict is particularly important. While the flagship programmes did not target Naxalite areas in particular, the selection criteria implied that the efforts were particularly intense in the Red corridor. At the same time, the provision of infrastructure to regions affected by an insurgency brings with it particular challenges, and the disruption of flagship schemes by the Maoist movement has received regular coverage in the press. It is important from a policy perspective to document these challenges in order to improve the delivery of public goods in these vulnerable communities.

Our research introduces a unique dataset of geo-coded infrastructure projects and conflict incidents at the level of census villages. The infrastructure programmes include four of the Government of India's flagship rural infrastructure programmes for mobile phone connectivity (USOF), rural roads (PMGSY), rural electrification (RGGVY), and flexible small-scale infrastructure (IAP). Only the last programme was targeted explicitly at LWE affected localities. We investigate whether LWE affected localities were more or less likely to be selected for coverage under these programmes, and whether the roll-out of these programmes faced particular challenges in these communities. We find that the general infrastructure programmes for roads, electrification, and telecom coverage did not differentially select villages with Maoist activity between 2001 and 2013. For the programme that focused explicitly on curbing Maoist violence (IAP), we do confirm that treated villages were more violent. While violence correlates with delays in infrastructure provision, it does not appear to be related to differences in overall completion.

Scope of the study: Four flagship infrastructure programmes

This section offers a brief introduction to the four flagship programmes considered in our project.

Under the Universal Service Obligation Fund (USOF), commercial providers received subsidies to build telecom towers in locations uncovered by mobile phone connectivity. The programme was launched in 2007, and 7,353 telecom towers were built by the end of 2011 under USOF phase I. Villages were targeted based on population size, and only uncovered village clusters of more than 2,000 inhabitants were eligible.

The RGGVY (Rajiv Gandhi Grameen Vidyutikaran Yojana) programme was launched in 2005 with the aim to connect un-electrified villages to the electrical grid. After the 10th plan, which focused on Northern states, the goal of RGGVY was broadened to support "intensive electrification" of already electrified villages. In the

first phase, 102,627 unelectrified villages were connected to the grid between 2005 and 2012. Eligibility for RGGVY was based on the criterion that less than 10% of the population had access to electricity.

Pradhan Mantri Gram Sadak Yojana (PMGSY) is the Central Government's flagship programme for rural road construction. Under PMGSY, 349,178 km of roads have been built between 2001 and 2013, providing connectivity to previously unconnected locations. Eligibility is based on population thresholds in combination with prioritisation rules based on the rank of the village by population in a given district.

The Integrated Action Plan (IAP) was launched in 2009 with the explicit goal of curbing Maoist violence through small-scale infrastructure development. These projects were deemed to be an important tool to win the good will of the population. To facilitate effective targeting, local authorities (the District Magistrate and Police) were responsible for its implementation. IAP is restricted to 86 tribal and Maoist-affected districts, and its guidelines require at least 65 percent of the funds to be spent in the most deprived and Left-Wing extremism-affected areas.

Maoists and infrastructure provision: Qualitative evidence

For each of these programmes, the roll-out in Maoist-affected villages gives rise to particular challenges. Based on a comprehensive review of press reports, we identified the following problems:

- Maoists directly disrupt the roll-out of certain types of infrastructure, including roads and telecommunications, but not others, such as village level electrifications and small-scale IAP projects. Direct disruption thus appears to be motivated by the security benefits certain types of infrastructure can offer.
- The Maoists attempt to justify their opposition by referring to concerns of the local population about the quality of implementation (for electrification) or local work opportunities (PMGSY).
- Maoists are regularly reported to extort money from contractors, which suggests a willingness to allow for infrastructure development in return for other benefits.
- Maoist activity may have delayed, stopped, or diverted infrastructure development and there are two reasons for this: reduced willingness of contractors to enter areas or reluctance by government officials to travel to certain sites.
- The impact of each of these programmes and their contribution to the observed reduction in Maoist violence after 2012 is debated.

We believe each of these stylised facts deserves careful investigation. Our project attempts to contribute to this effort by developing a village level dataset of Maoist activity and infrastructure development.

Data resources

We match data on the four flagship infrastructure programmes between 2001 and 2013, as Maoist violence continued over the same time period, to a backbone data set of villages of the 2001 Census for India's 10 Maoist affected states.[1] As most locations are only described by names, we employed fuzzy matching algorithms to link projects to census villages, yielding match rates between 77% and 98% at the census village level for all programmes except IAP. For IAP we identified 6 districts with particularly precise data: Bastar (including its recently carved out districts), Kawardha, and Koriya in Chhattisgarh; Karimnagar in Andhra Pradesh; and Puruliya and Bankura in West Bengal. Information for the infrastructure programmes comes from publicly available data on programme roll-out, whereas the Maoist incidents are drawn from the South Asia Terrorism Portal.[2]

Quantitative findings

Our data confirms the geographical spread of the conflict. Around 50% of villages belong to districts with at least one Maoist related incident. 14% are in districts with at least 25 incidents. Still, recorded incidents at the district level are relatively rare. Slightly less than 1% of villages (2,929) were characterised by at least one occurrence of a LWE related incident. The summary statistics also confirm the impressive scale of the three flagship programmes, which were set to provide 18% of villages with electricity, 19% with rural roads, and around 30% with mobile telecom infrastructure through USOF. The share of villages receiving any single or combination of projects is higher among Maoist affected villages than among those villages that did not qualify for the programme. Still, it is natural that these schemes focused on the relatively poorly connected localities that suffer most from LWE related violence. Therefore, we will turn to a regression model to describe the relationship between Maoist activity and the roll-out of the programmes.

Interestingly, there is very little evidence of differential targeting of LWE affected localities. We do not find any evidence that Maoist events make villages more or less likely to have qualified for coverage or for a tower under USOF, a new PMGSY road, or electrification under RGGVY. At the district level, only RGGVY appears to be more concentrated in LWE affected areas. This finding is consistent with the fact that most of these programmes used objective selection criteria that were unrelated to LWE activity. Of course, further research is needed to determine whether this pattern is causal, by using the timing and criteria of roll-out and violence.

Perhaps more surprisingly, we also find limited evidence of disruption of roll-out in Maoist affected localities. For USOF, LWE localities do not experience higher delays or cancellations. For RGGVY, projects appear to suffer longer delays in affected

1. Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Karnataka, Odhisha, Madhya Pradesh, Maharashtra, Uttar Pradesh, West Bengal.
2. Full descriptions of these data can be found in the accompanying papers "Mapping Rural Infrastructure Development in India" and "Connecting the Red Corridor".

villages (for extensive projects) and in affected districts (for intensive projects), but completion does not appear to be affected. For PMGSY, more violent districts and villages are similarly characterised by longer completion times, although projects are not significantly less likely to be completed. Surprisingly, average costs per kilometre appear to be lower in Maoist affected areas. This result could be a consequence of selection: if only the easiest roads get sanctioned or completed in Maoist affected areas, the observed roads could be cheaper. Similarly, in the absence of quality monitoring, the quality of roads may be poorer in Maoist affected districts. We cannot yet distinguish between these possible causes.

In contrast to the three general "all-India" programmes we study, IAP is clearly targeted at more severely affected villages, though all districts under IAP benefited from the same funding package. While we do not have good performance metrics for IAP, it is interesting to see that the cost per project is not higher in Maoist affected villages, and it significantly lower in severely affected districts. These results mirror the finding that PMGSY construction was cheaper in Maoist affected localities.

It is important to keep in mind that these correlations cannot be interpreted causally, and our future research agenda will attempt to investigate the timing and direction of these patterns in more detail.

Conclusion

We introduce a unique, integrated dataset on Maoist activity, three flagship programmes for rural infrastructure development (PMGSY, RGGVY, and USOF), and a dedicated programme targeted at India's LWE regions. Our data reveals that Maoist affected villages were not targeted differentially by the flagship programmes, but did attract more IAP projects. The relationship between Maoist activity (at the village or district level) and programme performance appears to be complex. Regression results are partially in line with a large body of qualitative evidence on the importance of disruption. Nevertheless, we note some cases in which programme completion is faster (USOF) or appears to be cheaper (PMGSY and IAP) in Maoist affected areas.

The patterns described in our research hold important insights. The evidence we find for disruption of flagship programmes by Maoists is quite mild. There is some evidence of delays, but no evidence of under-targeting, lower completion, or higher costs. This is not to say that the disruption of the type reported by newspapers does not take place, but our analysis suggests that projects in non-LWE localities are disrupted as much as those in LWE localities, possibly for different reasons. Moreover, development projects are not rolled out in a security vacuum, and the performance outcomes could reflect the activities of police forces as well. Even when we acknowledge these interpretational challenges, the correlations allow us to identify a limited number of mechanisms that could generate the observed patterns. We can dismiss the most pessimistic scenario in which security threats are so severe that there is no observable development activity in the vulnerable communities affected by Maoism. In the most optimistic view, our analysis points at effective

implementation, possibly as a result of adequate security provision by police forces. There are two alternative views that are more pessimistic. First, the administrative data we use might not capture the lower quality of projects completed in LWE localities or the data might be manipulated. This interpretation would be consistent with the lower costs reported for PMGSY roads in conflict zones. Second, development projects could be tolerated by Maoist groups because these groups benefit from extortion income. The latter scenarios cast doubt over the contribution of these projects to improvements in law and order.

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