

Ex post evaluation

Sector Programme Railway II, Indonesia



Title	Railway sector programme II – Track Maintenance Improvement		
Sector and CRS code	Rail transport 21030		
Project number	BMZ no. 2005 66 612 and A+F 2007 410		
Commissioned by	Federal Ministry for Economic Cooperation and Development		
Recipient/Project-executing	Republic of Indonesia/Ministry of Transport		
Project volume/ Financing instrument	EUR 32 million development loan; EUR 0.5 million FC grant for a basic and advanced training measure		
Project duration	12 December 2009 to 7 July 2017		
Year of report	2022	Year of random sample	2020

Objectives and project outline

The outcome-level objective underlying the EPE was the appropriate use of the railway infrastructure preserved by the improved maintenance system. By ensuring the performance of Indonesian railways as a cost-effective, safe, environmentally friendly and efficient means of transport, the project was intended to contribute to poverty-reducing and environmentally friendly growth (impact level).

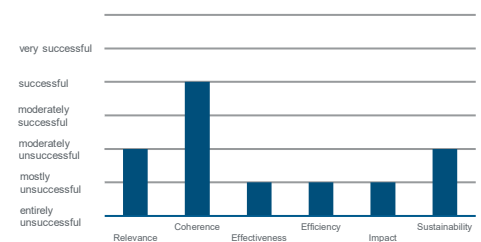
The project included deliveries of machinery for maintaining the route, workshop equipment and training and education measures. This was intended to support Java in the context of the reorganisation to improve the maintenance system of the railway infrastructure. Contrary to the original planning, only one instead of two track construction yards was completed by the executing agency after the end of the project.

Key findings

The project was only able to achieve its developmental effectiveness marginally. For the following reasons, it is rated as “mostly unsuccessful”:

- The FC project addressed a core problem in the country relevant to development policy – the deterioration of the condition of the roads.
- The main assumption of the project – the reorganisation of the maintenance of railway infrastructure – did not take place. This was decisive for the executing agency concept and therefore decisive for the lack of impact. The executing agency concept was associated with high risks from the outset.
- The use of the supplied machinery and workshop equipment always remained far below target. Most of the equipment is not or is only sporadically used. The operating time of the track tamping machines, which are important for the maintenance of the track, remains far below target level.
- In view of the insufficient use of the measures, the contribution to the overarching development impact was only marginal. The positive developments in the Indonesian railway sector cannot be attributed to the project.
- In addition to the insufficient use of the equipment, the delayed completion of the track construction yard and the long storage period, which is particularly damaging to climate-sensitive components, also impair sustainability.

Overall rating:
mostly unsuccessful



Conclusions

- In the context of sector reforms and reorganisation of responsibilities, it is necessary to formally include both previous and future responsible organisational units in the design of the project and to consider fall-back options.
- In early stages of sector reforms with expected long implementation times and open points that are decisive for the success of the project, predetermined breaking points or disbursement requirements should be included in contracts.

Rating according to DAC criteria

Overall rating: 5

Ratings:

Relevance	4
Coherence	2
Effectiveness	5
Efficiency	5
Impact	5
Sustainability	4

Relevance

Indonesia has the fourth largest population in the world. In 2008, at the time of the project appraisal (PA), around 60% of the country's then around 230 million inhabitants lived on the densely populated island of Java – the country's economic, political and social centre of gravity with large urban agglomerations, such as Jakarta, Surabaya and Bandung.

At the time of the project appraisal, Java already had a dense west-east and north-south rail network, which took into account the high population density, and, at the time of the project appraisal, transport services were good, even by international standards. Despite its importance as a comparatively environmentally friendly mode of transport that is particularly favourable to poorer sections of the population, rail transport as a share of transport services (modal split) had already fallen before the PA, while total traffic volume had increased.

According to the programme proposal (PP), the low level of investment in the network infrastructure over many years was barely sufficient to maintain the stock. Furthermore, it was found that the existing outdated track maintenance machinery could not ensure the network was maintained over the long term, as a large part of the machinery had reached the end of its service life and were in any case unsuitable for use with concrete sleepers and international standard rails. As a result, the railway network on the island of Java was largely in a poor condition at the time of the PA and there was a risk of a further deterioration due to insufficient maintenance of the infrastructure.

Even from today's perspective, the core problem described above was correctly identified during the PA. Consequently, the aim of the project was to improve the maintenance of the track on Java and thus mitigate the deterioration that was feared through equipment supplies (special machinery for infrastructure maintenance, spare parts, workshop equipment and machinery/equipment for two track workshops to be constructed) as well as training measures.

This was based on the following impact chain: Supply of (large) machinery and workshop equipment as well as training measures → Improvement of the route → Safeguarding of rail transport performance → Increased mobility, in particular for poorer population groups → Contributing to environmentally friendly and poverty-reducing development.

A reliable transport system is an essential prerequisite for collaborative economic activity and numerous social activities (access to markets, jobs, services, educational institutions; participation in the political process, and transport of food) and therefore for development. Measures (technical design and scope), impact chain and focus of the project region on Java were valid at the time, as they still are from today's perspective, and were fundamentally suitable for helping to solve the core problem and contribute to the MDGs and SDGs: In view of the high population density and the extreme increase in road traffic volume, rail transport offered an environmentally friendly alternative to motorised individual transport, as it is more energy-efficient and much lower in emissions when used to capacity and used less space. Furthermore, on Java the railway was used as a public transport system with a high number of economy-class seats, primarily by poorer sections of the population who could not afford mopeds, cars or taxis. With regard to

regional transport, commuters in particular used the railways to gain access to labour markets in the inner cities.

The strategy designated the Directorate General of Railways (DGR) of the Indonesian Ministry of Transport (MoT) as the executing agency and thus as the recipient of the above-mentioned deliveries and services. At the time of the PA, rail infrastructure and rail operations were already formally separated. The railway infrastructure (network) was state-owned. But until then, the MoT had largely delegated the task of infrastructure maintenance within its area of responsibility back to the Indonesian state railway company PT Kereta Api Indonesia (PT.KAI), which is not subject to the MoT, but to the Ministry of State Operations at that time and today.

The above-mentioned separation of network and operations, which was decided in the Railway Act (2007), was to be completed not only formally but also organisationally at the time of the project appraisal (2008). Infrastructure maintenance tasks should be carried out by a (still to be set up) technical unit within the DGR and no longer be delegated back to PT.KAI. The project measures were intended to support DGR in this regard. However, this reform step was never implemented; the responsibility for maintaining the infrastructure remained with PT.KAI, and the role of the MoT is limited to the regulation, monitoring and inspection of the infrastructure's condition. As early as 2010, a MoT decree (Decree no. 219) laid down the rules for the maintenance of the infrastructure by PT.KAI.

The following circumstances at the time of the PA already had the potential to jeopardise the success of the project and to call into question the selected executing agency strategy:

- The reform of the railway sector, including the reorganisation of maintenance, was still at the very beginning at the time of the PA, and implementation was expected to take several years. Despite the formal separation of network and operations, which had already been decided at the time, many organisational aspects of the infrastructure area were still unclear at the time of the PA (especially in the context of the project, the relevant question is whether the MoT will also operate the network on its own for the long term or establish an independent network company regulated by the MoT in the future).
- At the time of the PA, PT.KAI was the only organisation that was able to ensure regular maintenance of the route based on the technical, personnel and infrastructural prerequisites and to use the equipment procured by the project directly. The technical unit in the DGR to which the track maintenance tasks were to be delegated and which was to receive supplies and services had insufficient staff capacity. In view of this, at the time of the PA, in addition to education and training, emphasis was also placed on the fact that professionals from PT.KAI would be recruited. This does not seem realistic as PT.KAI was not subject to the MoT, and the organisational change was unattractive for specialists in light of established routines and structures. Furthermore, there was already a certain level of competition between DGR and PT.KAI, even at that time. For example, the risk that there will be no agreement between the two organisations regarding the transfer of the track maintenance department was already identified at the time of the PA.
- The fact that the success of the project also largely depends on the cooperation of PT.KAI was correctly recognised during the PA. In the past, implementation delays had already occurred in coordination processes with PT.KAI. Furthermore, ownership rights to the track construction yard and machinery in Cirebon, for which workshop equipment was to be supplied, were unresolved between DGR and PT.KAI at the time of the PA with corresponding potential for conflicts.

It is considered a design weakness that the aspects described above were foreseeable when the project was designed but were not addressed with risk-reducing approaches in the project concept. If necessary, the above-mentioned risks could have been counteracted by involving PT.KAI and/or by contractually agreed breaking points or implementation requirements.

Although theoretically it was desirable to separate the network and operations and corresponding support from the project measures, in view of the aforementioned circumstances, the question arises as to whether the MoT was the appropriate institution for the actual implementation of maintenance and repair measures. From a sector organisational perspective, splitting the railway undertaking (separating infrastructure construction and maintenance and transport services) combined with the Ministry of Transport's focus on its regulatory functions could probably have facilitated a sustainable solution. It is unclear whether this option was available in the sectoral reorganisation considerations at the time. Irrespective of

this, it would have been sensible to involve the state-owned railway company PT.KAI in the contracts in order to ensure the cooperation of all stakeholders and the orderly transfer of responsibilities. From today's point of view, the project or the transaction structure of the loan (granting of the loan combined with a state guarantee) should have been restructured before the award (2011/2012), which, as mentioned above, took place after the retention of responsibility by PT.KAI (2010), or it should have been agreed that the loan would be passed on to PT.KAI, or at least that PT.KAI would use the equipment.

Although measures and impact chains were generally suitable for contributing to solving the core problem, the relevance is rated as unsatisfactory in view of the executing agency concept, which was already heavily risky at the time of the PA, and its importance for the success of the project.

Relevance rating: 4

Coherence

At the time of the appraisal, the Federal Ministry for Economic Cooperation and Development (BMZ) had already largely withdrawn from the FC priority area of transport. But as described under Relevance, the project had the potential to contribute to significant CO₂ savings at the time of the PA by focusing on the densely populated island of Java and preserving rail transport services, to improving the environmental situation and thus to the agreed priority area of environmental protection and climate action, as well as to the MDGs and SDGs. In addition, positive contributions to sustainable urban development would have been expected.

The project followed the first phase of the "Railway Sector Programme" (BMZ No. 2000 66 357), in which approx. 500km of track were rehabilitated. Here, ballast compaction, which requires the use of machinery, could not be realised to the necessary extent. The intent was to remedy this deficit with the "Railway Sector Programme II" project evaluated here, thereby increasing the sustainability of Phase I. In addition to FC, Japanese DC was involved in Indonesia's railway sector, including the double-track development of track sections on Java. No information is available on donor coordination at that time. However, the measures were complementary in nature.

At the time of the PA (2008), the Indonesian government aimed to improve rail infrastructure. This is reflected both by the Railway Revitalization Program and by the Railway Act adopted in 2007 (see Relevance), which stipulated the separation of network and operations. The project measures would have supported both the targeted organisational separation and the efforts to improve road maintenance.

Although the reorganisation of maintenance was ultimately not implemented, the high importance that the Indonesian government continues to attach to the railway sector is demonstrated by the significantly increased funds for the maintenance of infrastructure and the payments to PT.KAI for the provision of non-cost-covering offers (Public Service Obligation (PSO)). As part of the development planning for the 2015–2019 period, the government focused more on the construction and expansion of suburban railways in the urban areas. Furthermore, the government intends to establish effective high-speed connections between the major metropolises on Java in long-haul transport over the next few years. It should be noted that the Indonesian side's own efforts have increased significantly over time and that the sectoral framework conditions have significantly improved as a result.

The project is highly coherent with the objectives of German DC, SDGs and Indonesia's own efforts and is therefore considered good.

Coherence rating: 2

Effectiveness

The outcome-level objective underlying the EPE was the appropriate use of the railway infrastructure maintained by the improved maintenance system.

The following indicators were planned to assess outcome-level target achievement:

Indicator	Status at PA	Target value at PA	PCR value (2016)	EPE (values for 2019)
(1) Transport services in the passenger sector (million pkm) three years after project completion	14,700	14,700	19,104	28,024 (roughly 80% of which is Jakarta's suburban train system)
(2) Transport services in the freight sector (million tkm) three years after project completion	870	870	3,458	4,547
(3) Number of derailments	90	90	7	11 (Overall network)
(4) Line length (in km) with a maximum speed of at least 80 km/h	2,350	2,350	1,281	2,800
(5) Rehabilitation capacity per rail tamping machine delivered (km/a)	-	250	150	60–100

Indicators (1) to (4) were achieved or significantly exceeded: Passenger transport has almost doubled compared with the target value and the corresponding number of freight has increased fivefold. The number of derailments and the length of reduced speed areas has decreased significantly. On almost 90% of Java's main lines, the maximum permitted speed exceeds 80km/h. The main lines on Java have now been upgraded to permit a speed of 120km/h, almost reaching the speed limit for narrow-gauge railways. **The achievement of indicators (1) to (4) needs to be placed in the context of indicator (5) and, against this background, is not attributable to the project and not to be rated as a project success.**

However, the indicator (5) directly attributable to the project – use of the seven track tamping machines supplied – remains far below the target level considered appropriate and has fallen even further below the already poor level since the final inspection. On average, it was only around 20 days of use per machine per year over the five years before the EPE. This corresponds to an annual output per delivered machine of 60–100km. The tamping machines supplied by DGR/MoT are essentially only used for new construction measures and are leased to the construction companies. Two of the seven items of machinery were shipped to Sumatra, the only island besides Java on which there are railway lines, and are used there. The large items of machinery delivered as part of the project are theoretically also available to PT.KAI for maintaining the route in exchange for a leasing fee to DGR. However, PT.KAI itself has procured machinery and uses it to maintain the route. Maintenance and servicing of these machines is carried out by PT.KAI. The MoT only maintains machinery that was procured as part of the FC project. Contrary to the original planning, only one track construction yard (in Ngrombo) was realised by MoT/DGR rather than two – after the end of the project. The workshop in Ngrombo is exclusively responsible for the maintenance of the machinery owned by the MoT. Large parts of the machinery and equipment supplied as well as the workshop equipment for the two track construction yards that were originally to be newly built or expanded by the partners themselves are stored unused or only used sporadically.

The planned basic and advanced training measures were also only partially implemented. They were directed at DGR and aimed at training up workshop management and personnel as well as machine operators and track inspectors. Some of the measures did not materialise due to the delayed construction of the above-mentioned workshop and high staff turnover. On the other hand, the training up of track inspectors has been more successful. These inspectors now monitor the lines and, together with PT.KAI, prepare annual plans for preventive track maintenance.

The state of the rail network on Java has improved significantly since 2010 after many years of neglect. Some of the main routes have been expanded to two tracks, and alternative and overtaking routes have been set up. As a result of these investments, a massive increase in transport services was possible, combined with increased safety. At the same time, the punctuality of trains in passenger traffic increased. However, the project's contribution to this positive development of the condition of the rail network, which is reflected in the above-mentioned indicators, must be rated as marginal. The partially impressive target achievement and/or significant over-fulfilment of the targets was achieved through the major efforts of PT.KAI itself, combined with extensive government grants for the provision of transport services that do not cover costs, above all in local public transport and for infrastructure maintenance.

In view of the marginal contribution of the project to improving the condition of the infrastructure described above and the insufficient use, effectiveness is considered to be clearly insufficient.

Effectiveness rating: 5

Efficiency

The FC-financed internationally tendered deliveries and services fell short of the costs estimated during the appraisal. This suggests high production efficiency. However, the costs for consulting services increased due to the longer project duration. The workshop in Ngrombo was only set up from Indonesia's own funds after the project was completed. It cannot be assessed whether the costs for the construction of the workshop are appropriate.

From the perspective of the railway, the project was highly relevant from a microeconomic point of view in terms of its objective. In any case, maintaining the existing infrastructure by regularly maintaining the route is cheaper than letting the system completely deteriorate then subsequently rehabilitating it. The project had the potential to increase the useful life of the rail infrastructure through adequate maintenance and repair, so that replacement investments could have been made with the project at a later stage than without the project. The internal rate of return of the project was correspondingly high at the time of the PA and was also above 20% in the sensitivity analysis at the time. Other positive effects of such projects are to reduce travel-related accidents and derailments as well as to cut travel times by decreasing the number of reduced speed areas. There are also positive effects for people and the environment through the avoidance of CO₂ emissions.

Both the current condition of the route, the traffic performance and the other positive effects mentioned above cannot be attributed to the project in view of the little-used tamping machines (two of them on Sumatra with no benefit for Java) and the largely unused equipment (see Effectiveness). The generally high allocation efficiency of the measures has been wasted; the reorganisation of the infrastructure maintenance was not implemented and the maintenance remained with PT.KAI. The machinery and equipment supplied, which were financed by a development loan as part of the project, are not used by PT.KAI, meaning that the project's expenses have had hardly any positive effects. As a result, very low or negative economic rate of return can be assumed and allocation efficiency is clearly insufficient.

Although production efficiency is expected to be good, the equipment is scarcely used or not used at all, and the resulting insufficient allocation efficiency therefore has led to clearly insufficient overall efficiency.

Efficiency rating: 5

Impact

The objective at impact level was to contribute to poverty-reducing and environmentally friendly growth by ensuring the performance of Indonesian railways as a cost-effective, safe, environmentally friendly and efficient means of transport.

The fundamental impact chain is set out under Relevance. The project's high potential with regard to the intended impacts at impact level has not materialised as a result of the little-used tamping machines and the largely unused machinery and equipment (see Effectiveness). Therefore, only a marginal contribution of the project at impact level can be assumed.

The investments in the infrastructure, which were ultimately made by the state and PT.KAI in the period between the PA and the EPE and are not related to the FC project, show what developmental impacts would have been possible: As a result of the increased transport performance, the railways on Java are making a significant contribution to the economic development of the country. This applies to both goods transport and passenger transport, which show significant growth in transport performance (see Effectiveness). Supplying people was ensured as part of the Public Service Obligation not only in the agglomerations, but also in rural regions. The share taken by economy class passengers has been quite constant in recent years.

Apart from the intended impacts at the time of the PA, rail transport also contributes to sustainable urban development. This applies in particular to local public transport in large cities – especially on Java. The expansion of the suburban train system in the greater Jakarta area was a great success: More than one million people use it every day. Overall, approximately 440 million people used the railways in 2019, which is significantly higher than the usage at the time of the PA, which was reported at 160 million passengers. As a result of the COVID-19 pandemic, passenger numbers have also fallen significantly in Indonesia. However, given the importance of the transport system, passengers are expected to gradually return.

By significantly increasing its transport services, the railways also contributed to more environmentally sustainable growth. Compared with the scenario of further deterioration of the route network feared at the time of the appraisal, the increased transport services of the railways compared with other modes of transport contribute to saving significantly more than 2 million tonnes of CO₂ (depending on assumptions between 2.2 and 2.7 million tonnes of CO₂/a) per year. At the time of the PA, emission savings of 0.9 million tonnes of CO₂/a were assumed, as it was assumed that the transport services would be safeguarded and not expanded.

The improvements described in the sectoral environment and the resulting impacts are not related to the FC programme. The overarching development impact of the project is insufficient.

Impact rating: 5

Sustainability

At the time of the EPE, all of the seven large items of machinery procured during the project to maintain the route were still in operation – albeit with insufficient operating times. Two items of machinery are still stationed on Sumatra. They are also only used sporadically. This is due to the failure to separate network and operations. The result is that maintenance has remained with PT.KAI. In principle, it is possible for PT.KAI to rent machinery from the MoT. However, this does not normally happen. PT.KAI uses specially procured items of machinery to maintain the route.

The machinery procured as part of the FC project was to be maintained by MoT. After the project was completed, only the workshop in Ngrombo, where the MoT machinery is maintained, was ultimately built. No information can be provided on the quality of the maintenance of the tamping machines at EPE. According to the final inspection (2017), there was a visible risk that the machinery was being driven to wear.

Procured workshop equipment, other large machinery and devices – apart from the track tamping machines – are still stored largely unused or are only used sporadically (see Effectiveness). As early as the PCR (2017), it was considered a risk, especially for climate-sensitive components, that the equipment stored for several years could be damaged by the long storage period and might no longer be usable.

The basic and advanced training measure was only partially implemented. Its sustainability was also affected by high staff turnover (see Effectiveness). A positive aspect is the basic and advanced training of the MoT inspectors, who now plan the maintenance and monitor its implementation together with PT.KAI.

From today's perspective, to ensure the sustainability of the project, formal involvement of the railway operator PT.KAI would have been necessary back in the project design stage (see Relevance). This would have increased the chances of sustainable operation without duplication in procurement and the associated economic losses. In view of the actual development (see Relevance) with regard to maintenance, at least a restructuring of the transaction structure of the development loan or the transfer of the machines to the state-owned railway company PT.KAI should have taken place during implementation.

Apart from the above-mentioned advanced training of the MoT inspectors, the sustainability of all other measures is insufficient and thus the overall sustainability is not sufficient.

Sustainability rating: 4

Notes on the methods used to evaluate project success (project rating)

Projects are evaluated on a six-point scale, the criteria being **relevance, coherence, effectiveness, efficiency, overarching developmental impact** and **sustainability**. The ratings are also used to arrive at a **final assessment** of a project's overall developmental efficacy. The scale is as follows:

Level 1	Very good result that clearly exceeds expectations
Level 2	Good result, fully in line with expectations and without any significant shortcomings
Level 3	Satisfactory result – project falls short of expectations but the positive results dominate
Level 4	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
Level 5	Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
Level 6	The project has no impact or the situation has actually deteriorated

Rating levels 1-3 denote a positive assessment or successful project while rating levels 4-6 denote a negative assessment.

The **overall rating** on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. Rating levels 1-3 of the overall rating denote a "successful" project while rating levels 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (level 3).