

# Ex post evaluation – Ethiopia



**Sector:** 21020 Road Transport  
**Project:** Addis Ababa-Gedo road, Phase III (Ambo-Gedo)  
 BMZ no.: 2002 65 686\*  
**Implementing agency:** : Ethiopian Roads Authority (ERA)



## Ex post evaluation report: 2017

		Planned	Actual
Investment costs (total)	EUR million	30.00	30.70
Counterpart contribution	EUR million	6.00	12.94
Funding	EUR million	24.00	17.76
of which BMZ budget funds	EUR million	24.00	17.76

\*) Random sample 2016

**Summary:** The project included the new construction and extension of the road section from Ambo to Gedo (65 km) on the route from the Ethiopian capital city of Addis Ababa to Gedo (179 km overall) in the west of the country. Phase III, which is evaluated here and includes the Ambo to Gedo section, connects Ethiopia's capital to the western parts of the country together with the sections that were newly built or extended in Phases I (Addis Ababa to Ginchi – 77 km) and II (Ginchi to Ambo – 37 km).

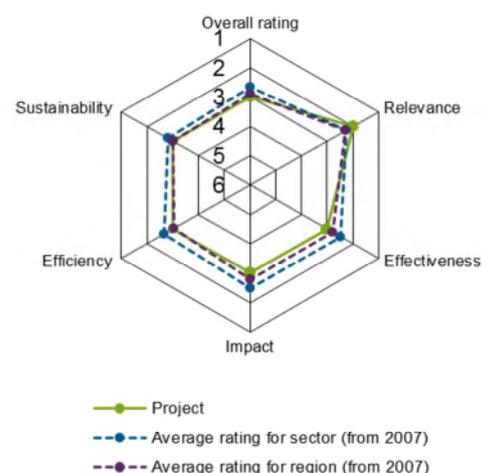
**Development objectives:** The project objective was to increase use of the project road, extended to meet traffic needs and assure sustainability. Improved access to markets and social services, and use of transport that proves cost-effective in the macroeconomic aggregate were intended to contribute to the project region's socioeconomic development (overarching development objective).

**Target group:** The beneficiaries are vehicle owners, users of transport services and residents along the project road.

## Overall rating: 3

**Rationale:** The project involved newly constructing or extending the third and final section of a crucial transport corridor for Ethiopia. The road's levels of use are significantly higher than expected and positive multiplier effects on the project region's socio-economic development resulting from the improved use of transport are plausible. However, the positive developmental impact is already currently limited by early materialized damage to the road and comparatively poor road conditions in some places as of the ex post evaluation, which necessitate more extensive maintenance work than was foreseen.

**Highlights:** The Ethiopian government's counterpart contribution for the project was unusually high and underscores the project's relevance for the country. The execution showed that use of innovative technologies (in this case, changing the road structure and surface) demands special preparation and intensive discussion in advance.



## Rating according to DAC criteria

### Overall rating: 3

#### Relevance

The establishment of an efficient transport sector plays a key role in Ethiopia's overall development today in 2017 as it did during the project appraisal in 2003, with the road sector particularly important in most regions in the absence of alternative transport links. The 65 km-long project road, running from Ambo (126 km west of the capital city Addis Ababa) to Gedo, continues to be a crucial section of the most important east-west road link in Central Ethiopia, as of the ex post evaluation (EPE). Together with the Addis Ababa to Ginchi (77 km) and Ginchi to Ambo (37 km) sections, which were newly built or extended in Phases I and II, the project road connects Ethiopia's capital to the western parts of the country, further along the whole highway towards the (South) Sudanese border region. As a result of this (including Phases I and II), the road provides access to fertile highlands with a population of around 350,000 people in the direct catchment area (2003) and 5.8 million people in the highway's extended catchment area (including the Gambella and southern Benishangul-Gumuz border regions). The Ethiopian Roads Authority (ERA) rates it as the country's fourth most important road corridor.

The asphalt-covered highway was in very poor condition during planning in 2003, which was considered a serious impediment to traffic on the local, regional and national levels. Vehicles still suitable for the road's state of repair nevertheless used it extensively, because there were no alternative routes or means of transport to the project regions – as is still the case. Especially when viewed in perspective, however, the chance of the road's use increasing in line with its importance was constantly shrinking and the poor road condition resulted in unnecessarily high vehicle operating costs and journey times.

It was convincingly argued during project design that inadequate transport links are a fundamental obstacle to economic development for the wider project region and that the appropriate usability of the road is highly important for the region's administrative and socio-economic integration. In this way, a fundamental limitation was recognised and addressed with the project. The particular importance of the road for the Ethiopian transport network, as stated above, was reflected accordingly in the exceptionally large Ethiopian counterpart contribution to the project funding.

The project was closely tied to the Ethiopian government's Road Sector Development Program (RSDP) whose Phase 1 was implemented between 1997 and 2002 and Phase 2 between 2003 and 2007. The project also fit in with the considerable funding from other donors in Ethiopia's transport sector (including the World Bank, EU and African Development Bank), which was coordinated via the RSDP. The World Bank-financed rehabilitation of the Gedo-Nekemte road section that abuts the project road is particularly worthy of mention here as Nekemte constitutes the economic and population centre of Western Central Ethiopia.

The actual extent of change in traffic was hardly foreseeable at the time of project appraisal. From today's perspective, however, given the very conservative traffic forecast during the appraisal, it would have been sensible to implement the project with a higher expansion standard from the outset.

### Relevance rating: 2

#### Effectiveness

The project objective taken as a basis during the EPE was to increase the use of the project road, extended to meet traffic needs and assure sustainability. This objective is assessed by means of the following indicators:

Indicator	Status PA (2003)	PA target value	Ex post evaluation
Average annual daily	N/A	+4 % p.a.	2003 - 2014: +29 % p.a.

traffic	(659 vehicles/day)		2011 <sup>2)</sup> - 2014: +26 % p.a. (2014: 2,770 vehicles/day) <sup>1)</sup>
Condition of the project road (evenness, drainage, soft shoulder)	Very poor condition	Meets traffic needs	Visible defects and damage (2017). Average road condition rated by implementing agency as "poor". Yet it remains significantly more accessible than pre-rehabilitation.

1) Simple average of each of the three traffic counts annually without adjusting for seasonality factors (ERA data)

2) Rehabilitated road section completely finished, start of 2011 (2010: AADT of 1,350)

The growth in motorised transport and concomitant usage of the project road significantly exceeded expectations from during project planning. A 4% annual traffic increase was the fundamental target value (conservatively) adopted during the project appraisal (2003). However, average growth levels of 26% p.a. were reached in the four years since the road section that was newly built or extended in Phase III (2011-2014) began operating in full. A similar picture emerges when we consider the whole period since the project appraisal, with average increases of 29% p.a.. Altogether, motorised traffic on the section more than quadrupled between 2003 and 2014. On the other hand, this very positive usage outcome contrasts with the condition of the road, which has currently – as of 2017 – already become inadequate in places. The state of repair rating acts as a proxy indicator for the road's performance and, as such, for whether it can sufficiently meet traffic needs. Serious defects and damage were sometimes clearly visible upon simple inspection in terms of both evenness and, in places, the condition of the drainage structures and soft shoulder<sup>1</sup>. The road's overall state of repair was rated as "poor" in a road status report by the implementing agency in 2016. It started to sustain damage shortly after the road was completed (2012). This significantly restricts both utilisation capacity and quality for the vehicle drivers, as well as resulting in higher vehicle operating costs than would exist if it were in good condition. On a positive note, the project's implementing agency, the ERA, provided a considerable amount of funds for maintenance in view of the road's importance as a transport route. Since the road started operating, already two major operations to remedy damage have been performed which was projected in the original plans to be necessary only by the eighth year of operation. We therefore assume that the current state of repair would have been even worse without these roadworks.

There are various possible causes of these defects' very premature occurrence, detailed technical assessment of which is outside the remit of this EPE. The considerably higher transport volume puts strain on the road, whose design from that time may not have been adequately geared to this. Indeed, heavy-duty traffic has been somewhat underrepresented in the growth overall compared with lighter vehicles, although this is not the case for extra heavy truck trailers. Since construction planning, their number rose from an average of just 56 to 398 a day between 2003 and 2014 (and then again to 675/day in the busy year of 2015).

In terms of truck overloading, which was identified as far back as the project appraisal as presenting a particular risk of premature road damage, there have been improvements in the Ethiopian system of checks and limits in recent years. Nonetheless, we cannot fundamentally assume that since road operation commenced, overloaded vehicles have started to unload before driving on the section. As of the EPE (2017), there is only one weigh station at the highway's eastern exit, which means that none of the traffic travelling eastbound is checked for overloading until it has already driven through the entire stretch.

In addition, after the detailed design was completed, a road structure (consisting of base course and wearing course) different from the one used in Phases I and II was ultimately chosen. The stretches of road from Addis Ababa to Ambo (Phases I and II), which are likely to be also affected by the massive traf-

<sup>1</sup>Evenness: Quality of the road surface/paving (taking account of ruts, potholes etc.); drainage structures: for example, concreted culverts beneath the road; soft shoulder: fastened section along the road's edge, usually 1.5 m wide.

fic increase and strong heavy-duty traffic increase (including potential overloading) in absolute terms, are in significantly better condition today. Consequently, it is plausible that the road structure and surface used in Phase III alongside possible maladjustment to the section's specific substrate are important causes of the early road damage. In hindsight, doubt persists as to whether – along with the general suitability of the surface – the parties involved in implementation had sufficient experience with this technology and the specific substrate and execution requirements to guarantee adequate performance.

The achievement of project objectives paints a mixed picture. Indeed, the intended level of road use was significantly surpassed. Yet the project objectives of creating a project road that meets traffic needs and is extended sustainably were only partially fulfilled due to the sometimes poor condition and by all appearances inadequate road structure and surface, which limited potentially even larger effects. The project effectiveness is therefore assessed as satisfactory overall.

### Effectiveness rating: 3

#### Efficiency

The execution of the project (2006-2012) was delayed by several years. Originally, a mid-2008 start of operation date was envisaged for the entire road, which was to follow a two-year construction period. However, the last road section was not ultimately completed until early 2011, with a two-and-a-half-year delay. Further repair work was performed up to mid-2012. The delays were mainly a consequence of the building contractor's very slow mobilisation and, as the project progressed, work that the consultant and implementing agency criticised as too slow and in frequent need of reworking.

Total construction costs in the local currency rose during the prolonged implementation phase caused by these delays. This rise is primarily attributable to price increases (around 18%). This increase is within reasonable bounds, considering an average general inflation rate<sup>2</sup> of 16% p.a. in Ethiopia during the same period. For the project's total cost in euros, there was hardly any overall increase from the cost estimate made during the project appraisal, because savings were made on the chosen road structure and surface, and the value of the Ethiopian birr more than halved against the euro during the implementation period. Note that close to two-thirds of the total project costs were handled in euros, in any case. The over 70% rise in the consultant's cost for supervision of works, which was caused by the implementation delays, is significant. The consulting costs<sup>3</sup> represented 8.8% of the cost of the project, although this is still considered reasonable overall. The construction costs per kilometre, amounting to EUR 0.43 million, prove to be fairly low by national and regional standards.

During the project appraisal, a 6% macroeconomic rate of return was specified to achieve the development objective, while the feasibility study's model calculations<sup>4</sup> came to around 15%. At the time of the EPE (2017), there was no data available for the road section regarding present savings on vehicle operating costs and journey times. The road condition is currently appreciably worse than was assumed in the model calculations at that time. There is also, as mentioned, a lack of data on time savings and vehicle operating costs. It is therefore impossible within the scope of the EPE to re-calculate in detail based on the model used in the PA, despite the presence of the actual usage statistics and total project costs. However, the road's average Roughness Index (index to measure the road's state of repair) currently continues to show a significant improvement from its condition prior to rehabilitation. This is likely accompanied by some savings on operating costs and is consistent with the anecdotally reported cut to journey times on the road section (refer to "Impact"). At the same time, the traffic growth levels were far above the foundational projections originally used for the rate of return calculation (classified as conservative during the appraisal). We can therefore assume, based on a greatly simplified economic efficiency calculation made as part of the EPE, a rate of return significantly above 6% being reached in spite of the deteriorated road condition. Even so, the scale of the rate of return is beset with uncertainty, including in terms of vehicle operating cost savings and upkeep work needed throughout the road's life cycle. Another relevant fac-

<sup>2</sup>Consumer Price Index (CPI), IMF data

<sup>3</sup>Including creation of detailed design and tender documents, schedule of services, plus supervision of works

<sup>4</sup>Model calculations based on the Highway Development and Management (HDM-IV) application for analysis, design, management and evaluation of road maintenance, improvement and investment decisions

tor here is the residual value due to be conclusively measured in light of the new fundamental rehabilitation, which is already planned. In all probability, these will not result in the rate of return falling below 6%.

Considering the road's state of repair, which is poor in places and its operating life falling as a result, the efficiency, is rated as still satisfactory.

**Efficiency rating: still 3**

### Impact

The overarching development objective assumed as a basis during the EPE was to contribute to the project region's socio-economic development with improved access to markets and social services, and with use of transport that proves cost-effective in the macroeconomic aggregate. The impact is measured by the following indicators:

Indicator	Status PA (2003)	Target value	Ex post evaluation
Macroeconomic rate of return	N/A	At least 6%	>6%
Journey time	N/A	Reduction	Respondents estimate that journey times have shortened significantly despite the limits from road damage.

In a good road condition, given the rapid increase in road usage, the macroeconomic rate of return would be considerably higher than the original (conservatively formulated) target value. Despite the limitations stemming from the road's sometimes poor state of repair, it stands to reason that the target value would still be reached from today's perspective (see "Efficiency").

There are also time savings for journeys on the road in today's condition (1.15-1.5h depending on vehicle vs. around 2h pre-rehabilitation). The localities along the road, the major town of Ambo and the capital city of Addis Ababa are easier and faster for the users of public transport to access, according to unrepresentative surveys. These indicated that a journey from the project region to the capital and back could now be made across the entire stretch (including the sections from Phases I & II) in one day without the previously necessary overnight stay in Addis Ababa. The road extension has in addition enabled new means of transport to be used on the road. While respondents state that larger vehicles could drive on the road before the rehabilitation, small three-wheeler vehicles and minibuses now also operate. These are used by the general population and can be utilised more flexibly. It thus seems plausible when road users note that this has improved the population's access to corresponding services (such as the health stations and hospitals in the towns along the road), even though the rehabilitation did not involve providing road access to a new area. The improved access primarily arises from a changing distribution of traffic and time savings. We can also assume further positive multiplier effects on the project region's socio-economic development from the road rehabilitation (including sections from Phases I & II). It stands to reason that the better connections to other parts of the country and the capital city have created improved and less expensive marketing opportunities for agricultural products. These effects could have been even greater, but were diminished by the higher operating costs attributable to the poor road condition being passed on. In line with the considerable rise in traffic volume on the road is the observation that impulses for the development of the local economy resulted from this – at least in some circumstances, such as new hotels opening. Small and medium-sized enterprises in sectors like catering and vehicle maintenance should be also able to benefit significantly from the strong road usage increase. According to the various local respondents, vendors and hauliers benefited most from the rehabilitated road, which corresponds to the direct effects when extending a highway section of this sort.

There was no sound data on accident rate trends since the rehabilitated road started operation. Negative effects from the road rehabilitation particularly stem from the higher risk of accidents, which especially in-

cludes higher vehicle speeds among non-motorised forms of transport. A variety of measures were adopted when formulating the road design to mitigate such risks, however, in particular to protect pedestrians in the localities. Nonetheless, the structural quality of the mountain road – parts of which can now be travelled at speeds up to 90 km/h – must be classified as dangerous (primarily outside of settled areas). This is also supported by the widespread practice of road signs and markers being repeatedly stolen and evasive manoeuvres around damaged parts of the road leading to serious risks of accident. There was no information concerning HIV.

In summary, we would note that the road rehabilitation has produced positive effects both on the cost-effective use of transport and on the socio-economic development of the project region. On the other hand, the road's state of repair has limited the former. The positive socio-economic effects would also have been larger, given an appropriate road condition. The project's impact is therefore only rated as satisfactory.

**Impact rating: 3**

### Sustainability

The current partially poor condition of the project road and the Ethiopian road maintenance system are both decisive for the project's sustainability. The project implementing agency, the ERA, is responsible for planning and organising national highway upkeep in Ethiopia. This is primarily financed through the Road Fund, whose funds are chiefly (90%) sourced from a fuel levy. But revenue growth has not been able to keep pace with the rapid road network expansion in recent years. The ERA's road condition assessments for the whole network have not to date revealed any scandalous deficiencies in road maintenance efforts. The ERA draws on allocations from the budget for larger-scale maintenance work on important roads. However, we can assume that the (insufficient) access to funds from the Road Fund is going to have an increasingly critical impact should larger-scale maintenance work also be necessary on the newly extended roads in the future. This drives a negative outlook for the massive Ethiopian road investments' sustainability and positive developmental impacts, unless further substantial improvements are achieved in budget planning, revenue raising and road maintenance spending efficiency. Different technical assistance projects are addressing this topic. For example, alongside conducting studies to improve the Road Fund revenues, the World Bank has committed to introducing output and performance-based road contracts. These contracts would largely link responsibility for maintenance to the original road construction contracts.

Aside from routine maintenance work, by 2017 the ERA has already had to carry out two serious and unplanned repairs on the project road to guarantee basic continued passability. We can assume that the road condition would have been even worse without this and that major works will still be necessary in the future due to the problems described. Failing these repairs, the project's impacts, which are still evaluated as satisfactory today, would likely be strongly diminished. The road's crucial importance for the Ethiopian road network indicates that relevant funds should continue to be provided. On the other hand, from the ERA's perspective, these early upkeep costs put excessive strain on the maintenance budget. A new fundamental rehabilitation of the project road has already been agreed on in 2015 for in the near future. Until this starts (probably later in 2017), upkeep work is apparently limited to the minimum required to ensure basic passability. The situation has even included some emergency repairs stopping.

The first factor in assessing the project's sustainability is the road's reduced operating life from damage that already exists today, as well as the general risks in the future of funding the growing needs for maintenance on the Ethiopian road network as a whole. On the other hand, this is contrasted by the ERA's evident readiness to ensure sufficient road passability going forwards in light of the traffic route's crucial importance. We would positively evaluate the essential progress in developing the general institutional conditions inside the RSDP and efforts to adopt new approaches for sustainable road maintenance. Sustainability is therefore still rated as satisfactory.

**Sustainability rating: still 3**

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

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

<b>Level 1</b>	Very good result that clearly exceeds expectations
<b>Level 2</b>	Good result, fully in line with expectations and without any significant shortcomings
<b>Level 3</b>	Satisfactory result – project falls short of expectations but the positive results dominate
<b>Level 4</b>	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
<b>Level 5</b>	Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
<b>Level 6</b>	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.

### Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability): The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected).

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

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).