KfW Development Bank

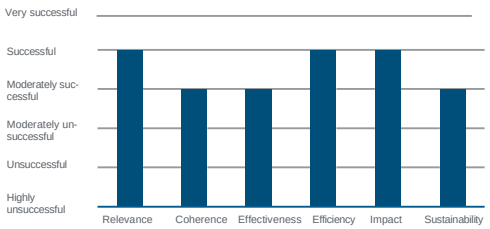
Ex-post evaluation
Rural Infrastructure Programme VI, Cambodia

Title	Rural Infrastructure Programme Phase VI		
Sector and CRS code	Transport and communication (CRS code: 21020)		
Project number	Phase VI: 2015 68 641, education and training measure (A+F): 1930 05 477		
Comissioned by	Federal Ministry for Economic Cooperation and Development (BMZ)		
Recipient/ Project- executing agency	Ministry of Rural Development (MRD)		
Project volume/ Financing instrument	Phase VI: EUR 5.1 million, A+F: EUR 0.6 million / FC grants		
Project duration	*2017 (financing agreement) until 2021 (final inspection)*		
Year of report	2024	**Year of random sample**	2024

Objectives and project outline

The objective at outcome level was the year-round and efficient utilization of the rehabilitated and upgraded rural roads. At the impact level, the aim was to contribute to improving the socio-economic living conditions in the catchment areas of the financed infrastructure. To this end, almost 54 kilometers of rural roads in the province of Banteay Meanchey were rehabilitated and expanded for more intensive and year-round use. The accompanying basic and advanced training measure supported the capacities of the executing agency with regard to project implementation and road maintenance.

Overall rating:
Moderately successful



Key findings

The programme had a good developmental impact, but its sustainability is at considerable risk. For the following reasons, the programme is rated as "moderately successful" overall:

– The poor rural road network is one of the main obstacles to the socio-economic development of rural regions in Cambodia.

– The efficiently implemented expansion of the rural transport infrastructure has reduced this central obstacle to development in the project regions and created an important prerequisite for improving the income, health and education of the target group.

– The infrastructure provided is intensively. The transaction costs for the transport of goods and people have fallen, although the ongoing degradation of the infrastructure has already partially offset the efficiency gains in journey times and vehicle operating costs.

– Although the financial, organizational and technical capacities for the operation of rural roads at the executing agency have increased continuously, they are still inadequate overall and jeopardize the sustainability of the project. A concerted approach and, in particular, the coordination and harmonization of the commitment of the various donors are still lacking; however, the ongoing international cooperation and continuous support continue to give hope for an improvement in maintenance capacities.

Conclusions

– In order to strengthen maintenance and minimise progressive degradation, a coordinated approach by national and international players in the rural transport sector is required on the basis of a fundamental review of the current sectoral structures and the development of a stringent and comprehensive maintenance concept.

– Further sources of funding are needed, such as a road fund financed by tolls or fuel levies.

– Project-related implementation units within ministries represent a duplicate structure in terms of capacity building and knowledge transfer that reduces efficiency. construction and maintenance of rural roads.

– Consistent axle load controls to prevent premature degradation and the awarding of larger construction lots to more efficient companies to develop the capacity of the local construction industry through trickle-down effects are possible starting points for the design of new projects.

Ex-post evaluation - assessment according to OECD DAC criteria

Overview of the rating per criterion:

Relevance	2
Coherence	3
Effectiveness	3
Efficiency	2
Overarching developmental impact	2
Sustainability	3
Overall rating:	**3**

Abbreviations:

A+F	Training and further education
ADB	Asian Development Bank
BMZ	Federal Ministry for Economic Cooperation and Development
DAC	Development Assistance Committee
DBST	Double Bituminous Surface Treatment
DC	Development Cooperation
DRR	Department of Rural Roads
EPE	Ex-post evaluation
EUR	Euro
FC E	FC evaluation
FC	Financial Cooperation
GDP	Gross Domestic Product
IFAD	International Fund for Agricultural Development
MDG	Millennium Development Goals
MMO	Maintenance Management Office
MPWT	Ministry of Public Works and Transport
MRD	Ministry of Rural Development
NDC	Nationally Determined Contribution
PCR	Project completion report
PDRD	Provincial Department for Rural Development
PR	Project review
RIP	Rural Infrastructure Programme
RRAMO	Rural Road Asset Management Output
RRAMS	Rural Roads Asset Management System
SDG	Sustainable Development Goals
TC	Technical co-operation
USD	US Dollar

General conditions and classification of the project

At the time of the project appraisal (PA) in 2017, German-Cambodian cooperation in the field of rural road construction had already been established for more than ten years with the *Ministry of Rural Development* (MRD), the project executing agency responsible for rural roads. The programme built on this long-standing FC commitment and promoted the further expansion of the rural road network.

Brief description of the project

In order to improve the socio-economic living conditions of the poor and vulnerable rural population, existing unpaved roads in rural areas with a total length of almost 54 km were rehabilitated and expanded for more intensive and year-round use as part of RIP VI in the Cambodian province of Banteay Meanchey.[11] The design of the rural roads included bitumen surfaces, robust drains and larger and reinforced culverts. This was intended to enable a higher intensity of use on the one hand and to increase resistance to the increasingly demanding climatic conditions on the other. In addition, small accompanying infrastructure measures such as connecting roads and a rice drying slab, public toilets, a meeting place and fencing in the catchment area of the roads were financed. A training measure financed accompanying training measures to strengthen the technical and management capacities of the project executing agency MRD and its local units at provincial level (including the target provinces of previous phases of RIP).

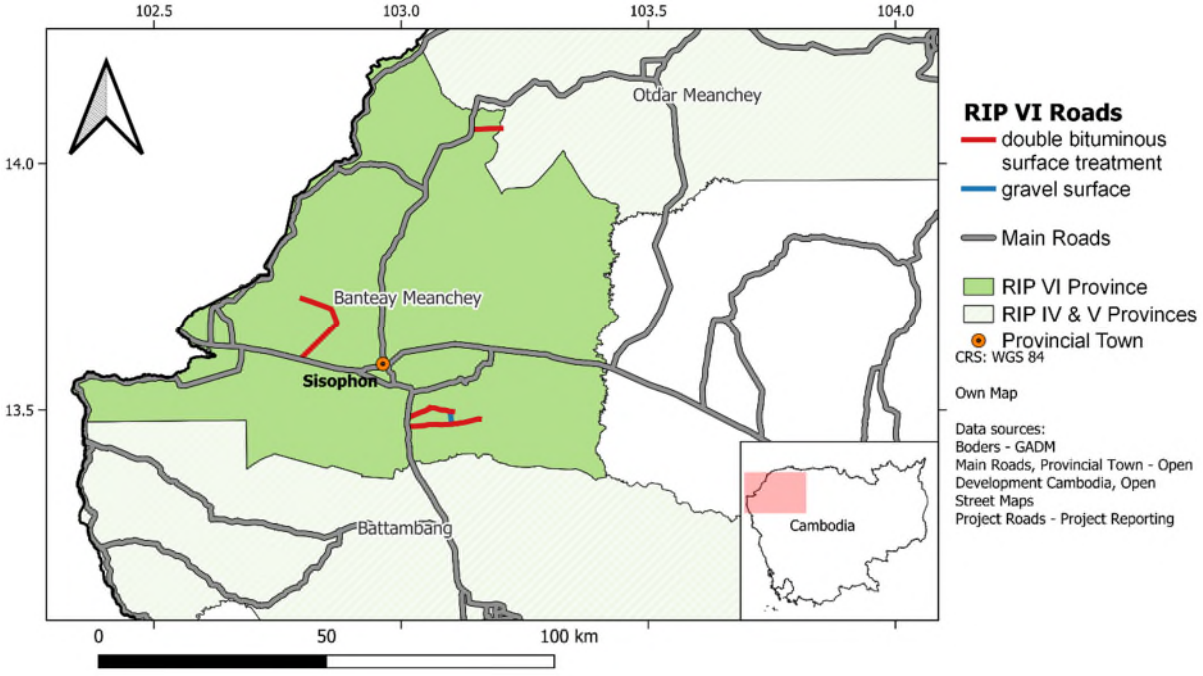
The target group of the project was the rural population in the catchment areas of the roads to be upgraded and comprised 42 villages with around 41,400 inhabitants in 10,152 households.

Breakdown of total costs

		RIP VI (Plan)	RIP VI (Actual)	A+F (Plan)	A+F (Actual)
Investment costs (total)	**EUR million**	**5.61**	**5.61**	**0.60**	**0.60**
Own contribution	EUR million	0.51	0.51	0	0
External financing	EUR million	5.10	5,.10	0.60	0.60
of which BMZ funds	*EUR million*	*5.10*	*5.10*	*0.60*	*0.60*

[1] The expansion of the roads goes the rehabilitation of the roads, but the term "rehabilitation" is used for the sake of readability.

Map of the project country incl. project areas



Rating according to OECD DAC criteria

Relevance

1. Alignment with policies and priorities

The objectives of the programme were in line with the *Millennium Development Goals* (MDGs) and the current 2030 Agenda (see *contributions to the 2030 Agenda*) as well as the German development cooperation priority of promoting sustainable economic development in Asia. This is set out in the position paper "New Asia Policy of the BMZ - Utilizing Asia's Dynamism" from 2015. This emphasizes the importance of improving living conditions, building infrastructure and increasing productivity in rural areas for the inclusivity of dynamic economic development in Asia.

The project was consistent with the objectives of the sector strategy for Cambodian-German development cooperation (DC) on rural development adopted in November 2014 and was a relevant component of the DC priority area "Rural Development", in which the expansion of transport routes played a central role. The project's objectives and selection of measures were consistent with the "Regional Economic Development" DC programme at the time (DC programme objective: the poor rural population, especially women, increase their income and actively participate in local sustainable economic development). The DC programme was based on the bilateral priority area strategy paper "Rural Development" from 2011.

The expansion of the transport infrastructure supported by the project was and is part of the national Cambodian rural development strategy[2], which is based on the government's overarching development strategy[3] and the associated implementation plan[4]. The rural development strategy prioritizes the expansion of transport infrastructure and rural roads to increase productivity in rural areas and for general economic development. For rural roads, it was explicitly planned to replace natural and gravel roads with bituminized roads and to strengthen road maintenance. These objectives are also reflected in the current rural development strategy[5] of the MRD. One of the four priority programmes of this strategy places particular emphasis on the expansion and operation of the rural road network. The road expansion programme also supports the partner country's goals of increasing the climate resilience of the infrastructure, which are also set out in Cambodia's *Nationally Determined Contribution* (NDC).

With regard to quality criteria, gender equality and poverty reduction (see below) were taken into account during project appraisal and an environmental and climate impact assessment was carried out.

2. Alignment with the needs and capacities of the beneficiaries and stakeholders

At the time of the project appraisal in 2017, the poor rural road network continued to be one of the main obstacles to the socio-economic development of rural regions in Cambodia. This also affected the project province, which benefited little from rural road development projects before the FC-financed RIP phases IV to VI and had an above-average poor population (see *Overarching developmental impact - contribution to overarching (intended) developmental changes*). The existing roads were not sufficiently efficient for motorbikes and cars. During the rainy season, they were sometimes impassable due to softening and high-water levels at river crossings. This problem will become even more serious with the predicted increase in extreme weather events caused by climate change, which has been taken into account in the assessment. As a result, access to the market for small farmers was associated with great effort and was a major obstacle to development for the region. The population in the target regions also had poor access to social infrastructure such as schools and health facilities as well as public services. Women only participated in motorized private transport to a limited extent. The core problem of the poor road network and the associated impacts were correctly identified from today's perspective. Consequently, the programme addressed the expansion of rural roads with the aim of strengthening the socio-economic development and living conditions of the target group. A transparent process was planned for the selection of the project locations, with included criteria such as particularly high poverty rates, low levels of development and poor rural infrastructure. Gender impact potential with regard to year-round and low-cost access to health facilities and

[2] Rural Development Policy Strategy and Rural Development Policy and Action Plan 2014 - 2018, 2019 - 2023
[3] Rectangular Strategy for Growth, Employment, Equity and Efficiency, Phase III (2013) and Phase IV (2018)
[4] National Strategic Development Plan (NSDP) 2014 - 2018, 2019 - 2023
[5] Rural Development Policy, 2019 - 2023

secondary schools as well as income opportunities were taken into account. Further gender impact potential through a broader conceptual design is also not recognizable ex-post. A participatory selection process involving the target group and coordination with the TC operating in the region was planned for the accompanying, small-scale infrastructure measures. The capacities of the executing agency MRD were adequately taken into account in the design (see below).

3. Appropriateness of design

The following results chain was assumed for the measure during the appraisal, which was and is plausible both then and now: Improvement of the road infrastructure in rural areas → Reduction of transport costs and – times → better transport and marketing opportunities and year-round access to employment and income opportunities as well as public services, education and health → Improvement of the socio-economic living conditions (income, poverty reduction, education and health). These interdependencies pursue a holistic approach to sustainable development, as they take into account both economic and social development. With climate-resilient construction method, the increasing climate change-related challenges for the rural road network were also taken into account. The impact assumptions were presented transparently during the appraisal. The target system and the corresponding indicators were comprehensible and appropriate overall (see Annex 1).

The assumed results chain of the accompanying training measure is as follows: Provision of formal and *on-the-job* training as well as laboratory equipment Improvement of carrier capacities at national, province and district level → Maintenance, expansion and operation of the rural road network are being improved. This causal relationship was and is also plausible. The institutional capacities in the Cambodian road sector, which were still weak at the time of the appraisal (2017), were a key limiting factor for effectively maintaining and expanding the road network in rural areas. The accompanying training measure aimed to reduce these limitations. It was primarily intended to promote routine maintenance. In addition to technical and organizational capacities, the provision of sufficient financial resources was and continues to be central to improving road operation. With this in mind, the Cambodian government undertook to provide a minimum contribution of USD 3.3 million per year for the duration of the programme to finance road maintenance measures in the twelve provinces benefiting from the FC programme, as in the previous phases. The conceptual aim was to use these funds to take account of the increasing need for maintenance as a result of the network expansion and to the maintenance of rural roads that had already been rehabilitated with FC financing. However, this is only plausible if additional funds are provided that exceed the budgets already planned (see *Efficiency - Allocation efficiency*). Whether these funds should be provided in addition to the planned budgets is not explicitly stated in the programme proposal and could not be clarified during the EPE.

The conception of the measure, including its technical, organizational and financial design, is considered suitable from the perspective of the time and today to contribute to solving the core problem described above and to achieving the DC programme objective. The weak capacities of the partner government and the project executing agency at the time of the appraisal were realistically assessed and taken into account in the design. The programme concept was geared towards the executing agency's capacities in need of expansion and included the financing of international consulting services to support the executing agency during implementation as well as an accompanying training measure for capacity development. The concept of the training and development measure designed to strengthen the capacities for the implementation and sustainable operation of the financed infrastructure.

The conceptual focus of the training measure expanding routine maintenance capacities in the form of organizational and technical knowledge at central (MRD) and provincial level (*Provincial Department of Rural Development* - PDRD) is also considered highly relevant in retrospect. It is considered critical that although it was already identified at project appraisal that the executing agency was neither technically nor financially prepared for the maintenance of bituminized surface courses, this was not taken up more prominently in the concept of the training measure. There is no doubt that capacity building is a long-term process. However, as already noted in the EPE of the previous phases RIP IV and V, in retrospect the contribution of the training and development measure to the further development of the executing agency capacities, which are crucial for the sustainability of the measures, was also assessed too optimistically by the training measure in Phase VI (see *Sustainability - Capacities of those involved and affected / Contribution to supporting sustainable capacities*).

According to the programme proposal, the wishes and needs of the target groups were to be decisive for the specific selection of the accompanying small infrastructure measures. Possible measures included local water supply and pedestrian bridges and paths. Even though this component only accounted for a small proportion of the total

costs estimated at programme appraisal (around 7%), it is considered critical no results chain was formulated for this at programme appraisal and that the measures were not explicitly mapped in the programme's results chain. The developmental justification for financing these measures from FC funds thus remained unclear in the programme proposal and also remains unclear in the EPE. The inadequate conceptual integration of accompanying infrastructure measures (markets) was also observed in previous phases.

In accordance with the Cambodian guidelines (*Standard Operating Procedures*) for internationally financed projects, a project implementation unit financed by the executing agency MRD was again deployed to implement the project. This unit was responsible for the implementation of the programme and for implementing the maintenance measures financed from the above-mentioned minimum maintenance contribution of USD 3.3 million per year.

This created a dual structure with the existing *Department of Rural Roads* (DRR), which is responsible for road construction and maintenance (see *Sustainability - capacities of stakeholders and affected parties*). The processing via a separate project implementation unit was already criticized in the EPE of the predecessor phases (RIP I and II) submitted during the project appraisal. However, a change in the Cambodian requirements is beyond the scope of an individual project and requires a political dialogue with the Cambodian government. This also applies to the responsibility for the construction and maintenance of rural roads. This is not the responsibility of the Ministry of Public Works and Transport (MPWT), as is the case for all other roads, but of the MRD. This raises the fundamental question of whether these responsibilities, which are divided between two ministries, are sensible and efficient with regard to the development and maintenance of the entire road network and in particular for the maintenance of bituminized surface courses.

4. Adaptability- response to change

There were no significant changes that would have required an adjustment to the project concept during the implementation phase.

Rating summary

With the climate-resilient expansion of rural roads based on plausible impact assumptions, the programme addressed a central obstacle to development and thus the target group's central need to improve their socio-economic living conditions by connecting producers and the population to goods and service markets and public facilities. The concept was integrated into local, national and supra-regional development strategies of the Cambodian government and its development partners. The conceptual focus of the training measure on routine maintenance is considered to be sensible. However, it is incomprehensible why, despite the realization at the time that the executing agency was neither technically nor financially prepared for the maintenance of bituminized surface courses, this was not taken up more prominently in the concept and catalogue of measures of the training measure. Particularly in view of the inadequate experience with bituminized surface courses, it is regrettable that the opportunity to directly strengthen the DRR, which is responsible for construction and maintenance, was missed by updating a separate project implementation unit due to the Cambodian *Standard Operating Procedures*. Equally critical is the fact that the accompanying infrastructure measures were not embedded in the results chain and were inadequately conceptualized.

Overall, despite the weaknesses mentioned, the relevance is considered successful due to the very important developmental expansion of the rural transport network and the essentially appropriate design.

Relevance: 2

Coherence

5. Internal coherence

The project was implemented in the development cooperation priority area "Rural Development" as part of the development cooperation programme "Regional Economic Development" parallel to the TC measure "Regional Economic Development". The priority area was coordinated by FC. The German commitment pursued the approach of integrated rural development and included in particular the promotion of value chains, measures to

increase productivity and production in agriculture, the qualification of local self-governing bodies, the promotion dialogue and cooperation between the state, the private sector and civil society, particularly with regard to the economic development of rural areas, as well as climate-resilient and poverty-oriented investments in rural infrastructure. The programme made a relevant contribution to the latter. The division of work between the TC and FC implementing organizations in the development cooperation programme was designed to be complementary. In principle, there was complementarity between the measures of the programme and the commitment of TC in the province of Banteay Meanchey with regard to the promotion of rural value creation and the relevant administrative capacities. However, there was only a slight overlap between the target areas of the measures during implementation, so that there were hardly any synergy effects with regard to the mutual reinforcement of impacts. The rice drying site built as a small-scale measure as part of the FC programme, which was intended to complement the TC activities in the municipality concerned, is only a selective exception here.

The programme was consistent with the international standards to which German development cooperation is committed. The promotion of women, poverty orientation and risk management with regard to unintended environmental and social impacts should be emphasized in particular. The programme contributes to adapting to the consequences of climate change by making the roads more climate-resilient. It thus made a contribution to Germany's international climate financing, to which the German government committed itself on the basis of the Paris Climate Agreement of 2015. These aspects of internal coherence are assessed positively. However, the expansion of roads for motorized private transport (usually with combustion engines in the local context), from which the intended positive developmental impacts are derived, also conflicts with international efforts to reduce greenhouse gas. However, there was no sensible alternative for creating year-round access to socio-economic infrastructure for the rural population and the resulting intended improvement in their living conditions (see *Efficiency - Allocation efficiency*). This aspect is therefore not analyzed. However, when designing future projects in the rural transport sector, it is important to consider whether there are opportunities in the specific context (e.g. by promoting collective transport such as school buses or similar) to minimize the increase in greenhouse gas emissions.

Overall, in view of the fact that TC and FC were hardly complementary during implementation, internal coherence is only rated as satisfactory.

6. External coherence

The programme supported the Cambodian government's own efforts to expand the rural road network. The partner country's own efforts are also reflected in its own contribution to the investment costs. The project was implemented by the executing agency MRD, with which there had already been more than ten years of cooperation in the field rural road construction at the time of the project appraisal (2017). The Cambodian *Standard Operating Procedures* were followed with the establishment of a project implementation unit (see *Relevance - Adequacy of the concept*). With regard to capacity development and knowledge transfer, however, the implementation of duplicate structures should be viewed critically (see *Efficiency - Allocation efficiency/sustainability - Contribution to supporting sustainable capacities*).

In the "*Cambodia Southeast Asia Disaster Risk Management Project*" (USD 61 million), which was implemented from 2017 to 2023, the World Bank financed the climate-resilient expansion of rural roads with a length of around 250 km in six provinces. Since 2020, it has also been financing the "*Road Connectivity Improvement Project*" with a volume of USD 35 million. This includes the expansion of the national and regional road network as well as rural roads. The two projects financed by the World Bank are complementary in terms of content, although there was no geographical overlap with the evaluated RIP VI project. The second phase of the "*Cambodia Southeast Asia Disaster Risk Management Project*", which has just started, also provides for investments in the province of Banteay Meanchey, some of which are directly linked to roads in this project.

The Asian Development Bank (ADB) has been implementing several programmes for the expansion and operation of rural roads since 2009. The ADB's second programme phase, which runs until 2020 and has a financial volume USD 118 million, was implemented at the same time as the project evaluated here. Where the provinces overlapped with the FC projects in Banteay Meanchey, the selection of intervention areas for the programme was coordinated in order to avoid overlaps and improve the priority rural road network in the provinces across the board. The "*Rural Road Asset Management Output* (RRAMO)" project, which was launched in 2012 and financed by the ADB, supported the MRD in the further development of the database into a *Rural Roads Asset Management System* (RRAMS), which is to be used for the prioritization and planning of maintenance financing. FC has discontinued its support for the development of a road management system, which had already begun in the

previous phases, in favor of the RRAMS in order to avoid competition between incompatible systems and to contribute to donor harmonization and the use and establishment of a system for monitoring road conditions and planning construction measures.

Alongside Japan and Korea, Germany was the leading bilateral development partner for the financing of rural roads in Cambodia during the term of the programme. In addition, there were numerous programmes for rural (economic) development (including from the World Bank, ADB and the *International Fund for Agricultural Development - IFAD*), which also promoted the expansion of rural roads and the connection of producers to markets as project components. China is an important bilateral donor to Cambodia and, in addition to several national roads, has also financed rural development projects focusing on electrification and water supply, in some cases in the same provinces as the project. At the same time as the EPE (2024), a project financed by the *Asian Infrastructure Investment Bank (AIIB*) focusing on the expansion of rural roads was launched, which is also being implemented by the MRD and is similar in concept to the project evaluated here. Overall, there was good complementarity with other donor projects, particularly in the rural transport sector, but also with the above-mentioned commitment in the area of rural economic development. At the time of the project appraisal, the donors active in the sector and representatives of the government were organized in a *sub-technical working group. "Transport Infrastructure"* was organized. However, there does not appear to have been any comprehensive coordination of the ongoing internationally financed projects by MRD during implementation. Until the time of the EPE (2024), donor coordination in the rural transport sector was not formalized, but only took place on an ad hoc basis between individual donors and as part of overarching coordination on infrastructure and rural development by the MRD. However, formalized coordination between the Cambodian government and the donors would be extremely important for the sectoral coordination process and also for knowledge transfer in order to learn from experience across projects for the design and implementation of road infrastructure measures, to leverage synergies and to develop solutions for the problematic sustainability of the road infrastructure and in particular the continuing weaknesses in maintenance - especially with regard to the bituminized surface courses - in a joint policy dialogue (see *Sustainability - capacities of stakeholders and affected parties*). In retrospect, a joint approach to address the ongoing maintenance problems, which are known to all parties involved, would have been appropriate for many years.

Rating summary:

The programme supported the partner country's own efforts implement the development strategies described under Relevance effectively and consistently with international standards. Both coherence with German DC and with other development programmes was conceptually ensured due to the complementary content of the rural development measures. However, the synergy effects of TC and FC in the implementation were rather low due to the lack of spatially overlapping measures. The potential for strategic and operational coordination between the government and the development organizations active in the sector was also insufficiently utilized. This is particularly regrettable as there is an urgent need for a solution-oriented dialogue between the partner government and donors in order to address the ongoing structural problems in the sector and counteract the progressive degradation of the cost-intensive bituminized roads with timely (routine) maintenance. Overall, coherence is assessed as having limited success.

Coherence: 3

Effectiveness

7. Achievement of the (intended) objectives

The goal adapted within the framework of the EPE was the year-round and efficient utilization of the rehabilitated rural roads.

The achievement of the objective at outcome level can be summarized as follows:

Table 1: Target achievement Outcome

Indicator	Status at PA (2018)	Target value according to PP/EPE	Actual value at PCR (2021)	Actual value at EPE (2024)
(1) Year-round trafficability of the RIP VI Roads	Roads not passable all year round, considerable travel limitations in the rainy season	Roads are passable all year round	Some road sections were flooded during heavy rainfall events and only passable to a limited extent	Some road sections were flooded during heavy rainfall events and only passable to a limited extent **Partially fulfilled**
(2) Average specific travel times on the RIP VI roads (motorbike)	4.3 min/km	-30 % (EPE)	-58 % (1.8 min/km)	-41 % (2.5 min/km) **Fulfilled**
(3) Average specific vehicle operating costs on the RIP VI roads (motorbike, in 2018 prices	0.076 USD/km	-30 % (EPE)	-43 % (0.043 USD/km)	24 % (0.058 USD/km) **Not fulfilled**
(4) Average daily traffic volume on the RIP VI roads	9,197 motorized vehicles/day	+20 % (PP)	+62 % (14,871 motorized vehicles/day) [1)]	+44 % (13,222 motorized vehicles/day) **Fulfilled**

8. Contribution to the achievement of objectives

As part of the programme, five road sections with a total length of 47.2 km were rehabilitated and equipped with bridges and culverts in the province of Banteay Meanchey. A further 6.4 kilometers were implemented using residual funds from phase RIP IV. Apart from a 900m long connecting section with a gravel surface, all road sections were provided with a double layer of bitumen. In 2020, some road sections were affected by a 50-year flood event and were partially damaged and partially repaired as part of the project.

Some sections of road were or are repeatedly flooded during heavy rainfall and are then only passable to a limited extent. These events have also caused permanent damage in some cases. Heavy goods traffic was or is restricted on at-risk sections during periods of heavy rainfall in order to prevent more severe damage. In the case of EPE, year-round trafficability (indicator 1) was therefore only partially guaranteed.

In addition to the sustainable and year-round use of roads, the expansion should enable time- and cost-efficient transport on roads. The corresponding indicators of the project record specific journey times (indicator 2) and average specific vehicle operating costs for motorbikes (3), which are still by far the most frequently used vehicle for private transport in the target region. The results allow conclusions to be drawn regarding the costs and time required for transport with other motorized vehicles, which also correlate with road conditions. The target level for both indicators was raised during the EPE from the 20% proposed at appraisal to 30%, as the original target value was considered too conservative and a higher proportion of road kilometers (~98% instead of the original ~45%) with a higher construction standard (bituminized roads) was implemented during the course of the project. This enabled higher average speeds and lower vehicle operating costs. After completion of the roads, the indicator for measuring specific journey times was achieved (indicator 2). However, the specific journey times and the underlying average travel speeds at the time of the EPE on all RIP VI road sections are already significantly affected by the deterioration in the condition of the road surface compared to the condition after completion in 2021. The expected reductions in vehicle operating costs (indicator 3)[6] on the rehabilitated and upgraded roads were achieved after completion of the project, but no longer at the time of the EPE. This was confirmed anecdotally by road users during the impact assessment for the EPE, who complained about a renewed increase in time and fuel consumption.

The clear downward trend in the positive effects of the above-mentioned efficiency indicators compared to the values after completion reflects the deteriorated condition of the road surfaces, which was observed- to varying

[6] Calculated according to ADB specifications for Cambodia with updated prices from 2018 on the basis of the road roughness (International Roughness Index) determined by driving and inspecting the roads as part of the EPE according to World Bank specifications. This is used to record the quality and condition of road surfaces. Asian Development Bank: Rural Improvement Project II. Economic and Financial Analysis. Report to the President. July 2014.M. Sayers, T. Gillespie, and W. Paterson: The World Bank Technical Paper Number 46, Guidelines for Conducting and Calibrating Road Roughness Measurements.

degrees- on the majority of road sections during the site visits carried out as part of the EPE. The deteriorated condition of the road surfaces is - depending on the road section - due to different or a combination of factors such as a road design with limited resilience to heavy rain/flooding, inadequate construction quality, lack of maintenance (see *sustainability - durability of effects over time*), exceeding axle loads, but also due to unregulated development and land use changes, some of which lead to water damage on the roads by changing the runoff pattern. It is not possible to measure the effects of these individual factors on the general road condition. However, it is plausible that regular and proper maintenance would have contributed to better results.

The 44% increase in average traffic volume (indicator 4) measured as part of the EPE is well above the target value of 20%. The observed increase in traffic volume is consistent with the reports from the catchment area of the roads. During the site visits, all interviewees (road users, representatives of the local administration and neighbors) reported a significant increase in traffic volume and increased mobility since completion of the expansion. The fact that the traffic volume recorded during the EPE is lower than the value at the end of the project does not necessarily a negative trend. The counts carried out with a small sample of one to two days per road section are only of limited significance due to the high temporal variability of the indicator, which can be assumed due to climatic and agricultural seasonality, among other things.

The above-mentioned traffic counts as well as the impressions from interviews and site visits indicate that - with the exception of two financed roads there has been a change in the use of transport from pedestrians and cyclists to motorized traffic. The proportion of light commercial vehicles and passenger cars increased significantly. An increase in privately organized public transport such as shared taxis and vehicle hire was also observed locally.

Interviews confirmed that the participation of women in motorized road traffic has increased significantly. In the traffic counts conducted as part of the EPE, 32% of motorbikes were driven by women. In principle, equal access to the roads is guaranteed for the entire target group. Against this background, the programme did not include any specific measures for particularly disadvantaged or vulnerable groups (including women).

Furthermore, a total of 11.3 km of access roads to the roads rehabilitated in the programme were improved as accompanying micro-measures and equipped with pipe culverts where necessary, and further micro-infrastructure (a rice drying slab, two public toilets, a community meeting place, fencing around a primary school and a pond) was financed. Regardless of the inadequate conceptual integration of the micro-measures (see *Relevance - Adequacy of the concept*), the target group expressed a high level of satisfaction with the access roads and the above-mentioned community infrastructure in the interviews conducted as part of the EPE, as both types of measure contribute to the local quality of life. The rice drying slab, on the other hand, is not used as the location is rather remote and the local farmers do not have a need for such a drying facility.

As described in the final report, the accompanying training measure comprised the following activities: 1.) Training of the project executing agency at central level (PMU and DRR) and at decentralized level (PDRD) to strengthen road maintenance (including bituminized roads) with regard to inventory, implementation (procurement, construction supervision), climate adaptation, quality control and laboratory tests; 2.) *On-the-job* training on road construction and maintenance for the responsible PDRD staff in Banteay Meanchey and community representatives on the RIP VI roads; 3.) Support for the MRD's in-house testing laboratory for material testing for road construction and maintenance. The development of a concept for routine road maintenance planned at the time of project appraisal as part of the training measure build maintenance capacities was not realized. With regard to the support of laboratory capacities, those involved in the programme reported that many of the trained specialists have left the laboratory since the end of the programme. Although the laboratory was basically functional, it was not used in the implementation of ongoing road projects following the project. External laboratories would continue to be used for these. The recommended certification of the laboratory in accordance with ISO/IEC 17025 has also not yet been implemented (see *Sustainability - contribution to supporting sustainable capacities*). The contribution that the A+F measure can make to improving maintenance was assessed too optimistically and the personnel, technical and financial capacities of the executing agency have not yet increased to the necessary extent (see *Sustainability - Capacities of those involved*).

Notwithstanding the useful training measures that were implemented as part of the A+F measure, the A+F measure is categorized as having limited success overall.

In view of inadequate maintenance and the expected increase in climate damage, a further decline in the positive effects can be expected in the future (see *Sustainability - capacities of those involved and affected* and *durability*

of the effects over time). The trend reversal is already reflected in the indicators 2 and 3 presented above in the course of time between completion and EPE (see *Effectiveness - achievement of the (intended) objectives*).

9. Quality of implementation

The technical design of the roads is based on Cambodian standards for rural roads. Good 98% of the road kilometers were sealed with double bituminous surface treatment (DBST) to improve resistance to higher traffic volumes and heavier rainfall. DBST sealing has been the Cambodian standard for rural roads since 2016. In view of the development of traffic volumes, the sometimes intensive use of the roads by heavy goods vehicles and the climatic stresses, road sealing is considered sensible.

In some cases, the execution quality of the building contractors was initially inadequate; the quality of the construction measures achieved with improvements during the warranty period was considered acceptable to good overall by the final inspection and the EPE's inspection did not reveal anything to the contrary in this regard. The EPE considers the quality of the management and implementation by the executing agency and implementation consultant to be target-orientated and effective overall.

10. Unintended effects (positive or negative)

Some target group interviews reported a negative development in road safety (increase in accidents and increased through traffic in residential areas) in connection with the road expansion. This goes hand in hand with increased use and higher speeds but emphasizes the need to raise awareness of road safety and stricter monitoring by the traffic police. Traffic signs and speed bumps installed in the project are largely still in place and to reduce speeds and the risk of accidents. To protect the population in the catchment area of the roads and paths, the project also carried out awareness-raising measures for both road safety and HIV/AIDS prevention. However, these temporary measures can only be effective to a limited extent and continuous sensitization of the population to road safety is also required.

Rating Summary

With the expansion of the rural roads, they can be used with considerably fewer restrictions during the rainy season. The traffic counts and anecdotal evidence from target group surveys indicate that the roads are being used actively and productively. Furthermore, although transport times and transport costs have been reduced, utilization efficiency is already suffering significantly from the deterioration in the condition of the roads and is likely to deteriorate further without comprehensive maintenance ahead of time. At the same time, the achievement of the primary objective of the trainings - the improvement of the maintenance capacity - fell short of expectations. At the time of the EPE, the effectiveness is rated as moderately successful.

Effectiveness: 3

Efficiency

11. Production efficiency

As part of RIP VI, a total of 47.2 kilometers of road were rehabilitated, thus just reaching the total distance of 48.3 km envisaged at the time of the appraisal - although significantly more kilometers of road were bituminized than originally planned (see below). A further 6.4 kilometers of road were financed from residual funds from phase RIP IV.

The specific costs were estimated at 78,000 EUR/km during the appraisal. This was based on the assumption that only ~45% of the road kilometers would be bituminized. During the implementation phase, however, almost all of the road kilometers were bituminized (~98% of the road kilometers). The specific investment costs for these roads were therefore ultimately around EUR 100,000/km (this also applies to the road section realized with RIP IV residual funds). They were thus in line with the specific costs of the predecessor phases RIP IV and V (around EUR 100,000/km at ~75% bitumen of the road kilometers) and comparable projects in Cambodia and the region[7] (see *Allocation efficiency*).

[7] In the FC projects in Laos, the specific costs for DBST roads are in the same range and in the above-mentioned World Bank projects in Cambodia at around USD 140,000/km.

The construction work was tendered nationally and in one lot per road section. This was intended to give smaller and local construction companies the opportunity to participate and to further develop the construction industry with a view to road operation with maintenance and repair. However, this approach led to efficiency losses on the one hand due to a higher level of support from the executing agency and consultant during tendering and implementation and on the other hand to lower quality in the execution and the requirement for significant rework during the warranty period. In terms of efficiency, but also with a view to capacity development, it would be worth considering piloting the awarding of larger lots to larger and more competent construction companies for similar future projects. It stands to reason that these would work with smaller local subcontractors anyway. At the same time, however, the contractors would also be expected to ensure the quality of execution and thus a transfer of knowledge that contributes to capacity building. Piloting would therefore help to determine whether a different type of contract award would have a positive effect on construction quality and the development of expertise and local road operating capacities and achieve better results in this respect.

The implementation time of the project was due to some delays in the execution of the construction contracts, travel restrictions during the COVID-19 pandemic and damage to infrastructure already built due to storms in 2020 (see *Effectiveness - contribution to target achievement*). However, the delays are considered justifiable overall given the challenging framework conditions. In particular, the more time-consuming execution of the construction measures according to international standards by national companies was well justified by the intended capacity building.

The costs for the implementation consultant slightly due to additional consulting services required and delays caused by the COVID-19 pandemic. At over 20 %, the share of consulting services in the total costs was higher than in comparable rural road construction projects. This is due to the smaller scope of this phase of the project and the fixed costs of the consulting services, which are independent of the number of kilometers. Both the services of the implementation consultant and the A+F measure were put out to international tender in order to achieve efficient prices with high quality.

12. Allocation efficiency

In order to achieve the mobility objectives of the project in sparsely populated rural areas, the expansion of roads was the most efficient alternative to other transport technologies (e.g. a train connection). The target regions were selected according to the expected effects based on the economic and social development potential. The selection of particularly underdeveloped regions was an efficient allocation, as a particularly high marginal benefit of the funds used was to be expected here.

The technical design of the roads rehabilitated and upgraded as part of the programme is considered appropriate in terms of traffic volume and climatic requirements (see *Effectiveness - Quality of implementation*) while at the same time ensuring efficient specific costs (see *Efficiency - Production efficiency*).

The decision to pave most of the roads with bitumen complies with the Cambodian government's standard for rural roads, which has been in place since 2016, and improves resistance to higher traffic volumes and heavy rainfall. The expansion of the roads with sealed surfaces is understandable in principle and would be efficient with effective maintenance and control of axle loads as well as corresponding maintenance capacities (see *Sustainability - durability of effects over time*). However, a higher design standard (sealed surfaces) leads to higher follow-up costs for maintenance and is accompanied by higher demands on technical capacities. The responsible local authorities do not yet have sufficient financial, organizational and technical capacity to do this (see *Sustainability - Capacities of those involved and affected*).

Due to the year-round use and usability as well as the improved condition of the roads reduced transport times and costs (transaction costs) for marketing local agricultural products, for external activities and employment as well as for the use of schools and health services (see *Overarching developmental impact - contribution to overarching (intended) developmental changes*). This has strengthened the economic and social participation of the target group as well as rural human capital. However, a clear downward trend in utilization efficiency - measured by the indicators of journey times and vehicle operating costs - can already be observed, with a corresponding prospective impact on the above-mentioned effects of the transaction costs (see *Effectiveness - contribution to achieving the objectives*).

The Cambodian government committed to providing an annual amount of USD 3.3 million for the maintenance of roads in the provinces benefiting from the FC projects for the duration of the programme. However, only USD 2.2 million was provided in 2016 and 2017 and USD 3.2 million from 2018 to 2021 and prioritized for FC-financed infrastructure. No information was provided to EPE by the partner for the years 2022 and 2023. Furthermore, the EPE was unable to conclusively clarify whether these funds were provided in addition to the budgets planned for the respective provinces (see also *Relevance - Appropriateness of the concept*). Conditional utilization of the maintenance budget is not considered efficient - insofar as these funds are not provided in addition to the budget planned for this purpose anyway and independent of this project. Although the contractually agreed allocation of funds improves the sustainability of some roads rehabilitated as part of FC projects, from an overall economic perspective the funds would not necessarily be used where they would bring the greatest added value given the overall scarcity of funds. The obligatory provision of maintenance funds under RIP phases IV to VI will not be continued in the loan-financed follow-up programme RID4CAM.

In addition, implementation was carried out via the MRD's project implementation unit and thus in parallel with the DRR, which is responsible for road construction and maintenance. From an efficiency point of view, duplicate structures are questionable in general and also with regard to the training measures. In addition, training measures cannot be implemented with a closer integration of internationally financed road construction measures with nationally financed road construction and -maintenance measures, greater learning effects can be expected.

Rating summary

The specific costs were reasonable and justify a good overall production efficiency. The high consulting costs and minor delays are considered acceptable. The fit-out standard was appropriate in terms of utilization intensity and climatic requirements. The year-round usability and (transaction cost) efficient utilization of the roads, in combination with the selection of particularly underdeveloped regions, led to clear positive socio-economic effects. With regard to the separate project implementation unit of the MRD, however, it should be noted that from an efficiency point of view, duplicate structures are questionable, both in general and with regard to the A+F training measures. Irrespective of this, the efficiency is assessed as successful against the background of the efficiently achieved outputs and impacts.

Efficiency: 2

Overarching developmental impact

13. Overarching (intended) developmental changes

From 2009 to 2019, Cambodia achieved significant economic growth averaging 7% per year based on macroeconomic stability, a good investment climate and openness to international trade. This was also accompanied by an improvement in living conditions[8]. This trend collapsed with the COVID-19 pandemic, which led to a recession in 2020 with a decline in economic growth of -3.1 %. The subsequent recovery has so far fallen short of expectations with annual economic growth of just over 5% (2023/2024). The reasons for this were the subsequent crises in the form of the US fiscal policy measures to combat inflation, which made investment capital more expensive in the heavily dollar-based Cambodian economy. In addition, the global geopolitical situation had an impact on trade and tourism. These led to the materialization of existing structural risks in the Cambodian economy, e.g. dependence on a few export goods and markets. Inflation rose to a 13-year high of 7.8 % in mid-2022. The first months of 2024 have already seen a recovery in exports and tourism, which can be attributed to economic recovery in the main markets of the US, EU and ASEAN, while the economic situation in the important export market of China remains tense. Growth of over 6% is now forecast for the coming years. At the same time, inflation fell to 0% in the first quarter. [9]

The rural regions of Cambodia, where 75% of the 16.8 million inhabitants lived at the time of the EPE, are characterized by difficult living conditions. While part of the more remote rural population lives from subsistence farming, market orientation is progressing rapidly in better-connected areas. In 2015, agriculture still contributed 27% to gross domestic product (GDP). Since then, the share has fallen to 22% (2022). In 2020, agriculture provided

[8] International Bank for Reconstruction and Development / World Bank (2022): Cambodia Poverty Assessment. Toward A More Inclusive and Resilient Cambodia
[9] World Bank (2024): Cambodia Economic Update. Export Revival and Trade Shifts - Strengthening Cambodia's Education System for Future Growth

around 35% of jobs in Cambodia and contributed 22% of GDP. Its products currently account for 17.4% of Cambodian exports. Rice is grown on around 79% of arable land and generates 50% of agricultural GDP. Other important products are cassava, cashew nuts and rubber. While the labor force tied to agriculture decreased from 58% (2009) to 35% (2019/20), combined with a corresponding migration from the countryside to the cities, labor productivity in agriculture more than doubled. Overall, economic growth - also due to the increase in non-agricultural income opportunities and remittances from migrant workers - had a positive impact on rural areas and the improvement of living conditions there.[8]

Between 2014 and 2019, the national poverty rate in Cambodia fell from 26% to 18% nationwide and from 30% to 23% in rural areas. According to the World Bank, this development was primarily due to the overall strong economic growth and hardly any targeted transfer measures such as e.g. social security systems. In the same period, access to electricity in rural areas has increased from 48% to 79% and infant mortality has more than halved nationwide [8.]
The target province of Banteay Meanchey has around 860,000 inhabitants and is very rural in character. It had an annual population growth rate of 2.2% between 2008 and 2019. The only larger city, Sisophon, is home to just over 60,000 people and therefore 7% of the population.[10]The proportion of poor households in Cambodia according to ID-Poor[11] was 17.5% nationwide at the time of the EPE (2024) and has therefore barely fallen since 2019 due to the aforementioned influences. At 17.4 %, the proportion of poor households Banteay Meanchey province is close to the national average. The average poverty rate in the catchment areas of the roads at EPE was 18.9 % and therefore above the overall average for the rural province.

The aim of the EPE to contribute to improving the socio-economic living conditions of the population in the catchment area of the rural roads.

The achievement of the objective at impact level can be summarized as follows:

Table 2:Target achievement Impact

Indicator	Status PA (2018)	Target value according to PA/EPE	Actual value at PCR (2021)	Actual value at EPE (2024)
(1) Household income in the RIP VI road access areas	1,734 USD [1) und 3)]	+20 % [2)] (PP)	+43 % [2)] (USD 2,490 [1) and 3)]	+241 % 2) (USD 5,833 [1) and 3)] **Fulfilled**
(2) Proportion of the poor population in the catchment areas of the RIP VI roads (ID-Poor)	21 % [1)]	16 % [1)] (EPE)	18 % [1)]	19 % [1)] **Not fulfilled**
(3) Motorized vehicles per household in the catchment areas of the RIP VI Roads	0,66 [1)]	+20 % [2)] (EPE)	+32 % [2)] (0,92 [1)])	+60 % [2)] (1,05 [1)]) **Fulfilled**
(4) Trade volume of agricultural products produced in the RIP VI road catchment areas	737 USD [1) and 3)]	+30 % [2)]	+1 % [2)] (USD 719 [1) and 3)])	+336 % [2)] (USD 2,467 [1) and 3)]) **Fulfilled**
(5) Proportion of young people (aged 12-17 enrolled in secondary schools in the catchment areas of RIP VI roads	34 % [1)]	44 % [1)] (EPE)	39 % [1)]	39 % [1)] **Not fulfilled**

[1)] Average of the RIP VI road catchment areas
[2)] Average change in the RIP VI road catchment areas.
[3)] In baseline prices with inflation adjustment based on the Cambodian consumer price index.

[10] General Population Census of Cambodia 2019
[11] Cambodian system for identifying poor households, available at: https://idpoor.gov.kh

14. Contribution to overarching (intended) developmental changes

Household incomes in the catchment areas of the RIP VI roads rose by an average of 241% (indicator 1), with the road catchment areas with previously low incomes experiencing a particularly strong increase and the income differences between the target regions decreasing. The project has made a decisive contribution to these higher incomes by improving access to goods and labor markets. The expansion of rural roads has led to a considerable upturn in the market production and marketing of agricultural products in the catchment areas. Agricultural products (rice, cassava, cashew nuts and meat) were already being produced for the market before the roads were extended, but to a lesser extent due to the previously high transport costs. The volume of trade in agricultural products has more than tripled (indicator 4). Network effects played a major role here, as the rehabilitated roads are connected to important supra-regional and in some cases transnational transport routes that facilitate supra-regional and international trade with neighboring Thailand. Since the expansion of the roads, agricultural produce has been brought to pick-up points by farmers or collected directly from the settlements by customers. The number of traders has more than doubled since the baseline scenario, with increasing competition from buyers and lower transport costs leading to better purchase prices for producers. In the catchment area of the roads, the supply has also increased due to travelling traders and at the markets. Numerous new construction projects for private and agricultural buildings were also observed during the field visit. On average, female-headed households recorded higher income growth than male-headed households. This suggests a reduction in income inequality. While the income of female-headed households was only 62 % of the average household income in 2018, this proportion had risen to 90 % by 2024.

In contrast, the proportion of the poor population in the catchment area of the roads (indicator 2) has not fallen as sharply as would be expected given the sharp rise in income in the catchment area of the roads (indicator 1). Several factors may have played a role in the development of the ID-Poor poverty register data. Some of these are actual changes in the economic situation of the target group due to the regional decline in growth rates and the COVID-19 pandemic. The return of migrant workers played a particularly important role here, which resulted in a lack of remittances on the one hand and these people returning to the regions without an income on the other. Others are plausibly linked to changes in Cambodia's poverty reduction policy, which incentivized inclusion in the poverty register by increasing transfer payments to cushion the impact of the recession. During the impact assessment, it was also reported that labor migration is still below pre-pandemic levels and that some households are over-indebted to microfinance institutions. In contrast, both vehicle ownership as an indicator of economic well-being (indicator 3) and household income (1) have increased significantly. The interviews conducted as part of the EPE confirmed the impression that the residents have benefited from the improved living conditions and income, but that the increases in prosperity are presumably unevenly distributed. The entrepreneurial part of the target group in particular, such as large farmers and traders, appear to have benefited disproportionately from market integration.

It seems plausible that the programme contributed to non-agricultural rural development by increasing the use of educational opportunities (indicator 5) and the expansion of professional activities outside of agriculture. In the interviews and focus group discussions, it became clear that the improvement of rural routes makes it possible to take advantage of secondary education programmes and to commute to the nearest cities. The proportion of pupils registered at secondary schools has increased by an average of five percentage points compared to the baseline.

However, this positive development is below the expected improvements due to better transport options. It is plausible that the effects of school closures during the COVID-19 pandemic are still having an impact today. Beyond the impact of roads, however, secondary school attendance is influenced by other factors such as the availability of good educational opportunities within easy reach and a good educational dividend on the labor market. The current World Bank report on Cambodian economic development emphasizes the challenges in the education system and identifies the economic situation of families and the rather poor education on offer as major obstacles to participation in school education.

Social services (health and education) have become more accessible to end users, including women and vulnerable groups. Visits to health centers and the accessibility of hospitals have improved considerably and are now guaranteed with significantly fewer restrictions during the rainy season. In particular, medical care for pregnancies and births has improved. Public safety in the villages has increased thanks to the quicker accessibility of the police. Citizens can make better use of public services. This emerged from the interviews and focus group discussions as part of the EPE.

The participation of women in motorized road traffic has increased significantly (see *Effectiveness - contribution to achieving the objectives*). It has been reported that this was due to the increase in vehicles, the improvement in road conditions and general safety. Anecdotal reports suggest that these factors enable greater independence and participation in economic life. During the on-site surveys, it also became clear that the programme improves safety in public and domestic spaces through better accessibility of settlements by the police, which particularly benefits women.

As the connection to an efficient transport infrastructure is key to the development of rural areas and cannot be substituted, it can be assumed that the above-mentioned developmental impacts would not have been realizable without the project. This was also demonstrated in the EPE by the level of development of settlements without suitably developed roads.

The programme has not contributed significantly to structural or institutional changes. This requires cross-project coordination and the development of solutions (see *Coherence - External coherence*). However, the programme was designed in such a way that it complemented other FC-financed phases of rural road network development and those of other donors or could be linked to the programme with further projects.

15. Contribution to overarching (unintended) developmental changes

No contribution to unintended developmental changes was identified in the EPE. While human trafficking is a relevant problem in Cambodia, a significant contribution to this from the expansion of existing rural roads is not plausible, as the programme does not open up any new areas for road transport. Further human trafficking does not require regular road transport, meaning that the reduced transaction costs only play a subordinate role.

Rating summary

The indicator target values for household income, vehicles per household and trade volume with agricultural products produced in the catchment areas of the RIP VI roads were already exceeded at the end of the project and also at the time of the EPE. This suggests an improved income situation for households. This contrasts with the share of the poor population, which has not fallen as much as would have been expected, especially in view of the sharp rise in income in the catchment area of the roads. This is presumably due to falling growth rates, increased registration in the poverty register (as a prerequisite for transfer payments) and the lower number of migrant workers since the COVID-19 pandemic. However, unequal increases in prosperity from economic integration cannot be ruled out either. However, the increase in household income and vehicles per household in particular suggest that it is not only a small proportion of the target group that has seen an economic improvement in their living situation. Further positive effects can also be expected in the future due to the now possible utilization of social services (health and education). Overall, the overarching developmental impact is still considered to be successful.

Overarching developmental impact: 2

Sustainability

16. Capacities of the beneficiaries and stakeholders

At the time of the EPE, the network of rural roads in Cambodia covered a total length of around 48,000 km. The *Department of Rural Roads* (DRR) in the *Ministry of Rural Development* (MRD) is responsible for the planning, construction and maintenance of the rural road network (all other road categories above the rural road network are the responsibility of the MPWT). Within the DRR, the central task of maintenance is carried out by the *Maintenance Management Office* (MMO). At provincial level, the *Provincial Department for Rural Development* (PDRD) is responsible for this. The processes are highly centralized at national level, while the PDRDs have only limited autonomy. In particular, responsibility for the maintenance of bitumen roads lies entirely with the DRR. The budget for the maintenance of rural roads is allocated directly from the national budget. MRD has no other dedicated sources of funding for this, such as a road fund, which is fed directly from revenues such as fuel levies or user fees.

The budget allocated to MRD for the maintenance of rural roads rose in parallel with the expansion infrastructure from USD 0.25 million in 2006 to USD 19.7 million in 2017, with a further increase to USD 25 million by 2020. The allocations stagnated in the following years. They then increased to around USD 28 million in 2023 and to

around USD 30 million in 2024, indicating moderate but still insufficient growth. In the 2023 financial year concluded at EPE, a calculated USD 580 per kilometer was available for maintenance for the rural road network. Since 2017, an average of around 55% has been used for periodic maintenance (including road surface renewal), 35% for routine maintenance (filling potholes, repairing erosion damage, clearing out culverts, etc.) and the remainder for emergency measures. The most recent amount of maintenance carried out was around 3,000 km of gravel roads and 1,300 km of bituminized roads. As bituminized roads require periodic maintenance every five to seven years on average and gravel roads every three to five years and both road types require annual routine maintenance, it can be calculated from these figures that the scope of maintenance carried out for the rural road network is inadequate. The average specific costs for maintenance calculated roughly from the budgets and kilometers maintained were around USD 6.400 per km in the years 2017 to 2023. This is less than half the specific costs for periodic maintenance that were incurred for the maintenance work carried out as part of the RIP IV / V projects and amounted to ~ EUR 14.000/km. From this it can be deduced that the measures financed from the above-mentioned regular maintenance budget were not comprehensive maintenance, but rather needs-orientated and spatially limited repair measures.

Routine maintenance of the bitumen roads implemented in the project was not carried out comprehensively and systematically. The MRD does not yet have sufficient organizational and technical capacity for this and, given the shortage of funds described above, does not have the necessary budget. The same applies to the PDRDs, which also have no mandate for the maintenance of bitumen roads. Only a few selective repairs to the road surfaces were carried out - in some cases also by the neighboring municipalities and with the financial participation of commercial road users. Culverts and drainage channels are often blocked by rubbish or inappropriate development and the road equipment (signs, marker posts, etc.) is partially damaged. At present, it also takes too much time to repair road damage, as the recording of damage in the provinces and the planning and implementation of maintenance measures are not handled efficiently by the central ministry level. This results in consequential damage due to the continued use of the damaged road sections.

The control of heavy goods traffic by the local administration is inadequate and, in addition to and in conjunction with the climate change-induced increased strain from rainwater, leads to rapid degradation. With regard to heavy goods traffic, the self-interest of local decision-makers is also relevant, as they themselves, as agricultural producers, are often interested in realizing the largest possible transport volumes with as few vehicles as possible for cost reasons. The fact that this is detrimental to the long-term transport capacity of the roads is lost sight of.

Although the executing agency's implementation and operating capacities have increased continuously, there is still great potential for improvement in terms of maintenance. The own efforts and the continuous donor support[12] give reason to hope for an, albeit slow, improvement in the maintenance capacities. A new FC programme is planned to specifically address the deficits in the area of maintenance. However, in order to keep pace with the expansion of the rural road network, efforts need to be accelerated, intensified and coordinated across individual projects. With regard to the design of effective structures and processes for routine and periodic maintenance, an inventory (strengths and weaknesses) of the current structures and procedures seems unavoidable in order to develop solutions for the deficient maintenance and its organization (structuring, processes, responsibilities and financing) and to cast them into a comprehensive maintenance concept. This requires a joint effort by all stakeholders in the rural transport sector, i.e. cross-project coordination and a harmonization process (see *Coherence - External coherence*).

Asset management, including an overview of the condition of rural roads and the corresponding, efficient resource planning has been a major problem for sustainability to date. The Rural Roads Asset Management System (RRAMS) established for this purpose is operational and can potentially be used as a basis for systematic planning and budgeting of road maintenance. However, the data collection for this is costly and challenging. It is therefore currently being supported by several donor-funded development projects, such as the ongoing FC project RID4CAM, in their respective target regions.

17. Contribution to supporting sustainable capacities

As part of the training measure, the programme worked towards capacity building to ensure the sustainability of the infrastructure and it can be assumed that the measures had a positive, but not sufficient, impact on capacities. Contrary to the concept of the programme proposal, however, the focus on routine maintenance (including

[12] In a new project, FC plans to specifically the deficits in the area of maintenance

surface-sealed DBST roads and the development of a concept for routine road maintenance) was not consistently implemented (see *Effectiveness - contribution to achieving the objectives)*. This is considered critical, particularly in view of the continuing deficits in routine road maintenance.

Supporting laboratory capacities was a focus of the A+F measure with the aim of enabling the materials for road construction and maintenance to be tested by the ministry. During the EPE, those involved in the project reported that many of the trained specialists had left the laboratory since the end of the project. Although the laboratory is basically functional, it is not used in the implementation of ongoing road projects. External laboratories continue to be used for these projects and the recommended certification of the laboratory has not yet been implemented (see Effectiveness - *contribution to achieving the objectives*).

Overall, the contribution that the training measure can make was assessed too optimistically and the personnel, technical and financial capacities of the executing agency have not yet increased to the necessary extent - especially with regard to the maintenance of bitumen cover layers. Ultimately, the scope of accompanying technical A+F measures is too limited to compensate for the considerable and structural capacity deficits and to build up expertise for new climatic and technical challenges in this context. As previously noted (see *Sustainability capacities of those involved and affected*), this requires a coordinated approach by all stakeholders.)

18. Durability of impacts over time

The condition of the roads rehabilitated and upgraded as part of the programme still allows for good to mediocre, with some sections having poor trafficability. The design of the implemented rural roads (e.g. bitumen surfaces, larger and reinforced culverts/bridges), which is more resistant to the increasingly demanding climatic conditions, has contributed positively to the intended year-round passability and resilience to climate-induced degradation. However, exceptional heavy rainfall events and flooding have already led to considerable damage in some cases, which could not be prevented by the climate-adapted designs.

Damage caused by intensive road use and ground and surface water was found on several sections, but culverts and drainage channels were also partially obstructed by rubbish or inappropriate development. The damage has already led to the declining trends in journey time savings and vehicle operating costs mentioned under Effectiveness. Damage and the resulting restrictions on trafficability were particularly pronounced on road sections which, due to their topographical conditions, are exposed to heavy flooding in the rainy season or are used intensively for transporting heavy loads. The control of axle loads to prevent premature degradation of the road surfaces is not guaranteed across the board. The efforts of the Cambodian side to increasingly carry out weight checks (e.g. using mobile weighing systems) are to be seen as positive and further expansion to maintain the roads is essential.

Both in this EPE and in the EPE of phases IV and V, it was found that road sections in settlements are predominantly heavily degraded. This is probably primarily due to the high intensity of use within the settlements, but also to construction activities and waste, which have a negative impact on water runoff.

In terms of fiscal space and budget allocation, it should be noted that the macroeconomic risks in Cambodia have weakened. Unless further unexpected shocks occur, it can be assumed that economic growth will stabilize. It is forecast at just over 6 % for the coming years. There are also signs of a recovery in the tourism and export sectors, which are important for Cambodia and which collapsed during the COVID-19 pandemic (see *Overarching (in- tended) development policy changes*), which should increase demand for agricultural products and labor. Overall, this creates a good environment for the continuation of the developmental impact of the project, whose target regions are largely dependent on food production and remittances from migrant workers.

Climate change and the predicted increase in the frequency and severity of extreme weather events pose a medium to long-term risk to the impacts of the project - both for the infrastructure and for agriculture-based development. Although the roads are significantly more resilient to extreme weather events following the expansion implemented by the programme, the already existing maintenance challenges are exacerbated by climate change. In addition, without adaptation measures, increasing heat stress could reduce the agricultural yields on which the project regions depend. Increasing extreme weather events therefore pose a threat to rural infrastructure and the road network in particular and require additional funding for climate-resilient development and more comprehensive preventative road maintenance.

At the time of the EPE, the sustainability of the intended objectives achieved at outcome level already shows

clearly negative trends in the dimensions of year-round passability, journey times and vehicle operating costs. With further degradation of the roads, this will presumably also have an impact on the socio-economic effects (impact) - such as secondary school attendance, market access and the economic viability of market production - and reduce these. It is nevertheless likely that the provision of economic and social (basic) services will remain at least in the immediate vicinity of the roads, but that their use will be associated with higher transport times and costs.

In their current scope, the impacts could only be secured through direct and appropriate periodic maintenance and repair of the damaged road sections. Without a change in the maintenance regime, the maintenance of the impacts depends on comprehensive rehabilitation as part of further development projects and thus ties up scarce financial resources of international cooperation as well as resources of the Cambodian state, which could be used more efficiently to achieve new developmental impacts.

Rating summary

In summary, the financial, organizational and technical capacities for the sustainable operation of rural roads are still too weak to counteract the degradation caused by climatic conditions and the intensity of use while the road network is growing. The sustainability of the developmental impact is therefore structurally at great risk. Positive prospects arise

The successful launch of the RRAMS road management system, the increasing controls on axle loads, the recent increase in the maintenance budget as part of the economic recovery and the ongoing international cooperation in the area of rural roads. A structural improvement in maintenance requires a joint effort by all stakeholders in the rural transport sector to take stock and develop solutions for a comprehensive maintenance concept. Decades of support for rural road construction without a solution to the maintenance problem are viewed critically. Taking into account the positive outlook mentioned above, the overall sustainability is rated only as moderately successful.

Sustainability: 3

Overall rating:

The expansion of the rural transport infrastructure reduced a relevant bottleneck for the socio-economic development of the target group and laid the foundation for the positive impacts at the socio-economic level (income situation, health and education). The programme was therefore highly relevant for rural development in particularly weak regions of Cambodia and also promoted economic and social participation, including that of women.

Due to the overall strong expansion of infrastructure combined with the problematic macroeconomic and associated fiscal conditions of recent years, the financing of road maintenance is still at an inadequate level. This also applies to the organizational and technical capacities for operating rural roads. This jeopardizes the sustainability of the financed infrastructure, which is likely to have a significant negative impact in the long term. However, a complete reversal of the impacts is not to be expected even in the event of severe degradation due to the structure-building effects of the project on the commercialization of agriculture and an improved economic and social infrastructure. Positive prospects for an improvement in maintenance capacities arise from the expected recovery of the economy with good growth prospects, the - albeit insufficient - efforts of the partners and the continuous and financially comprehensive donor support for the rural transport sector.

Despite the successful evaluation of relevance, efficiency and the overarching developmental impact, the programme is rated as having limited success overall due to its limited coherence and effectiveness as well as its successful sustainability, which will lead to further losses at the outcome and impact level without significant improvements.

Contributions to the 2030 Agenda

With the improved road connection (*Sustainable Development Goal* (SDG) 9: Industry, innovation, infrastructure), an increase in income and an improvement in living conditions was achieved through the market integration of the target group. As a result, the programme contributed to the achievement of SDG 1 (No poverty) despite the increase in poverty rates described, as it can be assumed that the poverty situation would have been even worse without the road expansion - even if the income increases are presumably very unevenly distributed. Indirectly, it has contributed to better healthcare (SDG 3: Good health and well-being) and better education (SDG 4: Quality education worldwide). The increased participation of women in motorized transport and the resulting access to public services and social participation corresponds to a contribution to SDG 5 (gender equality). In its design and implementation, the programme drew on existing systems, pursued a holistic approach to sustainable development and contributed to the resilience of the target group by increasing the climate resilience of the infrastructure.

Project specific strengths/weaknesses and general conclusions/lessons learned

The strengths of the project include in particular

- The very high relevance of the rural transport sector for improving the socio-economic situation is confirmed by the results of the EPE.
- The network effects of improved agricultural production and marketing with regional and international trade as well as with larger cities offer new marketing and income opportunities for the target group.
- Income growth was above average in female-headed households and women's participation in motorized transport increased.
- The improvement of living conditions through education, health and public services (including security) enables the further development of human capital in rural areas and a diversification of income sources.

The weaknesses of the project include in particular

- Despite intensive support as part of this and previous FC projects as well as projects by other donors, capacity development for the operation of rural roads was insufficient. The development of the laboratory also fell short of expectations. Although it is basically functional, it is not being utilized for ongoing road projects. While the deficits in maintenance capacities were correctly identified during the appraisal, the implementation of the training measure was not consistently aligned with this.
- From an efficiency point of view, duplicate structures are questionable in general and also with regard to the training measures. Although the establishment of a project implementation unit complies with the Cambodian *Standard Operating Procedures* and enables effective project implementation, it sometimes limits the potential for capacity strengthening and knowledge transfer within the MRD.
- The increase in extreme weather events requires a higher standard of road construction (bituminization). This goes hand in hand with higher construction and maintenance costs as well as higher technical and organizational requirements for awarding contracts, construction supervision and maintenance, which the responsible authorities have so far only inadequately met.
- The implementation of heavy goods vehicle controls on the project roads or central feeder roads was not planned as part of the project. The control of heavy goods traffic by the local administration is inadequate. The heavy goods vehicle traffic, in conjunction with the climate change-induced increased stress caused by rainwater, among other things, leads to rapid degradation. With regard to heavy goods traffic, the self-interest of local decision-makers is also relevant, since as agricultural producers they themselves are often interested in realizing the largest possible transport volumes with as few vehicles as possible for cost reasons. The fact that this is detrimental to the long-term transport capacity of the roads is lost sight of.

Conclusions and lessons learned:

- Formalized coordination between the Cambodian government and the donors is required in order to learn from experience in the design and implementation of rural road infrastructures across projects and to leverage synergies.
- Solutions for adequate maintenance (institutional governance, structural and procedural organization and

financing) must be developed on the basis of a differentiated inventory and implemented in a coordinated manner by all stakeholders so that operation and maintenance can keep pace with the expansion of the rural road network. Training measures in addition to individual infrastructure projects could not achieve the necessary changes.

- In order to finance maintenance, other dedicated sources of funding are required in addition to the allocations from the budget. A *road fund* could be expedient here. This could be fed directly from traffic-related sources such as tolls or fuel levies. This would make more funds available for maintenance. This would also make the road sector more independent of fiscal bottlenecks.
- Project-related implementation units within ministries represent a double structure that reduces efficiency in terms of capacity building and knowledge transfer for rural roads construction and maintenance and that lacks the necessary interlinking with the governance structures which are actually responsible. Although this procedure complies with local *standard operating procedures*, double structures are questionable from an efficiency perspective, both - in general and with regard to training measures. Cross-project training measures can be expected to have a greater learning effect.
- In order to promote the local construction industry and its capacities, it would be worth considering piloting the awarding of larger lots to larger and more efficient construction companies for similar future projects with a view to both efficiency and capacity development. It stands to reason that these will work together with smaller local subcontractors anyway. In this constellation, the contractors must ensure the quality of execution. Knowledge transfer and thus trickle-down effects can be expected here, which contribute to capacity building. Piloting would therefore help to determine whether a different type of contract award would have a positive effect on construction quality and the development of expertise and local road operating capacities and achieve better results in this respect.
- The methodology of traffic counts could be improved by recording the actual situation through use of automatic *low-cost traffic counters* so that measurements could be taken over longer periods of time and thus the variability could be recorded. In addition, movement data (e.g. from mobile phone or data providers) could be used to triangulate the results at the counting points with greater spatial resolution and to record changes in traffic in the vicinity of the project roads.
- The number of motorized vehicles per household provides a good indication of both the development of economic activity and income as well as road use. This makes it an important proxy indicator that can compensate for inflationary effects on household income and methodological problems with traffic counts.
- Against the background of the intended increase in road use and economic activities and the associated heavy goods traffic, coupled with increasing climatic challenges, axle load controls are essential to prevent premature degradation of road surfaces. The economic interests of local decision-makers must also be taken into account.
- The degradation of road sections in settlements described under sustainability speaks in favor of a higher standard of construction within settlements. Concrete surfaces offer a good alternative here, which has already proven its worth outside the project in Cambodia.
- With the predicted and in some cases already occurring increase in extreme precipitation due to climate change, Cambodia faces particular challenges when it comes to adapting the road network. At the same time, extreme weather events place particularly high demands on the standard of construction and maintenance. The climate-adapted expansion of transport infrastructure in partner countries particularly affected by climate change is an important task for development cooperation, which requires appropriate funding.

Evaluation approach and methods

Methodology of the ex-post evaluation
The ex-post evaluation follows the methodology of a rapid appraisal, i.e. a data-supported, qualitative contribution analysis and represents an expert judgement. This involves attributing impacts to the project through plausibility considerations based on the careful analysis of documents, data, facts and impressions. Where possible, this also includes the use of digital data sources and modern techniques (e.g. satellite data, online surveys, geocoding). Causes of any contradictory information are investigated, attempts are made to eliminate them and the assessment is based on statements that are - if possible - confirmed by several sources of information (triangulation).

Documents:
Project reporting of the project executing agency, impact monitoring of the project, strategies and policies of the partner government, project documents of other donors (esp. ADB and World Bank), economic analyses, secondary literature, context, country and sector analyses and ex-post evaluations of previous projects.

Data sources and analysis tools:
Reports by the project organizer on budgets and maintenance and emergency measures, databases, data collection and impact studies on site, GPS and speed data, satellite images and geodata.

Interview partner:
Project executing agency, target group, other development organizations, local and regional administrations

The analysis of impacts is based on assumed interdependencies, documented in the impact matrix developed during the project appraisal and, if necessary, updated during the ex-post evaluation. The evaluation report presents arguments as to why which influencing factors were identified for the identified results and why the analyzed project presumably made which contribution (contribution analysis). The context of the development project is taken into account with regard to its influence on the results. The conclusions are set in relation to the availability and quality of the data basis. An evaluation design is the reference framework for the evaluation.

For project evaluations, the method offers a - on average - balanced cost-benefit ratio, in which the knowledge gained and the evaluation effort are in equilibrium and allows a systematic assessment of the effectiveness of FC projects across all project evaluations. The individual ex-post evaluation can therefore not fulfil the requirements of a scientific assessment in the sense of a clear causal analysis.

The following aspects limited the evaluation:
- Detailed information requested by the executing agency on the maintenance work carried out on the roads was only provided incompletely and exclusively for the peri- odal measures handled by the project management unit.
- The breakdown of the maintenance budget by project province requested by the executing agency was not provided.

Methodology of the performance evaluation

A six-point scale is used to assess the programme according to the OECD DAC criteria. The scale values are assigned as follows:

Level 1 Very successful: result significantly above expectations

Level 2 Successful: result fully in line with expectations, without significant deficiencies

Level 3 Moderately successful: below expectations, but positive results dominate

Level 4 Moderately unsuccessful: is significantly below expectations and negative results dominate despite recognizable positive results

Level 5 Unsuccessful: despite some positive partial results, the negative results clearly dominate

Level 6 Highly unsuccessful: the project is useless or the situation has worsened

The overall rating on the six-point scale is based on a project-specific weighting of the six individual criteria. Levels 1-3 of the overall rating indicate a "successful" project, while levels 4-6 indicate an "unsuccessful" project. It should be noted that a project can generally only be considered developmentally "successful" if the achievement of the project objective ("effectiveness") and the impact on the overall objective ("overarching developmental impact") as well as the sustainability are rated as at least "Moderately successful" (rating 3).

The annex to this report is available upon request (German only).

Imprint

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