

Thailand: Maintenance of Irrigation Projects II (MIP II)

Ex-post evaluation

OECD sector	31140 / Agricultural water resources	
BMZ project ID	(1) 1994 66 038 (investment in fixed assets) (2) 1994 70 303 (complementary measure)	
Project-executing agency	Royal Irrigation Department (RID)	
Consultant	GITEC CONSULT GmbH	
Year of ex-post evaluation	2005	
	Project appraisal (planned)	Ex-post evaluation (actual)
Start of implementation	(1) 01 / 1995 (2) 01 / 1995	(1) 02 / 1996 (2) 02 / 1996
Period of implementation	(1) 24 months (2) 36 months	(1) 68 months (2) 68 months
Total cost	(1) EUR 78.1 million (2) EUR 1.1 million	(1) EUR 128.6 million (2) EUR 0.8 million
Counterpart contribution	(1) EUR 62.3 million (2) EUR 1.1 million	(1) EUR 112.8 million (2) EUR 1.1 million
Financing, of which Financial Cooperation (FC) funds	(1) EUR 15.8 million FC/L (2) EUR 1.1 million FC/L	(1) EUR 15.8 million FC/L (2) EUR 0.8 million FC/L*
GTZ cooperation (cooperation project)	no	no
Other institutions/donors involved	no	no
Performance rating	(I and II) 5	
• Significance / relevance	(I and II) 5	
• Effectiveness	(I and II) 5	
• Efficiency	(I and II) 5	

* after the loan was reduced by EUR 0.3 million

Brief Description, Overall Objective and Project Objectives with Indicators

The project "Maintenance of Irrigation Projects II" (MIP II) was carried out from 1996 until 2001 in four irrigation regions in Thailand with an irrigation area of approx. 2.67 million rai (427,500 ha). Introducing better preventive maintenance methods into the irrigation and drainage infrastructure operated by the project-executing agency Royal Irrigation Department (RID) was to contribute to stabilizing the income of agricultural families.

The main programme measures comprised the purchase of machines and equipment for maintenance work, catch-up work to eliminate deficiencies in repair and maintenance that were detected during the project appraisal, and also consulting services. Under the complementary measure the RID was assisted with introducing the preventive maintenance concept.

The overall objective of the project was to contribute to stabilizing agricultural production and to ensuring income for farming families.

Keeping family income for typical small irrigation enterprises at around THB 1,300/rai/p.a. (price basis 1993) was defined as indicator of achievement of the overall objective.

The programme objective was to improve maintenance of the primary and secondary irrigation and drainage systems in the four regions I (north), VII, VIII (both in the center) and XII (south).

Indicators of achievement of the programme objective:

- Increase in irrigation efficiency by 4% three years after introduction of the maintenance concept;
- Adherence to the annual specific maintenance costs of approx. THB 175/rai (price basis 1993, corresponding to approx. THB 250/rai based on 2003 prices) calculated on the basis of estimated unit costs;
- Timely provision of the annual maintenance budget.

Project Design / Major Deviations from the original Project Planning and their main Causes

At the time of the project appraisal, a lack of maintenance of the hydraulic infrastructure in the irrigation areas was identified as one of the problems standing in the way of efficient water use. The introduction of a new preventive maintenance concept and the purchase of the machinery and equipment needed to implement this concept were to help eliminate the bottlenecks in water supply believed to result from the lack of maintenance. The measures planned during the project appraisal were, for the most part, carried out as planned. They comprised:

(a) Investment in fixed assets

Catch-up work to eliminate the deficiencies in repair and maintenance of the irrigation infrastructure that had arisen, such as the reinstatement of the canal profiles, renewal of canal lining, renewal of the roads etc. (solely funds from the Thai budget; 28% of the total cost);

Performance of routine maintenance work during the programme period, such as removal of sediment and weeds from the canals, filling of potholes in the operating roads, repair of the paintwork of the steel hydraulic structures etc. (solely funds from the Thai budget; 51% of the total cost);

Purchase of machines and equipment for maintenance work (19% of the total cost; financing to 53% out of Financial Cooperation – FC - funds);

Support for the project-executing agency by an implementation consultant (financing solely out of FC funds, 1.3% of the total cost).

(b) Complementary measure

Personnel support for the project-executing agency with the introduction of an IT-based preventive maintenance concept (financing solely via the FC loan; 0.7% of the total cost).

The catch-up work and the expansion of the operating areas for the repair and maintenance of the machines and equipment to be acquired, both of which are required for the introduction of the preventive maintenance concept, were financed out of the Thai budget and were carried out properly and on time by the project-executing agency during the preparatory phase. However, the scope of the catch-up work - both time-wise and quantity-wise - increased considerably compared to the estimates at the time of the project appraisal, due partly to the delays that arose, particularly in connection with the acquisition of the maintenance equipment financed under FC. Owing to the longer project period, the cost increase mainly involved the catch-up and maintenance work, which was originally estimated at EUR 38.2 million and jumped to EUR 101.1 million since it took 9 years instead of 2 as originally planned. Furthermore, the

prolonged project period also included the routine maintenance costs (planned: EUR 18.8 million, actual cost: EUR 65.2 million).

The project period increased substantially. The reasons for this increase are mainly related to the following difficulties that arose in connection with the acquisition of the special equipment financed through FC:

- the introduction of a special acquisition unit was not successful; as a result, the at times extremely time-intensive Thai acquisition procedures and administrative processes had to be adhered to;
- the fact that some of the equipment was supply-tied further increased the difficulty in acquiring it since in some cases the approval of the Ministry of Agriculture was required.

As a result, this programme component took 68 months instead of 24 months as originally planned. In contrast, the maintenance equipment acquired using funds from the Thai budget was delivered to the regions on schedule.

In addition to a clear division between the preparatory work and the actual introduction of the preventive maintenance concept, the original design called for the fulfillment of a few important requirements. For instance, payments for key measures financed under FC (equipment) were not to be made until the unit costs for the preventive maintenance concept had been approved by the BoB. In the progress review on April 17, 1997 we had informed the German Federal Ministry for Economic Cooperation and Development (BMZ) that we assumed that, once the RID gave its approval to the unit costs, they would also be approved by the BoB, and therefore considered the payment requirement to have been met. In the later stages of implementation, however, this assumption proved to be incorrect. The implementation concept was not changed although it became apparent that, barring the approval of the unit costs, an essential prerequisite for successful programme implementation was not given.

Key Results of the Impact Analysis and Performance Rating

The preventive maintenance concept was introduced only temporarily on 34% of the project area during project implementation. It is now no longer being applied. From today's point of view the design of the above mentioned measures, in particular for the components financed out of FC, is adequate to only a limited extent. In retrospect, an early adjustment of the measures to the changed framework conditions would have made good sense.

The computer programmes developed under the MIP II programme for support/planning of the maintenance work are not being applied in any of the regions. This is due to their low level of user friendliness and a lack of programme maintenance and support. In addition, owing to the high fluctuation of operating staff in the programme regions, trained staff is available only infrequently. The calculation of the MIP unit costs was too detailed and not practicable enough.

What is more, most of the programme components planned for the M&E system are no longer in use, with the exception of agricultural production. A continuous, computer-based M&E system is no longer being used, neither for the maintenance work nor for the machinery.

In particular, some of the FC-funded special machinery and equipment such as the aquatic vegetation harvesters, suction excavators and multi-purpose tractors have hardly been used. Apart from insufficient budget funds, a further reason is probably that the technical design of the equipment and machinery was not optimally adapted to the conditions in Thailand. In addition, the project-executing agency did not have adequate trained personnel to operate them.

Owing to the fact that the unit costs of the preventive maintenance system were not approved by the BoB, in all four programme regions a curative maintenance concept continues to be applied which has been improved in some respects compared to the situation at the time of the project appraisal. The condition of the infrastructure, such as the canals, barrages, dams, roads etc., is judged to range between good and satisfactory. No maintenance deficits that limit the operation were noted on-site. Between 10% and 20% of the approved budget are earmarked for unexpected necessary repairs and then used to finance such works. Therefore, the regional

directorates of the RID should always be in a position to ensure adequate functionality of both the irrigation and the drainage systems.

Project objective:

Preventive maintenance according to the MIP is no longer being carried out. The indicator of the amount of the specific maintenance costs is therefore no longer relevant. Between 2002 and 2005 approx. THB 170/rai were spent annually on repairs, corresponding to around 2/3 of the indicator value. The approach implicitly stated in the programme objective of using preventive maintenance methods based on MIP to keep the maintenance costs lower than the costs incurred when a curative concept is applied could not be proven convincingly. Cost-benefit analyses that include transparent calculations of the costs and above all of the expected benefit of the preventive maintenance are not available. Based on observations during the ex-post evaluation, the project-executing agency is able to maintain the infrastructure with the available budget allocations in such a manner that the functionality of the irrigation perimeter is ensured. For the most part, however, the project objectives have not been met.

Overall objective:

It remains unclear whether the basic project assumptions - according to which the curative maintenance system for the irrigation infrastructure that is applied by the RID (a) leads to water scarcity and thus to lower income for the water users, and (b) the infrastructure is degraded as a result of this maintenance system to such an extent that in certain intervals, extremely costly catch-up work becomes necessary that leads to higher average annual costs for the maintenance than would have been the case under the planned preventive maintenance system - were correct or incorrect. The assessments carried out to this end under the project could not provide proof of these effects. The preventive maintenance concept is no longer being applied. It was implemented only temporarily on approx. 34% of the project area. No water deficits resulting from a lack of maintenance work could be observed during the ex-post evaluation. Whether the maintenance situation in the early 1990s was far worse and brought about the stated deficits can no longer be assessed conclusively. Assessments performed during the ex-post evaluation showed that no impacts of the MIP II on the diversification of cultivation and on the development of the harvests can be determined. Based on rough estimates, the average farming income in the project region in 2003 was approx. THB 2,000 – THB 2,500. Thus, the indicator of achievement of the overall objective is met. However, since an impact of preventive maintenance on the harvests and earnings cannot be determined, the changes in income are not connected with the project. Therefore, the overall objective was not achieved.

The project's developmental effectiveness is assessed as follows:

- The project objective was to improve the maintenance of the irrigation and drainage facilities by introducing the preventive MIP II maintenance system. Since this system was not introduced, the project objective was not achieved. The condition of the irrigation and drainage systems is satisfactory, thanks to the catch-up and routine maintenance works performed under the project that were financed solely out of Thai counterpart funds, as well as to overall adequate curative maintenance. 70% of the FC funds were used to purchase special machinery, which is not being used sufficiently. The IT programmes to calculate unit costs and the M&E system that were developed under the FC complementary measure are no longer being used. We rate the effectiveness as clearly insufficient (rating 5).
- The relevance of the project is based on the assumption that there are major water deficits caused by inadequate curative maintenance of the irrigation and drainage systems that are causing agricultural production to decline. No water deficits caused by a lack of maintenance work could be identified. Preventive maintenance was carried out only temporarily during the project implementation on a small section of the area (34%) and ceased once the FC measures ended. No direct or indirect impacts on the project's target group level could be determined. We rate the project's relevance and significance as clearly insufficient overall (rating 5).

- The specific investments costs were appropriate, yet the project objective and the overall objective were not achieved to a sufficient degree. We rate the production efficiency as insufficient. In terms of the allocation efficiency, the project did not generate any savings on the macroeconomic level, and the economic rate of return can be assumed to be inadequate. We classify the efficiency of the project as clearly insufficient (rating 5).

The developmental effectiveness of the project is rated clearly insufficient overall (rating 5).

In terms of the socio-economic effects, during the project appraisal it was argued that the preventive maintenance to be introduced under the programme would improve the water supply and thus encourage agricultural diversification (specialized crops). Women who work primarily in specialized agriculture would benefit from this. The analyses that were carried out did not reveal any corresponding effects, however. The project has not had any significant impacts on employment and income, nor on the situation of the women. Improving the environmental situation was not one of the project's objectives. No signs of negative environmental impacts are discernible. The project intended neither to improve participation and governance nor to improve gender equality.

General Conclusions

The instrument of tied supplies should only be used following an in-depth analysis of the advantages and disadvantages for later long-term operation. Here, one major aspect is the operation of German suppliers in the recipient country on a sufficiently broad scale.

Components that are based largely on the consultant's own developments of IT application programmes should not be included. Such components are not very sustainable. Once the consultant's support comes to an end, their professional further development and maintenance are not ensured.

Continued monitoring is necessary to check whether the project rationale is still valid. If key assumptions prove to be doubtful, an analysis must be made to determine whether changing the project design and implementation could lead to sufficient developmental effectiveness, or whether it would make more sense to terminate the project prematurely.

Abbreviations

BoB	Bureau of Budget
ha	Square measure (10,000 m ²)
MIP	Management of Irrigation Projects
M&E	Monitoring & Evaluation
O&M	Operating & Maintenance
Rai	Square measure (0.16 ha)
RID	Royal Irrigation Department
THB	Thai Baht (local currency)

Legend

Developmentally successful: Ratings 1 to 3	
Rating 1	Very high or high degree of developmental effectiveness
Rating 2	Satisfactory developmental effectiveness
Rating 3	Overall sufficient degree of developmental effectiveness
Developmental failures: Ratings 4 to 6	
Rating 4	Overall slightly insufficient degree of developmental effectiveness
Rating 5	Clearly insufficient degree of developmental effectiveness
Rating 6	The project is a total failure

Criteria for the Evaluation of Project Success

The evaluation of the "developmental effectiveness" of a project and its classification during the ex-post evaluation into one of the various levels of success described in more detail below concentrate on the following fundamental questions:

- Are the project objectives reached to a sufficient degree (aspect of project **effectiveness**)?
- Does the project generate sufficient significant developmental effects (project **relevance** and **significance** measured by the achievement of the overall development-policy objective defined beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?
- Are the funds/expenses that were and are being employed/incurred to reach the objectives **appropriate** and how can the project's microeconomic and macroeconomic impact be measured (aspect of **efficiency** of the project concept)?
- To the extent that undesired (**side**) **effects** occur, are these tolerable?

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms, or to carry on with the project activities on their own and generate positive results after the financial, organizational and/or technical support has come to an end.