

**Morocco: Agricultural Development Loukkos III and Projet
d'Amélioration de la Grande irrigation II (PAGI II)**

Ex-post evaluation

OECD sector	31140 / Agricultural Water Resources	
BMZ project ID	(1) 1982 65 431 (Investment in fixed assets) (2 a) 1993 65 602 (Investment in fixed assets) (2 b) 1994 70 196 (Complementary measure)	
Project-executing agency	Office Régional de Mise en Valeur Agricole du Loukkos (ORMVAL)	
Consultant	(1) GERSAR (2 a) BRL/GERSAR (2 b) SEMA-Group, Gauff/ADI/GERSAR	
Year of ex-post evaluation	2005	
	Project appraisal (planned)	Ex-post evaluation (actual)
Start of implementation	(1) 1983 (2 a) 1994/95 (2 b) 1994/95	(1) 1983 (2 a) 1995 (2 b) 1995
Period of implementation	(1) 3 years (2 a) 6 years (2 b) 3 years	(1) 7.5 years (2 a) 8 years (2 b) 8 years
Total cost	(1) 41.7 million EUR (2 a) 19.7 million EUR (2 b) 1.5 million EUR	(1) 22.7 million EUR (2 a) 14.4 million EUR (2 b) 1.0 million EUR
Counterpart contribution	(1) 19.2 million EUR (2 a) 5.9 million EUR (2 b) 0.0 million EUR	(1) 5.3 million EUR (2 a) 4.3 million EUR (2 b) 0.1 million EUR
Financing, of which Financial Cooperation (FC) funds	(1) 22.5 million EUR FC/loan (2 a) 13.8 million EUR FC/loan (2 b) 1.5 million EUR FC/loan	(1) 17.4 million EUR FC/loan* (2 a) 10.1 million EUR FC/loan* (2 b) 0.9 million EUR FC/grant
Other institutions/donors involved	(2a) World Bank, AFD	(2a) World Bank, AFD
Performance rating	(1 and 2) 4	
• Significance / relevance	(1 and 2) 3	
• Effectiveness	(1 and 2) 4	
• Efficiency	(1) 5 (2) 4	

*The loan was reduced by EUR 5.1 million (1) and EUR 3.75 were reprogrammed (2a)

Brief Description, Overall Objective and Project Objectives with Indicators

The project Loukkos III comprised the development of a net irrigation area of about 3,700 ha in the sectors Plaine des Ksar (PK) and Basses Collines (BC) of the Loukkos perimeter through the following investments: (a) dikes and structures (protection measures against floods); (b) pumping stations, equalising tanks, pipeline network, sprinkling equipment (irrigation measures); (c) construction of roads and paths; (d) expansion of agricultural consulting centres; (e) equipment for the project-executing agency; and (f) consultant. With regard to its content it was a follow-up project to the two FC projects "Agricultural Development Loukkos I" and "Agricultural Development Loukkos II" which were also implemented with the Office Régional de Mise en Valeur Agricole du Loukkos (ORMVAL) as project-executing agency.

The PAGI II project was designed for the rehabilitation of large irrigation perimeters. It was linked to structural reforms of the sector, which mainly concerned the public agricultural development societies (Offices Régionaux de Mise en Valeur Agricole, ORMVA). PAGI II was financed jointly with the World Bank (lead agency) and the Agence Française de Développement (AFD). The FC funds were used as parallel financing for the rehabilitation especially of the pumping stations and the road network of the irrigation sectors R'Mel and Drader in the Loukkos area (about 16,000 ha in total), which had been developed under the FC projects Loukkos I and II in the 1970s and 1980s. Within the framework of the complementary measure, the rural development society in charge of the region of Loukkos, the Office Régional de Mise en Valeur Agricole du Loukkos (ORMVAL), which acted as project-executing agency, was supported in certain areas.

The overall objective of the project Loukkos III was to increase national self-sufficiency in food production and to reduce the unemployment and underemployment rate in the project region. No indicators were defined in the project appraisal report (old project). The project objective was to increase the income of peasant families. The indicator of achievement of the project objective was an increase in the yearly incomes of peasant families from MAD 12,000 to 17,000 (price basis 1983).

The overall objectives of the project PAGI II were (1) to increase the economic efficiency of agricultural production in the Loukkos perimeter; (2) to conserve the increasingly scarce water resources and (3) to secure agricultural incomes.

The following indicators were defined: (for 1) 30% reduction of the cropland used for growing sugar cane in R'Mel (to no more than 4,000 ha); (for 2) fourfold increase in the cropland used for fruit and vegetables in Drader and R'Mel (to 2,000 ha); (for 3) development of real agricultural incomes on the basis of the production margins of the crops. At the time of project appraisal, the economic rate of return (ERR) was expected to be 21% for the rehabilitated pumping stations and 11% for the rehabilitated roads on the basis of corresponding calculations of the World Bank.

The project objectives of PAGI II were: (a) to increase the economic autonomy of ORMVAL and the farmers (b) to durably ensure a reliable and demand-oriented supply with irrigation water in the sectors of R'Mel and Drader

Indicators: (for a) the tariff revenues of ORMVAL cover 70% of the operating costs of the irrigation systems by 1999; the Trâme A – i.e. freedom for the farmers to choose the crops they wish to cultivate – is introduced throughout the irrigation sectors (100%) of R'Mel and Drader (so far Trâme B stipulates that the farmers have to cultivate sugar beet and sugar cane); (for b) the number of pump interruptions due to disruptions in operation decreases by 50% compared with 1992; the amount of water provided corresponds to the needs of the crops; irrigated areas are maintained.

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

The project design fixed in the project appraisal report for Loukkos III was implemented without major changes and comprised the following measures:

- Development of the sectors Basses Collines (BC) and Plaine de Ksar (PK) for irrigation farming through the construction and supply of pumping stations, equalising tanks, pipeline networks, sprinkling equipment, drainage networks, dikes and structures along the Loukkos river as water intake source;
- Construction of 70.9 km altogether of first and second class paths and 21.1 km of partly asphalted arterial roads;
- Expansion of two agricultural consulting centres and a test station
- Supply of various equipment for the project-executing agency ORMVAL.

The project was largely implemented as planned during project appraisal. The significant extension of the implementation period (by 4.5 years) to 7.5 years was due to delays in the award of contracts, in the construction work (length of remaining work and rework) and problems with the timely provision of the Moroccan counterpart contribution. Considerable cost savings resulted from the devaluation of the MAD, given that about 99% of costs were domestic costs. This made it possible to reduce the loan by EUR 5.1 million.

Within the project PAGI II, the following investments were co-financed from FC funds as planned: (a) rehabilitation of 140 km of paths and bituminous roads; (b) rehabilitation of embankments along the main irrigation channel C 70 (about 2 km); (c) installation of a sill beam to raise the water level in the Loukkos river; (d) repair and acquisition of spare parts for the pumping stations; (e) acquisition of construction machinery, vehicles and equipment of a workshop; (f) acquisition of equipment for the operation of the irrigation network; (g) acquisition of equipment to improve the use of water.

The project-executing agency ORMVAL took charge of the planning, the tenders, the award of contracts and construction supervision with slight support from the consultant. The implementation period took two years longer than planned. Unlike original planning in the project appraisal report, the sprinkling equipment was financed by the government and the users. As the cost of the project was significantly lower than planned (among others advantageous offers, no sprinkling material) EUR 3.74 million from the FC loan were reprogrammed.

The project PAGI II expected the following structural reforms for the regional public agricultural development societies (ORMVA): (1) Measures to achieve cost-covering water tariffs; (2) individualised metering of water consumption and effective sanctions for payment arrears, (3) strengthening of their autonomy, in particular with regard to financial planning; (4) conversion of their legal status from state-companies to public commercial enterprises; (5) implementation of "Trâme A", i.e. freedom for the farmers to choose the crop they wish to cultivate. The reforms that were directly in the sphere of influence of ORMVAL were supported by a complementary measure (among others successful introduction of a management information system and analytical accounting as well as preparation of an operation and maintenance study).

The structural reform, which was especially expected as a result of the participation of the World Bank, was implemented only to a limited extent. Only the liberalisation of farming (5) was fully implemented. The water tariffs were raised, but the cost recovery ratio is only 50%. In the project area of PAGI II it is possible to meter individual water consumption of the farmers; sanctions for payment arrears were legally introduced only recently. The ORMVA have not gained more autonomy and their legal status has not been changed. They continue to be highly

dependent on budget funds, which are not allocated in sufficient amounts and in due time. The rural development society responsible for Loukkos (ORMVAL) is particularly affected by this lack of funds, as its operating costs are high due to the unfavourable location (extensive use of pumps to overcome a difference in elevation of 70 m).

Collection efficiency has considerably worsened. Since the implementation of the action plan to adjust tariffs it decreased from an already low level of 42 and 44 % (1997 and 1998) to currently only 21%. According to ORMVAL the introduction of Trâme A is an essential factor for this decrease. While the farmers used to be forced to cultivate sugar and the state-owned sugar factories automatically retained the water tariffs from the farmers in the form of low purchase prices, such "invisible" retention is no longer possible now that the farmers are free to choose their crops. The possibilities to sanction arrears of payment being inadequate the farmers' willingness to pay has diminished.

Key Results of the Impact Analysis and Performance Rating

As a result of the investments of the project Loukkos III, about 3,700 ha of traditional dry farming area were converted into intensive irrigation areas and the cultivation programmes and yields of the major crops were intensified.

The achievement of the overall and project objectives of the project Loukkos III can be summarised as follows:

- In 2004, the average income of farmers was 218% higher than at the time of project appraisal (price basis 2004). Thus the target indicator was clearly exceeded.
- The overall objectives (increase of national self-sufficiency in food production and reduction of the unemployment and underemployment rate in the project area) were fulfilled (sugar + 11,400 t p.a., estimated employment effect of 2,000 – 3,000 job equivalents). However, the achieved increase in production of the main crop sugar (about 50% of the cropland) is linked with very high costs. The economic rate of return of the project is negative.

As a result of the project PAGI II, the irrigation systems are operated continuously and in a technically satisfying manner for an irrigation area of about 16,000 ha. However the level of utilisation of the capacity of the newly installed pumps is low. The road network is heavily degraded again.

Achievement of the project and overall objectives of the project PAGI II:

- The pumping stations are working much better now. As there is insufficient data on the initial situation it is impossible to assess exactly whether the indicators have been fulfilled.
- Freedom of cultivation (Trâme A) has been introduced. The water-intensive cultivation of sugar has strongly decreased (2003: 6% of cropland). The amount of water supplied every year has dropped; utilisation of the capacity of the pumps is relatively low.
- Although the water tariffs were raised, they cover only about 50% of total costs. Due to the lower collection efficiency and insufficient budget allocations, the financial situation of ORMVAL is very strained.
- As a result of the reduction of sugar cane crops and the increased cultivation of fruit and vegetables the economic efficiency of agricultural production in the Loukkos perimeter has increased. Moreover the project has contributed to the conservation of water resources. The indicators set for the respective areas under cultivation have been achieved.
- It is not possible to clearly determine whether agricultural incomes have risen as planned because the project appraisal report does not include detailed data in this

respect. According to the information of the Moroccan partner, agricultural incomes increased by about 26% from 1998 to 2002.

- Even on the basis of positive assumptions the economic rate of return of 2.7% p.a. is clearly below the acceptable level for a country such as Morocco (6% p.a.).

The actual expenses for maintenance and repair cannot be clearly derived from the data of ORMVAL due to unclear delimitations. A large share of periodic maintenance was probably financed through donor-financed projects. From 1999 to 2003 the expenses of ORMVAL for maintenance were about MAD 600/ha per year. According to our experience, adequate yearly maintenance should amount to at least 2% of the investment costs, which would correspond to 1,400 MAD/ha/year.

The risk regarding the collection of tariffs, which had been recognised during project appraisal, has occurred. Collection efficiency dropped drastically. During project appraisal it was not sufficiently taken account of the revenue problems that would result for ORMVAL from the reduction of sugar cane and sugar beet crops, because farmers would no longer quasi automatically pay water tariffs indirectly through the lower price they receive from the sugar factories for their yields. Ultimately, the risk that ORMVAL has insufficient rights to enforce and collect water tariffs and especially that the reform efforts of the World Bank would not be sufficiently successful was underestimated. As a result the risk of inadequate maintenance /repair, which was identified during project appraisal, has materialised. Consequently the sustainability of the project is at great risk. The road network is already considerably degraded.

We rate the developmental effectiveness of the project Loukkos III as follows:

- The project objective of increasing the incomes of farmers was achieved but the capacity of the pumps financed from FC funds is utilised only to a small extent. Proper and sustainable operation of the investments financed from FC funds is highly at risk. Therefore, we classify the project's effectiveness as slightly insufficient (sub-rating 4).
- The project was generally appropriate to increase national food production through higher yields. Considerable income and employment effects were achieved. We classify the project's relevance and significance as sufficient (sub-rating 3)
- Overall, the cost of the financed investment measures was adequate. The economic profitability of the project is negative. The efficiency of the project is clearly insufficient (sub-rating 5).

All in all, the overall developmental effectiveness of the project is evaluated as slightly insufficient (rating 4).

Regarding the developmental effectiveness of the project PAGI II we come to the following results:

- The rehabilitation measures contributed to the maintenance of the assets of the previously heavily degraded irrigation infrastructure. However major parts of the investments financed out of FC (pumping stations) are insufficiently used. Proper and sustainable operation of the investments financed from FC funds is highly jeopardised and parts of the financed investment (paths) are already heavily degraded. The project's effectiveness is rated as slightly insufficient (sub-rating 4).
- Generally, the project was appropriate to improve the situation of farmers and to increase the efficiency of agriculture. In the past years, farmers' incomes rose noticeably. We rate the project's significance and relevance as sufficient (sub-rating 3).
- The cost of the financed investments was adequate. The economic rate of return (no more than about 3%) is clearly below the acceptable figure for Morocco (6%). The project's efficiency is rated as slightly insufficient (sub-rating 4).

In summary, the overall developmental effectiveness of the project is evaluated as slightly insufficient (rating 4).

The about 3,000 enterprises that benefited directly from the project and that have access to the irrigated area are not part of the poorest rural population. Given the prevailing sizes of the enterprises, their incomes are clearly above the Moroccan poverty line (1998/99: EUR 300 p.a. for rural regions). Direct, self-help oriented participation of the target groups in the planning and implementation of the project was not planned and did not take place.

According to a study on the gender-specific effects of the irrigation projects in the Loukkos area the labour contribution of women in the cultivation of fruit and vegetables is high, but they are generally not involved in the relevant decision-making processes.

An improvement of the environmental situation was not aimed for in the project appraisal report. The sample surveys that are regularly carried out by ORMVAL have not revealed any signs of general negative environmental impacts, apart from certain short-term problems.

The project was not designed to improve participation or governance.

General Conclusions

For projects pursuing the aim to substitute imports, it is recommended to calculate the economic efficiency in a scenario model, in order to appropriately take into account the risk of fluctuating world market prices.

Also within joint projects which are implemented with "lead donors" (e.g. World Bank) that are generally considered as assertive in the sector dialogue, front loaded conditions are recommended for governments that are not very reform oriented. This is particularly true if the FC investments are not directly linked with those of the lead donor (e.g. different project sites). FC funds should be used only if the reform process promoted by the lead agency has shown clear success.

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.