

Bolivia: Irrigation in Sacaba Valley (alternative development)

Ex-post Evaluation Report

OECD sector	31140 /Agricultural water resources	
BMZ project ID	1996 65 928	
Project executing agency	Prefectura del Departamento Cochabamba	
Consultant	CES/GfA	
Year of ex-post evaluation report	2009	
	Project appraisal (planned)	Ex-post evaluation (actual)
Start of implementation	Q 4 1997	Q 4 1997
Period of implementation	42 months	66 months
Investment costs	EUR 10.2 million	EUR 11.6 million
Counterpart contribution	EUR 2.3 million	EUR 3.7 million
Finance, of which FC funds	EUR 7.9 million	EUR 7.9 million
Other institutions/donors involved	<>	<>
Performance rating	3	
• Relevance	2	
• Effectiveness	3	
• Efficiency	3	
• Overarching developmental impacts	2	
• Sustainability	2	

Brief Description, Overall Objective and Project Objectives with Indicators

The project comprised the extension and construction of water catchments with supply lines and canal networks to support irrigation farming in the cropping areas of Sacaba Valley. Expanding irrigation aimed at raising the productivity of farming enterprises and family incomes, so as to prevent the cultivation of coca plants and alleviate the heavy pressure on the population to migrate to the nearby coca planting region Chapare. In addition, a complementary measure and a training measure were carried out to support the farmers in organisational and irrigation issues (support measures).

The overall objective of the project was to increase family incomes from legal activities. The indicators for this were farming income of US\$ 1,350 (valley) and US\$ 1,500 (highlands) per enterprise and year and increased value added per working day (factor income) from US\$ 3 (without irrigation) and US\$ 8 (with irrigation) to US\$ 10 after project completion. The project objective was to raise the productivity of the farming enterprises through the increased application of irrigation and thus enabling a wider range of cultivation to include lucrative crops (particularly fruit and vegetables). The indicator here was an increased intensity of use of 25% on land already irrigated at project appraisal and of 50% on new irrigated land and greater cultivation of vegetables and fruit.

Originally, the project target groups were about 2,400 farming enterprises in the two irrigation associations Apaka Punta (ARAP) and Larati. In the course of project implementation, the smaller irrigation association, Larati, declined to participate in the project and was therefore omitted as a target group. Altogether, 1,585 families in the ARAP irrigation association benefited from the project (two-thirds compared with initial planning). At an average family size of 5 persons (estimate at project appraisal: 6.7 persons per household), approx. 8,000 people were therefore reached by the project, at least two-thirds of whom number among the indigenous population. The project also benefited the landless population, who are employed as temporary seasonal labour by the enterprises on a day-wage basis. Project outreach largely comprised poor sections of the population, whose family income at project appraisal amounted to between US\$ 190 and 1,000 a year. Owing to the excessive number of allotments, most families are also forced to take on extra work or individual members have to move temporarily to other regions of the country.

Programme Design

ARAP or the village communities (user groups) are responsible for the operation of the whole irrigation system (including the primary facilities) and maintaining the secondary and tertiary distribution networks. The family-owned enterprises are located in 27 rural municipalities spread over 5 zones and have joined together to form so-called sindicatos (user groups). During the project, basic improvements were made to irrigation management and regulation efficiency raised through a thorough reorganisation of water distribution. ARAP recruited an engineer, two technicians and three water attendants, who are responsible for managing and supervising the irrigation infrastructure. Disputes over water distribution are arbitrated by 'water magistrates' appointed by the municipalities. The irrigation association properly coordinates the technical and organisational operation of the irrigation systems. The municipal water utility in the city of Sacaba also obtains about 50% of its entire drinking water supply from ARAP and its members.

Key Results of Impact Analysis and Performance Rating

The figures on project objective achievement are as follows: In 2008, i.e. about 2 years after completion of the intermittent complementary measures, the incomes of the farming enterprises reached or well exceeded (Este and Alturas Zones) the target defined at project appraisal of US\$ 1,350 a year in the valley and US\$ 1,500 in the highlands, with the exception of the Central Zone (US\$ 929).

Average operating income and factor income in US\$ (2008)					
	Valley			Highlands	
	Sur Zone	Central Zone	Este Zone	Norte Zone	Alturas Zone
Operating income	\$ 1,395	\$ 929	\$ 2,578	\$ 1,795	\$ 3,173
Labour factor income	\$ 16	\$ 22	\$ 25	\$ 21	\$ 20

Value added per working day also well exceeds the target of US\$ 10 in all zones. Intensity of use (project objective) had increased at ex-post evaluation by 69% to 104%, depending on zone (combining old and new land). The exception is the Central Zone, where land utilisation only rose by 45%, presumably due to increased urbanisation. The productivity of the small farming enterprises was not just increased through increased land use intensity, but also due to the reorganisation of irrigation management, which enabled the introduction of new, more profitable crops (particularly onions, tomatoes and gladioli) and changes to the crop calendar, resulting in better

sales prices at harvest time. In all, the overall objective and the project objective have in our estimation been met. However, only two-thirds of the target group was reached by the investment measures due to the refusal of the Larati irrigation association.

The ARAP irrigation association presently has about 1,600 members and is registered as a non-profit organisation. The annual irrigation tariff per user charged by ARAP is US\$ 3. At about 60% continuously over the last few years, collection efficiency in tariff revenue is very low. The tariff revenue and additional income from the sale of water to the municipal water utility are enough to meet a part (some US\$ 5,000) of administrative costs, including paying the water attendants and a technician from the city of Sacaba. Specific repairs are financed by ad hoc cost allocations.

Major decisions are taken at the monthly general meeting (asamblea magna) of the ARAP, so that the farmers have a regular opportunity to voice their opinion and exert an influence on the operation of the irrigation system. The monthly general meetings are, however, also used to discuss and decide on other social and economic questions in the rural communities concerned. Thanks to its number of members, which make up a significant electoral group, ARAP also exerts political influence and can thus effectively put forward its concerns in dealings with the Sacaba municipality (e.g. obtaining subsidies for larger repair measures). Despite weaknesses in financial management, the local farmer organisations (sindicatos and ARAP) can draw on a long tradition and perform their tasks satisfactorily, unlike government agencies.

The general maintenance and state of repair of the irrigation infrastructure is satisfactory. There has been no discernible significant structural damage and no interruptions in irrigation have occurred so far. The cleaning of the canal systems and small repairs are usually performed properly as part of collective maintenance work, which are obligatory for all users on three 3 days a year. Larger-scale repair activities have been financed from various sources till now. While Cochabamba Prefecture has not made any contribution to maintaining the main structures, in breach of contractual agreement, more extensive repair measures have been financed both from central government funds and the Sacaba municipal budget, which provided the equivalent of US\$ 13,000 for this purpose in 2008. In all, operation and maintenance of the irrigation infrastructure can be assessed as satisfactory. There were no discernible serious risks to its proper operation at the time of final inspection.

To assess the macroeconomic benefit of the project, we have calculated real macroeconomic return on a 2007 price baseline, accounting for the situation with and without the project. Real macroeconomic return amounts to 12.7% and 8.1% including the support measures.

The project has contributed to improving income for the predominantly poor target group. It did not afford any scope for contributing to gender equality, even though women took part in planning measures and they work in irrigated and particularly small livestock farming and market their products.

Environmental protection and resource conservation was not an aim of the project. The increased intensity of use of the irrigated land has only resulted in a small rise in the application of fertilizer and pesticides.

The project was not geared to participation and good governance. The development of the irrigation association helps the farmers to advance their interests more effectively in dealings with local authorities, for improving infrastructure, for example. The association attends to the diverse social and economic concerns of its members, which contributes to improving their socio-economic situation (exchange among farmers on cultivation and marketing methods, joint representation of interests in dealings with the local authority, etc.). In summary, we assess project performance as follows:

Relevance: The project has contributed to solving the core problem: the shortage of irrigation water. The results chain postulated at project appraisal remains valid: Increased availability of water contributes to intensifying irrigated agriculture and hence also to improved income for farmers. The project conforms with the development-policy goals of German development cooperation. The activities of the donors complement each other well in water resource management, but deficits are evident in the irrigation sector. We assess the relevance of the project as good (Subrating 2).

Effectiveness: The anticipated project result, the increased productivity of farming enterprises, was surpassed, by a large margin in part. Except for the Central Zone, intensity of use increased by between 69% and 104%, depending on zone, and thus well exceeds the target of 25% on existing land and 50% on new land. Altogether, we assess effectiveness here as very good (Subrating 1). The new cropland also exceeds expectations at the time of project appraisal (about 1,100 versus 672 hectares). The original target group of 2,400 families was not, however, reached. Only 1,600 families ultimately benefited from the project investments. Considering the smaller target group outreach, we assess effectiveness as satisfactory (Subrating 3).

Efficiency: Real macroeconomic return at a 2007 price baseline equals 12.7%, 8.1% accounting for the support measures. Assuming rising prices for maintenance of 10% in 2012, 2017 and again in 2022 and a simultaneous decline in profits with projects on a similar scale (stress scenario), the return hardly changes at all (11.9% and 7% resp.). The minimum requirements for allocative efficiency have thus been met. In contrast to this, however, are the comparatively high investment costs per hectare and the two-year increase in the implementation period, which incurred higher costs for consulting inputs, to the detriment of the investment measures. Altogether, we assess project efficiency as satisfactory (Subrating 3).

Overarching developmental impacts: Except for the Central Zone, the incomes of the farming enterprises in 2008 met or well exceeded (Este and Alturas Zones) the target at project appraisal (US\$ 1,350 in the valley and US\$ 1,500 in the highlands). A lower figure was only recorded in the Central Zone with about US\$ 930. We also expect long-term incomes to increase in future as well. The user groups have also found new sources of income in livestock keeping, for example, and created about 800 seasonal jobs. The irrigation management practised in Sacaba and the high degree of self-organisation in ARAP can also set an example for other projects. This is also the case as reported by the executing agency, so that the capacity-building effects fully merit a positive assessment. Altogether, we gauge the overarching developmental impacts of the project as good (Subrating 2).

Sustainability: The state of repair of the irrigation systems is satisfactory. Proper routine maintenance measures (e.g. cleaning of canal systems) have been jointly carried out by the members of ARAP so far. No reserves have, however, been built up for upkeep. Even though Cochabamba Prefecture has not met its contractual obligations on maintaining the main facilities (primary irrigation infrastructure) till now, the requisite repair measures and replacement investments have been carried out via cost allocations among the users and with the help of public subsidies from central government and Sacaba municipality. In view of the major importance of irrigated agriculture as a source of income for the predominantly indigenous population, its profitability and the political influence exerted by the irrigation association, finance for requisite upkeep measures can be expected through user contributions and/or public subsidies. Altogether, we assess the sustainability of the project as good (Subrating 2).

Weighing up the above impacts and risks, due above all to cost increases in the course of project implementation and the smaller target group than planned (about a third less), project performance is judged as satisfactory altogether (Rating 3).

General Conclusions

Sufficient preparation time is required for complex projects in irrigated agriculture, to develop and agree on project design, operational methods and if necessary also measures for personnel support together with the target group, also to ensure the acceptance of the investment measures. This can avoid unintended delays in implementation and resulting higher costs to the detriment of the investment measures and target-group outreach.

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

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

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

A rating of 1 to 3 is a positive assessment and indicates a successful project while a rating of 4 to 6 is a negative assessment and indicates a project which has no sufficiently positive results.

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

Sustainability level 1 (very good sustainability)

The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability)

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

Sustainability level 3 (satisfactory sustainability)

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

Sustainability level 4 (inadequate sustainability)

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

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. A rating of 1 to 3 indicates a “successful” project while a rating of 4 to 6 indicates an “unsuccessful” project. In using (with a project-specific weighting) the five key factors to form an overall rating, it should be noted that a project can generally only be considered developmentally “successful” if the achievement of the project objective (“effectiveness”), the impact on the overall objective (“overarching developmental impact”) and the sustainability are considered at least “satisfactory” (rating 3).