

Colombia: Erosion Protection Río Checua II

Ex post evaluation report

OECD sector	31130 Agricultural land resources	
BMZ project ID	1994 66 590	
Project executing agency	Corporación Autónoma Regional de Cundinamarca	
Consultant	GTZ	
Year of ex post evaluation report	2007	
	Programme appraisal (planned)	Ex post evaluation (ac- tual)
Start of implementation	Q2 1995	Q1 1996
Period of implementation	4 years	7 years
Investment cost	EUR 6.2 million	EUR 7.6 million
Counterpart contribution	EUR 1.1 million	EUR 2.5 million
Financing, of which FC funds	EUR 5.1 million	EUR 5.1 million
Other institutions / donors involved	GTZ	GTZ
Performance rating	2	
• Relevance	2	
• Effectiveness	2	
• Efficiency	3	
• Overarching developmental impacts	2	
• Sustainability	3	

Brief description, overall objective and project objectives with indicators

The project is located in the Cundinamarca region and comprised the rehabilitation of the slopes in the water catchment area of the Fúquene lagoon (around 64,000 ha and rural communities with roughly 52,000 inhabitants). Mechanical and biological erosion control measures were implemented in heavily eroded areas and sustainable farming techniques were introduced with the aim of halting or reversing the destruction of farmland while at the same time stabilising and increasing income and employment for that small farming units. Furthermore, at the time it was appraised the project was expected to contribute towards preventing the silting up of the Fúquene lagoon. Small family-run farming units growing crops on the erosion-prone slopes were the main target group of the programme. The programme "Erosion Control Río Checua II" is a follow-up to the preceding project Erosion Control Río Checua - BM ID 1982 65 068) and was also implemented in cooperation with the GTZ. The programme executing agency was the regional development agency "Corporación Autónoma Regional de Cundinamarca (CAR)".

The financial cooperation funds were used to finance biological and mechanical erosion control measures on degraded and heavily erosion-prone areas, while the GTZ trained personnel of the executing agency in how to carry out an agricultural extension programme designed to promote

environmentally sound land management systems. The definition of the consultancy provided also included adapting the minimal land use farming method, which was unknown in the country at the start of the project, to the agricultural and ecological conditions and production systems prevailing in the Andean region. The GTZ also took over the consulting functions for the FC component (implementation consulting and supervision of construction).

The total cost of the FC-financed project was EUR 7.6 million, of which EUR 5.1 million was from FC funds and EUR 2.5 million was counterpart funds (including the interest generated by the disposition fund). The consultancy services under TC amounted to a total of EUR 6.9 million, although it has to be considered that the period under review relating to the TC project also includes the implementation period of the preliminary phase of the FC project described here.

The overall objective of the project was to preserve and develop natural resources while stabilising and improving the living conditions of the farming population. The indicators for the achievement of the overall objective were a) slowdown of the soil erosion processes by 2003 (no further expansion of the strongly and moderately eroded areas, steady or declining sediment and particle content of streams and rivers) and b) stabilisation of the income of farming units situated on slopes by the year 2003.

In order for the overall objective to be achieved it was necessary for the population to practice viable erosion control methods successfully (project objective). The indicators for the achievement of the project objective were: a) by the year 2000 at least 50% of the small farming units in the project region employ profitable and environmentally sound production methods adapted to the local farming conditions; b) the measures (including the revegetation) implemented on the erosion-prone areas (13,008 ha) are in good condition.

Project design / major deviations from the original project planning and their main causes

The project conception aimed at safeguarding the natural bases of production and the income situation of the rural families through the parallel approach of preventive and curative erosion control. The following biological and biological-mechanical measures were financed from FC funds:

- Revegetation and contour furrows (total of 4000 km), representing the priority of the FC investments. These fulfilled their purpose of taking up sediments and also prevented the further spread of erosion clefts, allowing a new layer of vegetation to grow. Plant growth depends on the basic conditions but is generally progressing well, as can be seen at locations of the earliest interventions.
- Installation and revegetation of water retention basins (total of 766,000 cubic metres). They offer a higher capacity in appropriate places in the erosion clefts and not only fulfil the main purpose of preventing erosion but also have the side effect of serving as water retention basins for the farming units. Because of the seasonal water scarcity farms have cleaned these basins at their own expense and the villages or farmers have built further (smaller) basins themselves.
- Construction of stone walls for torrent control (total of 21,000 cubic metres). This relatively expensive technology was rather sidelined in comparison with similar techniques and was limited to particularly critical places as the preliminary phase of the project had confirmed the effectiveness of the less costly prior techniques.
- Revegetation and planting of eroded areas and embankments. These measures overlapped with the other erosion control measures and were aimed at speeding up plant growth. In the vast majority of locations the planting was successful and growth is satisfactory. Regular pasturing is already possible in areas where grass plantings of this

phase complemented older erosion control measures. The speed of this development, however, will depend on rainfall levels in years to come.

On the occasion of the ex post evaluation the change in the degree of erosion proneness in the project area was assessed on the basis of the geographical location of the financed curative erosion control measures. This analysis revealed that only around 250 ha out of the 13,200 ha area that was rated particularly critical at the time of project appraisal were still considered critical at the time of the evaluation, meaning that 98% of the degraded areas had been transformed successfully.

Complementing the main measures described above, some equipment for environmentally sound farming (preventive erosion control) and for measuring indicators was financed as well. Direct seeding machines as well as different hydrological metering devices for measuring outflow and sedimentation were acquired. The equipment is still in the possession of the CAR which lends them to the communities or directly to the user associations against a fee in the framework of pertinent agreements.

The operation of the hydrological metering stations is clearly inadequate. Although they operated satisfactorily at the time of the final inspection, the meters were not in operation at the time of the ex post evaluation. Their fragile construction had been partly damaged by flooding after torrential rains, and the executing agency regards the quality of the data as insufficient (as the water flow is not registered automatically there is no way of determining a link between rainfall and sediment load) to justify the effort of necessary manual data collection. CAR is considering acquiring automatic stations for selected locations from funds of its own. The metering stations do not materially affect the outcome of the assessment of the project as they accounted for only 0.7% of the funds.

With the TC measure the GTZ enabled the project executing agency CAR to train the local administrations and their communal extension services and participated actively in developing and adjusting the minimal land use and direct seeding method in the project region and in spreading these methods to other territorial authorities and the agricultural authorities of Cundinamarca.

In summary it can be said that the simultaneous approach of TC advice for maintaining the production potential of locations still in productive use together with the rehabilitation of heavily degraded areas (FC) was well suited for resolving the problem. The measures were very well received after the curative erosion control measures also brought direct benefits for the population by improving water availability.

Key results of the impact analysis and performance rating

The specific impacts on the target group were rated as follows: Most of the impacts of the FC investments occurred in the farming units whose degraded areas were rehabilitated with curative erosion control measures. It is hardly possible to exactly quantify with reasonable effort how many erosion gullies were prevented from spreading and how much topsoil loss was prevented and, thus, what productivity loss was prevented. The regeneration of these areas stabilises them and, in the medium term, enables them to be used as pastureland again, which is particularly significant in the dry season given their improved water storage capacity. This was clearly discernible during the evaluation mission, although this impact will comprise a larger portion of the rehabilitated area only in the medium term (that is, around 13,200 ha).

The water retention basins not only have a protective function but also benefit the families directly as they supply them with water for domestic use and livestock. Furthermore, they are also used for additional irrigation where needed, sometimes through hoses, and they promote the growth of pastureland through infiltration. These benefits are indirectly reflected through the increase in milk production. The combination of higher and more stable milk prices and the reduction of production risks through improved supply of fodder creates incentives for the farmers to invest in improved dairy species. In the subsequent implementation phase the improvement

of pasture areas was a direct topic of extension services. The income effect on pure dairy farms is estimated at around 110% against the situation without the project. The traditional ploughing of degraded pastureland for planting potatoes was replaced by the planting of leguminous species for green fertilisation by the direct seeding method. Pastureland improvements therefore also take place outside the rotation with potato growing and are based on the nearly complete substitution of the reversible plough by the spring-tooth cultivator.

As expected, the adapted land use has stabilised and even improved the efficiency of crop farming (peas, maize and potatoes). Especially in potato farming this result is subject to pronounced natural price fluctuations. The use of tillage machines has been reduced considerably in all three crops, leading to further adjustments of production methods specific to each crop, but primarily to cost savings, producing the highest increase in returns for peas. The efficiency in the year of the report (2006) was around 20%, 29% and 186% higher than that of traditional farming methods for maize, potatoes and peas, respectively. These figures should only be taken as an orientation and in the case of potatoes are based on a year of favourable sales prices.

Income gains of 52% to 77% were identified on the basis of representative farming units (around 6 ha of farmland), although other types of farming units also earned higher incomes by applying some of the advice provided by the extension service. It must be expected that these figures will not be fully attained in the long term because the potato production was particularly profitable in the year under review. The situation tends to be more favourable for pure dairy farms as their income gains are higher for the above reasons (110%, for instance, in the dairy component of the model farm). The project has therefore fulfilled the expectation of providing higher incomes which was stated in the appraisal report. Moreover, the project measures have led to a reduced production risk as a result of the water storage capacity of the soils, meaning higher resilience during dry periods.

The project does not cause any significant consequential costs for the project executing agency as the erosion control measures are taken care of by the users (managing tree growth) and the executing agency only performs advisory functions. The consequential costs of the measures implemented in the farming area (TC priority) to maintain the impacts thus far achieved are low, although the potential to further develop the production systems will no longer be fully utilised if the consulting services are reduced. Particularly the further spread of green manuring plants in the farms where there are bottlenecks in the supply of seeds could no longer be supported to the desirable extent. However, there is no risk to the sustainable implementation of the remaining measures aimed at environmentally sound tillage as they have become common practice and do not require support from the executing agency.

Apart from the impacts the project had on individual farming units, it has achieved the following positive overall economic effects: a) it has ensured the supply of drinking and irrigation water in the plains by regulating the outflow of water on the slopes; b) it has converted abandoned farmland into cropland and pastures; c) it has halted and prevented productivity losses from declining soil fertility and d) it has enabled income gains through the assumption of production methods encouraged by the project (particularly through more profitable dairy farming).

In addition to bringing about productivity increases the introduction of erosion control measures and adapted land use methods secured the farmers' bases for production in the long term. The project succeeded in halting the destruction of the bases of life and production that goes hand in hand with the impoverishment of the people and the destruction of social structures resulting from migration.

Beyond these effects, further positive impacts have occurred on the regional level. Farmers' associations initiated by the project have extended their activities. Communal fields are now being cultivated and the impacts on the dairy market of the region in particular are positive. The acquisition of milk cooling equipment has made the groups independent from middlemen, they now receive much higher prices for the milk from the dairy and have been encouraged by the

improved marketing situation to perform more intensive and productive dairy farming. Furthermore, groups of farmers have begun to produce certified potato seeds with minimum tillage methods. The issuance of the necessary authorisations by the competent authorities documents the acceptance of the new production method even by those agencies who were critical at the outset.

The expected pronounced reduction of erosion processes in the catchment area can be considered achieved. This can be taken as a fact as the critical areas are almost fully under management and on the basis of the documentation obtained from measurements conducted in a similar constellation under Phase 1. It is not possible to provide quantitative evidence from the tributaries to the Fúquene lagoon for lack of informative data. Nor can a reduction in the cost of dredging the lagoon or the irrigation channels be determined because the efforts of the executing agency referred largely to eliminating water plants. The drinking water supply of the town of Chiquinquirá (approximately 50,000 inhabitants) is currently not jeopardised. It cannot be ruled out in the long term that the lagoon might be silted up as a result of eutrophication unless appropriate measures are taken to prevent it (such as sewage treatment plants).

The project had the potential of promoting gender equality as the protection of natural resources immediately affects the living conditions of the women in the project region. Particularly the improvement of the dairy farming operations, which particularly affect the women's rights of disposal, contributed to raising family income. This also applies to those areas of the project region in which crop farming became less important. The potential was reasonably utilised within the project.

The immediate objective of the project was to protect the environment and natural resources and it has contributed to enhancing the local population's environmental awareness. The project methods and advice have been put on a broad, solid basis through the training of the community extension services the agricultural authority of Cundinamarca and other regional authorities. The expansion of production is not expected to have any negative environmental impacts because the extension services provided under the project directly lead to a significant reduction in the use of plant protection agents.

The project directly safeguarded the long-term access to resources for mostly small farmers who are considered as members of the country's poor population. They identify with the project and their participation in productive agriculture is a reality. On the other hand, promoting participation in politics or governance did not constitute project objectives.

On the basis of the reasons described above our overall assessment of the project's developmental impacts is as follows: The core problem of the degradation of the natural resources on the slopes of the water catchment area of the Fúquene lagoon and the associated deterioration of the bases of life of the rural population was correctly identified at the time of project appraisal. The extent to which the unsustainable traditional production methods add to this problem was correctly identified. The connection between the erosion processes on the slopes and the degradation of the Fúquene lagoon, however, is less clear than was expected at the time of appraisal because of the eutrophication problem of the lagoon. We give the relevance of the project the sub-rating of 2 (good).

The project considerably slowed down and largely halted the erosion processes in almost all of the critical parts of the project region (98% of the designated area). The areas are recovering as expected and can soon be utilised productively. The loss of sediment in these areas has been reduced significantly and will be further combated by the widespread introduction of soil-conserving tillage methods and the renewal of pasture land (reversible ploughs are being largely replaced). The reduction of production costs, the improvement of pastures and the increase in milk production, even in marginal locations, illustrates an improved income situation on the slopes in most of the project region. In two communities (with approximately 20% of the population) a large portion of the population have largely given up crop farming and now limit themselves to dairy farming, which is dominated by women, while the men specialise in coal

mining activities. The association of regional authorities has enabled the approach to spread into other regions. Overall we rate the overarching developmental impact as good (sub-rating 2).

The erosion control measures put in place are in good condition and the replanted areas are growing as expected. The adoption rate is yielding varying results depending on the production method and its system of reference. Positive behavioural changes have occurred in 70% to 100% of the farms as different tillage methods and plant protection agents are being used and harvest residue is not being burned any longer. In these cases the acceptance is above the specified indicator level of 50% (which originally referred to minor adjustments, however). On the other hand, the adoption rate of the manuring plant element as one of three central elements of the new crop growing methods is clearly lower at around 20%. The effectiveness of the project is rated good overall (sub-rating 2).

The curative erosion control measures were intensively adapted to the local conditions under the preliminary phase and the previous, more cost-intensive structures were replaced by more efficient measures. These works were put out to tender locally and carried out by local private contractors. The remaining equipment and machinery were procured at market prices. Production efficiency therefore can be considered reasonable. The measures were generally implemented with a delay, however, as the plantings could not be done swiftly for lack of rainfall. The production procedures for crop farming were developed successively in the course of project implementation. The complex internal procedures of ensuring a continuous staff of advisers, however, prevented the advisory potential from being used even more efficiently (allocation efficiency). Overall, we assess the project efficiency as satisfactory overall (sub-rating 3).

The sustainability of the environmental impacts and the stabilisation of incomes in this case are largely independent from further advisory services being provided by the executing agency and are largely ensured by the benefits accruing to the rural population. Some restrictions may apply to those parts of the erosion control measures that were complemented by afforestation measures. The trees may have to be pruned if they grow well in order to preserve the grass cover. As the executing agency turns its attention to new political topics it is possible that corresponding training measures may not be carried out in time. For the same reason there is a likelihood of declining effectiveness of the special equipment owned by the executing agency and of a slow-down in the further development of the minimal tillage technique. This will slow the spread of green manuring plants. As the remaining elements surrounding environmentally sound tillage have spread far beyond the direct advice implemented under the project, these risks do not generally jeopardise the results. The sustainability of the project is satisfactory overall (sub-rating 3).

On the basis of the sub-ratings described above we have given the project an overall rating of "good" (rating 2).

General conclusions and recommendations

The following general conclusions can be drawn: Investments in soil protection measures on degraded sites are particularly well accepted by the population when they are implemented together with measures to promote productive agriculture. Cooperative projects may appropriately complement both approaches in a suitable overall environment.

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

Projects are evaluated on a six-point scale, the criteria being relevance, effectiveness, "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 result that clearly exceeds expectations
- 2 Good result, fully in line with expectations and without any significant shortcoming

- 3 Satisfactory result – project falls short of expectations but the positive results dominate
- 4 Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
- 5 Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
- 6 The project has no impact 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 an unsuccessful project.

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).