

Ex post evaluation – Paraguay

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Sector: Rural development (43040)
Programme/Project: Sustainable management of natural resources II (No. 2007 65 966)*
Implementing agency: Ministerio de Agricultura y Ganadería (MAG)



Ex post evaluation report: 2016

		Planned	Actual
Investment costs (total)	EUR million	10.90	10.66
Counterpart contribution	EUR million	4.20	4.20
Funding	EUR million	6.70	6.66
of which BMZ budget funds**	EUR million	6.70	6.66

*) Projects in 2016 random sample; **) Residual funds (EUR 38,000) to be transferred to subsequent phase

Summary: Second phase (2008-14, precursor phase 2002-10) of a promotional programme (together with German TC) - targeting sustainable agriculture and forestry as well as an increase in the production and productivity of roughly 4,800 smallholder farms in the "Región Oriental" of Paraguay ("Departamentos" Caaguazú, Caazapá, Concepción, Paraguari and San Pedro): introduction of conservation agriculture, reforestation and agroforestry measures as well as the promotion of sustainable natural forest management by means of FC-funded inputs, equipment and consulting for planning and implementing the various measures.

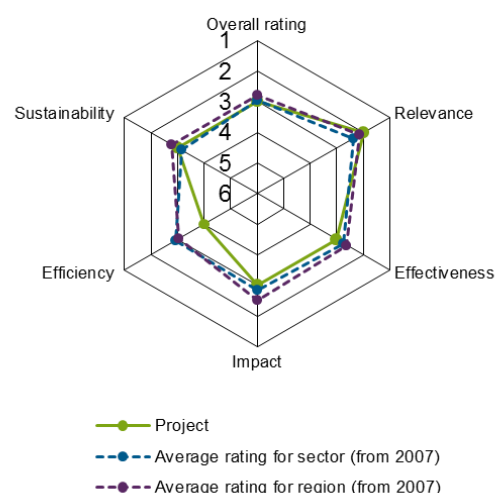
Development objectives: Higher productivity of smallholders' farming and forestry plots alongside a sustainable natural resources use by at least 50% of the supported farms (intended outcome) contributes to the preservation and rehabilitation of natural resources and to a sustainable improvement in living conditions for the poorer rural population (intended impact).

Target group: Roughly 4,800 smallholdings in the afore-mentioned "departamentos" that apply the various practices (mentioned above) on an area of just under 6,800 hectares.

Overall rating: 3

Rationale: The objectives in terms of acreage under conservation agriculture and forestry use have largely been achieved. In the case of forests they were even marginally exceeded, and results are likely to endure. However, the application of conservation agriculture practices has dropped sharply on many areas, partly as a result of the at best limited professional follow-up support after the end of the programme.

Highlights: In spite of the distinct microeconomic advantages over conventional agriculture (higher incomes with generally less work required), the acceptance of conservation agriculture is tending to wane. Neither the farmers themselves nor the employees of MAG and the consultants were able to provide a coherent explanation for this phenomenon - nor reasoning based on rational arguments. The regular post-harvest burning of fields, which was widespread at the PA (and particularly detrimental to soil quality of), now no longer takes place on the project area. According to information from farmers and consultants, the practice of burning has also dropped by 50-80% even on neighbouring farms that did not participate in the project.



Rating according to DAC criteria

Overall rating: 3

Relevance

Paraguay's smallholder farming sector comprises roughly 250,000 farms working on around 2 million hectares, which means an average size of about 8 hectares; however, farm sizes (i.e. cultivable and grazing land, possibly forestry plots) in the visited areas of the project region averaged out at roughly 5 hectares. Arable land is still a significant source of income for the largely poor smallholder's farmers in the eastern part of the country. The largely fragile soil quality in these areas was put at risk – not only in the project region – by harmful practices (especially burning, unprofessional tillage). This resulted - and to some extent still does result - in reduced content of organic matter that is crucial for soil fertility. This is why initiatives targeting careful and soil-conserving farming practices are just as warranted as concepts for the sustainable management of the (still) available silvicultural potential. The latter potential had barely received attention prior to the start of the project; rather, forested areas - being considered worthless - were cleared, where possible and converted into cultivation or grazing land¹.

In retrospect, it remains unclear to what extent the project design met an articulated demand, especially with regard to conservation agriculture. From today's perspective it seems plausible that at least that most important component was implicitly promoted on the assumption that conservation agriculture - widespread among medium and large farms at the time of the project appraisal (PA) - would be equally suitable for smallholders. In this respect the approach can rather be deemed supply-oriented.

From the documents available, it cannot be clearly ascertained to which extent sluggish acceptance of the methods disseminated back then, especially conservation agriculture (see section on "Effectiveness") had already been identified as a possible bottleneck at the start of phase 2 evaluated here. From MAG's perspective, and according to statements of professionals employed back then, the problem of limited acceptance was well known from the first phase and was discussed at operational level. However, this did not result in any conceptual adjustments. Meanwhile, a continuing high demand for longer-term follow-up support by the agricultural extension service DEAg has become apparent (see sections on "Effectiveness" and "Sustainability"). That issue was not raised at PA either, at least not explicitly.

In terms of design and conceptual outlook, the project corresponded to the focal areas of bilateral cooperation as well as to declared national priorities. With regard to the latter, we perceive a lack of coherence between the various public interventions - particularly for the smallholder sector. This is reflected in - at times - contradictory approaches pursued by different projects: for example, mechanised tillage for smallholders is sometimes supported – not just by the Ministry of Agriculture but also by local corporations – despite this being in stark contrast to the minimal tillage concept pursued by this project.

Furthermore, the fact that poverty in Paraguay is largely a rural phenomenon means that the Ministry of Agriculture (MAG) is commissioned by the government to carry out various initiatives to reduce rural poverty. On the one hand, this gives rise to at least latent conflicts of objectives with the mandate of the MAG that is rather based on increasing productivity and production; on the other hand, the Ministry's tight capacities are allocated to areas for which there is barely any specialist expertise (i.e. in social sciences). From a design perspective, the project was affected by this in as far as intervention areas were selected in accordance with poverty criteria.

In essence, the intervention logic - according to which smallholders sustainably increase their incomes from soil-conserving cultivation and from harnessing silvicultural potential, is also coherent in retrospect. We can conclude from the below-average sizes of farms by national comparison (see above) that applying poverty criteria did in fact favour the selection of poorer smallholdings. In this context, a connection with the sluggish overall acceptance cannot be ruled out (see above): experience shows that smaller agricultural holdings - equipped or funded below average - are particularly reluctant when it comes to adopt-

¹ Although a deforestation ban was introduced in 2004, in the period from 1990 to 2010 Paraguay lost more than 35,000 km² or just under 17% of its forests (<http://rainforests.mongabay.com/deforestation/2000/Paraguay.htm>).

ing innovations like in the case of this project. The TC also showed that that the "technology packages" offered via the project evaluated here were considered rigid by at least some of the farms; in an environment where the supply of (family) manpower is tending to decline, the ergonomic requirements were deemed (too) high on various occasions.

Relevance rating: 2

Effectiveness

There is no comprehensive data available on the extent to which conservation agriculture practices disseminated by the project are currently applied. However, it can be inferred from ad-hoc surveys conducted (25 districts in four departments) that only a good half of the roughly 5,000 hectares determined during final inspection (2013) are still cultivated without tillage and by virtue of direct seeding and green fertilise (i.e. between about 2,500 and 3,000 hectares). The necessary machinery (mainly subsoiler, blade roller / "rolo de cuchillo" to burrow in fertilising plant residues) is largely in a usable state and ready for use: according to information received, conservation agriculture is sporadically also practised on neighbouring farms that did not participate in the project. No "green fertiliser" is used on an additional area amounting to approximately 1,000 hectares, but direct seeding is employed, which results in soil cover in the form of crop residues or weeds. This largely corresponds to the objective of stabilising and increasing organic content by means of conservation tillage. The remaining areas are subject to conventional tillage (generally with disc harrows / "rastron à discos"). It is also to be noted that the regular post-harvest burning of fields, which was common at the PA (and particularly harmful for the humus content) now hardly takes place - not just on "project plots": on neighbouring farms not supported by the project, too the practice of burning has dropped by 50-80% - according to the farmers and field extensionists. This is reportedly a "bandwagon effect" triggered first and foremost by the project.

The sustainable use of natural forests, as promoted by the project, is still practised to the original extent according to surveys (FI: 792 hectares); it is valued by the smallholdings affected (roughly 1/3 of the participants), even though essentially no thinning takes place - contrary to recommendations communicated by project staff. The small woodlots of generally no more than 1.5 hectares per farm are used as back-up reserves for timber and for occasional commercial logging ("piggy bank"). The same applies for the reforestation areas supported selectively by the project (847 hectares, predominantly eucalyptus, sometimes also indigenous trees that do not grow as fast). Moreover, additional areas were spontaneously reforested (i.e. without project support) - predominantly eucalyptus stands.

The microeconomic advantages of conservation agriculture were highlighted in various studies (GIZ, SLE) and confirmed by the majority of those surveyed: initially higher efforts and expenses (especially the application of green fertilisers in the form of various leguminous crops enhancing soil fertility) was offset by a much lower labour required for weed control in subsequent cultivation periods: while areas exposed to conventional tillage have to be weeded out several times, mostly manually, this is not needed on conservation agriculture areas where the sown green fertiliser largely suppresses weed growth. What is more, the soils' increased nutrient and moisture content - caused by "green fertilisers" - generally boosts yields by more than 100%. In this regard, the rather sluggish acceptance which tended to decline after the end of the project is quite remarkable. By all accounts, this is due to various factors: the low willingness of the mostly older farm owners to change cultivation practices out of their own accord; the widespread expectation of mostly politically motivated assistance programmes provided by government officials (esp. during election campaigns), which are usually perceived as "gifts". For some of the participating farms, the key motivation lay in the opportunity to receive inputs at low-cost - or even for free - via the project. Further constraints included the generally low availability of manpower (see above) and the patchy presence of the state-run extension service DEAg after the end of the programme, particularly in remote regions. Repeatedly, general reservations were expressed with view to organised and officially registered associations - which were a precondition to participate in the programme. A minority of those questioned revealed that they had extra-agricultural income sources (e.g. from family members working abroad). Other factors behind the declining acceptance included the occasional scarcity of seeds for green manure and occasional problems encountered with pest infestation in green fertiliser stands. Regarding the project's silvicultural components, in contrast (management of natural forests, reforestation), barely any acceptance problems have surfaced.

The farms participating in the project were supported intensively during implementation, mainly through consultants employed by the project - and to a lesser extent by DEAg employees. According to project employees and farmers, this close support really facilitated and accelerated the initial adoption of conservation agriculture practices during the implementation period. After project completion, though, DEAg - on account of chronic staffing and financial constraints - finds itself incapable of providing an even remotely similar follow-up extension support.

The objectives defined at the PA are deemed conservative. Their achievement can be summarised as follows:

Indicator	Status PA	Ex post evaluation
Adoption of conservation agriculture practices by at least 50% of the 4,800 farms participating	Conservation agriculture: > 3,000 hectares; Forest agriculture: > 1,600 hectares	Conservation agriculture: > 2,500 hectares, plus 1,000 hectares (partly managed according to conservation agriculture requirements) Forest management: > 1,800 hectares roughly 2,500 smallholders in total
Rise in yield per hectare	30% on average	According to surveys, generally > 100% for farms continuously participating
Compliance with principles of sustainable forest management	not defined in more detail	Forest areas exist, are used selectively, but not thinned

In overall, requirements were largely achieved. For conservation agriculture, though, this only holds true when including the **partial** adoption of conservation agriculture practices on roughly 1,000 hectares (see above). Taking into account declining acceptance, the effectiveness can be considered still satisfactory from today's perspective.

Effectiveness rating: 3

Efficiency

The direct support costs of roughly USD 900 / hectare for conservation agriculture and between USD 90 and 180 / hectare for agricultural extension are compounded by the project's consulting costs of around USD 400 per farm over 3 years. This can largely be considered appropriate and is in line with comparable initiatives implemented elsewhere in the country. Production efficiency therefore is satisfactory. Yet this does not take into account the sluggish acceptance, and the 81-month implementation period required for investment measures far exceeds the original estimate (53 months).

The expense referred to above is justified in terms of the allocation efficiency - provided the disseminated practices are applied consistently: in the case of conservation tillage, contribution margins for agriculture rise by around USD 500 per hectare and per year. Yet the acceptance problem must be considered here (see above). Since the number of participating farms has fallen to approximately half (see above), the "efficiency" of the use of resources as described above also halves. Thus, overall efficiency is no longer rated as satisfactory .

Efficiency rating: 4

Impact

The achievement of the relevant indicators formulated at the PA can be depicted as follows:

Indicator	Target at PA	Ex post evaluation
Increased family income	> 200 USD/ a	Only fulfilled by farms continuously participating (at least USD 500)
Improved living conditions for > 60% of the women surveyed	Positive results in terms of food supply, workload and/or income	Barely any data available, but largely fulfilled according to ad hoc surveys of farms permanently participating
Adoption of disseminated techniques beyond intervention areas	> 3 "new projects" and > 30 local initiatives	No figures available: questionable for conservation agriculture, reportedly fulfilled in the case of discontinued post-harvest burning and reforestation

According to rough calculations from various studies, at least 500 USD in extra income per hectare can be derived from conservation agriculture on average per family and year, which is also confirmed by results in ad hoc surveys. The few women taking part in the surveys unanimously emphasised their improved nutrition situation thanks to the higher income, along with the better quality of crops produced for own consumption (mainly cassava). Moreover, women are generally responsible for small animal husbandry (frequently including pigs), which also tends to result in higher income due to better fodder production yields (e.g. maize).

There have been some positive effects in environmental terms, mainly with regard to the treated areas' soil quality, organic matter and moisture content, which was confirmed during the various field visits. Additionally, a number of farmers reported that areas under conservation agriculture were also less prone to erosion damage than fields tilled conventionally, though this could not be visibly confirmed during the visit, as it took place during the dry season. The greater regard that owners have for their (admittedly modest) natural forest patches means that those have not fallen victim to slash and burn practices, as is still common in many other places.

As is evident from the table above, replication effects regarding conservation agriculture, with reduced tillage, green fertiliser etc., have at best been limited. Yet, looking beyond this to the previously widespread and now very much declining practice of post-harvest burning (see above - "Effectiveness"), a wide-ranging impact can be noted in this area; this similarly applies to reforestation (mainly eucalyptus, see above). Concerning the latter aspect, however, it is still unclear to what extent other factors facilitated the increasing spread of reforested areas.

The project has had structural effects to the extent that the consulting components have resulted in the intensive training and further education of more than 100 field advisers². Many of those are still active, mostly in the sector (some now in managing positions) and can therefore act as facilitators for spreading the approach promoted by the project.

Comparing the roughly 4,800 households supported by the project with the approximately 250,000 smallholdings, largely in the east of the country, the project has made necessary, though by no means sufficient, contributions towards an extensive stabilisation of agricultural production at national scale. In their own right, however, i.e. in terms of the targets set, these contributions are deemed satisfactory on the whole.

Impact rating: 3

² Moreover, complementary interventions by German TC 65 helped train other DEAg advisers in conservation agriculture techniques

Sustainability

The approaches propagated by the project are likely to be continuously applied at least by a part of the target group - possibly, however, modified and adjusted to some extent according to prevailing circumstances and limitations. We consider this to be largely beyond dispute in the case of forest management and the widely abolished post-harvest burning (see above). In contrast, we cannot rule out a further decline in the retention of conservation agriculture practices, towards which several smallholders display reservations (albeit rationally understandable just in part - see above). The very patchy presence of the state's agricultural extension service (see above - "Effectiveness") - particularly in more remote locations - can be seen as a significant constraint in this respect. All in all, sustainability can still be rated as satisfactory.

Finally, it is generally difficult to assess to what extent external factors like the persistent external demand for agricultural land will impact on the further development or even the continued survival of the smallholding sector. It is plausible to assume that specialisation and concentration trends will increase, while it remains unclear which effect the smallholding sector's general inertia (see above) will have. In any case, this sector is likely to be increasingly reliant on sufficient (supplementary) non-agricultural income sources to survive.

Sustainability rating: 3

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

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

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

Rating levels 1-3 denote a positive assessment or successful project, while rating levels 4-6 denote a negative assessment.

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

Sustainability level 1 (very good sustainability): The effectiveness of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The development effectiveness 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 effectiveness 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 effectiveness.

Sustainability level 4 (inadequate sustainability): The effectiveness of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. 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. Rating levels 1-3 of the overall rating denote a “successful” project while rating levels 4-6 denote an “unsuccessful” project. It should be noted that a project can generally be considered developmentally “successful” only if the achievement of the project objective (“effectiveness”), the impact on the development objective (“impact”) **and** the sustainability are rated at least “satisfactory” (level 3).