

Soil and Water Conservation Policies and Actions in Brazil: Lessons from the Past and Perspectives for the Future

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1 Introduction

Brazilian soils experience high rates of erosion by water, particularly in agricultural and disturbed areas. Average erosion rates often exceed 25 tons per hectare per year, which are well above the average soil loss tolerance for tropical soils.

However, during the last 20 years soil conservation programs were designed and implemented in several regions of the country. Some of these projects were funded by the World Bank. In these projects, the major goals were the reduction of on-site effects, mainly erosion, maintain the soils productive and preserve the vicinal roads.

As a consequence, a decrease in erosion was significant, with the introduction of conservation practices such as terraces, vegetative buffer strips and relocation of farm roads. Despite this advance, most actions were not sufficient to reduce off-site impacts, such as river and reservoir sedimentation and water pollution.

However, with the country's new technical, institutional and legal realities, it is now possible to implement even more effective conservation programs, where the watershed is taken as the planning unit, user participation is encouraged and off-site issues are explicitly considered. With this new approach, and using different forms of financial and fiscal incentives, the National Water Agency, responsible for the water regulation in Brazil, aims at the reduction of the non-point source pollution from rural areas. This problem will be addressed by incentive payment/cost-sharing agri-environmental programs, where both environmental and economic performances will be the leading criteria.

The objective of this paper is to review the Brazilian soil and water conservation policies and programs of the last 20 years, and present the strategies for the new agri-environmental approach, such as ANA's *Water Provider Incentive Program*.

2 Review of the soil and water conservation programs: lessons from the past

Aiming at the reduction of the severe on-farm erosion processes in Brazil, several states designed and implemented soil and water conservation programs, starting in the mid-80's. Examples of these projects were the *Parana Rural Program* and the *Santa Catarina Watershed Management Project*, both funded by the World Bank. In these projects, best management practices (BMP's), such as terraces, contouring, no-till, gully control etc were implemented in critical agricultural areas of those states, using small watersheds (—3,000 hectares) as the planning and implementation units. Other programs, such as the *São Paulo's Best Way Project*, aimed at relocation and conservation of rural roads. In these 3 programs alone, over 300 thousand farmers participated, covering an area over 10 million hectares, as well as thousands of rural roads, in more than 4,000 small watersheds. Investments over US \$ 600 million were made.

These projects were successful in terms of user participation and in the reduction of erosion and some off-site problems, such as silting and pollution (see Fig. 1 and 2).

In those Programs, farmer training and extension were an important component. In the Parana Rural Program alone, it responded for more than 25% of the program cost (over US \$ 45 million).

As a result of the erosion reduction and productivity increases, provided by the Programs (average duration of 7 years), the average farmer income also increased substantially (Fig. 3).

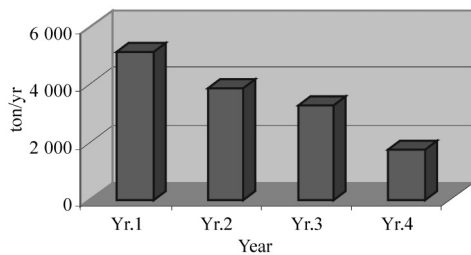


Fig. 1 Ave. Sediment Yield Reduction in the Parana Rural Program

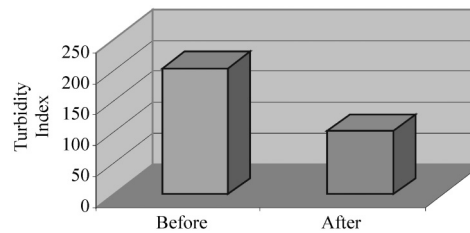


Fig. 2 Ave. Water Turbidity before and after the Parana Rural Program

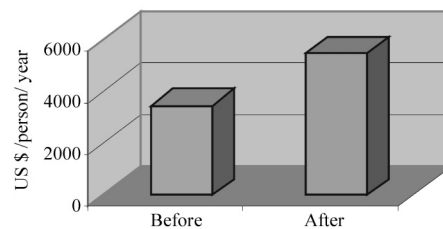


Fig. 3 Ave. farmer income, before and after the Parana Rural Program

3 Agri-environmental programs aiming at the reduction of non-point, off-site impacts: strategies for the future

Though the benefits generated by the soil conservation programs in the past 20 years were significant, the off-site effects of the BMP's were not explicitly considered in the project design. Therefore, there is still room for improving the off-site benefits, such as sedimentation and non-point source pollution, particularly in watersheds where water quality is impaired.

The present trend is to move from the traditional on-farm, "good-practice" approach, toward an off-farm, "improved environmental performance" method (Claassen *et al.*, 2001). In the former, the farmer receives incentives for implementing any kind of BMP, regardless of their environmental performance. In the latter, the participant is paid according to the environmental benefit provided by the adopted practice, compared to the original condition. Although the improved performance approach requires an intensive monitoring by the implementing agency, it provides a better environmental benefit/cost ratio (Claassen *et al.*, 2001). This could be seen in Fig. 4, where the benefits are those to water quality.

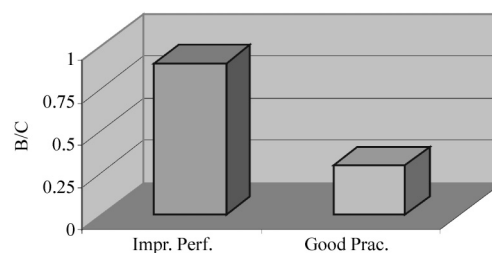


Fig. 4 Benefit/cost ratios for "Improved Performance" and "Good Practice" Programs (Claassen *et al.*, 2001)

The Brazilian National Water Agency (ANA), whose responsibilities include the conservation of national strategic water supply sources, is aiming exactly at this objective, i.e., reduce non-point source pollution, through the incentive of management practices that provide the best environmental benefit/cost ratio.

ANA is presently designing one of such programs, i.e., the *Water Provider Incentive Program*, a voluntary, cost-sharing project aimed at farmers and ranchers in critical watersheds of Brazil (mostly upstream of urban water supply facilities).

In this program, the candidate (farmer or association) must submit a BMP proposal, which will be evaluated and eventually approved by ANA. A data-base will be used to rank the efficiencies and costs of different BMP's, and a conceptual model will weigh their environmental, economical and social effectiveness.

If eligible, the participant will be paid by the off-site benefit provided his project, and ANA (or an authorized representative) will monitor its effectiveness. Since it is a cost-sharing program (payments will cover 50%—100% of the costs of the BMP), the amount of incentive is proportional to the off-site environmental performance of the practice. The program is flexible, and includes BMP's which aim the reduction of sediment, fertilizer/pesticide or livestock waste to a particular water body.

Also, since the distance of the agricultural field or livestock feed-lot to a perennial water course is inversely proportional to the off-site pollution risk, as this distance decreases, the cost-sharing incentive will increase. In other words, ANA will pay for the measured product (sedimentation and pollution abatement) and not for the practice itself, according to its off-site performance.

The *Water Provider Incentive Program* program is a type of “green-box” incentive program, which is not characterized as a direct agricultural subsidy by the WTO agreements.

In a first stage (2—3 years), the Program will benefit a few pilot-watersheds, which will be selected by the states' water resources councils (according to the states' priorities), and approved by ANA. The watershed eligibility criteria include:

- the watershed must be a water supply source for urban or other important water user;
- the watershed must present significant rural non-point source pollution problems (i.e., sedimentation, eutrophication, and/or contamination);
- the watershed must have a number of farmers / ranchers which are willing to participate in agri-environmental cost-sharing programs;
- the watershed must be pre-selected by the state water resources council.

Depending on the results of the pilot-Program, ANA will implement the program in a larger scale, and will look for different funding opportunities, such as mutual funds (federal, state and, eventually, international agencies).

References

- Claassen *et al.*, 2001. Agri-environmental policy at the cross-roads: Guideposts on a changing landscape. USDA Economic Research Service, Washington, p. 67.
- World Bank. 1997. Parana Rural – Soil management and conservation Program of the State of Parana. Washington, p. 30.