

CHAPTER 8 RIVER AND BASIN MANAGEMENT PLAN COMPONENT(4)

8.1 Basic Policy

In the Mar de Dentro area, forest reduction due to various developments, soil erosion and runoff due to improper land use continue unabated, consequently lowering basin land productivity, deteriorating the water quality of lakes and marshes, as well as the desiccating wetlands. Of these, soil erosion and runoff prevention is considered extremely important for river and basin management. Actual agricultural conditions, which are directly related to soil erosion, and the present management of the basin were also considered in the formulation of the following basic policies for river and basin management.

(1) Implementation of countermeasures in areas highly prone to soil erosion

Cangucu district and the Sutil and Dulo river basins are considered highly prone to soil erosion based on calculations using the USLE method (see **Fig.2-3**). Agricultural activities flourish in both areas and the prevention of soil erosion and runoff would significantly impact economic conditions. With this understanding, a soil erosion control measure that is a combination of mechanical and agronomical measures will be adopted for both areas.

(2) Popularization of an Environmental Conservation Oriented Agriculture

Agronomical measures to prevent soil erosion include selection of crops suited to the condition of the land, generation of organic soil, mulching and planting of green manure crops, and non-tillage cultivation. The use of these methods along with the appropriate use of agro-chemicals/fertilizer is referred to as “environmental conservation oriented agriculture” that not only significantly prevents soil erosion but also significantly improves water quality. This study developed an environment-oriented agricultural model that suits prevailing conditions in the Mar de Dentro area, and will be applied not only in 2 of the areas aforementioned but in the whole area of Mar de Dentro.

(3) Utilization of Highly Cost-effective Mechanical Methods

Mechanical measures for soil erosion prevention consist of contour cropping, contour strip cropping, construction of a buffer zone, terracing, etc. The cost and impacts these methods would incur vary from each other. In consideration of the slopes of the area, mechanical methods that are highly cost-effective will be selected and adopted.

(4) Formulation of a Comprehensive Basin Management Master Plan for Main Rivers

A comprehensive basin (main rivers) management plan has not been prepared for the Mar de Dentro area, hence the area also has no basin management committee. In order to activate basin management committees and strengthen relevant agencies, a master plan for land use and water quality control in the Camaqua and Piratini river basins will be formulated. In addition, information extremely important for this formulation will be collected and utilized, and the joint use of information among relevant agencies will be promoted.

(5) Environmental Education for the Farmers and Dissemination of Farming Techniques

In order to promote an environmental conservation oriented agriculture, environmental education programs will be carried out for the farmers and farming techniques will be disseminated.

8.2 Promotion Project of an Environmental Conservation Oriented Agriculture for Cangucu Area

(1) General Area Conditions

Cangucu measures a total of 3,251km² (see **Fig. 8-1**), 20.7% (673km²) of which is cultivated. As the vegetable and cereal supplier of Pelotas, the area is a huge farming zone. Nonetheless, felling in steep slopes, burning, and intensive farming activities make the area prone to soil erosion and agro-chemical and nutrient salt runoff.

(2) Soil Erosion Prevention Measures

Since the farming zone is in an area where the slope gradient is high at 13%, contour cropping alone would not be sufficient to prevent soil runoff. Terracing should be introduced. In addition, the introduction of other agricultural techniques such as mulching and the planting of green manure crops to cover surface soil, as well as cultivation that does not entail tillage are also measures considered favorable in the area (see **Table 8-1**). **Table 8-2** shows the expected effects of soil erosion prevention measures.

(3) Area for Project Implementation

The area selected for the implementation of the project will measure 60,000ha: about 60% of the farmlands and about 50% of the artificial pastures, in consideration of the need to gain the consensus of the residents and the scale of the project. Terracing will be introduced together with non-tillage cultivation, and will cover 20,000ha.

**Table 8-2 Effect of Soil Erosion Countermeasures
in the Cangucu District**

Item	With project	Without Project	Effect	Effect/Benefit
Terraced arable land (ha)	43,363	3,363	40,000	1) Sustaining of agricultural productivity
Terraced pasture (ha)	20,000	0	20,000	
Total soil loss(ton/y)	7.7×10	14.0×10	6.3×10	
Erosion in arable land (ton/y)	7.7	122.4	114.7	2) Improvement of water quality
Erosion in pasture (ton/y)	3.9	87.6	83.7	
Nutrient loss of TN (kg/ha/y)	0	20.0	20.0	3) Reduction of production cost
Nutrient loss of K (kg/ha/y)	0	2.3	2.3	

Remarks: Runoff prevention effect was calculated based on the result of the study implemented in Parana State by JICA in 1995.