21. Have others picked up on your case idea and acted upon it?
If so, who, where and how?
Yes, agricultural practices were adopted by dairy farms, like Fazenda Santa Barbara, in São Paulo state; theoretical concepts to support dairy farm development activities are used by cooperatives of milk processing like Itambe in Minas Gerais State, Parma
lat in Goias State.

22. Are you aware of other cases like yours? If so, where?
Yes, the University of São Paulo/ESALQ, in Piracicaba, São Paulo State, has been applying some concepts of soil and roughage management to establish the dairy production system.

23. If your case is selected for in-depth development during the first six months of 1999:

a. Would an on-site assessment and perhaps visual documentation be possible?
[ x ] Yes [ ] No

b. Would you have time to collaborate on the case write-up (2-4 weeks)?
[ x ] Yes [ ] No

c. Do you have readily available audio-visual materials (photographs,
videos, GIS maps)?
[ x ] Yes [ ] No

Before you proceed to the next page (Section 5: Summary of the Case Study), are there any comments, remarks or suggestions you would like to make?

Thank you for your assistance

Section 5: Summary of the case study

Provide a summary of your case, including th
to and continuing throughout its duration. (
fill out this section with care, as it is th
case that will be shared with your colleague
in the compendium.)



Title/location:
Canchim's watershed as a natural laboratory for assessment and fostering the sustainable management of cattle farms in the tropics.
Sao Carlos, Sao Paulo State, Brasil.

Summary:

Structure
Canchim's watershed is comprised into an 1496 ha (14,96 km2)area located between the geographical coordenates of 21o55' and 22o00' S, and 47o48'and 47o52'W. The climate is classified as Cwa (Koeppen), warm with dry winter. Annual mean of rainfall is 1354
mm, with 1525 mm of potential evapotranspiration. Dry season extends from april to september, being August as the month with the lowest

precipitation (13 mm). In terms of geology, the area is comprised by sandstone with basaltic intrusion, where the relie

v is slightly undulated, with altitudes ranging from 680 to 912 m. Soils are predominantly of low fertility, with 300 g/kg clay, Orthic Ferralsols, presence of Rhodic Ferralsol and Ferralic Arenosols; showing a water hold capacity from 48 to 145 mm/m. Hid

rography: 20000 m of creeks. Vegetation: an interface between the fitogeographic domain of 'cerrado'(savana) and Atlantic forest vegetation; with 120 ha of tropical forest, 5 ha cerrado (linked to a neighbour 700 ha area), and extensive/intensively manage

d pastures complemented by 120 ha intensive agriculture to produce silage. The main forages are: Brachiaria decumbens, Panicum maximum cv. Tobiata and Tanzania, Pennisetum purpureum and Cynodon dactylon cv. Coast-cross for the rainy season, and Saccharum

officinarum, Zea mays and Sorghum bicolor for the dry season. The stocking rate varies from 0.7 to 15 A.U./ha (450 kg) in the rainy season. The dairy cattle are the Brasilian Dairy cross-bred and pure black and white Holstein; the beef cattle are mainly

the indian zebu Nelore, and crossbreds with european like Canchim (zebu x Charolais). The intensive dairy cattle system, with 58 ha and 220 animals, mean stocking rate of 9.4 A.U./ha, and pastures with up to 15 A.U./ha (in the rainy season), produces 2,10

0 L/day, 6,700 L/cow.305 lactation days, or 13,000 L/ha.year. The lactation begins with 26.8 months of age, and the calving interval is 12.8 months.

Processes

1. dairy and beef cattle production systems, based on rotational management of pastures, and food supply in the dry season.

2. research and technology development activities foccusing 2 holistic projects on competitive and sustainable production of milk and beef on pastures with tropical forages.

3. monitoring activities on environmental quality, altered by these systems, with spatial and temporal comparison of extreme performed areas (f.e., forest x extensively managed degraded pastures x intensively managed pastures x crop production areas).

4. training of students, extension professionals and specially farmers: on intensive, rational, competitive and sustainable management of dairy and beef production systems based on tropical forage pastures.

Please state: Objectives and purpose at the outset and how they may have evolved:

Initial objetives

a) installation of low cost, productive, competitive and sustainable real model of intensive, on tropical forage pasture, dairy and beef production systems, at watershed level.

b) monitor the impact of these systems on the environmental quality (soil and water).

Purposes

a) offer to owners of little-sized and medium-sized farms a technological option to reduce costs wich allows for competitivity with sustainability.

b) to train farmers for more productivity, competitivity and sustainability.

c) to establish ecological sustainability indicators.

Further objectives

a) to find an adequate use of inputs (mainly fertilizers and organic material).

b) to find buffer practices to these with potentially negative impact.

c) to evaluate the sociological view, related to the environmental perception by the watershed residents.

d) to find adequate integrated (multienvironmental) management mechanisms, at farm and watershed level: natural environments (ripparian forest, legal forest reserves = 20% of the surface), agricultural environments (agroecosystems), and urbanized environm
ents (concentration areas of animals and humans, like the seat, the settlement, the barns, and others), to support the farmers attendance to the environmental legislation, and also to get functional opportunities.

e) to make compatible environmental concepts used by different professionals engaged specifically to each environment (engeneers with water quality, ecologists with natural ecosystems, and agronomists with agroecosystems; besides lawers, sociologes and o.
)

f) to make compatible the multienvironmental activities with the environmental legislation, generating by the farmer feasable opperational solutions, and also support lowers and superintendent actions.

g) to generate a multienvironmental legislation manual, to guide farmers activities.

h) to develop a 'school' watershed, holistically and multiprofessionally managed, to be a reference to farmers activity.

i) to realize a multienvironmental planning, with modelling and simulation possibilities, with the goal to increase the resident clean water production, improving the hidrological cyclus.

Duration

The intensive dairy production activities started in 1993, and the watershed related activities in 1995, both in full course of expansion and holistic development.

Who initiated the process?

The production system was realized by Dr.Artur Chinelato de Camargo (Animal Production specialist); and the characterization and monitoring activities were realized by Dr.Odo Primavesi (Soil and Plant Nutrition specialist), in a project linked to the Embr
apa's Environmental Quality Program.

What needs were addressed?

a) a more intense partnership relation among different complementary research institutions and farmer associations were needed.

b) funds to allow the development of the minimal infrastructure.

c) the need to amplify the number of monitored environmental characteristics, with severe difficulties to improve the laboratory pool to do this, despite the partnerships.

d) the need for a more rigorous quality monitoring of the inputs, previewing potential negative impacts of impurities.

e) the need of environmental education towards the population engaged or resident in the watershed.

List the most outstanding results achieved.

A) in research

a. it happened a breaktrough of technical 'tabus', related to high milk producing cows on tropical forage pastures; or the ingestion of shopped sugar cane with urea.

b. it was verified the need of monitore soil characteristics in depth up to 1.60 m, considering environmental qualty.

c. it was verified the technical viability of pasture rehabilitation by surface application (without buring) of limestone and fertilizers, and fast calcium transport to 1,0 m depth, in 3 years.

d. it was verified the major importance of nitrogen to increase tropical forages (4C type), with low possibility of success of legume (3C type) use, because of the high intraspecific competition potential of the stimulated grasses.

e. it was verified the activation of a probable surface adsorption mechanism of cations, generating positive charges which store nitrate in soil profile, below 1,0 m depth: reduces losses, constitute N source for forages.

f. it was verified the need of simultaneous use of couteracting practices: f.ex., N fertilization (acidification) x limestone use (activation of pH-dependent charges of organic matter; the main charges in tropical soils) to avoid cation losses.

g. it was verified the need to consider differences in forage management, related to soil protection/ cover, like between bunch grasses (Panicum sp., Pennisetum sp.) and creeping (Cynodon sp.) or decumbent (Brachiaria decumbens) grasses.

h. it was verified the need of amplify the multielement analytical spectrum, to better characterize the inputs and natural ressources, and avoid future negative impacts or disorders.

i. it was verified the urgent need of a holistic view of multienvironmental rural management.

In the development and technology transfer

a. the importance of a real model of production system.

b. the importance of partnerships with private extension, value aggregation and trade services, to promote the rural development of a region.

c. the urgency to intensify training courses on basal concepts of

technologies, to extension people, farmers and rural workman.

Working staff:

Odo Primavesi (Soil and Plant Nutrition)
Artur Chinelato de Camargo (Animal Production)
Andre de Faria Pedroso (Animal Production)
Ana Candida Pacheco de Aguirre Primavesi (Soil and Plant Nutrition)
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