

Horizontal Cooperation in Terra Linda: Myth or bet?

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With Teaching Note

Introduction

The government of Terra Linda, through its Ministry of Agriculture (MA)¹, sought the government of Brazil in order to develop a cooperation project to enhance food safety and agricultural productivity, from an industrialization strategy based on agriculture. The context is complex, with many issues and few resources. Decisions must be taken. Choices will need to be justified and strategies should be outlined so that the project meets the country's demand, buoyed by the Brazilian experience, in a horizontal manner.

This case study presents the summary of a diagnosis made by a consultant hired by the government of Terra Linda to assist the development of a horizontal cooperation project with Brazil. The focus of the government of Terra Linda's demand is the development based on small-scale agriculture, water resources management and irrigation.

Terra Linda

The country Terra Linda is divided into nine administrative states (ethnically based) and subdivided into 68 regional zones. Terralindes is the official language. Due to its geography, the country has three climate zones: The cold zone, above 2400m, where the temperatures range from 0° C to 16° C, the tempered zone at the elevation of 1500m to 2400m at temperatures of 16° C to 30° C and the hot zone, below 1500m with tropical and arid conditions and daytime temperatures of 27° C to 50° C.

A number of factors – environmental, cultural, historical, institutional and technical – were added in order to produce, over time, a very complex picture of poverty, inequality and food insecurity.

Terra Linda is one of the poorest countries in the world with an annual per capita income of \$ 170, and occupies one of the last places among the 182 countries in the Human Development Index. Life expectancy at birth is only 54.7 years. The infant mortality rate (80 deaths per thousand births) and malnutrition rates (46% of the population) are also among

the highest. The individual consumption of calories per day is estimated to be 1808 kcal, and of proteins is 52 grams /day². The numbers are considered alarming. Although access to education has increased in recent years, the literacy rate is still considered low (36%).

Only 58% of the population has access to potable water and 80% have no access to basic sanitation. Of the children under five years of age, 38% are underweight and more than 12 million people currently suffer from chronic diseases or food insecurity. Its population is predominantly young, with an average of approximately 17 years. Today, 46.3% of the population is aged between 0 to 14 years; 30% in the range of 15-29; 17.7%, in the range of 30 to 44; and 4.5%, from 45 to 59 years. The population is essentially agrarian (85%) and characterized in part by nomadic behaviors.

Aside from the social issues, the weather - heavy rain alternating with periods of drought – is a preponderant factor for the impediment to the development of the country, especially with regard to land issues. Terra Linda's major problems are found in the underdevelopment and hunger.

The dilemma of the agriculture sector

On one hand, agriculture in Terra Linda is the pillar of the economy and the livelihood of the population, practiced by families on small farms, using rudimentary and outdated techniques that do not promote efficient production of food. In this context, 80% of the population survives on agriculture, contributing about 45% to the national GDP. On the other hand, 80% of export revenues, supply of goods and raw materials for other sectors of support of the economy come from agriculture. Such export volume is concentrated by large clusters of foreign capital and corresponds to the monoculture production.

Major export products

Coffee, oil seeds, legumes (beans), flowers, sugarcane , forage for animals, cereals such as wheat, corn, sorghum, barley and teff (a grain native of the region and appreciated in the local diet) and a plant named khat , which has psychotropic properties and which trade is free in neighboring countries.

Although the soil and climate can be considered suitable in some regions of the country, periodic droughts, erosion and soil depletion, deforestation, high population density and poor infrastructure make it difficult to produce and supply the markets and do not favor exports. According to data from the government itself, although there was growth in the agricultural production, the country has not yet achieved independence in food production.

Until the mid 1970s, Terra Linda had a known feudal system base. At the time, agricultural lands were under the power of the upper classes, where farmers were treated as tenants who paid their rent with about 50% of the harvests. The period was characterized by problems of tenancy and land reform, lack of government investment in the agricultural sector (which received less than 2% of the government budget in that decade), low productivity and lack of technological development. To aggravate the internal political instability of the country, extended periods of drought and internal disputes led to a time of famine, especially in the 80s.

It is no coincidence that Terra Linda sought Brazil. Besides the redistribution programs, its government recognizes that Brazil has a large accumulation of knowledge to balance increased agricultural output with training processes of institutional actors and small-scale production, seeking sustainable solutions compatible with the sociocultural reality site.

The government of Terra Linda showed interest in facilitating processes of technological development in the areas of:

- Irrigation, withdrawal and retention of water;
- increase in the institutional capacities in technical assistance and rural extension (TARE);
- improvement of the organizational capacities of producers (water users) of small scale.

Terra Linda's current strategy for the agricultural sector

Currently, the government of Terra Linda has made efforts to achieve greater agricultural development through the substantial allocation of their own resources, together with fundings coming from the international community. Therefore, in September of 2010, a structural document of Policies and Investments of the Agricultural Sector (Pias) was elaborated. This document, effective for 10 years, establishes the priorities for investment that can boost agricultural growth in the country.

The support base of Pias is a long-term strategy for economic development, through the Industrialization Based on Agriculture (IBA), focused on the transformation of the economic structure of the country. This policy is based on three main ideas: (a) agriculture as a pillar for export, (b) the country's food supply, and (c) industrial production.

Thus, to facilitate the marketing of agricultural products, the government, in collaboration with the Food and Agriculture Organization (FAO,) launched the Terra Linda Commodity Exchange (TLCE). The goal was to benefit both the private sector and small farmers (through cooperatives), since agriculture accounts for 86% of the total foreign exchange of the country and supplies 70% of the raw material needs of local industries.

Still on the use of land, the government has focused on the use of water resources, since the disorderly occupation, the use of outdated practices of planting and irrigation, and the climatic condition of the country itself (subject to alternating periods of drought and strong rain) have contributed to erosion and silting of the rivers. In this context, the occupation of land for planting follows, nowadays, the Decree 197/2000 which deals with Water Resources Management and Water Resources Management Policy. The decree regulates the occupation of the land for cultivation and exploitation of water resources for agriculture and livestock, according to what was established in the policy document, giving special attention to the preservation and restoration of degraded areas.

One of the objectives of the Water Resources Management Policy is the proper use of water in crops and livestock, as well as in industries. For this, the document recognizes the irrigation process as an important part of water management and therefore advocates the development and application of these technologies in agriculture. Thus, it is expected to guarantee drinking water for the rural population from the conscious use of natural sources, as well as promote socioeconomic development.

Apart from the Pias, the country is interested in developing public policies for food safety as a fundamental aspect for achieving socioeconomic development of the sector and to ensure citizens' right to food. Food safety is achieved when all people, at all times, have physical and economic access to food that is sufficient, safe, nutritious and meets the nutritional needs and food preferences in order to provide an active and healthy life.

Situational analysis: irrigation infrastructure, institutional organization and knowledge

The performance of agriculture has been conditioned by several factors, mainly climatic variability, limited access to technology, low levels of rural infrastructure, low institutional capacity, chronic poverty and poor water management, which prevails in almost all irrigation systems in particularly in communities that manage small-scale systems.

Despite the water resources potential of Terra Linda, irrigation remains underdeveloped and underutilized. The area under water or irrigation management is less than 10% of the crude irrigation potential, which measures approximately 5.3 million hectares. In an attempt to put irrigated agriculture in the center of the country's development agenda, the government of Terra Linda promotes irrigation with three approaches: small scale irrigation, improvements in water retention and withdrawal of rainwater for agriculture.

Three elements are essential for an irrigation system to be efficient and of good performance: infrastructure, institution and technique/technology. As already explained, the performance of small-scale irrigation

and the water collection practices in the country are rudimentary and outdated. The actual irrigated areas are often smaller than the areas equipped for irrigation, in other words, many times those areas have technological resources, but not people trained to use them. The efficiency of water use and productivity are low, mainly due to the following factors:

- the lack of supply organizations with technical and institutional capacity;
- infrastructure and poor irrigation system;
- poor design/construction or lack of appropriate maintenance;
- mismanagement of water because of inadequate support from extension services, and
- lack of markets for inputs and outputs.

The traditional irrigation infrastructure do not resist floodings, even minor ones, and do not allow proper regulation of water distribution. Thus, during the irrigation process, there is the supra/sub-irrigation and the application of unknown amount of water. The excessive loss of water is common in all small-scale irrigation systems, causing a low level of productivity of the water and the irrigated agriculture.

While water collection is welcome for the diversification of livelihoods, improvements in families food security and for the economic growth, the rate of water use³ did not achieve the expected levels due to several challenges, including: the lack of integration of irrigation development with the management of hydrographic basins, choice of inadequate technologies related to agroecology and water application techniques. The rainwater collected is not used efficiently for agricultural production due to the lack or the inadequacy of pumps to lift the water and apply it on the field. These technical and technological bottlenecks require support to increase the contribution of water collection of smallholders, in order to improve food safety in an environmentally sustainable manner.

The model adopted by Terra Linda was the community irrigation. This model requires a collective organization of users, something lacking in most small-scale irrigation systems in the country. What exist are irrigation cooperatives, with low capacity to manage the irrigation system and the adherence of its members. Because not all water users are members of cooperatives, there are difficulties to collectively manage water use, to do collective shopping for system maintenance and to adopt planting schemes.

Therefore, we identified the need to organize associations of water users in order to improve the management of irrigation systems and river basins - which are the main sources of water. If the performance of small-scale irrigation must be improved to contribute significantly in the enhancement of food safety and boost economic growth, the beneficiaries of irrigation should be institutionally strengthened.

Support services are inadequate and result from a system of fragile extension and the lack of technical know-how in irrigation. All extension agents have limited knowledge of agriculture in arid areas, in terms of techniques and technologies in irrigation. So, there is a need to improve the technical training of the extension workers and users of irrigation, through specific training and the sharing of experiences with the producers.

The current demand from Terra Linda to Brazil

Currently the Agricultural Research System of Terra Linda (ARST) has 55 research centers located in different agroecological zones of the country. Research centers vary in their expertise, human resources, material resources and management entities. Some of the research centers and units have one or more subcenters and experimental fields. The Institute of Agricultural Research of Terra Linda (IAR-TL) is responsible for managing the federal research centers and the regional institutes of agricultural research (RIAR) are administered by state governments (regional). Higher education institutions (HEIs) are also part of the system. The overall coordination of agricultural research is the responsibility of IAR-TL, which also acts in matters of agricultural research policymaking. The Ministry of Agriculture (MA) and the Regional Councils of Agriculture (RCA) are the main agencies for technical assistance and rural extension acting in the execution of public policies on agriculture and in the technical extension to strengthen the community irrigation system along with the small-scale subsistence producers.

This context is a direct reflection of the following situations: i) indiscriminate occupation of agricultural areas, without the use of appropriate technologies for the management of soil, water and biodiversity; ii) nomadic feature of much of the rural population; and iii) the low levels of agricultural productivity, as a result of a poor system of basic inputs contributions and of diffusion and absorption of available technologies. Therefore, the cooperation strategies should keep the focus on populations whose land occupation is perennial (non nomads), in a production model aimed at improving the quality of production and consequently the income of small and medium producers, based on actions of organization of the production and of the irrigation processes.

Although there is water potential, the resources have not been well used to develop the country's economic and social welfare. Although agriculture is the core for fighting hunger, reducing poverty and generating sustainable economic growth of the sector, it has been dominated by the subsistence family farming, which is characterized by the use of traditional technology, heavy dependence on rain, fragmentation of land and low productivity. Environmental degradation

leads to reduction in agricultural productivity, making the population more susceptible to drought and other natural disasters.

The project coordination in Terra Linda belongs to the Institute of Agricultural Research, while the Ministry of Agriculture (MA) and the RCA are the main stakeholders in the project. The MA, in collaboration with regional agencies for agriculture and water, and the FAO, will select the beneficiaries, including members and non-members of irrigation cooperatives. Among other actions, it is expected that the project will enable at least 40 technicians from the MA and RCA, and directly benefits the 760 farmers, while larger communities will benefit indirectly by the training activities. Lessons learned will be replicated to wider areas.

The expectation is that the budget for development of the sector, estimated at US\$ 750,000 per year (data from 2011/2012), skip to about US\$ 2.74 million by the end of Pias, which is to say that in the total of 10 years duration of Pias, about US\$ 16 million would be invested. Of this amount, US\$ 2.5 million is allocated to existing projects and programs in the country. The remainder will be put into specific objectives of Pias, in the second half of the program period. It is estimated that of this total, approximately 40% (US\$ 5.6 million) will be coming from donations. It is estimated that the cooperation with Brazil can last up to 24 months, subject to extension, based on the assessments of project outcomes. The estimated budget of the intervention by the Brazilian side is initially of US\$ 200 thousand.

Table 1: Some socioeconomic parameters

Indicador	Definition	Global Average
GDP/ <i>per capita</i>	The per capita income is an indicator that helps to know the degree of economic development of a country or region (it is the sum of the salaries of the entire population, divided by the number of inhabitants), and consists in dividing the national income (gross National Product - GNP), minus the cost of capital depreciation and indirect taxes, by its population. Sometimes, the Gross Domestic Product (GDP) is used.	US\$11,150
Life expectancy	The average number of years that a group of individuals born in the same year can expect to live, if kept, since birth, the mortality rates observed in the year of observation.	66.57 years
Child mortality rate	It consists of the number of child deaths in the first year of life. It is the basis for determining such rate, which is the infant mortality rate observed for one year, referred to the number of live births in the same period.	42.09 per 1000 births
Child malnutrition rate	Rate of underweight children under five years old, caused by improper, hypocaloric and lipoprotein diet. It can also be caused by malabsorption of nutrients resulting from other diseases.	7%
Calories Consumption	Amount of calories consumed per day.	2500 Kcal
Protein consumption	Quantity (in grams) of protein consumed per day.	80 grams/day
Illiteracy rate	Percentage of population that can read and write by level of education.	82%

Glossary

TARE – Technical Assistance and Rural Extension

TLCE – Terra Linda Commodities Exchange

RCA – Regional Councils of Agriculture

FAO – Food and Agriculture Organization

ABI – Agriculture Based Industrialization

IHE – Institute for Higher Education

IAR-TL Institute of Agricultural Research of Terra Linda

RIAR– Regional Institute of Agricultural Research

MA – Ministry of Agriculture (Terra Linda)

GDP – Gross Domestic Product

PIAS – Policies and Investment of the Agricultural Sector

ARST – Agricultural Research System of Terra Linda

Notes

¹ At the end of the text, there is a glossary of all the institutions and policies pertinent to the project.

² At the end of the text, there is a table showing some reference data for these socioeconomic variables.

³ The rate of water use is the measurement of water used per person for all their daily needs. The abundance of water can generate very high rates, or waste. But in areas of droughts and/or lack of irrigation, rates are below average, undermining food safety and therefore the population health. This rate also serves as the basis for calculating the cost of water use.