

Ministry of Agriculture and Livestock
Republic of Paraguay

Final Report

Final Evaluation Study of Beekeeping
Diversification Project for the Extension
and Improvement of Propolis and
Pollen Quality in Paraguay

Final Report

March 2002

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JAPAN INTERNATIONAL COOPERATION AGENCY

R. PEDRETTI & CONSULTORES ASOCIADOS

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Ministry of Agriculture and Livestock
Republic of Paraguay

**Final Evaluation Study of “Beekeeping
Diversification Project for the Extension
and Improvement of Propolis and
Pollen Quality in Paraguay”**

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SUMMARY OF PROJECT FINAL EVALUATION

Date: 15/March/2007

JICA Paraguay Office

1. Outline of the Project	
Country : Republic of Paraguay	Project Title : The Project of Diversification of Beekeeping for the Extension and Improvement of Propolis and Pollen in Paraguay
Issue/Sector : Agriculture Development	Cooperation Scheme : Technical Cooperation
Division in Charge : JICA Paraguay Office	Total cost : 36,549,000 Japanese Yen
Period of Cooperation	1/April/2005 – 31/March/2007
	Implementation Organization : Ministry of Agriculture and Livestock
	Supporting Organization in Japan : --

1-1 Background of the Project

In the Republic of the Paraguay, Beekeeping is realized by almost 80% of the small farmers, reason why the Paraguayan Government has been encouraging actively the beekeeping insertion in the unexplored areas and as a diversified item of the rural farm. The technical assistance to these farmers' tratum is one of the Policies of State, since agriculture is a key activity of the country.

The Japanese cooperation for the promotion of beekeeping through the technical cooperation of JICA has started from the 1970 year, though the experts sending, research project (1992-1995), and also training of Paraguayan technicians in Japan.

Later, from year 2005, in order to improve the beekeeping area of the country, JICA has supported a series of meetings with the authorities of the Ministry of Agriculture and Livestock, and there have been confirmed the need to realize the technical cooperation in the most efficient form.

Concerning the implementation of technical cooperation in the field of the beekeeping diversification and extension, the respective authorities recognized the importance of implementing a new project by means of JICA's cooperation, by sending expert of

Japanese ancestry (Nikkei of Brazil).

The new Project has begun on April 1st, 2005 for a period of two years of cooperation, which has been executed based on a Logical Framework (PDM) and Tentative Plan of Operation (PO). There have been selected for the project 5 producing areas located in the departments of Caaguazu, San Pedro, Cordillera, Paraguari and President Hayes, and the activities have been done in each model beekeeping committee in each department.

The Ministry of Agriculture and Livestock, as the counterpart institution designated extension officials from both DEAG (Extension Direction) and DIPA (Animal Production and Research Direction), to offer technical assistance to the beekeepers of the project.

1-2 Project Overview

(1) Overall Goal:

- Improvement of the standard of living of the beekeepers through the establishment of high quality production of the beekeeping products

(2) Project Purpose:

- To establishment norms for the quality and diversification of beekeeping products, honey, wax, propolis, pollen, etc.
- To transfer technical knowledge of diversification for the beekeepers

(3) Project Outputs:

- 1) Diffusion, training, and adoption of skills for suitable production
- 2) To provide with minimal infrastructure for an economic Gathering Center
- 3) To strengthen the beekeeping laboratory of the Ministry of Agriculture and Livestock

(4) Project Inputs

1) Japanese Side

Third-country short-term experts: 1 person x 34 times
(Brazilian NIKKEI expert)

Local cost: Approx. 12.168.000 yen

No. of trainees received in Japan: 8 people

2) Paraguayan side

No. of counterpart staff	DEAG(3), DIPA(3)
Local cost	Approx. 60.000 USD
Land, facilities, vehicles	

2. Evaluation Team Overview

1) Member of the team

Leader: Yutaka Iwatani, Vice Resident Representative of JICA Paraguay Office
Analysis and evaluation: Richard Pedretti, President of R.PEDRETTI Company
Coordination and Administration: Kenji Yamamoto, JICA Paraguay Office

3. Overview of Evaluation Results

3-1 Achievements

(1) Output Achievements

About output 1, honey production has been increased in the each model committees selected in four departments, especially in the case of Caguazu committee, they have gained high technique and capacity to produce honey that has tripled. However, it was not able to select the suitable committee in the department of Presidente Ayes, for the absence of the suitable farmer group which has potential location and good leader.

About output 2, in the committee of Caaguazu, the management of Gathering Center has been established and has been able to produce under the sanitary condition. The products except for honey have not produced during the project period, because economic profitability through honey production was preceded before other products. However, the possibility of high quality propolis production was confirmed in the model committee located in Paraguari Department.

About output 3, it could be accomplishment through technical transfer to the counterparts of DIPA/MAG.

(2) Project Purpose Achievement

About products quality control system has been establishment through the strengthening of the technical capacity of counterparts and one model committee. And basic quality control system and related know-how has been acquired in even other three committees. As result of the sufficient transfer of the beekeeping technique and knowledge, four committees have been launched and quantity of honey production has been increased in all committees. About technique of diversification has been transferred to farmers but profitable production has not been started yet.

(3) Over Goal Achievement

Honey production technique, which was necessary for the products diversification, has been acquired in all committees and contributed to the farmer's income. But farmer has tried only two production cycle so it is not sufficient to get higher production technique and the knowledge of Gathering Center management.

3-2 Summary of Evaluation Results

(1) Relevance (The relevance of the project is high)

- Strengthening of the small farmer is the one of the significant policy of the Paraguayan Government (Ministry of Agriculture and Livestock), so this project is in accord with the streamline of the agriculture polity.

- The project initially focused on the increase of the production beekeeping diversification, but considering the needs to improve qualitatively and quantitatively the production of honey, the project concentrated his efforts on this. The realized investigation demonstrated an internal increasing market for honey and derivatives. So the project objective was relevant to the national policy and the approach was also relevant to the market situation.

(2) Effectiveness (The effectiveness of the project is almost successful)

- The assisted beekeeping producers have successfully adopted the improved skills for production of honey and beekeeping derivatives.

- An increase of the honey production volume and of monetary income was achieved.

- The honey quality has been much improved by means of the installation and operation of the Gathering Centers in the most advanced Committees, Remaining to be completed in locations.

- The project concentrated on the maintenance of the current MAG Beekeeping Laboratory equipment but not acquiring new instruments. The Laboratory of Beekeeping at MAG is in operative conditions providing services mainly to honey marketing companies.

(3) Efficiency (The efficiency of the project is almost successful)

- The assisted committees are in diverse degree of development, for reasons which are specific to each one, not being due to the project. In the most advanced committees, the results are highly satisfactory considering the profitable economic return.

- The development of planned activities were mostly satisfactorily fulfilled, through the

energetic activities taken by counterparts of DIPA, although the assignation of the counterparts from DEAG was delayed very much.

(4) Impact (The estimated impact of the project is almost successful)

- The income increase of the beekeeping producers was achieved in the most advances committee but a similar result is also expected in the other committees.
- In relation to the PDM assumptions, both there were not social conflicts or registers negative incidences of agrochemical use in the beekeeping population. On the other hand, the incidence of natural adversities was experienced on honey production, especially effects due to droughts or rainfall excesses. This factor mitigates the obtained qualification.
- Concerning the assumed externalities such as bee attacks they were not registered, neither to the nearby human population nor the increase of flies or other insects as consequences of the beekeeping production.
- In Some cases positive effects were detected in nearby field crops by better bee pollination.
- It was registered a strong interest of the non beneficiary nearby population for entering to current committees or begin production activities in beekeeping.

(5) Sustainability (The sustainability of the project is middle level)

- Sustainability of the one advanced committee is estimated very high to develop continuously from institutional, human-resource, technical aspects. If the revolving fund system will be introduced, it's sustainability will be still made certain.
- However, in the other case of remaining committees, the management capacity for Gathering Center of Haney was insufficient, although the producing technology has been improvement.
- As the MAG makes a point of the support policy for small farmers, so it is estimated to continue the certain follow-up activities, however, considering the difficult budgetary situation of the ministry it is not able to predict the sustainability toward the nation-wide extension.

3-3 Factors Contributing in the Production of Effects

The shuttle style dispatch of the Brazilian NIKKEI experts, who are advantageous for the project in the aspects of communication capability and similar technology, has been very efficient for the project results. And the participation of the

educated counterparts trained by the ex-technical cooperation and their continuous visiting guidance to farmers has been also efficient, even during the experts absence.

In addition, the collaboration relation between the department of apiculture in DIPA and DEAG has functioned very well to do guidance about the Gathering Center management. In the farmers level, careful selection of the committee, sufficient base line survey, imposition of beneficiary's pay were very effective method for the project.

3-4 Problems and Factors that Raised Problems

The results of the level of acquired Production technique and organization of farmer's group has variety because of the capacity and endowment of committee leaders. In the committee in which the organization was delayed, planning of the Gathering Center allowance has delayed. And the vehicle of DIPA that was utilizing the project frequently has problems due to lack of budget and bad maintenance.

3-5 Conclusions

The project has consistency with the Paraguayan policy for small framers and JICA's aid policy that is "Assistance for small farmaers self-help" and "Re-activation of ex-implemented projects". Although project objective and results has been accomplishing in the advanced committee, in the remaining committees, it is insufficient in the technical aspects and Gathering Center management know how. It is recommended the follow-up activities through cooperation period extension.

3-6. Recommendation

- In case of continuing the Project, it is recommended to repeat the process of capacity building according to the recipient's stages of development, as it was performed in the current project

- It is recommended that in case of continuing the project, That the same one should concentrate in consolidation the already assisted committees, and stimulating the emergence of new committees in the same locations taking advantage of the local experience acquired by the assisted Committees (horizontal transfer), approach that is considered to be very effective to achieve the transmission of knowledge and experience between the own settlers of the area.

- To improve the performance of the technical assistance it is recommended to locate at local base level extension specialized in beekeeping, in order to achieve an effective follow up to the beekeeping committees. Also, to consolidate the results, obtaining it is needed longer periods of accompaniment at medium and long term.

- In case of the Chaco region, the project jointly with MAG will have to decide the strategy to be applied, considering that according to the ministerial specialists the area might produce beekeeping products with certified organic quality, concentrating specifically on the production of honey and pollen.

- In relation to the place of the Gathering Centers, although the decision must be based on a local analysis on their advantages and disadvantages, if it is possible the same ones should be located preferably in places which are property of the Committees, thinking that it must be carefully analyzed on a case by case basis, the property of the infrastructure and of the donated equipment, as well as the rights of use in order to prevent avoidable disagreements.

- For the future production of green propolis it is fundamental to evaluate previously the honey providing flora of the area, since the presence of species as the Sapiranguy, and others could affect the beekeeping products coloration, and therefore the commercial quality of the final product.

- It is recommended to advance in the initiative to realize joint sales in place of the Asuncion Market of Supply, in order to evaluate his economic result and to study the administrative internal forms of the organization, in order to regulate the bulk and retail marketing operations.

3-7 Lessons Learned

- The experience demonstrated that it is not possible to bypass initial stages in Committees whose members had an incipient production of bees, considering their ignorance of numerous technologies for modern production. Due to the above mentioned motive, the Project had to qualify firstly the beekeeper producers in the modern skills for honey production with productivity and quality, before escalating to production of green propolis and pollen, which are more sophisticated products with higher commercial value.

- In case of continuing the project, as for the institution counterpart, at MAG level it is needed to make clear what would be the institution entrusted to coordinating with other involved institutions (JICA/DEAG/DIPA), and to better compensate the assisting local technicians for their work.

- The methodology of selecting producers who were already beekeepers previously to the project turned out to be a very effective criterion, counting from the beginning with well motivated honey producers.

- High evaluation score was achieved on the part of the honey producers for the high quality of the received technical assistance, as well as by the project's provision of

inputs and the necessary equipment which were limiting factors given their poverty condition, as well as for the close follow up and opportunity of interventions from the project.

- The importance of Gathering Centers in the production of high quality honey implies that the election of the places where to be installed must be done on a case by case basis, with participation of the involved public and private participants.

- The fact by which the own committee members participated in defining the use regulations of the infrastructure from the Gathering Centers turned out to be very suitable. The majority of the interviewed showed knowledge for the most important aspects for the processing, and cleanliness and quality requisites of the obtained product.

- The training and technical assistance to the beekeepers provided by the expert and his counterparts based both on theory and practice in their own apiaries belonging to the committees associates, it was a very effective approach for technology transfer.

- The priority setting for areas not suitable for commercial agriculture, but with existing abundant natural vegetation, turned out to be highly beneficial, avoiding in that way being threatened by problems like that of agrochemicals contamination.

- The project demonstrated to be effective fallow areas or with abundant native vegetation, that do not usually provide economic income to its occupants and neighbors.

3-9 Situation of Follow-up Cooperation

Both side were agreed with the follow-up technical cooperation from April 1, 2007 to March 31, 2008. During the prolonged period, it is focused to strengthen the Gathering Center through the organization activities. At the same time, JICA will dispatch Japanese voluntaries to each committees to enhance and extend the project results. In addition, the project will try to extend the results to other regions concerned.

**PROGRAM OF BEEKEEPING DIVERSIFICACIÓN BY MEANS OF PROPOLIS
AND POLLEN IN PARAGUAY
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

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1.- Introduction

1.1 Antecedents

In the Republic of Paraguay, the beekeeping activity is realized by almost 80% of the small farmers, reason by which the Paraguayan Government is actively fomenting the insertion of beekeeping in the unexplored areas and as a diversified product of rural farms. The technical assistance to this layer of producers is one of the State policies, because farming is a key socioeconomic activity of the Country.

The Japanese Cooperation for the promotion of beekeeping through the Technical Cooperation of the JICA has initiated since the 1970 year, through experts delivery, donations of equipment for the Laboratory of the Department of Beekeeping from the Ministry of Agriculture and Livestock, and also by training of Paraguayan technicians in Japan.

Later, starting in the 2005 year, JICA has maintained a series of meetings with the authorities from the Ministry of Agriculture and Livestock, with the purpose to improve the beekeeping area of the country, and have confirmed the need to perform the technical cooperation in the most efficient way.

With respect to the implementation of the technical cooperation in the area of beekeeping diversification and extension, the respective national authorities recognized the importance of implementing a new project by means of JICA cooperation, by sending of experts from Japanese ancestry (Nikkei of Brazil).

The new project has begun on April 1, 2005 for a two years period of cooperation, which has been executed on the basis of the Project Design Matrix (PDM) and Tentative Plan of Operation (OP).

1.1.1 Evaluation purpose

Study Objective (Final Evaluation Project)

The evaluation objective is made up of three goals.

- a) That on the basis of the lessons learned with this evaluation, be possible to take decisions for executing future projects.
- b) On the basis of JICA's responsibility and mission, to spread the Project results to other interested institutions.
- c) Through third part people, it will be able to improve the "Strategic Plan of Cooperation of JICA".

It will be possible to formulate recommendations on the cooperation content to attain higher effectiveness in the execution of Project Type Technical Cooperation.

1.1.2 Main involved actors

Five producing zones located in the departments of Caaguazú, San Pedro, Cordilleras, Paraguari and President Hayes have been selected for the

project. Respectively, In these zones there is on going work with the following committees of small producers: Committee Beekeeper *Nyuari Eireté* which counts on 21 members (Caaguazú), Committee *Tajy Poty* with 8 members (San Pedro), Committee *Chirca Poty* with 13 members (Paraguari), *Carumbey* Committee with 10 members (Cordilleras) and *New Mestre* nucleus 1 (President Hayes).

The Ministry of Agriculture and Livestock, as counterpart institution designated both DEAG (Dirección de Extensión Agraria) extensionists civil service and DIPA (Dirección de Investigación y Producción Animal) specialists.

1.2.1 Logic Framework Summary

PROJECT DESIGN MATRIX (PDM) DIVERSIFICATION OF BEEKEEPING FOR THE EXTENSION AND IMPROVEMENT OF PROPOLIS AND POLLEN QUALITY IN PARAGUAY			
INDICATORS	VERIFIABLE OBJECTIVES	VERIFICATION MEANS	ANNEX II EXTERNAL FACTORS
1) SUPERIOR GOAL Improve beekeepers level of life by establishing high quality production level of beekeeping products.	Assistance to the beekeepers for diversification.	Statistical Division Dep., of Beekeeping from MAG	There is no modification of the Government, should the assistance to beekeepers.
2) OBJECTIVES OF THE PROJECT * Establishing norms for the quality and diversification of the beekeeping products, honey, wax, propolis, pollen, etc. * Transfer of technical knowledge for diversification of beekeeping for the producers.	* Protect beekeepers duplicate their production of honey and wax. * Model beekeepers selected from Dep. I, President Hayes and Remolins increase their pollen production. * Model beekeepers selected from Dep. I, Cordillera, Caaguazú San Pedro learned the harvesting of green propolis.	* Producers Register * Registers of model plant reception of honey (and post harvest)	* Beekeepers train * Increase in apiculturalists * Medical treaters
3) RESULTS 3.1.1) Diffusion, training and adoption of techniques for adequate production. 3.2) Profile and minimum infrastructure for an economical gathering center. 3.3) Strengthen the beekeeping laboratory from the Ministry of Agriculture and Livestock.	* Beekeepers of the project trained and adopted the adequate technology * Land acquiring * Build an economical gathering and storing center for the selected zone * Standardize the approved laboratory for analyzing honey, pollen, propolis and waxes.	* Assistance Unit * Training report * Construction Plans * Patent of municipal approval * Analysis Results	* Reduce economic conflicts * Institutional changes * Legal improvements * Budgetary availability
4) ACTIVIDADES 3.1.1) Zones Selection and organizing producers 3.1.2) Improvement of the technical and infrastructure of the producers 3.1.3) Selection and training to base technicians 3.1.4) Training to selected producers 3.2.1) Selection of lands in each department. 3.2.2) Realize Municipal ruling order 3.2.3) Provide equipment to the plant 3.2.4) Select and train to people in charge of storing center 3.2.5) Administrative of the center of storing and lands spread sheet of sales and purchases 3.3.1) Equipment maintenance 3.3.2) Input acquiring 3.3.3) Equipment acquiring	* 25 Beekeeper in 5 selected zones as model beekeepers. * 15 Base technicians selected and trained * 25 beekeepers continuously trained * 5 Department selected in 5 District or model zones * Equipment of laboratory functioning * 5 trained technicians * Functionary handbook available * Equipped local * Spread sheet of Sales and Purchases * Input acquiring * Input provided at the 6 months	* Agreement among MAG and beekeepers production Condition. * Certificate of training * Analysis spread sheet * Course report * Condition of producers established * Local approved * Extension technicians from MAG-DEAG * Functionary handbook * Equipment inventory * Service Contract * Purchase Invoices * Foundary A.M. and A.J.E.A.	* Resources availability * Socioeconomic Conflict * Institutional changes
	INPUTS (Paraguay) * Countryside available * Personnel available for work reports * No fee provided for the Expert * Vehicle and driver for mobility (vehicle donated by the initial Project of beekeeping -MAG/DIPA) * Laboratory of beekeeping.	INPUTS (Japan) * Third country expert employed * Training Courses for trainers in the country * Equipment and needed materials provided * Various expertises for the expert activities	Condición a Priori * The small beekeeper producers of the zone accept the activities expected in the project

1.2.2 General status

The general status of the Project is different according to the developmental stage of the different localities. In general, the comparative situation of beekeeping in the visited Chaco zones can be considered as incipient, the situation of the Committees from Atyrá and Sapukai as in initial stages, and those of Calle Bertoni and Juan Manuel Frutos as the most advanced ones.

AGRICULTURAL SCHOOL SAN JOSÉ OBRERO (CHACO)

Location and characterization of surroundings

The Project began in the Chaco zone in the new settlement New Mestre (nuclei 1 and 2) located at 40 km from the asphalt road, entering at km 310 of the Transchaco Route. In each nucleus 6 families were detected to be initially assisted. Since the community had problems of access during the rainfall period, the beekeeping project then looked for another location to extend the honey productive base, visiting the San José Obrero Agricultural School.

The school is located in the District Teniente 1^º Irala Martinez, Department of President Hayes, at kilometer 385 of the Transchaco Route. The School lodges up to 60-70 intern students of both sexes, including natives, originating from all the parts of the Chaco areas. It belongs to a catholic religious congregation that offer secondary level formation with farming technical orientation.

For social and agricultural technical extension support, the School attends two farming settlements, where one of them is located at 20 km distance (San Pablo Miki, with 10-12 families dedicated to milk production, commercializing through the Chortitzer Committee Cooperative), and the other (Falcon, with 14 families and same activities combined with subsistence crops) located at 70 km from the school. The organizational base of both communities is incipient.

The project had an initial participation with the School looking for the feasibility to perform qualification activities in beekeeping to stimulate its future diffusion in the Chaco region. Once the needed beekeeping capacities are acquired locally, the School could spread this line of production in its surroundings.

The Chaco region has a great potential for beekeeping production, considering that in Argentina the equivalent zones are the main honey producer and large scale exporter.

In the case of the Paraguayan Chaco, the main limiting factor would be the shortage and great geographic dispersion of the human settlements, especially of peasant small farmers who are largely surpassed in number by different indigenous ethnic groups, out of which only those of guaraní origin are agriculturists, being the other indigenous ethnic groups wage-earning at the extensive cattle ranchers or the Mennonites farms and agro industries in Central Chaco, or primitive hunter-collectors. The project is designed to attend communities of small farmers who are below the poverty line, and not including the various indigenous communities that require another type of developmental approaches with strong anthropological component, given the risk of negatively affecting their cultural patterns.

Another limitation for promoting productive initiatives such as the present project consists in the difficult road access during the rainfall season, from September to mid May, being the majority of them not paved. This is the same condition to reach the newer establishments like New Mestre. In the Central Chaco zones this limitation is greatly reduced due to the permanent maintenance work and roads repair done by the Mennonite colonies.

Most of the small farming settlements zones in Chaco are characterized by reduced cropping, rather of subsistence crops and few rent seeking cultures like sesame, combined with extensive areas of natural pastures and bush vegetation of ligneous and thorny species and palms, which are very apt to support honey bee populations, being the extraction of wild honey one of the main sources of income, although in small scale.

The Chaco region counts on very scarce urban nuclei, rather small and dispersed, being in better conditions the ones that are located by the Transchaco road, till Mariscal Estigarribia town. Other populations with stagnated development are the ones located on the shores of the Paraguay River, whose main communication way is river navigation.

It is estimated that any initiative of future diffusion of the Beekeeping Project would have to focus on the small population settlements nearer to San Jose School, and the small nuclei of farmers in the zone of Cruce Los Pioneros, at Central Chaco. The School already counts with beehives and all the specialized equipment donated by a previous project (Program PRODECHACO, with financing of the European Union), demanding proper qualification for its productive use with the best available technology.

In the extensive cattle ranching zone of the lowland southern Chaco, many ranches count on honey production gathered from few to a hundred hive boxes, although such equipment belong to the ranch owners, population that is not goal of the present project, destined to poor farmer populations.

COMMITTEE CHIRCA POTY (SAPUKAI)

Location and characterization of the surroundings

The *Chirca Poty* Committee is located in *Cerro Roké* at the District of Sapukai, Paraguari Department, in a high plateau zone in the *Cordillera de los Altos* Mountain range, neighboring the Valenzuela District.

The zone where the members of the Committee live is characterized by low productive potential for crop growing due to the very sandy and superficial soils predominance with rocky subsoil, being limited rather to the subsistence agriculture, by means of production plots of self consumption crops, such as manioc, maize, beans, peanut. In few farms pineapple is produced in addition as rent culture, which is locally sold to merchant truck drivers for its sale in the main urban markets of the country.

As far as the farming property structure, advanced minifunds like in other small farming zones is not observed, being rather low the population density. Even more, there are some large cattle raising properties interspersed with the small rural

settlements. It is not perceived conditions of extreme poverty either. The emigration of young people in search of educative and labor opportunities is a local reality. Also, except for the presence of some modest warehouses, the area lacks the majority of both public and private services that usually are present in other similar zones.

The main communitarian limitation consists in difficulties of road access, since in spite of being located at very few kilometers from Sapukai, like the closer main urban center, the road presents pronounced slopes when ascending the mountainous area, so that it requires appropriate vehicles to surpass them, being even more dangerous to transit under raining weather. Other access roads although not paved and with rocky aflorations in their entire itinerary, communicate with remoter towns. The community is served by bus transport with two daily frequencies that use these long roundups to arrive at their habitual destiny.

In contrast to the above mentioned aspect, all the community counts with a network of rural electrification and, in some zones, deep potable water wells.

The Sapukai District belongs historically to the group of old towns served by railroad, from mid 19th Century, remaining isolated by the more than half century delay in integrating itself to the rest of the territory by means of paved roads. This zone has been at the margin of the development process experienced by the populations communicated by modern hard cover roads, fact that worsened by the railroad cessation of operations in the last decade.

At the moment, this situation is next to be overcome by means of the asphalted modern road construction advance from Villarrica toward Paraguari town. The section up to date constructed already intercommunicates to Villarrica, Tebicuarymi, Ybytymí, until Caballero towns, anticipating that it will arrive from there to Sapukai in next May. Obtained this, it would only lack about 40 kilometers passing by Escobar until Paraguari where it will be connected with main Route 1. Although the new route arrival is close, its firstly mentioned exit would be favorable for the fast delivery of the beekeeping production towards the East of the country, lacking the final section only for direct communication with the main internal market, Asuncion and its metropolitan area.

In this producing zone predominates the natural bushy vegetation and some low native forests, which represents a great advantage for the beekeeping production due to the abundant staggered flowering according to the different species, combined to the fact of not existing agrichemical contamination, widely used in commercial agriculture, fact characteristic of other zones with better cropping potential. It is remarked the generalized abundance of the bushy vegetation with predominance of *Chirca*, essential for the production of green propolis, constituting this aspect one of its comparative advantages.

The Center of Gathering and Storing was located in a suburban estate of the Company Cerro Roké, donated by the District Municipality to the Committee. The facility was in advanced phase of construction up to the date of this evaluation.

COMMITTEE CARUMBAY (ATYRÁ)

Location and characterization of the surroundings

The *Carumbey Committee* is located at three kilometers of the Atyrá town with access of non paved road in the *Carumbey Company*, Department of Cordillera.

The zone counts with an argillaceous and sandy soils succession with low agricultural potential, in rather flat lands and slight undulations. Parcels of agricultural production are mainly not observed, but rather abundance of fallow lands and plots for cattle milk small operations scale.

The predominant vegetation is similar to the observed one in Sapukai denoting high potential for the beekeeping production by the abundance of varied bushy native vegetation, with staggered flowering, and absence of pesticides risks.

The access road is asphalted until Atyrá with a deflection near Caacupé of 15 kilometers, and it is located very close to the main center of consumption of the country, constituting this an important comparative advantage for the beekeeping products sale.

The community is served by a local network of domiciliary drink water distribution pumped from deep wells, removing this factor like limitation for this type of enterprise. Also, the whole zone counts with a network of electricity distribution, predominating the mono-phasic connections.

The community is served by public transport services not constituting this factor a limitation for the outgoing product nor to the access.

This Committee membership is characterized by its out of farm income sources, specially from construction (bricklayers, painters, etc). The Committee is integrated by members of both sexes. Some of them had a few crops for self sufficiency, mostly being independent workers, non growers. Nevertheless, in the neighborhoods also exists an agricultural school whose students participated in the training activities of the project.

Unlike the other localities, the structure of the land property is minifundist, constituting rather a suburban community. The interviewed person with larger single land surface had one hectare. In several cases it was reported that many of the beekeepers use neighboring parcels of small cattle raising in loan for the honey production.

The main nearer market of purchase of inputs and sale of products would be Caacupé at local level, and the metropolitan area of Asuncion as the main destiny.

The Center of Gathering and Storing will be constructed in the estate property of the Committee where already an own construction exists, constructed previously within the framework of the Project Communitarian Rural Investments (IRC MAG/BIRF) support.

COMMITTEE TAJY POTY (CALLE BERTONI)

Location and characterization of the surroundings

The *Tajy Poty Committee* is located in the District of San Estanislao, Department of San Pedro, at close distance to the population of the same name, limiting with the District of Guayaibí.

The zone where the members of the Committee are located is characterized by its suitable farming potential, with predominance of argillaceous friable red soils and smoothly slopes to flat topography used for agricultural production for both rent and self-sufficiency.

The predominant natural vegetation originally was of subtropical forest which has been intensely deforested in the course of the 40 years of the colony life, existing few plots reforested with giant paradise tree, and several others with native tree species. It is observed a succession of crop plots and implanted pastures (grazing land) for bovine animals raised for milk and meat, and animals for hauling and transport (there are frequent sulkies pulled by horses).

The zone counts with an acceptable dirt road access network (not paved) being moderately maintained, some of them embanked. The colony connects itself with the distrital capital by the Santaní-Rosario road, and Route 3, which is asphalted.

The community is served by a local network of domiciliary drink water distribution pumped from deep wells, removing this factor like limiting factor for this type of activity. Also, the whole zone counts with a network of electricity distribution, prevailing the mono-phasic connections.

The predominant agricultural production is varied, decreasing the cotton culture and increasing the sesame cropping, among the main cash crops. In addition, it is recurrent the presence of parcels of bitter orange and rustic equipment for essential oil distillation, based on *petit grain* (bitter orange). As it is traditional, all families produce for self-sufficiency smaller animals, manioc, maize, beans, peanuts, among the most frequent ones. In some farms is reported the recent advance of the production of commercial pineapple, as under the influence of the neighboring district of Guayaibí, traditional producing and exporting area of banana and is reported.

Concerning the land property structure, in general it is uniform since the community originated as a settlement of agrarian reform in the 60s decade, the *Colony Defensores del Chaco*, being the property size of 10 hectares per family, although some producers have expanded their property by purchase and annexation of neighboring parcels. Extreme minifundia in this community does not exist, and neither is observed signs of extreme poverty

The District of San Estanislao is experiencing a fast economic development having being favored by the conclusion of the new Route 10 that connects Asuncion with Saltos del Guairá in southwestern-northeast direction, reducing the distance to Asuncion to only 150 kilometers. In this town is located the crossing with Route 3 (Cnel. Oviedo-Yby Yaú) which runs in north-south direction. This road infrastructure network grants to the community a great competitive advantage in relation to other zones. In fact, the local urban population already constitutes one of the most important human concentrations of the Northern zone of the country and it is the largest in San Pedro Department. In such condition it is seat of both public institutions and private companies, suppliers of goods and services

The local native vegetation is not as varied as in other localities, but the presence of self sufficiency crops and other cultures with little or null use of pesticides assures the provision of adequate flowering raw material for bees honey

elaboration. The recent diffusion in this locality of the sesame crop in substitution of cotton is emphasized, given that its flowering habit is very favorable for the production of honey with differentiated quality, as it happens in Caazapá. The abundance of *Chirca* bush is not appraised, thus the green propóleo production would be limited to the zones where a certain concentration of this vegetation is detected.

The Center of Gathering and Storing was built and equipped being already finished and in use by the Committee members. The facility is located inside the office of DEAG in Calle Bertoni, at short distance of the associate member's farms. In addition they have other premises for committee meetings which were constructed in the framework of *Proyecto Inversiones Rurales Comunitarias (IRC-MAG/BIRF)*.

COMMITTEE EIRETÉ ÑUAI (JUAN MANUEL FRUTOS)

Location and characterization of the surroundings

The Committee Eireté Ñuái is located in the District of Juan Manuel Frutos, Department of Caaguazú. Most of the associates of the District reside in the town, having its beehives in property owned, rented or lent at short distance of the local population.

The zone is characterized by its farming potential, consisting of two predominant farming systems, the mechanized cropping coexisting aside to typical parcels of family agriculture's small farmers. The soils are red, and in majority sandy and friable sandy with smoothly slope topography. As rent crops predominate soybean plots and, in smaller scale, sunflower in the extensive mechanized agriculture, and on the other hand, cotton as main cash crop of the small producers. Also, pasture plots for bovine cattle, although in small scale of production are appraised.

This zone was originally dedicated to extensive bovine cattle raising on native grasslands, explaining its old name, *Pasturing*. These were in combination with forests for the selective lumber extraction (wood manufactures). In the last decades, a great advance of both types of cropping already mentioned associated with strong deforestation was registered. The predominant species in the above mentioned native vegetation in addition to the pastures and agricultural crops include zones with high density of *Chirca* bush, which confers potential for production of green propolis. Nevertheless, the presence of shrubs of *Sapiranguy* species, affects with dark coloration to the propolis diminishing the final quality of this product. In addition, the abundance of plants of *Ybyrá Pyta* and *Ovenia* species is reported, with favorable intense seasonal flowering.

The population is connected by asphalted access to Route 7, and internally it counts with none embanked but all time accessible internal roads, including some with stone paved sections.

As in other zones, the district is served by networks of potable water and rural electrification network, being closely related to the neighboring district of JE Estigarribia, one of the most dynamically developing zones of the country, counting with important private companies' suppliers of goods and services for the modern agricultural production.

In the small farmers sector, the agriculture based on traditional cash crop is in decay by the decrease of the cotton culture. In this zone predominates the production of cotton, manioc and beans, as cash crops for selling outside the District. In addition, it is produced the traditional self-sufficiency crops and smaller animals.

In relation to the land property structure, the zones of farms with 10 hectares as a result of official colonization are distinguished, and in parallel, medium and large parcels can be observed as the result of private land settlements of mechanized farmers, being a rather mixed zone. There remain few surpluses of the original forest by their land clearing for cropping.

The parcels occupied by the beehives belonging to the Committee partners, in great majority are owned or lent, generally being at a distance away from agricultural plots, with honey sources coming from flowering of the natural vegetation. The same lands include lowland areas with abundance of *Chirca*.

The Center of Gathering and Storing is located aside the DEAG office in the town of Juan Manuel Frutos, being already finished and in use by the Committee associates. In the Annex can be seen the photos of this infrastructure and equipment.

Comparison with the Base line

(Confidential Information, it is suggested to protect the identity of the interviewed people)

The characterization of the interviewed beekeepers is presented, considering the indicators relieved in the questionnaires concerning to its economic situation, as much at individual level and as group.

The Committees of Sapukai and Atyrá have a degree of lesser development level, being close to make their first honey harvest as a result of the Project interventions. Those from Calle Bertoni (San Pedro) and J.M. Frutos (Caaguazú) are the most developed demonstrating a great improvement as a result of the Project implementation.

1. - **The access to natural resources**, land and honey sourcing flora, is variable according to localities. In Sapukai, although most of the beekeepers producers counted with scarce own land surface, the availability of extensive neighboring countryside with native vegetation and few or no cropping at all does not represent a limitation for the bee population, abounding the necessary *Chirca* for production with green propolis, already obtained in small amounts. In Atyrá, own smaller parcels predominate, but it is acceded to land of neighbors with abundance of honey source native vegetation, under form of lending or renting. In Calle Bertoni (Santaní) the Committee members have in their majority their own plots of 10 to 20 hectares, received from old colonization programs, and environmental polluting agriculture with pesticides (such as cotton cropping) is in reduction, being in some cases replaced by the production of sesame, favorable for production of differentiated honey. In JM Frutos, some honey producers are urban dwellers, not having their own land, acceding to large parcels by means of loan or renting. The following table summarizes the average of land available of the interviewed people:

Nombre	Apellido	Localidad	Has. De Tierra	Tenencia	Cultivo de renta (has)	Cultivo de autoconsumo (has)
Julio	Miranda Roa (Testigo)	Santaní	10	Propia	0	4,5
Alberto	Miranda Roa	Santaní	20	Propia	6	3
Basillo	Miranda Raimondi	Santaní	20	Propia	3,5	3,75
Bernardo	Miranda	Santaní	20	Propia	5	3,25
Migdonio	Benítez Miranda	Santaní	10	Propia	3	1,75
Francisca Isid	Martínez Barreto	Atyra	0,5	Propia	0	0,5
Emilio	Jimenez Martinez	Atyra	2	Propia	2	0
Estanislao	Fernández Giménez	Atyra	360 m2	Propia	0	0,5
Eulalio	Ibarra Giménez	Atyra	3	Propia	0	3
María Emma	Molina	Atyra	1	Propia	0	1
Milciades	Vera	Sapukai	0,5	arrendado	0	0,5
Heliodoro	Torres Espinola (Testigo)	Sapukai	20	Propia	3	2
Gloria Mercedes	Ferrariño de Díaz	Sapukai	5,3	Propia	2	2
Juan Pablo	Contrera	Sapukai	1	arrendado	0	1
Cesar Raul	Cristaldo	JM Frutos	50	arrendado	0	1
Eugenio	Gauto	JM Frutos	1	prestado	0	0
Miguel Angel	Estigarribia	JM Frutos	2	Propia	0	0
Ovidio	Gauto	JM Frutos	800 m2	sitio de casa	0	0
Francisco Aní	Vera Silvero	JM Frutos	5	Propia	1,25	2
Pedro Carlos	Madsen Gauto (Testigo)	JM Frutos	104	Propia, bosque	0	2,5

Name, surname, location, hectares of land, land tenancy (own (propia), rented (arrendado), lend (prestado), housing plot (sitio de casa), forest (bosque)), cash crop in hectares, self-sufficiency crops in hectares.

2. - Also, most of the Committees beekeepers are **not dedicated to produce cash crops**, excepting the producers from Calle Bertoni, who have higher potential for agriculture. The same fact is reflected as far as the production of self consumption food items (manioc, maize, peanut, beans, small animals), being its production more important in Calle Bertoni and lesser in JM Frutos, among the most productive community in beekeeping.

3. - As far as the **average number of beehives** per honey producer at the beginning of the Project, the higher values corresponded to JM Frutos and Atyrá, and the fewer number to Calle Bertoni and Sapukai. The average number of beehives in production increased in three localities at the end of the Project, except in Atyrá where the boxes were donated by another previous project, which still were not totally under production (IRC-MAG/BIRF).

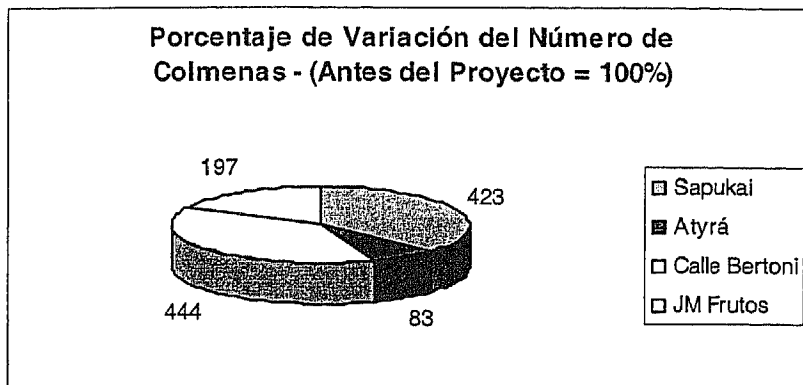
Comité	Nº Inicial de colmenas	Nº Final de colmenas	Porcentaje de aumento	Ingreso promedio (Gs./año)
Sapukai	3,25	13,75	423	N.A.
Atyrá	8,4	7	83	N.A.
Calle Bertoni	2,25	10	444	1.762.500
JM Frutos	12,8	25,2	197	5.036.600

N.A.: No Aplicable

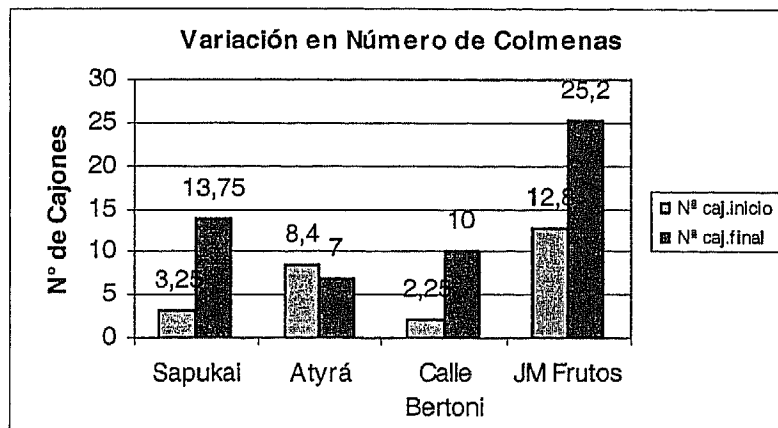
Committee, Number of initial beehives, Number of final beehives, Average income (Gs./year)

It is observed that beekeeping is the only source of income for the committee members at JM Frutos, being reflected by the higher number of beehives on production per capita (25,2 boxes) and the absence of other agricultural activities.

4. - The percentage of beehives increase from the beginning of the Project through the end was quadruplicated in Sapukai and Calle Bertoni, duplicated in JM Frutos and diminished in Atyrá, for the previously mentioned reason.

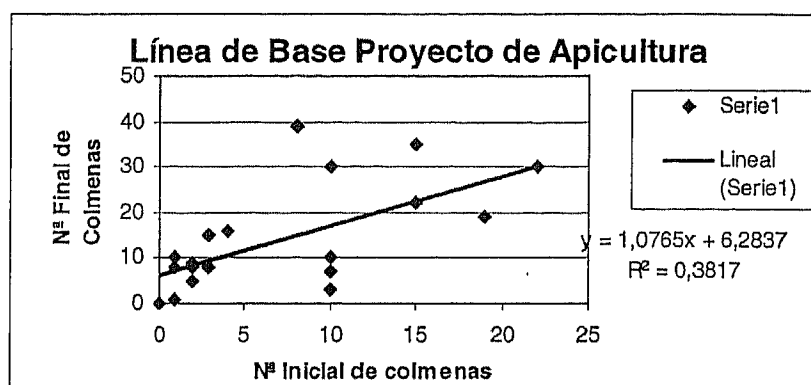


Percent of Variation in Number of Beehives (Before of Project = 100%)



Variation in Number of Beehives, Number of beehive boxes, initial and final

When considering all interviewed localities and honey producers, the tendency of the number of beehives per capita variation between the initial amount and the final one, in a lapse of two years of project appears in the following graph. According to the trend line, starting from 6 beehives by producer, for each initial beehive it is expected that the number increases in an additional beehive at the end of the period, although the correlation is relatively weak. This graph considers all the anticipated situations, from committees with low response capacity up to committees with greater dynamism. None of the interviewed controls increased the number of beehives during the same period, except the one from Sapukai who was joined recently to the Committee.



Beekeeping Project Baseline, final number of beehives, initial number of beehives

The detailed information at per producer level is presented as follows: