

# Agricultural insurance

A powerful tool for governments and farmers

- Linking small-scale farmers with markets
- Managing agricultural insurance in Brazil
- Paraguay taps its potential for biofuel production
- FONTAGRO funding potato projects





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### ► Correction

The authors of the article **Sustainable development and the territorial approach: identities and typologies**, published in COMUNIICA Magazine, Edition No. 2-2007, wish to state that the text highlighted on page 43: "(...) the collective recognition of an intricate meshing of characteristics and components specific to a given social fabric, unique to the inhabitants of a spatial unit and determined by its particular resources and the environmental, political- institutional, economic and sociocultural dimensions," was lifted from Benedetto, A. 2005. Reflexiones sobre la relevancia de incorporar estudios sobre la identidad territorial en la gestión del desarrollo rural (Ponencia). Primeras Jornadas de Antropología Rural, San Pedro de Colalao, Tucumán, Arg.

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In recent years, the world economy has exhibited an amalgam of phenomena in the areas of energy, food and finance. These phenomena, which are mutually reinforcing, produce amplified effects on national economies and, especially, on agrifood systems. The lines between the different phenomena are increasingly blurred, which makes it difficult to have a grasp of all the factors that trigger these phenomena. Added to this is climate change, which poses multiple challenges for which the countries must find solutions as a matter of urgency to mitigate their effects.

In this scenario, the role of the agrifood and rural sectors is unequivocally quite different from that which existed some months ago. The argument that agriculture should play a preeminent role in a world where at least 800 million people continue to be affected by food insecurity is gaining momentum. Given this context, it is imperative that we review the paths and strategies we have chosen and reflect on new development patterns and models that will achieve the best results, especially

as we meet head-on clearly defined global goals, such as the Millennium Development Objectives (MDO).

Failure to come up with new alternatives and instruments and continuing to do the same thing in contexts and scenarios that are vastly different will probably end up in Defeat in terms of reaching these important goals, notably, reducing poverty and hunger by half and ensuring environmental sustainability.

In its capacity as a coordinating body having a role to play in hemispheric integration, the Inter-American Institute for Cooperation on Agriculture (IICA) is engaged in ongoing dialogue with all stakeholder groups in the region regarding the topic of food security. In so doing, it presents various proposals for consideration by actors in agricultural and rural development as well as decision-makers in the countries.

The new edition of *COMUNICA* shares with readers a number of experiences bearing on the connection between small- and



medium-scale producers and these new and unpredictable market dynamics. Invaluable experiences such as those of Colombia, Peru and El Salvador will serve as a basis in addressing the imperative need to increase the connection between producers and the markets.

In the article “Agricultural Insurance: A Powerful Tool for Governments and Farmers”, the topic of agricultural insurance in the hemisphere is discussed. In essence, it reviews some of the concepts related to this important policy instrument intended to avoid shortfalls in the capital of agricultural producers and enable them to ward off the adverse effects of nature, such as hurricanes, desertification, frosts and floods.

Brazil’s experience with its current rural system is introduced and the need to institute an efficient system as a safeguard against the risks of pests and climatic events in that country is discussed under the topic, agricultural insurance.

This edition also includes an article on Paraguay’s potential to produce biofuels. This means that strategies could be identified for revitalizing the agricultural sector and mitigating the effects of the energy crisis.

Finally, in celebration of International Year of the Potato, a background explanation of experiences with FONTAGRO innovative projects with this important crop from the Andean Region is included. This is a highly valuable strategy that is designed to promote further responses to the global food security problem.

This entire effort at systematizing experiences and presenting innovative panoramas on topics such as the linkage between farmers and markets, innovation in production, agricultural insurance and the production of biofuels has been added to the significant collection of documents and technical publications that are part of the electronic magazine **COMUN//CA** and the web page [www.iica.int](http://www.iica.int).





# Linking small-scale farmers with markets

An analysis of successful initiatives in Latin America

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## Summary


Successfully linking small farmers to dynamic markets is a topic that increasingly appears on the technical cooperation agendas of national and international organizations. In implementing the initiative of the Global Forum on Agricultural Research (GFAR) on this subject, three medium- and long-term initiatives were studied that reflect the impact of public policies of three countries: the Project to Support the Development of Rural Microenterprises (PADEMÉR), in Colombia; the Project to Reduce and Alleviate Poverty (PRA), in Peru; and the FRUTAL-ES Program of El Salvador. This article presents an overview of the study, which has resulted in a plan of action for Latin America and the Caribbean (LAC) being submitted as part of the GFAR's proposed Global Partnership Programme (GPP) on Linking Farmers to Markets (LFM).

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**Key words:** *markets, small enterprises, rural development, agricultural policy, technical cooperation, international agencies, Colombia, Peru, El Salvador, Latin America.*

## Introduction

In recent years, successfully facilitating and supporting efforts to link small farmers to dynamic markets has become an important issue on the agricultural and rural development agendas of the countries and, therefore, of national and international agencies.

The GFAR, for example, has been promoting the formulation and implementation of a global project on the subject, for which various regional studies were conducted. The Latin American study was carried out by the IICA (PRODAR) - FORAGRO partnership. It focused on three medium- and long-term initiatives that reflect the impact of public policies in three Latin American countries:

- The Project to Support the Development of Rural Microenterprises (PADEMÉR), in Colombia
- The Project to Reduce and Alleviate Poverty (PRA), in Peru
- The FRUTAL-ES Program, in El Salvador

The authors of the study analyzed the intervention strategy and services of each initiative, the role of the beneficiaries, the main results and the elements that could be adapted for use in other areas. They identified various factors that accounted for the success achieved, including the

promotion of enterprises that respond to market signals, the visualization of the initiatives as part of changes at the territorial or agricultural chain level, the policy framework underpinning the initiatives and the adoption, assimilation and implementation of technologies.

Each initiative is summarized below.

### Initiative: Support for the Development of Rural Microenterprises - PADEMÉR (Colombia)

PADEMÉR was a project financed by the International Fund for Agricultural Development (IFAD) (US\$16 million) and the Government of Colombia (US\$4 million), carried out between 1998 and 2007. At the end of that period, the project gave way to a new type of action known as “rural opportunities,” designed and implemented based on the lessons learned from PADEMÉR. The Ministry of Agriculture and Rural Development (MADR) implemented the project through a National Technical Coordinating Unit (UTNC), whose primary objective was to increase income and employment in rural areas by supporting the development of rural microenterprises (RMEs) that guaranteed gender equity and the preservation of the environment.



PADEMÉR was implemented in three phases, as described below:

- **Phase I (1998-1999).** The criteria and rules adopted applied to all microenterprises in Colombia, not just to rural operations. Non-governmental organizations (NGOs) and research centers provided technical services (training in technological, commercial and financial aspects).
- **Phase II (2000-2004).** Focused on the needs identified during the first phase, mainly by NGOs that acted as promoters, supporters and facilitators of micro-business processes. One operational innovation was the use of assessment bodies, whereby the RMEs selected the entity they considered best equipped to provide the technical and business assistance.

- **Phase III (2004-2007).** The microenterprises themselves directly operated their projects and contracted the technical services they required, choosing them from a portfolio of service providers<sup>1</sup> in the rural sector.

## Intervention strategy and services

The project strategy consisted of actions at three levels: first, specific work with individual RMEs; second, collective work (at the sectoral or territorial levels) with a group of RMEs; and, third, follow-up efforts, to ensure the results of the project contributed to knowledge management and the design of policy proposals. The actions focused on three core components: a) markets - the articulation of small farmers with other actors in the chain; b) organizational strengthening; and, c) technological innovation-knowledge management.

### ■ Markets - the articulation of small farmers.

Under this component, the project used several tools, including:

- Learning visits. Several rural micro-entrepreneurs visited other organizations that have been successful in gaining access to markets and different outlets.

<sup>1</sup> The service providers were individuals who were experts in different areas.



- Participation in local and regional fairs to present the farmers' products, learn about others and make contact with clients (other businesses or end-consumers).
- Business matchmaking.
- Direct technical assistance with the improvement of products, packaging and presentations, the implementation of good manufacturing practices, the process of obtaining sanitary certification, bar codes and compliance with other legal marketing requirements.
- Specific market studies, carried out using a participatory approach, whose results could be used to take decisions for immediate implementation.

- **Organization-building strategy.** This component played a decisive role in integrating small farmers into competitive markets, since it enabled them to achieve economies of scale and redefine their role in value chains and in price formation. The work basically involved training actions and technical assistance aimed at management capacity development and organization building.
- **Technological innovation.** Under this component, PADEMÉR promoted the adaptation and adoption of

technologies. It used mechanisms such as the capitalization of business organizations to enable them to purchase new machinery and equipment, and farmer's management of their own knowledge and acquisition of more information. The actions focused on not only production technologies but also technologies for administrative, management, financing, planning, marketing and commercial tasks.

## The role that the beneficiaries played in achieving the results

The beneficiaries of PADEMÉR were viewed as project partners rather than beneficiaries. They started out as passive recipients of the technical assistance provided by the NGOs but subsequently became active participants, capable of formulating their own proposals and selecting, and contracting service providers. Many of PADEMÉR's successful micro-entrepreneurs have become part of "learning routes"<sup>2</sup> designed to facilitate the direct sharing of experiences among micro-entrepreneurs and participants in the Local Rating Committees (COLOCA) and Resources Allocation Committees (CREAR). These local entities discuss and rate the proposals presented to the Rural Opportunities Program, a new stage of PADEMÉR.

2 Methodology that makes it possible to tap local talents, drawing on their expertise as support for training and knowledge management. It involves "learning by seeing" and allows the participants to have direct contact with real businesses run by rural actors in a situation similar to their own.

## Main results<sup>3</sup>

Through December 2007, the main results of the project were:

- 43,014 new jobs created.
- 71% increase in the incomes of the families that benefited from the project for over two years.
- 80% of the RMEs are using clean production technologies.
- Public policies formulated for the RMEs.
- Two “learning routes” established as a knowledge management mechanism.
- 160 local talents (service providers) identified who support the incorporation and adaptation of technology.
- 159 associations of RMEs strengthened that represent 3949 micro-entrepreneurs. They established effective and transparent management bodies and participatory follow-up committees.
- 96% of the RMEs that received support in the second phase gained access to markets.
- 88% of the RMEs assisted by PADEMÉR increased their sales and 26% increased their assets.
- Ten self-managed revolving funds administered by the associations of RMEs, with total capital of US\$95,489 and regulations in place.
- 148 associations of RMEs identified and contracted their technological service providers. The services needed were selected applying competitive principles.

- Line of credit opened through microcredit funds and nine financial operators acquired rural microcredit technologies.

## Elements that could be replicated in other areas

There are several elements of this initiative that could be replicated in other contexts. The most important are as follows:

- The project is visualized as a medium- and long-term process. Many RMEs need to undergo major transformations, both of their productive structures and their administrative, management and organizational processes, as well as changes of attitude, which take time to be assimilated and incorporated efficiently.
- The competitive funds that provide support to RMEs, which use regional committees to select proposals, guarantee better results, since the people that rate the projects are familiar with the situation and priorities in each area.
- Equal importance is attached to productive, administrative, technological, socio-organizational and commercial aspects, and local service providers are identified in all the areas covered by the project.
- The revolving funds that make it possible to capitalize the agribusinesses, since they facilitate resources for purchasing machinery and other assets.

3 Highlighted by IFAD in the evaluation of the project (2007).



- The methodology for establishing the criteria for selecting the technology to be used in each undertaking<sup>4</sup>.
- The design and implementation of “learning routes” as a formal knowledge management tool that allows the visitors to meet their peers and share innovations and the mechanisms used to achieve them.
- The producers develop a culture of quality and formality but it is not imposed upon them. They realize it is necessary as a result of their interaction with clients and consumers.

policy. The emphasis is on the creation of an enabling environment, so that Peruvian products can gain access to international markets.

### Intervention strategy and services

The project makes use of Centers for Economic Services (CSEs), which are

## Poverty reduction and alleviation initiative (PRA), in Peru


The project was the result of an agreement between the National Confederation of Private Enterprises (CONFIEP) of Peru and the U.S. Agency for International Development (USAID), which was in place between 1998 and 2001. On 1 April 2001, the consulting firm Chemonics International Inc. assumed responsibility for implementing the PRA.

The program forms part of the strategic objectives of economic development and poverty reduction, specifically within the framework of the economic liberalization



Photo: CENTA

4 This must be easy to use, tailored to the volumes they handle, inexpensive and efficient.

 *The project looks for medium-sized or large firms willing to enter into partnerships with small-scale producers (e.g., crop and stock farmers, artisans, weavers, trout producers, native communities).*

business development offices. They provide and channel various non-financial services to private enterprises, marketing businesses and small-scale urban or rural producers of any productive or services sector, either as individuals or as members of associations, located in selected economic corridors.

The objective is to make production or services operations in rural areas more profitable and sustainable, with a market orientation. The project looks for medium-sized or large firms willing to enter into partnerships with small-scale producers (e.g., crop and stock farmers, artisans, weavers, trout producers, native communities).

The CSEs provide the following services:

- Mediation between buyers and producers. Emphasis is placed on the need to produce what sells instead of selling what is produced, through technical and management assistance to local producers interested in meeting the demand.
- Support for the establishment of regional clusters and the facilitation of relations between small-scale and micro-producers and the regional and national business community, seeking subcontracting arrangements.

The sequence of work in each case includes the following stages:

- a) Identification of commercial opportunities, based on which profiles of business plans are developed.
- b) Mediation between large or medium-sized companies and medium- and small-scale producers, to create a consortium that completes the business plan profile and works on its development.
- c) Strengthening of small-scale producers to meet the demands of the market through direct technical assistance.

Experts are hired to address technological innovation needs.

## The role of the beneficiaries

The “beneficiaries” become partners in consortia that develop the business plans, implement the experts’ recommendations to improve their production and marketing operations, and define their relationship with the medium-sized or large businesses by entering into contract agriculture agreements or joint ventures. The businesses involve actual concrete opportunities, not potential products identified in a market study.

Depending on the type of agreement entered into, the “beneficiaries” may contribute to the consortium financial resources, technology, seeds, land, technical assistance, labor or other inputs.



## Main results

The total amount invested in the project between 2001 and 2007 was US\$14 million. By the end of that period, the main results achieved were:

- 200 companies were working together, comprised of around 47,000 small-scale national producers involved with some 75 products or services.
- US\$211 million in sales, including US\$96 million in exports.
- Payment for 13 million days worked.
- US\$16 million invested in fixed assets.



## Elements that could be replicated in other areas

The following are some elements of this initiative that could be applied in other areas:

- The identification of “star economic agents” capable of harnessing the comparative advantages of the territories targeted.
- Recognition of the private business link interested in doing business in the areas selected, which acts as a catalyst.
- The approach whereby the demands of the market trigger all the processes, resulting in specific business plans.
- The concept of economic corridors (spaces along highways that link medium-sized consumption and population centers with small producers). Related to the territorial approach.

*The FRUTAL-ES Program reflect in its components: market intelligence, production and technology, increase and diversification of production, post-harvest handling and processing, quality plant material, marketing and commercialization, and financial management.*

- The CSE model, whereby a manager who is an expert in marketing facilitates the business relationship between companies and small-scale producers.
- The model of partnerships between medium-sized and large companies and small- and medium-scale producers, by means of joint ventures or contract agriculture.
- The strategy of adopting technology packages, following the identification of bottlenecks and the hiring of experts to implement the changes in any of the links in the chain.
- The vision of turning the “beneficiaries” into partners in businesses that are created by means of contract agriculture agreements or joint ventures.

and technological innovation. The objective set for the MAG-FRUTAL-ES program was to promote reforestation by developing and strengthening tropical fruit businesses, which were prioritized because they are profitable and environmentally friendly. Specifically, the program has strengthened competitive chains in order to tap market opportunities and generate sources of employment and income.

## National fruit initiative of El Salvador MAG-FRUTAL-ES

MAG-FRUTAL-ES is an initiative of the Government of El Salvador, promoted by the Ministry of Agriculture and Livestock (MAG) and implemented by the Inter-American Institute for Cooperation on Agriculture (IICA), with funds received from the privatization of ANTEL<sup>5</sup>. It forms part of the nation’s forestry development and protection policy.

The program dovetails with several different types of policies - those designed to promote exports and those aimed at the modernization of production, reforestation

## Intervention strategy and services

The FRUTAL-ES Program was designed, and is being implemented, with a chains approach that is reflected in its components: market intelligence, production and technology, increase and diversification of production, post-harvest handling and processing, quality plant material, marketing and commercialization, and financial management.

The procedure used by FRUTAL-ES is as follows. People interested in growing tree fruits register with the program and the technical personnel assess their situation, submit recommendations and prepare a technical and economic pre-feasibility

<sup>5</sup> National Telecommunications Administration of El Salvador.



document. Based on that information, farmers decide whether to invest their own resources or seek a loan on the basis of the study's conclusions. Trees are planted and technical assistance is provided for the growing, harvesting and post-harvest handling phases. Farmers receive a subsidy covering 75% of the cost of the seedlings they require.

The exotic and native varieties prioritized under the program have specific market niches. The former include avocado, coconut, lime, mango and cashew. Some of the native varieties promoted are jocote, nance, loquat and the arraya tree.

To help link farmers with the different markets (agro-export markets, supermarkets and processors), the program uses tools such as agribusiness forums, business matchmaking activities, national and international fairs, export platforms and tasting events.

Under the program, technological innovation mainly entails the use of adapted and improved genetic material and the adding of value through the development of processed products based on native fruits, such as jams, jellies and clarified juices and dehydrated and pulp products. The tools used include international observation visits, the implementation of a diploma course in fruit growing by the University of El Salvador and visits by experts from other countries to train not only the technical personnel of FRUTAL-ES but also the farmers and other professionals and technicians specializing in this area.



Photo: CENTA

## The role of the beneficiaries

The program works directly with small and medium-scale farmers who meet certain requirements. They must demonstrate a readiness to take risks, possess some capital or be in a position to obtain a loan, and be willing to change. Other producers are assisted indirectly, through NGOs and projects to which the program has provided technical assistance and training.<sup>7</sup>

## Main results

The total amount of funds invested in the program between November 2000 and the end of 2007 was roughly US\$6 million, contributed entirely by the Government of

6 With technical support from IICA's Inter-American Trade, Agribusiness and Food Safety Program.

7 The indirect beneficiaries meet the profile established by the NGOs that provide them with technical assistance.

El Salvador. The main results of the project to date can be summed up as follows:

- 3125 small- and medium-scale fruit farmers have received technical assistance.
- 37 nurseries have been supported.
- A national association of nursery owners was set up and has 15 members.
- 7167 hectares of land planted with citrus fruits (mainly lime) and avocado for the first time.
- Gradual substitution of imports of some fruits (avocado, lime and coconut).
- Access to international markets.
- Impact on vocational and higher education training programs and production of technical and pedagogical material.
- Creation of producers' organizations.
- Production of technical and pedagogical material.
- Resources obtained from the Regional Public Goods Fund of the Inter-American Development Bank (IDB) for the execution of the Program to Enhance the Competitiveness of Fruit Growing in Central America, designed mainly based on the experience of FRUTAL-ES.

## Elements that could be replicated in other areas

The following are some important elements of this initiative that, with the appropriate adjustments, could be replicated in other contexts:

- The chains approach and the market orientation.
- The selection of products or types of production based on the demand in the marketplace.
- The use of market niches (e.g., nostalgia, organic and fair trade products).
- The use of methodologies such as export platforms, international observation visits, participation in fairs and business matchmaking events, agribusiness forums and direct contact with clients.
- The creation of organizations involving several types of producers with common objectives who set up networks for sharing experiences, information and knowledge.
- Support for the preparation of pre-feasibility proposals to facilitate access to credit.
- A team of specialists recognized for their know-how and experience in each component of the program.
- The program's services are not subsidized 100%. The technical assistance is free but the beneficiaries cover 25% of the cost of the seedlings and assume responsibility for loans, on special terms.
- The diversification and value added approach.



- Exchanges and internships as a mechanism whereby producers appropriate knowledge.
- The existence of a general and subsector policy framework, with practical tools for its implementation to which others are added as constraints and gaps are identified.
- The participation of a university, to meet human resource training needs.
- Contact with private banks to help them better understand, and have more faith in, fruit growing as an activity.

### Factors that contributed to the success of the initiatives presented

The main aim of the initiatives studied was to promote and support enterprises that pay attention to market signals, a strategy that is reflected in various ways:

- In the case of the PRA, the projects focus on developing business plans agreed upon by companies and small or medium-scale producers.
- In the case of FRUTAL-ES, the approach centers on varieties with market potential.
- In the case of PADEMÉR, the projects supported are selected based on criteria such as market potential and economic viability.

The initiatives also include other business-related elements, such as loan applications, technological innovation, technical services and marketing. The beneficiaries of the program play an active role. They

select partners and agree business plans with them (PRA), choose and hire technical services (PADEMÉR) and, in all three instances, make investments and secure loans to cover the cost of them.

The programs' actions are not limited only to the business units as individual and isolated actors, but entail efforts to strengthen their ties with other actors, either using the territorial or agricultural value chains approach. PADEMÉR, which uses a territorial approach, promotes the creation of business networks, the development of local support services and the implementation of learning routes.

The PRA uses the concept of economic corridors, whose main artery is usually a highway. The concept entails linking producers in areas characterized by high poverty rates with entrepreneurs and markets in medium-sized or large cities, and even overseas. FRUTAL-ES applies the chains concept and nursery owners, producers and processors are regarded as beneficiaries of the program.





The three initiatives analyzed are being implemented within the public policy framework, with different emphases in each case: rural development, rural poverty and the generation of rural income and employment (PADEMÉR and PRA); the diversification of production and efforts to combat desertification (FRUTAL-ES); and trade liberalization (PRA and FRUTAL-ES). Several specific tools have helped the countries achieve results, including: specialized lines of credit for rural microenterprises (PADEMÉR) and for fruit production (FRUTAL-ES), export promotion mechanisms (FRUTAL-ES and PRA) and competitive funds to finance technological innovation projects (FRUTAL-ES and PADEMÉR).

In two cases (PADEMÉR and MAG-FRUTAL-ES), the State's participation - through the ministry of agriculture, and livestock - has been a key factor, because it has

helped secure and channel external and national resources and given the projects some sustainability. It has also permitted them to become a sort of "laboratory of public policies."

At the operating level, special executing units were set up in all three cases, either within the public institutional framework (PADEMÉR at Colombia's Ministry of Agriculture) or through external operators that were chosen following a bidding process (IICA, in the case of FRUTAL-ES, and Chemonics Inc. for the PRA).

The executing units exert clear leadership, albeit with special differences:

- They are markedly management-oriented.
- They are primarily geared toward the private sector (the PRA).
- The emphasis is on production (FRUTAL-ES).
- They are skewed toward public management (PADEMÉR).
- In all three cases, they have elicited a high level of commitment from the teams, inspired confidence in the private actors and provided continuity.
- A single person has managed each program from the outset.

At the marketing level, there are several common factors:

- The chain and market-oriented approaches were incorporated into the design of the projects from the outset.

- Support in identifying markets and linking small farmers to markets through direct contacts or the use of other tools, such as participation in business matchmaking activities and fairs.
- Establishment of a culture of quality.
- Direct technical assistance with process and product improvement.

Certain strategies and tools also stand out. PADEMÉR, for example, organized learning visits, where producers were able to see other successful enterprises first hand. The PRA used the CSE strategy, where the manager is a business developer who links medium-sized and large firms with small farmers and facilitates the relationship between the actors, builds trust and provides technical support to both actors to help them achieve the expected results. FRUTAL-ES used the export platform methodology, which prepares producers to market their products in U.S. markets.

With regard to technological innovation, the assistance provided for the adaptation, assimilation and application of technologies has been of key importance for the success of the three projects. The fact that the projects did not experiment or start from scratch gave producers enough time to achieve results.

Other differentiated characteristics worthy of note are the emphasis placed on local practical knowledge - referred to as “local talent” - and the “learning routes,” a mechanism that allows new producers joining the program to learn by doing and learn about the successful experiences of peers in other places (PADEMÉR).



Furthermore, needs are met by specialists in specific topics (the PRA and FRUTAL-ES).

These initiatives highlight major opportunities for speeding up the processes aimed at linking small farmers to markets and affording them access with quality products. This marks a significant transition: **from producers who are beneficiaries to stakeholders in agribusinesses**, whose decisions will revolve around investments, partnerships, associations, service contracting, the adoption of technologies, etc.

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# Résumé / Resumo / Resumen



## Relier les petits producteurs au marché: analyse d'expériences réussies en Amérique latine

L'un des nouveaux thèmes apparus dans les programmes de coopération technique des organismes nationaux et internationaux concerne la nécessité de faciliter la mise en relation réussie des petits producteurs avec des marchés dynamiques. Dans le cadre de la mise en œuvre de l'initiative du Forum mondial de la recherche agricole (GFAR) au sujet de cette question, nous avons analysé trois expériences de moyenne et de grande portée qui mettent en évidence l'impact des politiques publiques de trois pays. Il s'agit du Projet d'appui au développement de la microentreprise rurale (PADEMER) en Colombie, du Projet de réduction et d'allègement de la pauvreté (PRA) au Pérou et du Programme FRUTAL-ES, en El Salvador. Le présent article est une synthèse de l'étude, qui a conduit à la présentation d'une proposition de plan d'action pour l'Amérique latine et les Caraïbes (ALC) dans le cadre de la formulation du Programme de partenariat mondial (GPP) intitulé *Linking Farmers to Markets* (LFM) du GFAR.



## Vinculando pequenos produtores com mercados: análise de experiências bem-sucedidas na América Latina

Uma das ações emergentes nas agendas de cooperação técnica das instituições nacionais e dos organismos internacionais tem sido facilitar a vinculação bem-sucedida dos pequenos produtores a mercados dinâmicos. No contexto da implementação da iniciativa do Foro Global de Pesquisa Agropecuária (GFAR) sobre essa questão, foram analisadas três experiências de médio e longo alcance que refletem o impacto das políticas públicas em três países, a saber: o Projeto de Apoio ao Desenvolvimento da Microempresa Rural (PADEMER), na Colômbia, o Projeto de Redução e Alívio da Pobreza (PRA), no Peru, e o Programa FRUTAL-ES, em El Salvador. Este artigo constitui um resumo de um estudo cujo produto final foi a apresentação de uma proposta de plano de ação para a América Latina e o Caribe (ALC), no contexto da formulação do Programa de Parceria Global (GPP), sobre como vincular pequenos produtores ao mercado (LFM<sup>1</sup>) do GFAR.



## Vinculando a los pequeños productores con los mercados. Análisis de experiencias exitosas en América Latina

Uno de los temas emergentes en las agendas de cooperación técnica de organismos nacionales e internacionales ha sido facilitar la vinculación exitosa de pequeños productores a mercados dinámicos. En el marco de la implementación de la iniciativa del Global Forum for Agricultural Research (GFAR) sobre esta temática, se analizaron tres experiencias de mediano y largo alcance que reflejan el impacto de políticas públicas de tres países: Proyecto de Apoyo al Desarrollo de la Microempresa Rural (PADEMER) en Colombia; Proyecto de Reducción y Alivio a la Pobreza (PRA) en Perú; y el Programa FRUTAL-ES de El Salvador. Este artículo constituye una síntesis del estudio, cuyo producto final ha sido la presentación de una propuesta de plan de acción para América Latina y el Caribe (ALC) en el marco de la formulación del Global Partnership Programme (GPP) sobre *Linking Farmers to Markets* (LFM) del GFAR.

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1 *Linking Farmers to Markets*.



# Agricultural Insurance

## A powerful tool for governments and farmers

David Hatch<sup>1</sup>

### Summary

Agricultural insurance, which provides indemnification for economic loss resulting from damage to or loss of crops and animals in the event of adverse natural and other phenomena, is a subject of great urgency that must be addressed by ministers of production and finance. This article focuses on agricultural insurance throughout the hemisphere and on how it contributes to reducing poverty and helps rural farmers recover more quickly from such phenomena. The mandate issued to IICA by its Member States on this topic is included.

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**Key words:** *agricultural insurance, IICA, Latin America, the Caribbean, natural disasters.*

## Introduction

Insurance is defined as the equitable transfer of the risk of a loss from one entity to another in exchange for a premium. The risk bearing entity is the insurance company. The company assumes this liability once it accepts payment of a premium amount determined by the insurance company. The company carefully evaluates the risks and then determines adequate premiums to cover expected loss payments, administration expenses and a profit margin. The risk transferring entity is the purchaser of the insurance such as a car owner, homeowner, farmer or bank. This party has determined that the risk of loss is too great to assume and so for a certain payment (premium), the risk is now transferred to an entity or insurance company that can better afford the potential loss.

Insurance has become a fundamental risk finance tool for mitigating risks in developed countries ever since enterprising souls first developed marine insurance for ship owners in England centuries ago.

There are almost as many types of insurance as there are risks. For example, there is insurance in case a couple has twins and needs additional funds for clothing, food and professional care givers, outfitter insurance for wilderness guides or protection for movie stars (often purchased by studios) to protect against loss of income due to damage to their legs, voice, or any other marketable resource or

any resource that can be exploited for their own benefit.

Individuals often times will purchase car insurance, life insurance, and home insurance to name a few. There are many types of insurance for businesses as well, such as property insurance, product liability insurance, directors and officer's liability insurance and so on. In fact, virtually every commercial entity in developed countries purchases insurance, either by choice or by legal requirement.

*Insurance has become a fundamental risk finance tool for mitigating risks in developed countries.*

Unlike Europe, the United States and many parts of Asia, insurance is not a widely available and purchased product in Latin America and the Caribbean. Many incorrectly look at insurance as a form of investment that is not value added unless the claims payments exceed the premium paid. More education is needed to help ministers, individual farmers and many others to gain a clear understanding of the true value and innumerable benefits insurance can offer, including the critical sequential linkage between insurance, lending capital and achieving a healthy and growing economy.

There are two fundamental concepts of insurance, regardless of the type of insurance: "adverse selection" and "moral



risk”, which are explained below. Without sufficient safeguards in place to address both adverse selection and moral risk, no insurance program will be successful.

■ **Adverse selection** occurs when only those parties who know they will need insurance purchase coverage. Insurance companies look for a “spread of risk” much like an investment portfolio spreads risk among a variety of investments. Insuring a single island in the Caribbean is much more problematic for an insurer because one loss could create losses far beyond the premiums generated over the years. Therefore due to adverse selection related issues a regional program for the Caribbean would be much more viable option.

■ **Moral risk** is about fraud and corruption. Every insurance underwriter will want to make sure that in the program, the insured or agent does not misrepresent important information that could artificially reduce loss exposures and

thereby reduce premiums or inflate actual losses by manipulating crop damage information.

## Agricultural Insurance

Most commonly today, it is protection of specified crops and livestock against specified natural causes (e.g. drought, flood, pests and wind). It first began as insurance against hail in France and Germany during the 1820s. In the late 1800s, some farmers in the United States began a hail insurance program due to losses to their tobacco crops. This type of coverage still exists in many countries today.

Then in 1938, the United States started a program to protect against a wider range of natural disasters which became known as multi-peril insurance. On some occasions, programs offer protection against price risk. Covered losses can occur to crops, livestock, and even aquaculture, such as clams.

► *To the extent a country manages climate risk effectively it also helps to eradicate poverty.*



Photo: CENTA

## A few basic aspects to be considered in promoting insurance

- 1) *To the extent a country manages climate risk effectively it also helps to eradicate poverty.* Excellent research exists that clearly illustrates the dire levels of poverty that exist in most countries. In fact, one does not really need to do more research than to travel to a third world country to see pervasive poverty. What is less evident and well known is the role natural disasters play in perpetuating poverty.

“Climate shocks can destroy crops, livestock and other productive household assets. Many rural households in low-income countries list weather risk as their number one concern. Weather risks and climate shocks are critically important constraints to wealth accumulation, particularly those in rural areas who are either engaged in agricultural activities or have their livelihoods tied to the wellbeing of the farming sector.” (Columbia University, 2007).


While the poor seem to adapt to such catastrophes in relatively short order, it is only because they had so little to lose in the first place.

- 2) *The lack of insurance is a critical reason for continuing poverty.* Any producer who insures his or her crops and animals, would be making plans to rebuild shortly after a disaster occurs. Without

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it, producers will be lucky to build a shelter and provide food for his distraught family. Even more difficult will be rebuilding the business which took years to develop. The devastated producers will find themselves back in the poverty cycle now. The ability to adequately address the risk of loss cannot be over-emphasized. Because insurance is designed to address catastrophic risk, to an individual farmer or to a country, it too must become a pervasive risk management tool.



 *Insurance is an essential financial instrument for private-sector growth which, in turn, becomes a significant revenue generator for governments.*

3) *Insurance can provide sufficient collateral to secure loans.* In virtually every developed country there is some form of insurance available; otherwise, lenders would not put their capital at risk. Without adequate insurance, a lender's need for asset preservation would prevail over taking risks that would put their assets at significant peril. Lenders need some type of risk transfer mechanism to support their own business risk. What construction company would dare build a significant building without insurance in place? What manufacturing firm would carry out its business without a means to protect itself during the entire design and production process? Without a healthy lending industry, economies grow stagnant.

Every developed country has a sound and responsive insurance foundation, which plays a key role in economic expansion. The linkage that must be accepted is that insurance comes *first* in capital allocation decisions and once in place, lending steps forward to build upon that stability. Therefore, insurance is an essential financial instrument for private-sector growth which, in turn, becomes a significant revenue generator for governments.

## A Status Report on Agricultural Insurance

Agriculture insurance began in the early 1930s in the United States to ensure yield or production loss to corn or wheat and has grown steadily ever since. Today, the US agriculture insurance program insures over \$40 billion of production risk (both yield and price) to a wide range of crops and livestock. Many other countries in the western hemisphere, such as Argentina, Brazil, Canada, Mexico and Spain, have also instituted various forms of agriculture insurance.

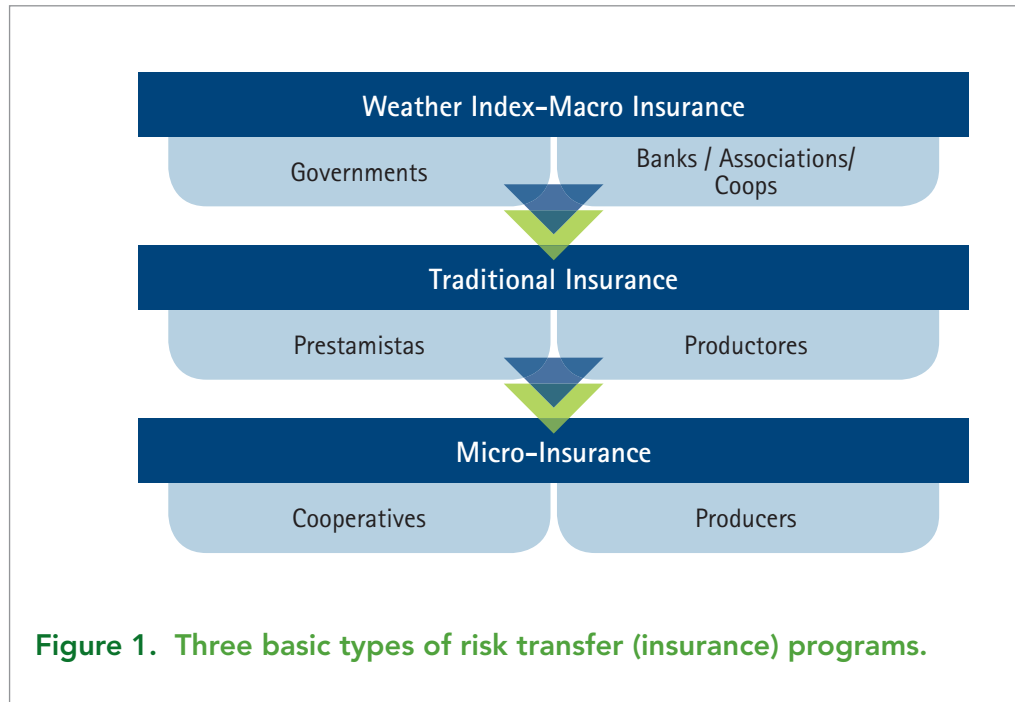
It is important to note that even long-standing agricultural insurance programs have significant room to expand. For example, of the recorded farmland, only a small percentage is actually insured; Argentina (1%), Brazil (3%), Canada (55%), and Mexico (9%). Other Latin American and Caribbean countries are in various stages of development. Chile and Venezuela are relatively new to agricultural insurance, but made good progress in insuring farmland (2% and 4% respectively). For purposes of comparison, the United States insures over 75% of its farmland and continues to grow (Risk Management Agency Web site/USDA).



The remaining countries either have no agricultural insurance program (e.g. most Caribbean countries) or have extremely limited programs (e.g. Dominican Republic, Nicaragua). We are pleased to note that several countries are working aggressively to develop programs (e.g. Bahamas, Chile, Colombia, Honduras).



## Different Types of Insurance



Inside figure 1, the first is a macro-level coverage employing a relatively new instrument called parametric or weather index. This instrument, largely purchased by governments or banks, is designed to protect against catastrophic losses (e.g. hurricanes). This risk transfer tool, which is growing rapidly, is of particular interest to the Caribbean.

A second approach employs the multi-peril coverage model developed in such countries as Canada, Mexico and the United States. This model provides protection against crop losses to specific

farms. Individual farmers or cooperatives purchase this coverage.

The third tool is called micro-insurance. As the name implies, this protection is for the smallest of individual farmers. It basically uses the same model as micro credit. Though extremely new, it holds promise.

Because each country has a different risk profile, each country's risk management plan will be unique. Therefore each country should carefully evaluate each type of program and determine a tailored approach.

## Governments can take the first steps

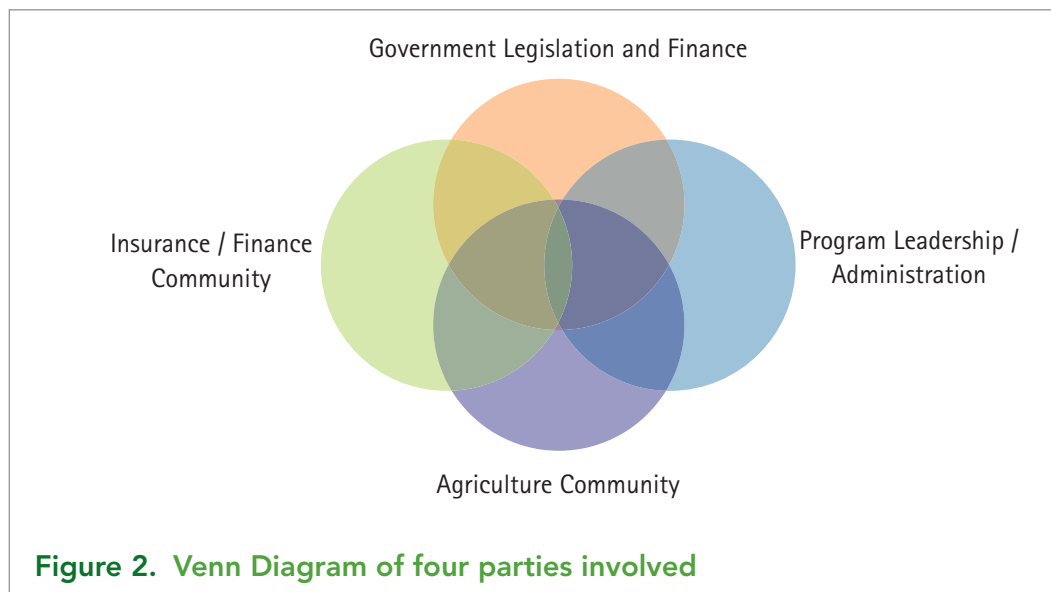
Research indicates that the most cost effective insurance programs have at their core a mutually beneficial relationship involving the support of the public sector, the involvement of the private sector and the strong participation by the farming community. It is a symbiotic relationship because each sector needs each other to succeed.

Since each government is the host of any private sector enterprise, it must take the first substantive steps to attract and retain for profit business. These steps are taken because the government knows the private sector is a potential strategic partner that brings expertise and financial resources not otherwise available. The first steps taken must address three fundamental components of a mutually beneficial

public/private sector partnership; 1) sound regulatory framework, 2) adequate historical climate information and 3) adequate historical production experience, preferably with relevant loss data.

### ■ Sound Regulatory Framework.

Global financial institutions expect to operate in a stable political environment over the long term with regulatory provisions that reward them for ethical and effective performance. Critical points of evaluation include how the government addresses taxes and profits, oversight authority, immigration/residency provisions for selected professions, incentives to establish effective distribution systems such as cooperatives, and appropriate premium subsidy levels to attract





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more participation by cooperatives and individual farmers. The insurance community will not participate if they determine the country's policies could change with each election. Legislation and central bank policy must be appropriate and enduring.

Government paid premium subsidies, a highly politically charged issue, must also be addressed so as to find some balance between promoting more trade while protecting its agricultural community from unfair competition. Because most farmers cannot afford the premium costs associated with an actuarially sound program, governments must determine at what level farmer premiums will be subsidized. Today, premium subsidies range anywhere from zero to up to 60% or more.

Last but certainly not least is the cooperation that must exist between the agriculture and finance ministers. Insurance is a financial instrument that has direct ties to the economy and government financial institutions, such as the Central Bank. This instrument is then applied to agriculture. Both ministries must understand and appreciate the critical role insurance plays and act in the long term interests of the program.

■ **Appropriate historical information on climate.** Risk-bearing institutions also expect to have sufficient technical information to evaluate risks and then price accordingly (premiums) before it will assume a portion or all of the risk. Climate maps with multi-year weather related data and risk maps to include earthquake ratings are necessary.

■ **Historical information on experience with production and loss.** As part of the information to be tracked over time, each country is expected to compile, organize and transfer precise data on the various crops and losses based on information technologies. Each country will also need to take all necessary steps to give the private sector confidence that such information is objective and sufficient. Absolute integrity is a must. In most cases, such information will need to be traced back to at least five years and, preferably, as much as 20-30 years. Without such information, adequate trending and pricing analysis is not possible or would be considered suspect.

## **IICA's Mandate for Insurance**

At its Thirteenth Regular Meeting, held 1 September 2005 in Guayaquil, Ecuador, the Inter-American Board of Agriculture (IABA) instructed the Institute to undertake the effort to promote cooperation among its members to develop and expand agriculture insurance in the Western Hemisphere.

Specifically, the IABA adopted Resolution 411, entitled “Horizontal cooperation in the area of agricultural insurance and guarantee funds.” More specifically it reads as follows:

*(i) That one of the strategic actions called for in the AGRO 2003-2015 Plan of Action is the promotion of innovative financial and non-financial and risk management systems for the rural milieu; (ii) That the development of the insurance market and guarantee funds may improve access to financial resources and considerably reduce the perception of risk in agriculture, thus improving financial conditions and favoring the attraction of investment; (iii) That the recurrence of natural disasters associated with climate variability affects the agricultural sector and the rural milieu of the Americas uniquely, and that, as a result of these adverse climatic events, production units repeatedly suffer from a loss of capital; and, (iv) That agricultural insurance is an important instrument for the management of risk, and also promotes the use of agricultural practices that are less vulnerable to natural hazards.*

The IABA resolved:

- a) *To ask the Director General of IICA to promote and facilitate horizontal cooperation among the Member States, and the systematization and dissemination of successful experiences in the area of agricultural insurance and guarantee funds.*
- b) *To urge the Member States to contribute to the exchange of information and experts.*
- c) *To ask the General Directorate to establish partnerships with public and private financial institutions and financial organizations, with a view to coordinating, and seeking complementarities among, efforts to develop and strengthen the agricultural insurance market.*



*The most recent IABA Meeting, held in Antigua, Guatemala.*

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# Résumé / Resumo / Resumen



## L'assurance agricole: un outil puissant pour les gouvernements et les agriculteurs

L'assurance agricole, conçue pour protéger les cultures et le bétail contre les phénomènes néfastes, naturels ou autres, constitue une question très importante sur laquelle les ministères responsables de la production et des finances des pays doivent se pencher de toute urgence. Il est nécessaire d'examiner les méthodes et leurs portées pour comprendre le fonctionnement ou la mise en œuvre d'un système d'assurance agricole dans le continent, afin de contrecarrer les effets de ces phénomènes sur l'augmentation des indices de pauvreté et d'aider les producteurs ruraux de la région à relancer leurs activités. Figure également dans l'étude le mandat dicté à l'IICA par ses États membres au sujet de cette question.



## Seguro rural: uma poderosa ferramenta para governos e agricultores

O seguro agropecuário, definido como a proteção de cultivos e animais contra eventos adversos de natureza ou de outra índole, constitui um tema de significativa urgência que deve ser atendido pelos ministérios da produção e das finanças dos países. É necessário considerar os processos e alcances para compreender seu funcionamento ou implementação no hemisfério, com o objetivo de contra-arrestar os efeitos gerados por esses eventos no aumento dos indicadores da pobreza e agilizar a recuperação dos produtores rurais na Região. Inclui-se o mandato outorgado ao IICA por parte de seus Estados Membros em relação ao tema.



## Seguro agropecuario: poderosa herramienta para gobiernos y agricultores

El seguro agropecuario, definido como la protección de cultivos y animales contra eventos adversos de la naturaleza o de otra índole, constituye un tema de significativa urgencia que debe ser atendido por los ministerios de producción y finanzas de los países. Es necesario considerar los procesos y alcances de este seguro en el hemisferio, y su contribución para reducir los índices de la pobreza y agilizar la recuperación de los productores rurales en la Región. Se incluye el mandato otorgado al IICA por parte de sus Estados Miembros en relación con el tema.



# Managing agricultural insurance in Brazil

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## Summary

This article presents different topics and proposals for solving the problems facing the rural insurance system in Brazil, addressed at the seminar “Risk and the Management of Rural Insurance in Brazil,” held on June 24-26, 2008, at the Economics Institute of the University of Campinas (UNICAMP). Much of the discussion focused on the advantages of operating an insurance system vs. extending debt repayment dates; the subsidizing of premiums when risks are high; and the need for an information system that can operate with detailed data on farmers rather than averages, which do not reflect the true situation in agriculture. Reference was also made to the possibility of creating a Catastrophe Fund in Brazil to provide victims with additional indemnification, since to date it has been impossible to implement an efficient system of protection against the risks posed by pests and climatic events in Brazil.

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**Key words:** *rural insurance, agricultural development, agricultural policies, Brazil, climatic risk*

## Introduction

At the seminar “Risk and the Management of Rural Insurance in Brazil,” the rural insurance system in Brazil was analyzed. It was held on June 24-26, 2008, at the Economics Institute of the University of Campinas (UNICAMP) and was organized by the university, the National Federation of Insurance Agencies and Companies (FENAAG), the National Federation of

Insurance Companies (FENSEG), the Brazilian Agricultural Research Enterprise (EMBRAPA), the Inter-American Institute for Cooperation on Agriculture (IICA) and the Ministry of Agriculture, Livestock and Supply (MAPA).

At the event, it became clear that the current rural insurance system is highly deficient and that the principal reasons for this are low subsidies, the lack of an information system with realistic data on agricultural



productivity, less than accurate climate forecasts and the need for a Catastrophe Fund. As a result, it is necessary to examine how the current system has evolved and how it has impacted both production and rural credit, to determine how best to make it more efficient and to give the government the tools it needs to reduce the losses incurred when farmers default on the payment of debts.

*The problem is a system that has tried to insure farmers against all types of risk (flood, hail, drought, pests, etc.) in a country as large as Brazil, where the climate varies greatly from region to region.*



## Evolution of the insurance system in Brazil

The rural insurance system in Brazil has experienced a number of serious problems that have affected its development. One example is the gap between the value of claims filed and total premiums paid. Between 1995 and 2005, the premiums collected totaled R\$277 million and claims R\$500 million, leaving the system with a deficit of R\$223 million.

The worst period was between 2003 and 2004, when floods and droughts in the south led to claims totaling R\$106 million vs. premium payments of only R\$40 million, leaving the system almost broke. The problem is a system that has tried to insure farmers against all types of risk (flood, hail, drought, pests, etc.) in a country as large as Brazil, where the climate varies greatly from region to region.

Given these problems, the number of insurance operations declined sharply, falling to 32,000 in 2007, for a value of R\$2.4 billion, leaving 97% of the cultivated area

in Brazil uninsured. It should be pointed out that in that same year the government subsidized premiums to the tune of R\$61 million. In 2008, the government plans to provide R\$160 million in subsidies for up to 72,000 farmers, which would increase the total insured cultivated area to 10%. The current system operates primarily in Sao Paulo, Rio Grande del Sur, Parana and Santa Catarina, and most policies cover only a few crops: soybeans, corn, apples and grapes.


Rural insurance accounts for a very small portion of all insurance held in Brazil. It represents only .37% of insurance operations and is available through only five companies: Alianza del Brasil (BB), MAPFRE, Puerto Seguro, Noble and AGF.

Nonetheless, there is great potential for growth in the rural insurance industry. If that potential could be fully developed and some of the obstacles to the effective operation of the system were removed, it



would be possible, for example, to expand coverage to at least 50% of the cultivated area in Brazil in the short term.

As the agricultural market is modernized through the adoption of new market instruments (CDA, LCA Warrants, for example), there is increased pressure for the rural insurance system to be more efficient and to keep pace with the evolution of the market.

 *There are also structural factors in Brazilian agriculture that increase risk, such as the limited transportation infrastructure, the inadequate financial management practices of the farmers, due to a lack proper technical assistance, among others.*

The unavailability of insurance also affects rural credit, forcing banks to be extremely cautious when offering credit. Without insurance, banks cannot protect themselves against losses caused by the bankruptcy of clients. As a result, banks end up lending only a small portion of what they have available. This was the case in Mato Grosso, where only 5% of available credit was made available in 2007. At the national level, the insecurity and uncertainty created by the lack of insurance may have reduced the availability of credit by some 30%.

There are also structural factors in Brazilian agriculture that increase risk, such as the limited transportation infrastructure, the inadequate financial management practices of the farmers, due to a lack proper technical assistance, among others.

It is well known that insurance also helps lessen the impact of volatility in the agricultural market. The need for rural insurance becomes most apparent during bad times in agriculture. In times of crisis, when debts pile up, credit is restricted, making it impossible to restart production.

In the final stage of the cycle generated by the unavailability of insurance, lack of credit and low levels of production, the volume of unpaid debts grows significantly. At such times, there is almost always strong pressure by farmers, asking for more time to pay back their debts. Governments generally end up extending deadlines or forgiving part of the debts (amnesties, extensions, moratoria, etc.) This carries a high political cost for the government, has a financial impact on the national budget and does little to encourage efficiency among farmers.

It is estimated that unpaid agricultural debts total R\$130 billion (approximately US\$90 billion), which is equivalent to the value of an entire harvest. This debt can be broken down as follows: the national budget (R\$97 billion), the Bank of Brazil and private banks (R\$33 billion) and input suppliers (R\$10 billion).

Table 1 details the amounts owed to the Treasury:

**Table 1. Annual average rural debit balances between 1995 and 2007**

Year	Total accumulated debt R\$ <sup>3</sup>
1995	42.3
1996	39.1
1997	37.1
1998	40.2
1999	44.2
2000	48.0
2001	51.7
2002	54.5
2003	62.2
2004	68.7
2005	74.4
2006	81.5
2007	87.4

Source: Gervásio and Kreter 2007.

In order to avoid the accumulation of even more debt, the government could implement an efficient insurance system and, in this way, reduce the need to renegotiate debts.

The solution may be subsidies or contributions to private catastrophe funds, with which the government could help to implement an insurance system in Brazil and, in this way, reduce the amount of irretrievable debt. It is estimated that the

*The need for rural insurance becomes most apparent during bad times in agriculture. In times of crisis, when debts pile up, credit is restricted, making it impossible to restart production.*



cost of providing such preventive subsidies would be much less than the costs the government incurs when farmers do not pay their debts.

In order to strengthen this system, the government could follow the example set by Spain, where the government is forbidden from helping farmers who do not pay their debts. To avoid the risk of losing their lands, farmers ultimately purchase the necessary insurance.

Therefore, insurance would be the best way to avoid the further accumulation of debt in agriculture, which has become very costly for the government and tarnished the image of farmers in the eyes of society. Also, it would prevent interruptions to production.

### **Obstacles to the implementation of an efficient insurance system**

The main obstacles to the implementation of a rural insurance system in Brazil include the problem mentioned by almost every speaker at the seminar, which is the lack of an efficient data base that can be used

3 Billions of R\$ in May 2007, adjusted for the Broad National Consumer Price Index (IPCA)



to calculate productivity indexes for both family and commercial agriculture. When the data for these two categories are mixed together, lower average yields are obtained. If such figures are used as a reference for insurance purposes, the more mechanized farmers are not eligible for coverage.

In Mato Grosso, for example, insurance covers only those who produce fewer than 46 sacks (60kg) of soybeans per hectare. According to farmers, this amount is extremely low and leaves mechanized farmers, who produce an average of 65 sacks per hectare, uninsured. If, as the result of a climatic event, their production drops to 50 sacks, for example, they are not covered. Insurance that works this way is not attractive to medium- or large-scale farmers.

Another obstacle to the creation of an efficient insurance system is the lack of accurate climate forecasts. No matter how credible weather forecasts are, they cannot extend beyond 15 days, and climate forecasts are highly inaccurate (less than 40% reliable over long periods). There are few weather stations in Brazil that can predict, with any degree of certainty, changes in weather and climate.

The monitoring of climatic conditions has become even more important given the expected impact of global warming and the greenhouse effect on agriculture. Data presented at the Seminar indicate that in certain regions of Brazil there will be an increase in the incidence of dry periods and in the minimum temperature. As a result, by 2040, bean production may cease and 1000 municipalities may no longer be able to produce cotton, 400 rice, 300 coffee





and 400 for soybeans, and cassava may disappear in northeastern Brazil.

In response to this challenge, a number of institutions that monitor climate and weather have appeared: AGRITEMPO, the Integrated Agrometeorological Center (CIRAM), the Technological Research Center (CEPETEC), EMBRAPA, the Agricultural Research Institute of Parana (IAPAR), the Meteorological System of Parana (SIMEPAR), the Agricultural Research Center of Santa Catarina (CEPAGR), CLIMATEMPO, the Agricultural Meteorological System (SOMAR), the Meteorological Institute (IMET), the Meteorological Center of Minas Gerais and the Meteorological Center of Pernambuco (CAMEPE).

The Food Supply Company of Brazil (CONAB) has also improved its harvest forecasting system, which is based on estimates made by local experts and using the georeferencing system known as (GEOSAFRAS), which relies on satellites and people on site who use GPS devices.

*The monitoring of climatic conditions has become even more important given the expected impact of global warming and the greenhouse effect on agriculture.*



Further, the Brazilian Geography and Statistics Institute (IBGE) and the Agricultural Forecast Laboratory (LSPA) compile agricultural statistics at the municipal level. One of these data banks, known as PAM (Producción Agrícola Municipal) contains the data from the municipal level. However, since they are published a year after they are compiled, they are of little use. Also, it does not distinguish types of technology used by farmers and does not provide detail on the visits the LSPA makes every month to farms producing 34 different crops.

Nonetheless, the 2006 Agricultural Census can be used at the municipal level to distinguish between family and commercial farmers (FAO/INCRA methodology) and later apply those coefficients to the PAM data.

► *There are a number of obstacles that must be overcome in Brazil, including a weak system responsible for investigating losses, due to the lack of trained personnel.*

Another element that helps to mitigate insecurity is the agricultural and climatic risk zonation done by the MAPA. Equations are used to determine the influence of soils, climate and plant characteristics (radicular system, water requirements, etc.) in the water balance of the crop. They also make it possible to determine the most suitable and least risky areas for planting each plant species. To date, the MAPA has published 200 resolutions with risk maps for a fairly wide range of products and regions. Zonation also promotes the development of technologies and helps to ensure that farmers and markets work with the same information.

Lastly, there are a number of obstacles that must be overcome in Brazil, including a weak system responsible for investigating losses, due to the lack of trained personnel. This invites fraud, so common in past experiences such as the Official Rural Insurance Program (PROAGRO), and still occurring today in the private-sector system. Because the risk is so great for insurance companies, they are not interested in providing this service or simply raise premiums to protect themselves.

This investigation could be done by satellite. However, it will still be necessary to have trained personnel who can use a GPS device to georeference, interpret, confirm and copy the satellite images on to effective risk maps.

The training of technical personnel is fundamental in an efficient investigation strategy. Without expert appraisals, it is impossible to develop an agricultural insurance system that can offer reasonable premiums.

## Proposals for overcoming obstacles

At the seminar, a proposal was made to discuss the topic of agricultural insurance further and to begin working with rural insurance rather than agricultural insurance alone. To do this, an income insurance system would be developed to include and protect farmers against variations in agricultural prices, as well as climatic risks. As a counterpart, the farmers would insure all his/her income. In other words, the farmer, and not only the crops, would be insured. Should a farmer lose money on one crop and earn money on another, his total income will not have varied and the insurance, therefore, would not be used.

There are, however, difficult technical-political problems that must be solved in order to adopt a system of this type. In the United States, such insurance exists, but risk is calculated based on the average earnings of the last five tax returns. In Brazil, most properties belong to physical persons, and their tax returns are neither reliable nor public.

The other solution presented was to propose to the government that it increase the subsidy on premiums. The subsidy currently varies between 40% and 60% of the premium, with an upper limit of R\$32,000 per subsidy. This helps small- and medium-scale, but not large-scale farmers.

Inasmuch as currently there are no state supported funds to protect farmers in the case of a catastrophic event (abnormal), several arguments were put forth that call for the creation of a Catastrophe Fund, to wit:

## arguments in favor of establishing a Catastrophe Fund

- The difference that exists between countries in terms of risk was explained. In Argentina, for example, the insurance system is fully private and focuses on providing protection only against the risk of hail, which is a fairly predictable event. As a result, the risk is less for insurers and reinsurers. In Brazil, in addition to hail, the system needs to provide protection against highly unpredictable events such as floods, droughts, excess rain, hurricanes, among others. As such, the possibility of a catastrophe occurring is greater and the current system has proven ineffective in providing such coverage.
- Others felt that the opening of the reinsurance system to foreign companies could help to reduce the cost of state intervention.
- It was decided that the Catastrophe Fund would be administered by a consortium which will have a council also supervised by the government through the Superintendancy of Public Insurance (SUSEP). The fund will be created with a subsidy from the government and with contributions from the private sector, which will serve as a reserve for the purpose of providing indemnification.
- The Catastrophe Fund would offer certain advantages over the current Rural Insurance Stabilization Fund (FESR). For example, it would not depend on supplementary budgetary allocations because it is a private fund to which the state will make a contribution so it can assume the commitments arising from catastrophes.
- The Ministry of the Treasury of Brazil has expressed interest in implementing this fund quickly and making it sustainable, thus putting an end to the renegotiations of agricultural debts, which are extremely costly. To this end, PLP 374/2008 has been sent to the National Congress in the hope that it will be approved in 2008.




## Final comments

Rural insurance, as it applies to agriculture, is one of the most important instruments for the development of agriculture. By protecting farmers against losses resulting from the adverse effects of nature, insurance becomes an instrument for income stabilization, job creation and promotion of technological development in the rural milieu.

Insurance also has an important impact on rural credit. By lowering the risk and

reducing the volume of unpaid debt, it brings down the cost of credit and facilitates the incorporation of rural activities into the capital market. In the current context, rural insurance is an essential condition for prosperity in agriculture, above all in an economic environment marked by uncertainty and high economic risks.

The time is right for Brazilian agriculture to take a major step forward by making the consolidation of rural insurance an important piece of the policy on promotion of competition and sustainable growth of the sector.

 *In the current context, rural insurance is an essential condition for prosperity in agriculture, above all in an economic environment marked by uncertainty and high economic risks.*

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# Résumé / Resumo / Resumen

## **Gestion de l'assurance rurale au Brésil**

Dans le présent article sont exposées plusieurs questions et propositions en rapport avec les problèmes du système actuel d'assurances rurales au Brésil, qui ont été examinées lors du séminaire sur le risque et la gestion de l'assurance rurale tenu du 24 au 26 juin 2008 à l'Institut d'économie de l'Université de Campinas (UNICAMP). Les principales questions abordées concernent notamment l'avantage que présente un système d'assurances du point de vue des reconductions de dettes, les subventions de primes lorsque les risques sont très élevés et la nécessité de disposer d'un système d'information qui fonctionne avec les données détaillées fournies par les agriculteurs plutôt qu'avec des moyennes qui ne reflètent pas la véritable situation du secteur agricole. Il est également fait référence à la possibilité d'instaurer un fonds de catastrophe au Brésil qui garantisse effectivement le paiement des indemnités extraordinaires, compte tenu du fait que, à ce jour, le pays n'a pas réussi à mettre en place un système efficace de protection contre les risques d'infestations et les phénomènes climatiques au Brésil.

## **Gestão do seguro rural no Brasil**

Apresenta os diversos temas e propostas para enfrentar os problemas do atual sistema de seguro rural no Brasil levantados no Seminário Risco e Gestão do Seguro Rural no Brasil, realizado de 24 a 26 de junho de 2008 no Instituto de Economia da Universidade de Campinas (UNICAMP). Os principais temas tratados disseram respeito às vantagens de um sistema de seguro com relação às prorrogações de dívidas, às subvenções aos prêmios quando os riscos são muito elevados e à necessidade de um sistema de informações que trabalhe com dados detalhados dos agricultores, em vez de médias que não refletem a verdadeira situação do agro. Também foi mencionada a possibilidade de ser estabelecido um fundo para catástrofes no Brasil que efetivamente garanta o pagamento das indenizações extraordinárias, tendo em vista que, até o presente, não foi possível implementar um sistema eficiente de proteção contra os riscos de pragas e eventos climáticos no Brasil.

## **La gestión del seguro rural en Brasil**

Se exponen diversos temas y propuestas para enfrentar los problemas del actual sistema de seguros rurales en Brasil, que surgieron del Seminario Riesgo y Gestión del Seguro Rural de Brasil, realizado del 24 al 26 de junio de 2008 en el Instituto de Economía de la Universidad de Campinas (UNICAMP). Los principales temas abordados corresponden a la ventaja de un sistema de seguro en relación con las prórrogas de deudas, las subvenciones a las primas cuando los riesgos son muy altos, la necesidad de un sistema de informaciones que trabaje con datos detallados de los agricultores en vez de promedios que no reflejan la verdadera situación del agro. También se hace referencia a la posibilidad de instaurar un fondo de catástrofe en Brasil que garantice de forma efectiva el pago de las indemnizaciones extraordinarias, en vista de que a la fecha no se ha logrado implementar un sistema eficiente de protección contra los riesgos de plagas y eventos climáticos en Brasil.



## Paraguay taps its potential for biofuel production

*Guillermo Souto<sup>1</sup>*

### Summary

Despite the concerns of some regarding the use of agricultural crops for the production of biofuels, and the fact that traditionally they have been used exclusively to feed humans and animals, Paraguay has begun to produce biofuels to be mixed with fossil fuels. The data included in this article will serve as input for a later study on the possible effects of mixing different percentages of such crops with fossil fuels. The results of this study will be significant due to the volume of biofuels currently consumed in the country (under the rules regulating the mixture of gasoline with ethanol) and the trend toward their increased use thanks to the recent introduction of flex vehicles.

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**Key words:** *biofuels, ethanol, biodiesel, naphtha, diesel, raw materials, cultivated area.*

## Introduction

Paraguay has the potential to become a producer and exporter of biofuels thanks to its agricultural and forest resources and experience in the production of crops suitable for use in biofuel production. In addition, the county is endowed with other conditions (climate, soil, labor, available land) that favor the cultivation of a wide range of high-yield crops that can be used as raw material in the generation of biofuels.

Within the broader topic of biofuels, this article focuses on ethanol and mainly on biodiesel, and on some of the raw materials used in their production, tallow in particular. It also describes alternative scenarios for the use of different crops and the percentage of same to be used in the manufacture of biodiesel in Paraguay.

*In addition, the county is endowed with other conditions (climate, soil, labor, available land) that favor the cultivation of a wide range of high-yield crops that can be used as raw material in the generation of biofuels.*

## Ethanol production

Considering that some 264 million liters of gasoline are consumed per year in Paraguay, and that the average mixture of ethanol in gasoline is close to 21%, some 55,400,000 liters of absolute ethanol must be produced annually to meet current demand. At present, the mixtures permitted by law are: up to 18% in 95 octane gasoline and as much as 24% in 85 octane gasoline, which is known as Econo85. No ethanol is added to 97octane gasoline.

Raw materials available for ethanol production:

- Sugar cane (*Saccharum officinarum*)
- Corn (*Zea mays*)
- Cassava (*Manihot esculenta*)
- Sorghum (*Sorghum vulgare*)
- Rice (*Oryza sativa*) (in smaller proportion)

In Paraguay, most ethanol is produced from sugar cane; other raw materials used include sorghum, rice, etc.

Nationally, some 82,000 hectares are planted in sugar cane, of which 33% are used to produce alcohol, 62% sugar and 5% cane syrup.

In 2007, ethanol production nationally reached some 53 million liters, a figure expected to rise in 2008 with the opening of two new alcohol mills, which should make it possible to supply all the ethanol needed for the different mixtures with gasoline. However, in 2008, demand for ethanol will increase with the introduction of flex vehicles, which can use gasoline, ethanol or any mixture of the two. This means that more land will have to be planted in sugar cane to supply the ethanol needed by such vehicles.

In June 2008, the Customs Directorate approved Resolution No. 280, which called for lower customs duties on flex vehicles. Shortly after the approval of this resolution, some automobile dealers began to import such vehicles. Likewise, individuals began to import flex vehicles for their own personal use or subsequent sale.

Further, it is possible to install what are known as "Flex kits" to adapt gasoline motors for use with ethanol, gasoline or any combination of the two. Given the short time this type of vehicle has been in use, it is too early to determine what percentage of the vehicle fleet is flex vehicles.

## Biodiesel production

In 2007, the Ministry of Industry and Commerce (MIC) mandated a mixture of 1% of biodiesel with diesel. In other words, in each 100 liters of diesel there would be one liter of biodiesel. By 2008, the percentage would be 3%, and from 2009 on, 5%, up to a maximum of 20%. According to data provided by the state-run Petroleos de Paraguay (PETROPAR), some 1 trillion liters of diesel are consumed per year at the national level. This means that, to comply with the mandated 1% mixture, 10 million liters of biodiesel will be needed, for the 3% mixture 30 million liters, and for the 5% mixture 50 million liters.

Should the biodiesel obtained from tallow, currently the principal raw material used, not be sufficient to meet national demand, it will be necessary to look for alternative raw materials. The country produces a number of crops that could be used as raw materials in the manufacture of biodiesel.

The following table presents the different crops, cited above, considered suitable for use in biodiesel production. It also shows the cultivated area need to produce the amount of biodiesel required for each mixture percentage.



Raw materials available for biodiesel production:

- Grugru palm (*Acrocomia totai*)
- Castor bean (*Ricinus communis*)
- Soybeans (*Glycine max*)
- Sunflower (*Helianthus annuus*)
- Tung oil tree (*Aleurites fordii*)
- Peanut (*Arachis hypogaea*)
- Cotton (*Gossypium hirsutum*)
- Sesame (*Sesamum indicum*)
- Jatropha (*Jatropha curcas*)
- Canola or Colza (*Brassica napus*)
- Animal fat
- Recovered oils

**Table 1. Cultivated area needed to produce required amount of biodiesel, for each mixture percentage.**

Crop	10 000 000 liters (1%)	Percentage (%) of total cultivated area	30 000 000 liters (3%)	Percentage (%) of total cultivated area	50 000 000 liters (5%)	Percentage (%) of total cultivated area
	Hectares and percentages (%)					
Grugru palm (number of plants)	13 333 000	22.2%	40 000 000	66,6%	66 666 000	(+) 11%
Castor bean	19 840	(+) 98.4%	59 520	(+) 495%	99 200	(+) 892%
Soybeans	21 050	1.0%	63 160	2.6%	105 260	4.8%
Sunflower	13 300	6.7%	40 000	20.0%	66 600	33.3%
Tung oil tree	5 500	45.8%	16 500	(+) 37.5%	27 500	(+) 129%
Peanut	20 000	54.0%	60 000	(+) 62.2%	100 000	(+) 170%
Cotton	83 300	46.3%	250 000	(+) 38.9%	416 600	(+) 131.4%
Sesame	22 200	31.7%	66 600	95.0%	111 100	(+) 58.7%
Jatropha	10 000	-	31 600	-	52 600	-
Canola	18 520	32.3%	55 560	96.8%	92 600	(+) 61.4%

(+) % of additional land planted required to meet estimated demand, based on each mixture percentage and in relation to the cultivated area currently planted in the crop.

Source: prepared by the author.





Tables 2, 3 and 4 present alternatives for the use of crops in the production of biodiesel, by mixture percentage. Production levels are considered in terms of cultivated area nationwide, as well as the respective yields.

what percentage of all the raw material earmarked for this purpose corresponds to each crop. The next columns show the cultivated areas needed to supply the required mixture percentages (1%, 3%, 5%). To the right of these columns are figures which show the area planted in each crop as a percentage of the total cultivated area in Paraguay during the 2006-2007 agricultural season.

The first column identifies five crops proposed for use as raw material in biodiesel production. The second column shows



*Jatropha Curcas*

**Table 2. Alternative No. 1 for use of crops in biodiesel production in Paraguay.**

Crops proposed	Percentage of all raw materials earmarked for biodiesel production (%)	Hectares required to comply with established mixture percentages					
		Cultivated area needed to supply 1% mixture (10 000 000 liters of biodiesel)		Cultivated area needed to supply 3% mixture (30 000 000 liters of biodiesel)		Cultivated area needed to supply 5% mixture (50 000 000 liters of biodiesel)	
		Hectares	* (%)	Hectares	* en %	Hectares	* (%)
Soy	50%	10 512	0.44%	31 580	1.32%	52 603	2.19%
Jatropha	25%	2 500	-	7 900	-	13 150	-
Castor bean	10%	1 984	19.84%	5 952	59.52%	9 920	99.20%
Grugu palm (plants)	10%	1 333 300	2.22%	4 000 000	6.67%	6 666 000	11.11%
Canola	5%	926	1.61%	2 778	4.84%	4 630	8.07%

\* Corresponds to the area planted in each crop, as a percentage of the total cultivated area in Paraguay during the last agricultural season.

Source: prepared by the author.



**Table 3. Alternative No. 2 for use of crops in biodiesel production in Paraguay.**

Crops proposed	Percentage of all raw materials earmarked for biodiesel production (%)	Hectares required to comply with established mixture percentages					
		Cultivated area needed to supply 1% mixture (10 000 000 liters of biodiesel)		Cultivated area needed to supply 3% mixture (30 000 000 liters of biodiesel)		Cultivated area needed to supply 5% mixture (50 000 000 liters of biodiesel)	
		Hectares	* (%)	Hectares	* (%)	Hectares	* (%)
Soy	40%	8 420	0.35%	25 264	1.05%	42 104	1.75%
Jatropha	30%	3 000	-	9 480	-	15 780	-
Castor bean	15%	2 976	29.76%	8 928	89.28%	14 880	148.80%
Grugu palm (plants)	10%	1 333 300	2.22%	4 000 000	6.67%	6 666 000	11.11%
Canola	5%	926	1.61%	2 778	4.84%	4 630	8.07%

\* Corresponds to the area planted in each crop, as a percentage of the total cultivated area in Paraguay during the last agricultural season.

Source: prepared by the author.

**Table 4. Alternative No. 3 for use of crops in biodiesel production in Paraguay.**

Crops proposed	Percentage of all raw materials earmarked for biodiesel production (%)	Hectares required to comply with established mixture percentages					
		Cultivated area needed to supply 1% mixture (10 000 000 liters of biodiesel)		Cultivated area needed to supply 3% mixture (30 000 000 liters of biodiesel)		Cultivated area needed to supply 5% mixture (50 000 000 liters of biodiesel)	
		Hectares	* (%)	Hectares	* (%)	Hectares	* (%)
Soy	30%	6 315	0.26%	18 948	0.79%	31 580	1.32%
Jatropha	30%	3 000	-	9 480	-	15 780	-
Castor bean	20%	3 968	39.68%	11 904	119.04%	19 840	198.40%
Grugu palm (plants)	15%	2 000 000	3.33%	6 000 000	10.00%	10 000 000	16.67%
Canola	5%	926	1.61%	2 778	4.84%	4 630	8.07%

\* Corresponds to the area planted in each crop, as a percentage of the total cultivated area in Paraguay during the last agricultural season.

Source: prepared by the author.

## Tallow

Given the importance of tallow in the production of biodiesel, its use should be promoted throughout Paraguay.

Almost all biodiesel marketed in 2007 came from tallow; however, by the end of that year, total production was not enough to cover even 2% of the 10 million liters needed for the 1% mixture mandated at the time. Only 1.6 million liters of biodiesel were produced.

According to data provided by the meat processing industry, an average of 8% of the carcass weight of a slaughtered animal

is tallow. Based on data published by the National Animal Quality and Health Service (SENACSA), an average carcass of 232 kilos would yield 19 kilos of tallow. In 2007, some 1,041,550 head were slaughtered, yielding some 241,640 tons of meat. Some 19,331 tons were tallow that could be used for biodiesel production. The yield of tallow is similar to that of vegetable oils, meaning that from the volume mentioned above (19,331 tons of tallow) some 19 million liters of biodiesel can be produced if all animal fat is earmarked for that purpose.

However, since almost all the biodiesel produced and marketed in 2007 (approximately 1.6 million liters) was manufactured using animal fat, in this case tallow, biodiesel production was affected when the price of tallow rose. According to the private sector, the price climbed to between 4000 and 4500 guaranies per kilo, which made the manufacture of biofuel unviable and shut down production.

Currently, however, tallow prices appear to have come down because some biodiesel companies have renewed production. Also, the industry indicated that the earlier increase in the prices was due to a reduction in the amount of animals slaughtered during that period.

If 50% of the tallow from slaughtered animals were used to produce energy, approximately 9.5 million liters of biodiesel could be produced per year, enough to supply the mandated 1% mixture. This volume of biofuel could be used to reduce the use of other raw materials to produce biodiesel.





## Conclusions

It is clear that current and potential demand for biofuels will require an increase in the production of raw materials. As regards ethanol, Paraguay has experience in its production, marketing and use in vehicles. It is estimated that in 2008 it will be possible to meet the demand that went unmet between harvests, thanks to the operation of new alcohol mills and to an increase in the area under cultivation in sugar cane. Likewise, in 2008, customs duties on imports of flex cars were lowered, which will mean a significant increase in consumption of ethanol.

In the case of biodiesel, the situation is different. Despite the existing legal framework and industrial capacity, it has not been possible to produce enough biodiesel on a regular basis to comply with the mandated mixtures. In the judgment

*In the case of biodiesel, the situation is different. Despite the existing legal framework and industrial capacity, it has not been possible to produce enough biodiesel on a regular basis to comply with the mandated mixtures.*



of biofuel producers, the basic cause of this situation is the high prices for their principal raw material (tallow). This situation reveals the need to consider using other crops available in the country or to introduce new crops such as jatropha, as well as the possible socioeconomic impacts they would have at the local level.

What is needed are more thorough analyses that consider the use of agricultural products for energy generation and its possible effects on “food security” at the national level.

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# Résumé / Resumo / Resumen



## Le Paraguay examine son potentiel en matière de biocarburants

En réponse à l'intérêt suscité par l'utilisation de denrées agricoles aux fins de la production de biocarburants, bien que, traditionnellement, ces denrées aient servi exclusivement à l'alimentation humaine et animale, le Paraguay a fait une incursion dans le domaine de la production de matières premières à partir de denrées agricoles, destinées à la production de combustibles d'origine biologique, au marché des combustibles fossiles et à la production éventuelle de mélanges avec des dérivés du pétrole. Les données fournies dans le présent article seront utilisées dans une étude subséquente des effets possibles de l'utilisation, dans diverses proportions, de denrées agricoles destinées à la consommation humaine et animale pour produire des biocarburants à l'échelle nationale. Les résultats seront importants compte tenu du volume de biocarburants consommé actuellement dans le pays (avec le régime en vigueur concernant le mélange essence-éthanol) et de la tendance à la hausse de la consommation de biocarburant (avec la récente introduction des véhicules Flex dans le parc automobile).



## Paraguai explora seu potencial em biocombustíveis

Em face da preocupação por utilizar insumos agrícolas na produção de biocombustíveis, embora, tradicionalmente, seu fim exclusivo tivesse sido a alimentação humana e animal, o Paraguai deu início à produção de matérias-primas a partir de culturas para a obtenção de combustíveis de origem biológica, o consumo de combustíveis fósseis e a eventual mescla com derivados do petróleo. Os dados incluídos neste artigo podem servir para um estudo posterior sobre os possíveis efeitos do seu uso em diferentes proporções de insumos agrícolas de consumo humano e animal na produção de biocombustíveis em nível nacional. Os resultados serão significativos, tendo em vista o volume de biocombustíveis atualmente consumido no país (com o atual regime de mistura de gasolina com etanol) e a tendência de aumento do seu uso (com a recente introdução dos veículos Flex à frota automotora).



## Paraguay explora su potencial en biocombustibles

Tradicionalmente en Paraguay el fin exclusivo de la producción agrícola había sido la alimentación humana y animal, pero este país ha incursionado en la producción de materias primas a partir de cultivos para la obtención de combustibles de origen biológico, el consumo de combustibles fósiles y la eventual mezcla con los derivados de petróleo. Los datos incluidos en este artículo contribuyen a un posterior estudio sobre los posibles efectos de su uso en distintas proporciones de rubros agrícolas de consumo humano y animal para la producción de biocombustibles a nivel nacional. Los resultados serán significativos debido al volumen de biocombustibles consumido actualmente en ese país (con el vigente régimen de mezcla de nafta con etanol) y la tendencia al aumento de su uso (con la reciente introducción de los vehículos Flex al parque automotor).



## FONTAGRO funding potato projects in Central America and Andean countries


Carolina Ruiz<sup>1</sup>

Potatoes are one of the most nutritional and versatile foods and potato cultivation is among the most adaptable to adverse climate conditions. Potatoes were domesticated in the Andes thousands of years before the arrival of Christopher Columbus and, today, the potato is a proven and interesting alternative for Latin American countries that face vulnerability and uncertainty as a result of the food crisis and climate change.

FONTAGRO is funding four technological innovation projects related to this nutritional and versatile tuber, in the amount of US\$1, 950, 000.



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*The potato is a prime quality food and is the fourth most important food crop worldwide.*

In this International Year of the Potato, the Regional Fund for Agricultural Technology (FONTAGRO) is funding four technological innovation projects related to this crop in the amount of close to two million dollars (US\$1, 950, 000).

The initiatives took off between 2006 and 2008 in a number of Latin American countries considered by the experts to be among the most vulnerable to the current food crisis: Ecuador, Bolivia, Peru, Venezuela, Nicaragua, Costa Rica, Honduras, Guatemala, Panama and El Salvador.

The initial results of these initiatives were made known during the Third Workshop on Technical Follow-up to FONTAGRO Projects for the Andean, Southern Cone, Central American and Caribbean regions. That workshop, held from June 25-27 last at IICA Headquarters in Costa Rica, was attended by 50 representatives from institutions and organizations in 20 countries.

During the workshop, 23 projects financed by the Fund were the subject of technical follow-up. Diseases, soil health, good agricultural practices in integrated pest management, reducing the use of agrochemicals, sustainable production, improving the quality of life of rural communities and production chains were

some of the thematic areas addressed in the initiatives that were reviewed during the workshop.

FONTAGRO, which is co-sponsored by the Inter-American Institute for Cooperation on Agriculture (IICA) and the Inter-American Development Bank (IDB), funds scientific and technological research and innovation projects that promote competitiveness in the agricultural and rural sectors, poverty reduction and the sustainable management of natural resources. To date, the 15 countries that make up FONTAGRO have invested US\$52.3 million.

After chronicling the history of IICA support for the Fund, IICA's Director General, Chelston Brathwaite, said that this type of partnership to promote hemispheric cooperation and integration in the area of technology has become now more than ever a high value added strategy for the countries.

In a context of vulnerability in the face of climate change, the limited availability of soil and water resources for production and the rising costs of inputs and transport resulting from rising oil prices, increasing agricultural productivity is a must and, for this, technological paradigms that are environmentally more favorable and more inclusive of the various production sectors are required, he said.

The representative from the IDB in Costa Rica, Fernando Quevedo, echoed these sentiments. He said that the tenth anniversary of FONTAGRO in 2008 coincides with a particularly difficult period for agriculture and the overall situation facing our countries.





## More and better potatoes

Two of the projects are intended to improve potato production and the quality of potatoes in Central America and the Andean Region. The two projects started in January 2008 and are scheduled to conclude in 2011.

Specifically, the initiative for Central America aims at selecting and disseminating potato genotypes that are suitable for Nicaragua, Costa Rica, Honduras, Guatemala, Panama and El Salvador. In addition, through technological innovation, not only will the seed be improved, but also national systems that produce it will be strengthened by achieving appropriate phytosanitary levels.

According to Arnulfo Gutiérrez, from Panama, the lead researcher for the Central American project, the varieties used in this region are old, require many inputs and are susceptible to pests. The expectation is that the project will increase the availability of varieties that are of superior quality, cut production costs by 50 per cent and increase crop areas by five per cent.

“The potato is a prime quality food and is the fourth most important food crop worldwide. If we train our producers and give them the necessary facilities to be competitive, we will impact food security for our people, the researcher said.

Another project that seeks to improve production and the quality of this tuber is the Latin American Potato Network. With

funding from FONTAGRO, the Network facilitates technology for small-scale producers in Peru, Bolivia, Colombia, Ecuador and Argentina to enable them to produce productive varieties that are disease-resistant and nutritive and thereby increase competitiveness and the profitability of these crops.

“We are working to develop resistance to biotic factors in germplasm, such as viruses and other potato diseases, and abiotic factors, such as stress caused by drought. We are also improving their nutritional value by adding zinc, iron and vitamin C and are facilitating access to these technologies for small-scale producers, Stef de Haan, coordinator of the Network, said.

The project seeks to benefit five per cent of potato producers in each country. For this, they will avail themselves of a range of channels for information and learning on the understanding that as good as a technology may be, if it is not used, it is of no use to society.

## Looking for new niches

Developing technological and commercial innovations to enable small-scale Andean producers to take advantage of the biodiversity of native potatoes and generate products that can be placed on differentiated markets is the goal of another project being funded by FONTAGRO in Ecuador, Bolivia, Colombia, Peru and Venezuela.

The initiative seeks to characterize the diversity of native potatoes according to their special attributes and potential uses, classify them and prepare recipes based on these varieties. It further proposes to identify a market niche in each country, develop industrial and culinary products and prepare a business plan and promotional program.

“We will thereby improve the income of the producers and, at the same time, conserve Andean biodiversity,” explained Cecilia Monteros, project researcher, who reckons that the direct beneficiaries of the initiative total some 200 producers. Indirect beneficiaries total some 1,000 people in each country.

According to Monteros, in these regions, there are thousands of varieties of native potatoes with unique colors, shapes, tastes, textures and aromas; only roughly five percent of these varieties reach the market. “So we have made chips with bright colors and gourmet potatoes to find another niche...And we have had good responses so far”, she said.

To promote these products, the project seeks strategic partners in professional

chefs and gastronomy schools, participates in gastronomic festivals and agricultural fairs. It further upgrades producer organizations with a commercial and entrepreneurial vision and trains them in market development, business plans and marketing.

Research is also intended to improve the production and productivity of this crop. For this, it is developing and circulating technological innovations among small-scale producers. According to Monteros, as of June 2008, several technological innovations related to the production and post-harvesting of native potatoes had been developed, validated and shared at the regional level.

## Bio-control of pests

The fourth FONTAGRO project, aimed at improving potato cultivation, develops and applies ecological practices in pest management in Bolivia, Ecuador and Peru.

The initiative seeks to reduce the economic losses of small-scale producers through environmentally sound Integrated Pest Management (IPM) strategies. “We wish to understand all of the factors, from the biological to the cultural, that impact the emergence of pests and then launch strategies accordingly,” the lead project researcher, Jürgen Kroschel, said.

The research, which started in July of 2007, has worked on mechanisms for improving the biological control of pests. For example, it has developed cropping systems and strategies for weed management to conserve and increase

the natural enemies of certain pests that infest the seeds of this tuber.

Another physical pest control method investigated was to install plastic barriers as fences around the potato fields. In Kroschel's view, this practice is very effective when the barrier is installed before the sowing and its cost is lower than the cost of applying insecticides twice to four times in the fields.

"The weevil (one of the potato pests in the Andean region) cannot fly and is incapable of climbing more than 20 cm. With barriers of this size, the white grub can only move from one side to the other around the plastic and cannot reach the potato on the other side", he explained.

Another technique tested by this project to reduce pests is the use of attracticides. These substances are chemically prepared and contain sex pheromones that attract the males of pests to kill them. According to the researcher, this method does not have an effect on other factors of the agro-system.

"Farmers must understand that the market has changed. Now, consumers do not wish to buy potatoes on which pesticides have been used. They need to change their farming practices to be able to sell their



## The weevil

*The potato weevil is a pest that threatens potato crops in the Andean region.*

produce and doing so has a dual benefit: the consumer usually is prepared to pay more for these chemical-free products and thus they help improve the environment," Kroschel said.

## Looking to food security

Though different in terms of the proposals and specific objectives, the four projects have in common a set of circumstances they are attempting to address: the challenge of climate change and food security.

"Whereas the prices of rice, wheat and barley have doubled and even tripled, the price of potato has risen less than 30 per cent. Potatoes continue to be an affordable staple for low-income people", Haan said. Furthermore, according to Gutierrez, "this



*Attracticides are substances that contain sex pheromones to attract the males of pests to kill them.*



tuber produces more food on one hectare than any other crop”.

What is more, potatoes can be sown over 3,800 metros above sea level, where other crops no longer survive. At this altitude, the rays of the sun and the high content of organic soil matter provide the conditions that are conducive to growing potato crops without the use of chemical fertilizers.

“If these projects succeed in improving production conditions, with appropriate and environmentally friendly pest management, they will be poised to contribute to food security in those countries and face the challenges of climate change”, the Executive Secretary of PROCITROPICOS, Jamil Macedo, said. Mr. Macedo participated as rapporteur at the FONTAGRO workshop at which the four initiatives were presented.

Potatoes are a great source of energy and have protein, fiber, anti-oxidant properties, iron, copper and a high vitamin value. “With these projects, we are therefore not only helping the cause of food security for our countries at a period when climate conditions are adverse, but also we are contributing to nutrition for our people”, Monteros said.



*Because they are highly adaptable to adverse climatic conditions, potatoes provide an alternative for responding to the challenges posed by climate change.*





## Table 1. It's all about potatoes



Jürgen Kroschel  
Development and  
application of ecological  
practices in pest  
management in Bolivia,  
Ecuador, Peru

*"Our idea is to understand the ecology, to understand why a pest is a pest, how the human factor contributes to the emergence and spread of pests and how natural enemies can eradicate them".*



Cecilia Monteros  
Differentiated markets  
for producers of native  
potato in Ecuador,  
Bolivia, Colombia, Peru  
and Venezuela

*"In addition to improving the living conditions of farmers, we help in preserving these natural resources so that they are not lost, and we contribute to food security in our countries"*



Arnulfo Gutiérrez  
Competitiveness in  
cultivating potato in  
Central America and  
the Caribbean

*"With the current food crisis, we must help producers produce their own food and make their production more competitive".*



Stef de Haan  
Latin American  
Potato Network

*"Potato continues to be an affordable food for low-income people and has high potential for dealing with the issues of food security and climate change".*



Jamil Macedo,  
Executive Secretary  
of PROCITROPICOS

*"The focus of most of the projects is on small-scale producers. They are certainly linked to the issue of food security and we have high expectations."*



**Table 2. From A to Z**

Name of the project	Period	Where is it being carried out?	Who is it benefiting?	How much is being invested?
Network for innovation in research and development: towards the development of mechanisms that impact the poor favorably through the dissemination of new varieties of potato in the Andean region.	January 2008 -2011	Peru Bolivia Colombia Ecuador Argentina	"5% of producers in each country".	\$1, 123, 594 (\$500, 000 allocated by FONTAGRO)
Development and application of ecological practices in pest management to increase the sustainable production of potatoes for low-income farmers in the Andean regions of Bolivia, Ecuador, Peru.	September 2007 - May 2010	Ecuador Bolivia Peru	"Thousands".	\$900, 000 (\$450, 000 allocated by FONTAGRO)
Technological research and innovation in potato cultivation to contribute to the competitiveness of potatoes and food security in Central America and the Caribbean.	January 2008-2011	Nicaragua Costa Rica Honduras Guatemala Panama El Salvador Chile	"Thousands".	\$1, 460, 500 (\$500, 000 allocated by FONTAGRO)
Technological innovations and differentiated markets for producers of native potato.	September 2006 - December 2009	Ecuador Bolivia Colombia Peru Venezuela	"Between 100 and 200 direct beneficiaries; there are 1 000 indirect beneficiaries in each country".	\$1, 066, 405 (\$500, 000 allocated by FONTAGRO)

## What is FONTAGRO?

**FONTAGRO** is an alliance of countries that was established to finance scientific and technological research in the agricultural sector. The Fund contributes to poverty reduction, increased competitiveness and the sustainable management of natural resources in Latin America and the Caribbean.

**Member countries:** Argentina, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Honduras, Nicaragua, Panama, Paraguay, Peru, Spain Uruguay and Venezuela.

**Structure:** a Board representing member countries and a Technical Administrative Secretariat (TAS)

**Sponsoring organizations:** the IDB and IICA.

**Member country capital investments:** US\$52.3 million invested by member countries to date. The Fund generates counterpart resources and organizes requests

for proposals along with their sponsors and other research and development organizations.

**The Fund:** A competitive and transparent mechanism. With minimum participation by member countries, projects are funded with interest generated by the capital and other organizations sharing the Fund's mission. Experts external to the Fund judge profiles and proposals on the basis of established socio-economic and environmental criteria, technical competence and institutional capacity.

**Research projects financed by the Fund.** In its ten years in existence, the Fund has financed a total of 56 projects dealing with topics such as improving production efficiency, genetic resources, technology in agrifood chains, competitiveness, agricultural health and food safety, etc. As of 2007, FONTAGRO had provided US\$15.7 million. It has mobilized more than US\$32 million in counterpart funding and has received over 330 proposals in response to eight requests for proposals.

Source: FONTAGRO

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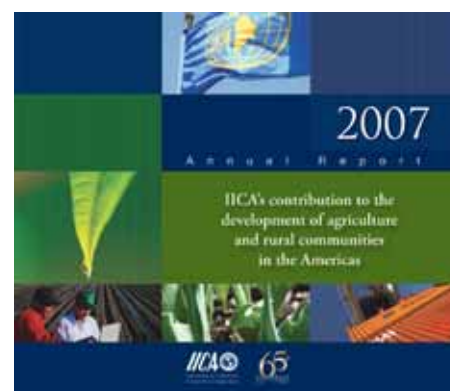
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### IICA's 2007 Annual Report

*2007 Annual Report: IICA's contribution to the development of agriculture and rural communities in the Americas* - IICA (2008)

Describes the most important results achieved by the Institute in the Member States as part of its mission to provide innovative technical cooperation and to realize its vision of being the partner of choice for agricultural and rural development efforts in the hemisphere.

<http://webiica.iica.ac.cr/bibliotecas/repiica/B0674e/b0674e.pdf>



### Biosafety

*Biossegurança e princípio da precaução: o caso da França e da União Européia.*- IICA, NEAD (2008)

This work compares the legislative and institutional frameworks of Brazil on transgenics with the regulatory frameworks of the European Union and France. It describes the debate concerning the precautionary principle, an idea put forward by the Ministry of National Integration in relation to transgenics in Brazil.

For a copy of the print version, contact [priscila.cascante@iica.int](mailto:priscila.cascante@iica.int)





## Trade

*El comercio justo como alternativa para el desarrollo equitativo.* - IICA, Corporación Latinoamericana Misión rural (2008)

This book contains a summary of the process of developing a proposed fair trade strategy for Colombia, with the active participation of a group of national and international institutions. The strategy proposes the creation of a national mechanism to support small producers, intermediaries and national consumers, to boost trade.

<http://webiica.iica.ac.cr/bibliotecas/repica/B0694e/B0694e.pdf>



## Irrigated agriculture - Brazil

*A irrigação no Brasil: situação e diretrizes.* - Ministério da Integração Nacional, IICA. (2008)

Analyzes the current situation of irrigation in Brazil and proposes that a new vision be developed for the government approach to the development of irrigated agriculture in Brazil.

The document is divided into three main sections:

- Background
- Description and analysis of the current situation
- A vision for the future

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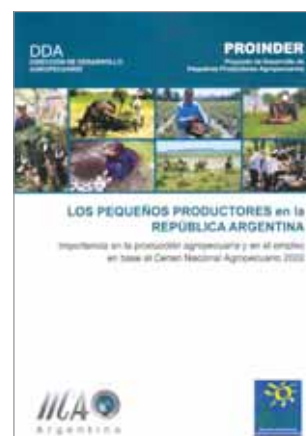


## Livestock producers - Argentina

*Los pequeños productores en la República Argentina: importancia en la producción agropecuaria y en el empleo en base al Censo Nacional Agropecuario 2002.* 2ed. IICA, Secretaría de Agricultura, Ganadería, Pesca y Alimentos (2007)

Presents an in-depth study of the characterization of small farmers in Argentina. The document's main objective is to underscore the important contribution that small farmers make in Argentina, in terms of both the economy and employment. In addition to specific results, the work presents important conceptual and methodological contributions that could be used for subsequent studies.

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## Agricultural financing

*Alternativas de financiamento agropecuário: experiências no Brasil e na América Latina.* - IICA, Unicamp (2008)

Explains the complex problems that affect agricultural financing, especially for the poorest farmers, who have traditionally been unable to obtain commercial loans. The document is divided into two parts:

- Part I:** Reflection on the importance of rural credit and the rationale behind the financing of the agricultural sector.
- Part II:** Several case studies and other examples of experiences of rural financing in Brazil and other Latin American countries. Also shows how credit programs and the various financial institutions use different credit technologies to deal with the problems of selection, guarantees, contract performance, scope and sustainability.



<http://webiica.iica.ac.cr/bibliotecas/repiica/B0693p/B0693p.pdf>

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## Institutional modernization

*Innovación, institucionalidad y desarrollo: experiencia y caminos para su integración.* - IICA, PROCISUR, INTA (2008)

Analyzes the institutional framework and the strategic transformation that Argentina's INTA has undergone in the area of institutional innovation. The experience provides a frame of reference for efforts to construct an institutional framework. Looks at the state of the art, consolidates arguments and identifies the concepts that are key to institutional change.

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