

Development of sericulture chain value: from mulberry to designers in Argentina



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Introduction

- Sericulture is a traditional activity in Argentina.
- The largest production came in mid-1940s, with fresh cocoons production of 70,000 kg.
- In the early 1950s the silk industry was in crisis by the appearance of synthetic fibers and finally disappears.
- In 1993, deep argentinean economic crisis provoke a new impulse on sericulture production
- In 2002, performed the 1st National Conference on Sericulture
- is then important the characterization of the argentinean sericulture chain value, in order to identify project constraints.



Objective

- Ten years after the 1st National Conference, and an increase in silk production, is then important the characterization of the argentinean sericulture chain value, in order to identify project constraints



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Methods and Materials

- Methodological triangulation (Valles, 2007) using quantitative and qualitative methods
- Sericulture value chain was analyzed using the methodology proposed by Kaplinsky and Morris (2000) and Ceverio *et al* (2010)
- The sericulture phases were grouped in Soria *et al.* (2001): moriculture, silkworm rearing and processing stage
- Chain related activities: non-mulberry silkworms, educational aspects and institutional and legal framework.

Moriculture Stage

- Major specie: *Morus alba L.* and varieties. Spontaneous hybrids.
- Endemic specie. Widespread use in urban forest
- Principal uses: fruit jellies and liqueurs, livestock feeding (otter, poultry, rabbits, goat, sheep) and rearing of silkworms.

Moriculture Stage

- Most common: Old high stem trees and wild mulberry trees
- Harvest is complex and risks of pesticide contamination have been high
- Gradual implementation of mulberry plantations from hardwood cuttings. 0.5 to 3 ha
- Subtropical Regions. bush type plants. 10,000 plants / ha. low stem pruning system
- Temperate and semi-arid areas, 3,000 plants / ha, medium and high stem pruning system
- intercropping techniques. Annual crops and green manures





Silkworm rearing stage.

- Sericulture as diversification activity.
- Located in small towns or suburban areas of cities.
- Most common: Isolated rearing units. Some rearing clusters.
- Principaly women. Direct source of cash income and sociabilization spaces

Number of silkworm rearing units and equivalent egg boxes per Region. Argentina

| Region | Nº Rearing Units | Nº egg boxes |
|--------------|------------------|--------------|
| Northwest | 50 | 25 |
| Northeast | 130 | 50 |
| Central | 40 | 17 |
| Total | 220 | 85 |



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Silkworm rearing stage.



Demostrative Centers



Farmers (rearing Units)



Schools



Development Institutions



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Silkworm Rearing Stage

- Quantity reared per year: 1 to 10 boxes of 10 g/seed. Determined by disponibility of labor (family members)
- Almost all farmers were rearing a complete cycle, from 1st up to 5th instar.
- Only those units near Demonstratives Centers made cooperative rearing of young silkworms.
- Predominant form of egg supply: combination of self-production and purchase of hybrids. Poor quality cocoons
- Most experienced producers mainly used hybrid eggs



Silkworm Rearing Stage

- Average yield: 25 kg of fresh cocoons / box
- Rearing Technique: Young silkworms rearing: shelf rearing.
- Late-age silkworms: shoot rearing or shelf rearing
- Mounting methods: paddy straw method, recycled poultry egg containers, as rotary mountage frame; plastic mounting frames
- Sanitary problems: subtropical areas *Nomurea rileyi* and *Beauveria bassiana* . In agricultural regions poisoning by agrochemicals





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Silk Production Stage

- Trade: mainly as raw silk or other silk intermediates. Small commercialization of fresh cocoons
- Users of silk: traditional artisans or design entrepreneurs (SMEs)
- Principal products: Range of products with varying degrees of processing: dried cocoons, skeins of raw silk, silk yarn dyed with natural dyes, spun silk yarn and non-yarn products , silk hankies, silk paper, silk felt, etc
- Traditional manual hand-spinning. Combination with cotton, wool, llama and vicuña fibers, among others.
- Each user need low volumes (about equivalent to 10 kg raw silk / purchaser / year



Silk Production Stage

- Major strategies of productive organization
 - Vertical Integration: Farmer
 - Coordination withing actors performing rearing and process of silk yarn or products, and then a common commercialization
 - Farmers produce cocoons or raw silk, traditional artisans or design entrepreneurs makes products.



Prices fixation Mechanism

- A major point of controversy
- Silk products in Argentina have not presented a classical commodities behavior
- Non-traditional agricultural products. Barrier to entry for new farmers activity
- More Demand than Offer. *It`s imposible to acquire coccons* . Strategy to adjust mechanism of price fixation



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Support Institutions

- Importance of institutions that could organize and promote the activity.
- Public support and international cooperation
- Enactment of a national law to support Sericulture
- Public agencies: INTI Textiles . INTA. ProHuerta
- Universities: Buenos Aires, Misiones, La Pampa
- National Conference on Sericulture
- Latin American Silk Meeting in Buenos Aires (2009)



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Red Latinoamericana de la Seda

- In 2006, Argentina gets into the Project *Red Latinoamericana de la Seda (RELASEDA) - Silk Latinamerican Network-*, funded by the Instituto Italo Latino Americano (IILA) and with the support of SocioLario (Italy).
- Support to Farmers, craftsmen and professional personal
- Demonstration Centers: La Pampa, Misiones, Salta
- More than 25 training and scholarships in Good Agricultural Practices, use of using natural dyes, textil research, silkworm breeding and eggs production, biomedical applications, among others areas. In the major production and research centers of Latin American and Europe.
- Selected silk handycrafts also participated in Fiera Milano 2009.

■ Courses of RELASEDA in Argentina



Scholarships of RELASEDA



Curso de producción y cría del gusano de seda - Como - Italia



Intercambio extensión - Ecuador

Pasantía en la ESPE, Ecuador



Capacitación en Mérida, Venezuela



Capacitación en La Molina Perú



Pasantía en la ESPE, Ecuador



Scholarships of RELASEDA

Capacitación en Mérida, Venezuela



Pasantía en la ESPE, Ecuador



Pasantía en Pereira, Colombia



Pasantía en Ecuador



Capacitación en Mérida, Venezuela



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Pasantía en colorantes naturales (Pavía, Italia)



Capacitación en La Molina Perú



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Demonstration Centers



Appropriate technology

Technological gap for different stages of sericulture. Following criteria for develop technology:

- Adoptable by small farmers or SMEs
- Close economic circuits locally
- Low cost of acquisition and input use
- Flexibility in terms of volume and quality of raw material (cocoons)
- Generate demand for labor
- Products that allow greater incorporation of added value and differentiation.



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Appropriate technology

Mulberry production and silkworm rearing stages:

Training courses, Reference materials, mulberry varieties, silkworm breeding and egg production, plastic mountage production

Silk Process: Training and tutorial courses in techniques, design and commercialization, Techniques for spun silk, protocols for degumming and natural dyeing

- Semi-automatic reeling machine. Yield: 100 g / h (50 den).
- four-position assembled single yarns machine and a two-position drum twister



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Educational approach

- Sericulture as a cultural component.
- Educational purposes: kindergarten, primary, secondary, agro-technical, technological schools.
- Schools with people in situations of vulnerability, many of them located in rural areas.
- Incorporated silkworm rearing and silk handicrafts in their curricular activities
- More than 200 institutions
- several educational materials used as methodological guidelines for other schools





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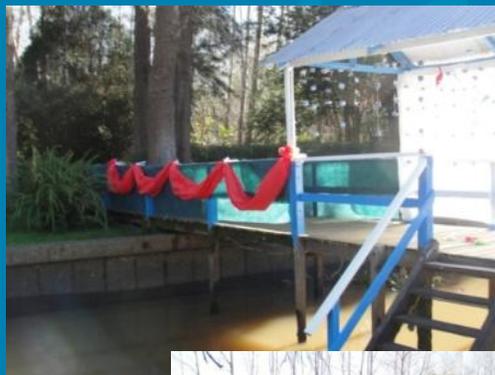


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Non-mulberry Silkworms

- Rothschildia Genre: *R. maurus*, *R. schreiretiana*, *R. jacobaea*
- Indigenous-peasant communities of northern region of the country developed techniques for collecting and processing these lepidopterous
- Systematization of original techniques, study of biological cycles, feeding and reproductive habits.



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Conclusions

- Sericulture has given a new impetus in Argentina, although the results are still limited
- The current objective is not to position Argentina as a country provider of fresh cocoons or silk yarn.
- The orientation is predominantly small scale; strengthen products that have high added value, with short channels of commercialization and distribution as fairly as possible between each link in the chain.
- If there is more development prices will fall
- Problems unresolved: domestic production of hybrid eggs and good mulberry cuttings supply.

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