

Information Systems for Grain Storage in Brazil

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ESALQ-LOG

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Outline for this presentation

- **Overview of grain storage in Brazil**
- **Our project: Information Systems for Grain Storage in Brazil**
- **Providers of grain stock information in Brazil**

Overview of grain storage in Brazil

Why is grain storage important?

- Product quality conservation



Long queues (storage on wheels)



Storage under open sky

Overview of grain storage in Brazil

Current scenario of storage

- Inadequacy of existing facilities (poor conditions in some production regions)
- Inadequate location (large distances -> higher logistics costs for farmer)

Storage capacity:
147 million t

Grain production*:
265 million t

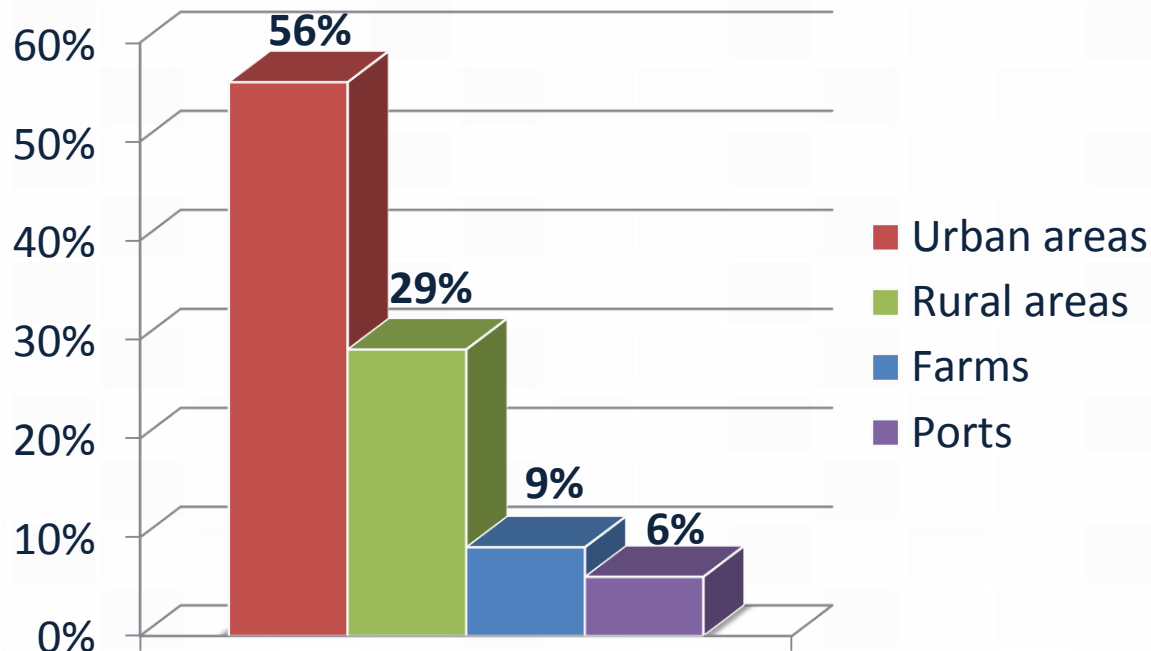
Storage deficit:
45%

** Grains: oats, rye, barley, beans, sunflower, corn, soybean, sorghum, wheat and triticale*

Sources: Conab and IBGE

Overview of grain storage in Brazil

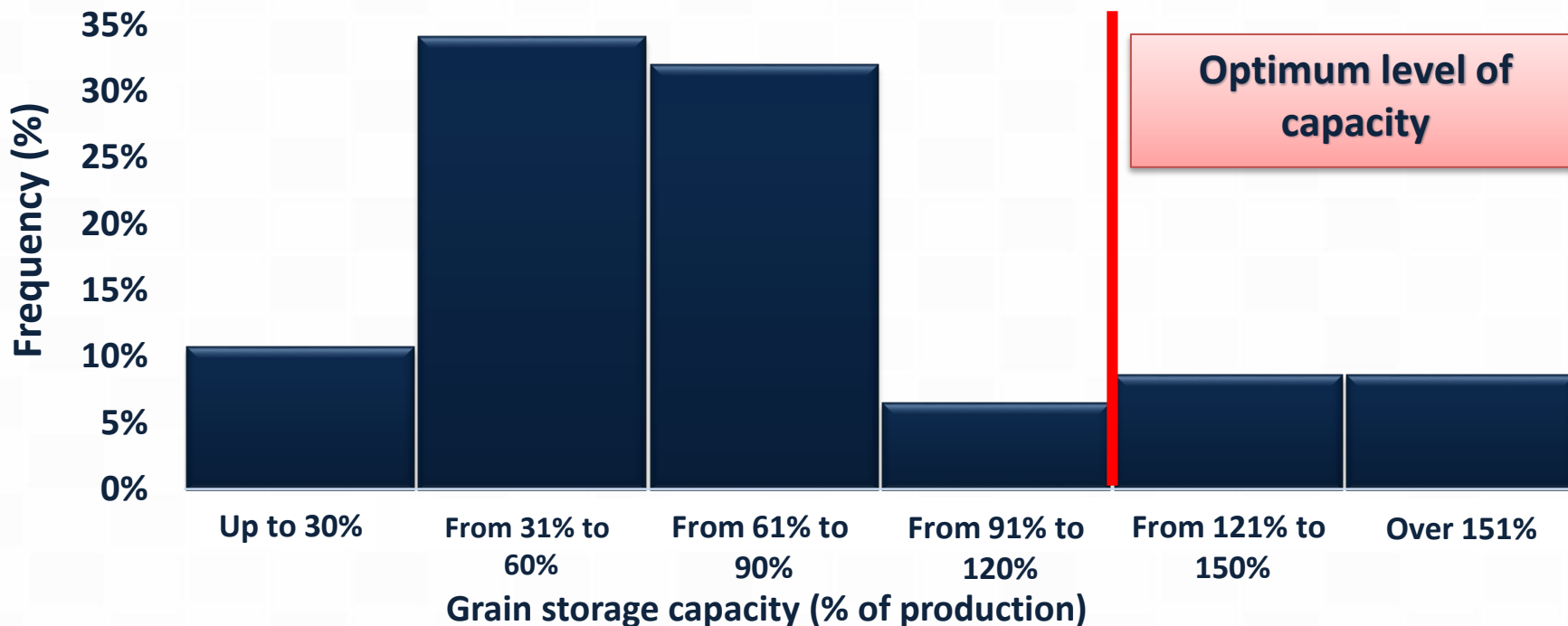
Deficiency in the capacity installed on the farms ...



Source: Conab

Overview of grain storage in Brazil

Distribution of storage capacity by region¹:

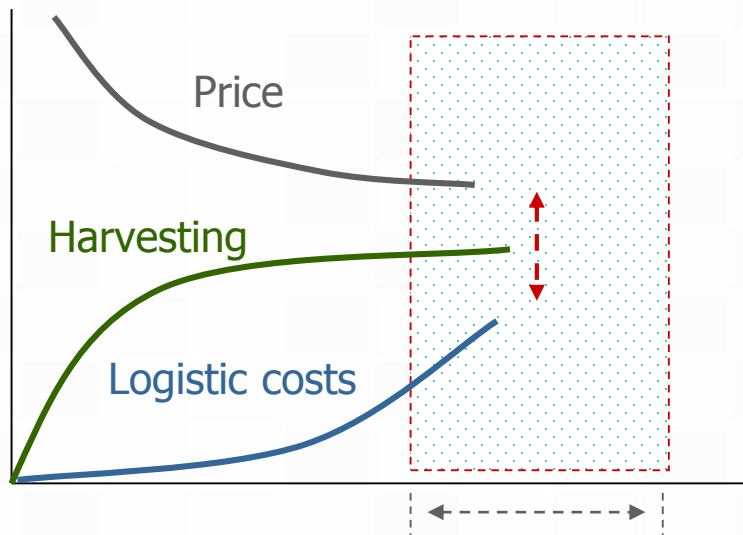


¹ Micro-region level at Brazilian Midwest

Overview of grain storage in Brazil

STORAGE BENEFITS

Current scenario with poor storage infrastructure

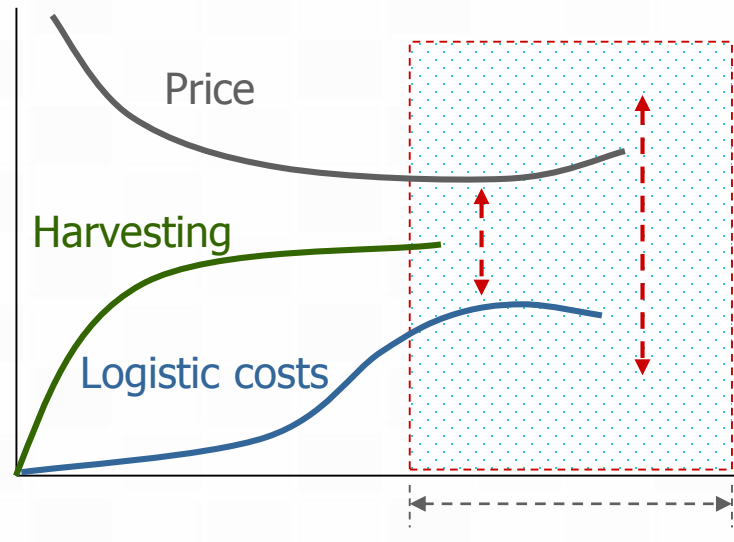


Source: NovaAgri

Concentrated flows

WAREHOUSES

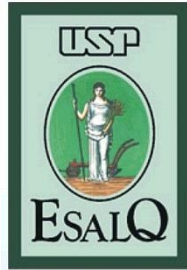
Scenario with additional storage infrastructure



Less concentrated flows

Information Systems for Grain Storage

USP



College of Agriculture “Luiz de Queiroz”




ESALQ-LOG



siarma



- **Information Systems for Grain Storage in Brazil:**
 - To perform research on **key storage features**, especially on **agricultural products (soybean and corn)**
- 
- The logo for siarma, featuring the word "siarma" in a bold, lowercase, sans-serif font. Above the letters "i" and "a" is a stylized graphic of a house with a colorful, multi-colored dot pattern inside the roof.
- Reduce **information asymmetry** on the market
 - Storage **rates**
 - **Locational models** for warehouses
 - **Investment analysis**
 - **Qualitative** analysis
 - **Strategic** storage use

Method

- **Identification** of the soybean and maize warehouses
- Primary data **collection**

Data analysis

**Results
(Prices)**

- Data collection **by phone**
- Collected **data**:
 - Storage **rate**
 - Storage **capacity**
 - Receiving and shipping **flows**
 - **Stored grains**
 - Current **investments**
- **Frequency**: Annual
- **Consulted agents**: around 100 companies (cooperatives and warehouses)
- **Available** (free) on: <http://esalqlog.esalq.usp.br/siarma>

Storage Tariff

It consists of three types of rates:

- **Fixed Rate:** it refers to the charge related to the use of warehouse, regardless of the storage period. It includes the reception operations, pre-cleaning, drying (it was adopted the standard of 17% of moisture), purge and shipping operations.
- **Variable Rate:** it refers to the rate of the storage operation for a period of 30 days, after the grace period negotiated.
- **Technical Loss:** it refers to the contractual tolerance related to the physical losses during storage service, in %.

For each product and region, there are grace periods in which only the fixed rate is charged. After such a period, the storage rate starts to be charged accordingly.

Storage Price

It refers to the price of storage service, charged for a specific period in the contract. It is calculated according to the previously reported rates, and it can be calculated by the following equation:

$$\text{PARM}_{i,n} = \text{TF}_i + \frac{(n - c_i)TV_i}{30} + qt_i pc_i$$

$$\text{for } n < c, TV_i = 0$$

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$$\text{for } n < c, TV_i = 0$$

where:

$PARM_{i,n}$ is the storage price for the region i , for n days stored (R\$/t);

TF_i is the fixed rate of the use of warehouse in the region i , regardless of the storage period (R\$/t);

TV_i is the variable rate related to the operation of storage in region i . Usually, this rate is negotiated for thirty-day contracts. In this case, it was decided to standardize the rate based on the number of days of storage.

n is the number of days the grain get stored.

c is the number of days of the grace period.

qt_i is the technical loss (%).

pc_i is the price of the grain (R\$/t).

Indicators of average parameters for storage fee - Soybeans

Average Parameters	Unit	GO	MT	MS
Grace period (c)	Days	29	41	20
Variable Rate (TV)	R\$/t	R\$ 4,95	R\$ 4,12	R\$ 4,92
Fixed Rate (TF)	R\$/t	R\$ 22,96	R\$ 24,31	R\$ 23,04
Technical Losses (qt) ¹	%	0,30	0,30	0,30
Price of the grain (pc) ²	R\$/t	R\$ 1.177,50		
Technical Losses in R\$/t (qt x pc)	R\$/t	R\$ 3,53	R\$ 3,53	R\$ 3,53

Amounts related to the standard moisture of 17%

¹ Technical Losses (qt): represent the amount of losses tolerated by contract in the storage operations (% of the amount stored).

² Soybean price: April/2015; Source: Cepea/ESALQ-USP

Indicators of average parameters for storage fee - Corn

Average Parameters	Unit	GO	MT	MS
Grace period (c)	Days	28	40	15
Variable Rate (TV)	R\$/t	R\$ 6,16	R\$ 4,18	R\$ 3,42
Fixed Rate (TF)	R\$/t	R\$ 21,57	R\$ 26,21	R\$ 23,55
Technical Losses (qt) ¹	%	0,30	0,30	0,30
Price of the grain (pc) ²	R\$/t	R\$ 488,33		
Technical Losses in R\$/t (qt x pc)	R\$/t	R\$ 1,46	R\$ 1,46	R\$ 1,46

Amounts related to the standard moisture of 17%

¹ Technical Losses (qt): represent the amount of losses tolerated by contract in the storage operations (% of the amount stored).

² Corn price: April/2015; Source: Cepea/ESALQ-USP



Logistics Strategies Simulator

Parâmetros

Indicadores de Fretes

Estatísticas de Armazenagem

Preços de comercialização

Indicadores de Armazenagem

- **Integrated platform:** freight prices, storage prices, soybean prices, static regional storage, production and export statistics
 - Strategic information for **decision makers**
 - **Logistics management support** information
 - **Scenario customization**

Information Systems for Grain Storage

Sistema de Informações de Armazenagem - Simulador de estratégias logísticas

Parâmetros

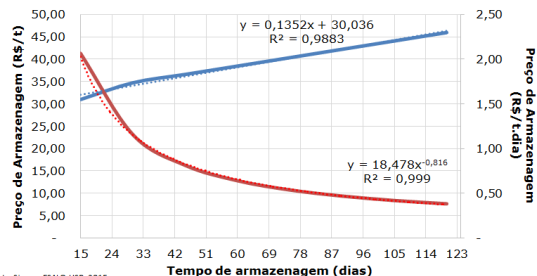
Indicadores de Fretes

Estatísticas de Armazenagem

Preços de comercialização

Indicadores de Armazenagem

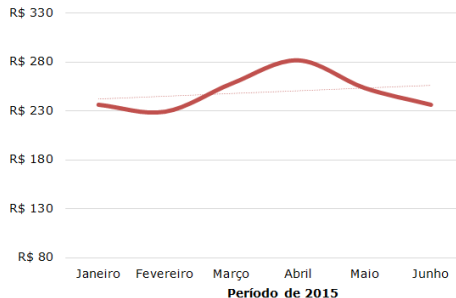
INDICADORES DE ARMazenAGEM



Fonte: Siarna ESALQ-USP, 2015

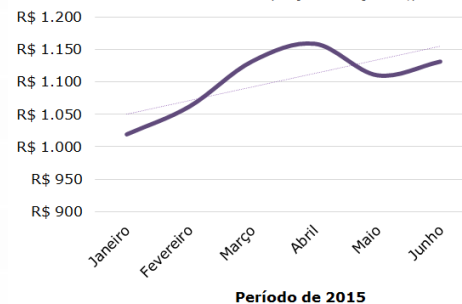
INDICADORES DOS PREÇOS DE FRETES RODOVIÁRIOS

Indicador do Preço do Frete - Sorriso (MT) Paranaguá (PR) - R\$/t



INDICADORES DOS PREÇOS DE SOJA

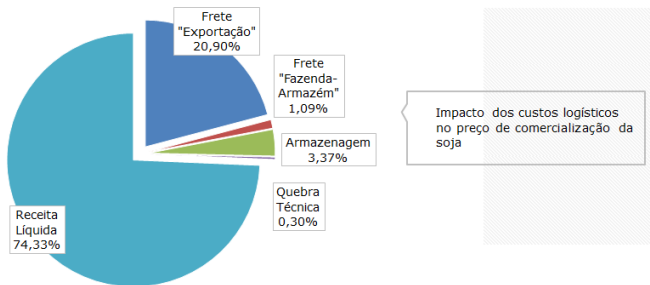
Indicadores dos preços de soja - R\$/t



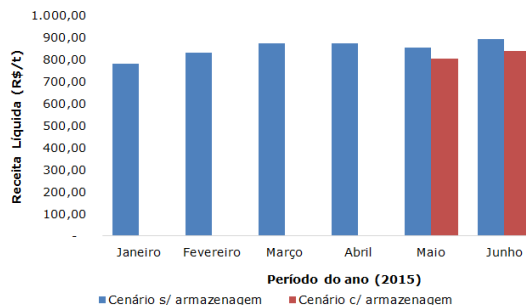
RECEITA LÍQUIDA GERADA COM A ESTRATÉGIA LOGÍSTICA ADOTADA

R\$ 894,82 / tonelada

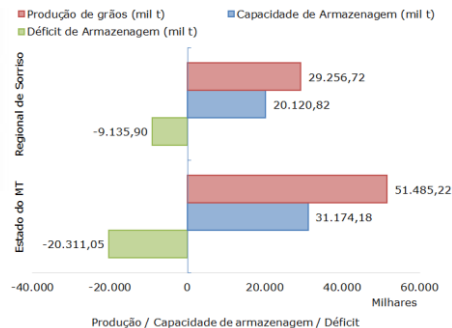
Armazenagem em Abril
Comercialização em Junho



AValiação de Receita Líquida a Partir do Cenário Logístico de Armazenagem em Abril



INDICADORES DE CAPACIDADE DE ARMazenAGEM



Providers of grain stocks

Institution: National Company of Food Supply (Conab)

Each warehouse in Brazil must have a register at Conab (public information system)

- **Private stocks** for coffee and rice
- **Public stocks** for wheat, sugar, cotton, peanuts, coffee, cassava, beans, corn, soybean, jute, sorghum, milk and others

Type of information provided:

- Volume, spatial distribution (by state level) and segment of storage

Method (private stock): Questionnaires application by post / e-mail to several registered agents at the public information system of Cona

Frequency: annual survey



Providers of grain stocks

Institution: Brazilian Association of Vegetable Oil Industries (Abiove)

Private stocks for soybean, soymeal and soy oil.

Type of information provided:

- Supply, demand, exports and stocks (national level)

Method: ABIOVE performs a survey about the soybean volume used by companies with activities in the soybean industry.

Frequency: monthly



Our Information Systems



SIFRECA – INFORMATION SYSTEMS FOR FREIGHT VALUES

Available on: <http://esalqlog.esalq.usp.br/sifreca/>



SIARMA – INFORMATION SYSTEMS GRAIN STORAGE

Available on: <http://esalqlog.esalq.usp.br/wordpress/?p=3679>



LOGISTICS STRATEGIES SIMULATOR (SIFRECA AND SIARMA INTEGRATED TOOL)

Available on: <http://esalqlog.esalq.usp.br/?p=4826>



Thank you!

For further **information**:

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