



Identity preservation: Lessons from a Case Study Addressing GM and Non-GM Maize Supply Chains

Introduction

- Identify preservation
- Genetically modified (GM) crops made agriculture commodities more diverse
- In Portuguese maize supply chain GM and non-GM maize coexist either in production or imports

Introduction

- **Identity preservation (IP)** refers to a system of production, handling and marketing practices that maintains the integrity and purity of agricultural commodities. Products segregation plays a key role in IP, but an IP system is more demanding, namely due to testing requirements.
- **Labelling regulation** for GM containing or derived food and feed in EU, as well as some food manufacturers' prerequisite of GM-free raw materials, prompted new developments of IP systems that are now part of the *modus operandi* of major supply chains.
- A research on the Portuguese **maize bread supply chain**, a minor maize supply chain in value but large due to the myriad of actors it involves, was conducted in order to understand **if and how GM labelling regulation is accomplished**.

Portuguese maize supply chain

- The feed industry, which absorbs 94% of maize, opted for positive labelling for the presence of GMOs, acquiring wholesale GM and non-GM maize. (*With the exception of a single organic feed*)
- The major food industries - breweries, starch, breakfast cereals, baby food – demand non-GM maize, requiring either the legal EU threshold of 0.9% or the technical zero (0.1%) for the presence of GMOs
- These food industries have close relationship with the primary production of maize and have stable supply circuits and are currently routinized in IP for several traits, GM-absence included.



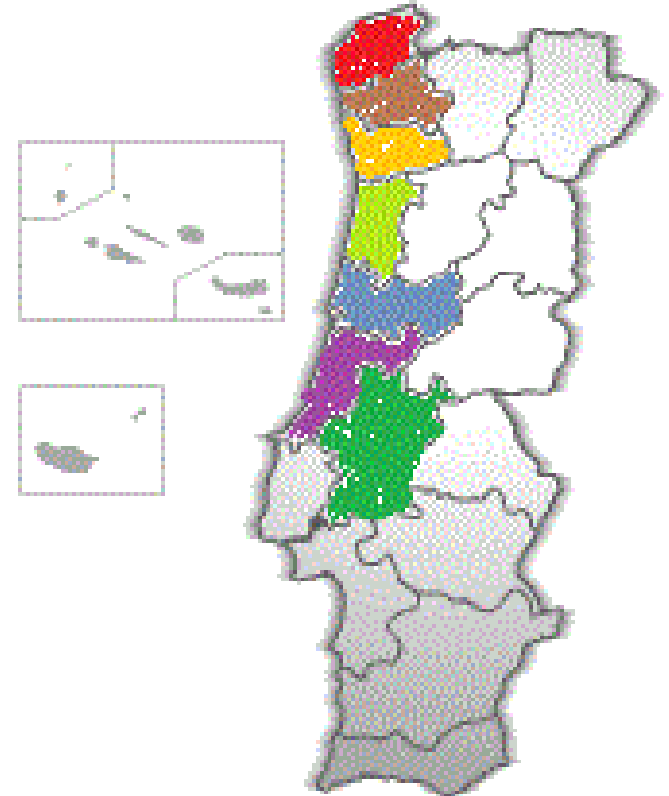
Maize bread

- Maize bread is a type of traditional bread in some regions of Portugal, but it is available anywhere in the country
- The maize bread corresponds to 1% of the bread turnover
- The bread industry is essentially different from other food industries that operate with maize:
 - scattered all over the country,
 - atomized, with numerous actors,
 - ranging from own production of single bakeries to industrial bakeries;
 - final product usually not packed;
 - the final product include different percentages of other cereals like wheat and/or rye
- Bakery business splits between bakery retail (only 10%) and non-specialized retail (supermarkets) that might include in-store bakeries



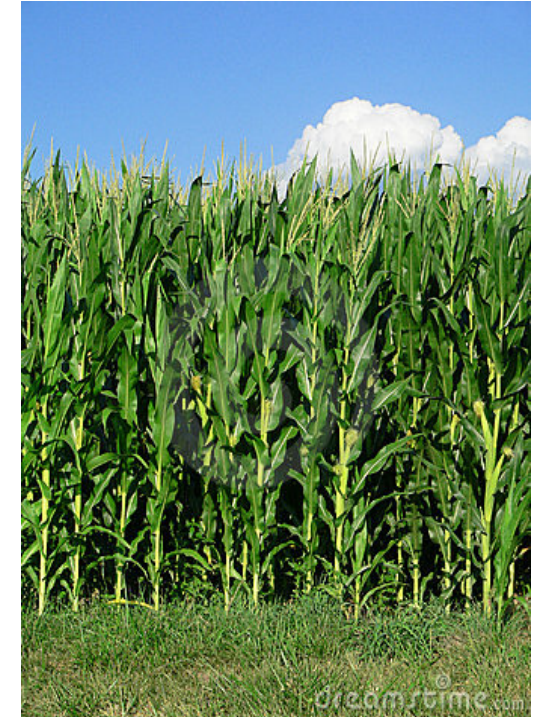
Maize bread Case Study

- This study aimed at evaluating the accomplishment of EU GM-labelling rules in maize bread supply chain
- Questionnaires targeting different classes of stakeholders along maize bread supply chain were drawn and applied by direct interviews to seventeen maize producers, nine stockists, twenty two millers and forty bakers
- It was made possible to gather data about adoption along this supply chain of Identity Preservation (IP) intended beyond GM and non-GM separation



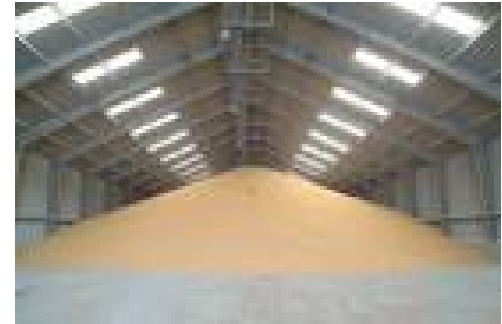
Results - producers

- All 17 farmers grow non-GM maize, either white maize cvs., the most popular for maize bread, or yellow;
- Most of them use conventional hybrids, but two still cultivate landraces.
- Only 25% of farmers mentioned the need of recordkeeping or written statements to meet their customers' requirements.
- The types of documents consisted of seed batch, seed batch plus cultivation register, declaration of integrated production or a statement that the maize is non-GM.
- No maize producer has been asked to provide test results to his customers.



Results – Stokists

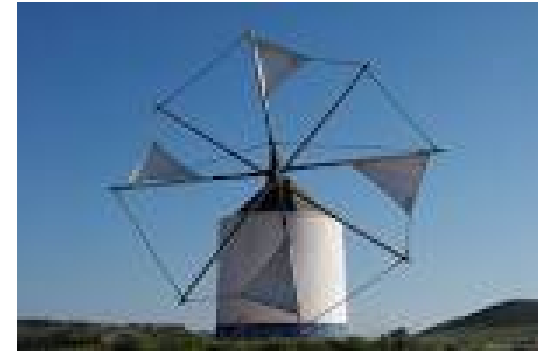
- Most stockists in this research deal only with domestic maize
- Only 22% trade also imported maize, coming from Spain.
- Though most stockists don't ask (78%) or provide (67%) documentation about the maize they trade, but 67% run tests on maize.
- However GM-testing is seldom included (only one case out of six).
- Nevertheless, 78% stated to handle only non-GM maize, the remaining stated to use dedicated lines or cleaning procedures to insure segregation.
- All wholesalers that provide records of their customers (33%) have the GM issue into account.



Results – Mills

- 77% of mills stated, at least, to use one form of ensuring separation of non-GM and GM-flour
 - Handling only non-GM maize (36%),
 - Running segregation procedures (32%)
 - and/or flour testing (41%)

- 23% indistinctly process non-GM and GM maize, suggesting their main business is feed industry supply.



Results – Mills

- Records and testing among mills are summarized in the table.
- Interestingly the demand of records from suppliers and testing exceed the request of customers, particularly when information on GM-presence is concerned.

Overview of IP items requested or developed by twenty two mills and relevance of GM information among these items

IP items	Overall	Share of those that include GMO
Records from suppliers	59%	69%
Records to customers	55%	17%
Maize testing	14%	67%
Flour testing	64%	64%

Results – Bakeries

- Within bakeries both industrial and individual were included.
- Most (83%) demand records came from their suppliers, though only 9% of these require records informing on GM-presence.



Discussion

- By its characteristics, namely the myriad of small businesses that coexist with major players, in maize bread supply chain it's possible to observe different stages of IP systems adoption between and within classes of stakeholders
- Except for white maize production, that gets a premium price due to the common lower yield compared with yellow maize cvs., along maize bread supply chain there is no premium price to be shared and cover IP system costs.
- IP adoption is quite frequent among millers that are likely pushed by food industry customers other than bakeries. Among those running IP, most have already built in GM control.
- Farmers secure segregation of white and yellow maize and supply of non-GM maize, though this is seldom documented.
- While several stockists perform tests on maize, this information not always (50%) flows downstream; besides in all cases of documentation to customers GM matter is included;
- This could suggest they might easily play their part in IP systems as far as they are asked to do it.



Discussion

- Most bakeries show to be attentive to IP systems, considering the percentage of those demanding documents, but they look scarcely concerned with GM issues, namely the labeling rules they should meet.
- Bakery industry in general is largely regulated and information in regard must have reached the operators, but the same does not apply to GM-labeling regulation that, by now, interests only a small niche of the business maize bread.
- Additionally, the pressure of consumers' awareness or exigency seems absent, but we have no data to support a discussion in regard.



Conclusions

- This quick overview of IP adoption in maize bread supply chain suggests a stakeholders' distribution ranging from early adopters to laggards, where adoption is due more to personal communication than to mass communication arising from consumers' organizations or regulators.
- This might encourage to further address IP adoption in the sociological framework of diffusion of innovation theory (Roger, 2003) and model (Bass, 1969), an approach that, to our knowledge, has not been used so far.

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