

Regulating Agricultural Innovations in a Globalized Food Supply: The Case of Biotech

by

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Effective regulation will be central to optimization of agrifood innovations in 21st century

Key criteria for evaluating the relevance of any regulation:

- Is there a market failure that requires regulation?
- Is the regulation efficient? (i.e. do social benefits exceed regulatory costs?)
- Is the regulation cost-effective?

Effective regulation will be central to optimization of agrifood innovations in 21st century

- In a globalized & interdependent agrifood supply chain, the impacts of regulation are increasingly complex and global
- Accordingly, more attention should be given to:
 - Regulatory impacts across whole chains rather than single industries/markets
 - Regulatory impacts across national borders
 - Structural and trade regulatory impacts
 - Variation of regulatory impacts in response to standards (e.g. thresholds)

Variation of regulatory impacts in response to different standards: The case of EU GM thresholds

Efficiency and cost-effectiveness of regulation determined by the specifics of implementation: “*Devil’s in the detail*”

CASE STUDY: HOW DO AP THRESHOLDS AFFECT REGULATORY EFFICIENCY?

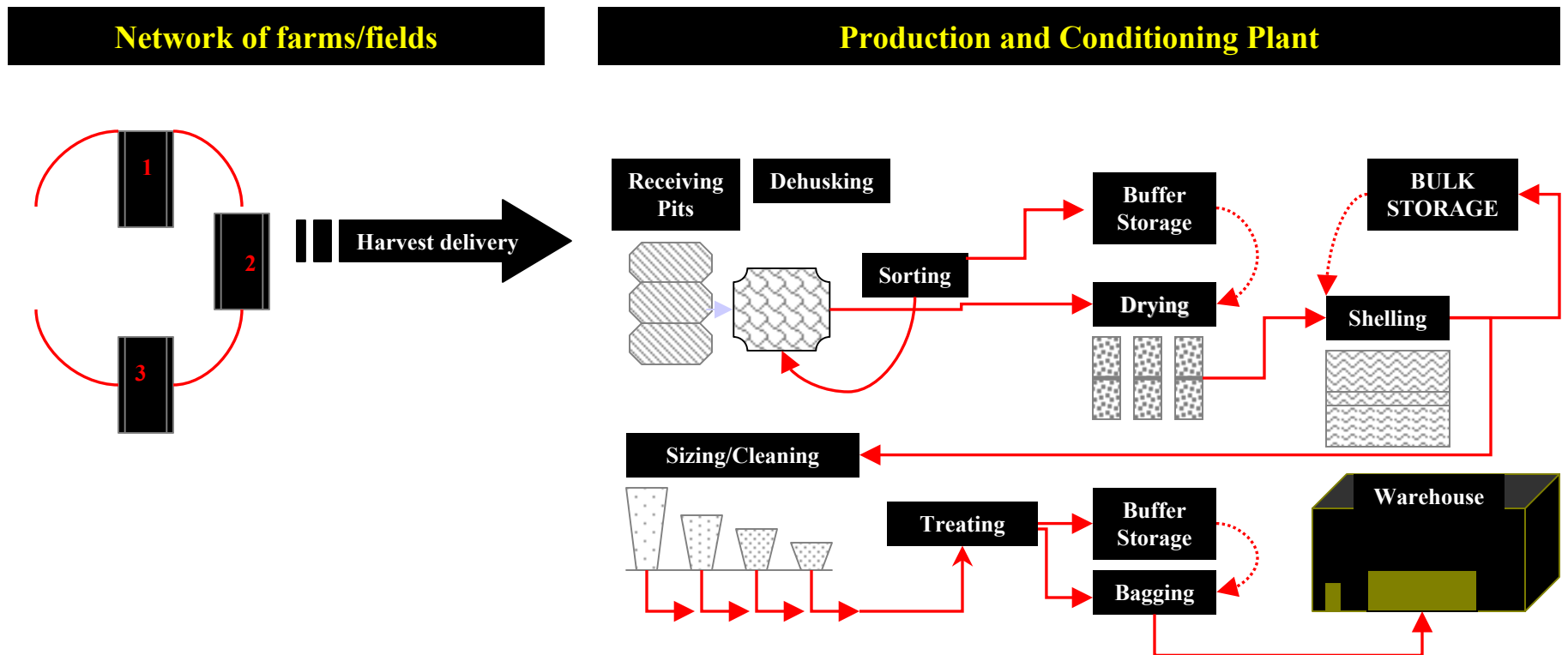
- Much deliberation on adventitious presence thresholds for approved and unapproved GM events in the EU over the last 6 years:
 - ✓ Thresholds currently under consideration for ingredients, feed, oils -- 0.9%? ..or...0.5%?
 - ✓ Working backwards to thresholds for seed --- 0.5%? 0.3%?...0.1%?
- How should GM thresholds be decided?
- How do regulatory benefits and costs vary with such thresholds?
- What might the impacts of such thresholds be on the global seed industry?
- What are the total economic, structural, trade and distributional implications of various thresholds?
- What do all these mean for the efficiency and cost effectiveness of the proposed labeling regulation?



Measuring the Regulatory Impacts of AP Thresholds on the Global Seed Industry

Measuring the costs of re-engineering production in Midwest seed facilities in order to respond to selected AP thresholds

Method: Engineering and Economic Analyses of representative seed facilities through PRESIP



Measuring the costs of re-engineering seed production in the presence of strict AP thresholds: An example

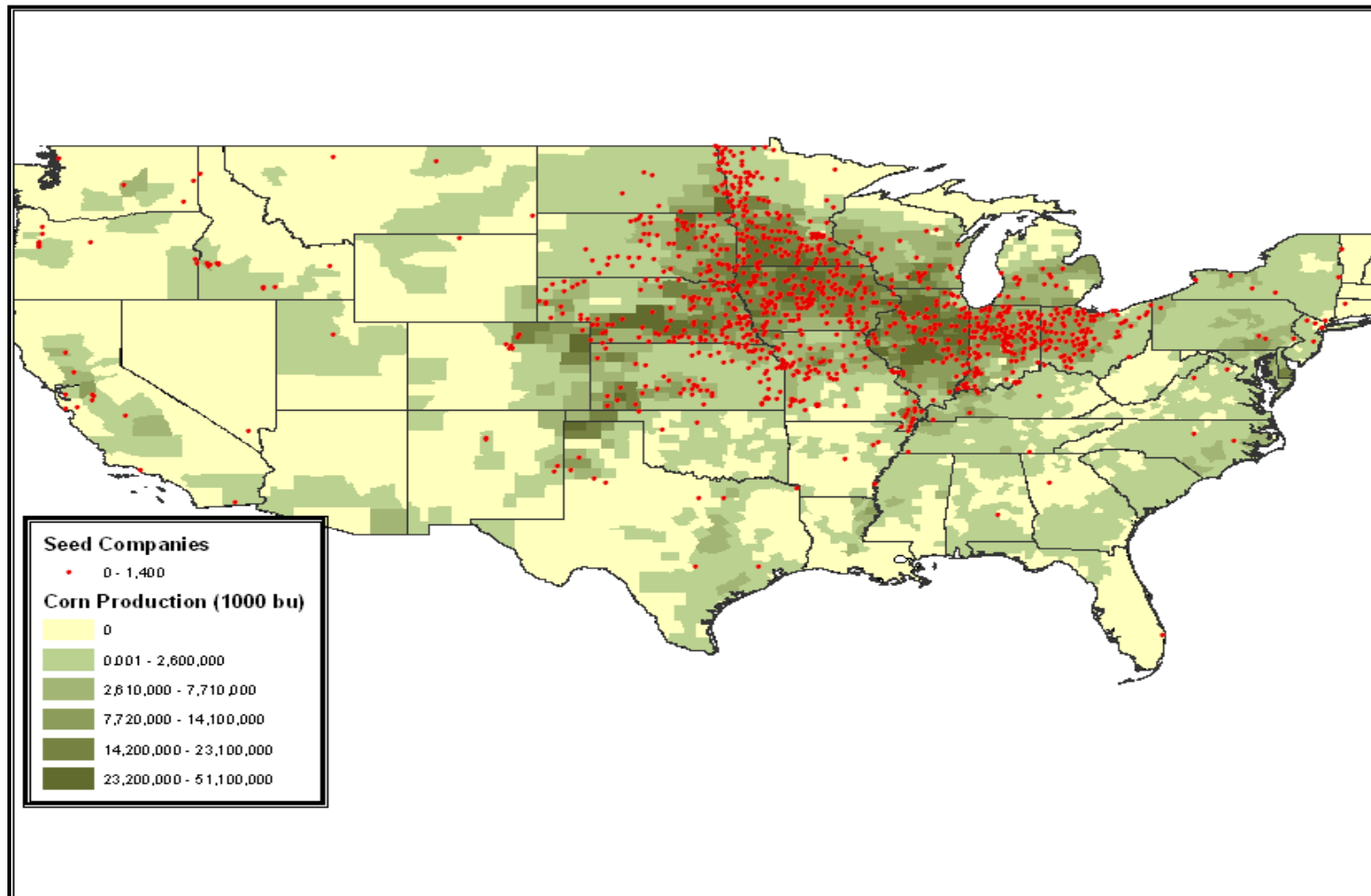
Re-engineering activity

- Move seed production from Midwest to regions with no GM corn production (e.g. in Washington State, Chile, etc.)

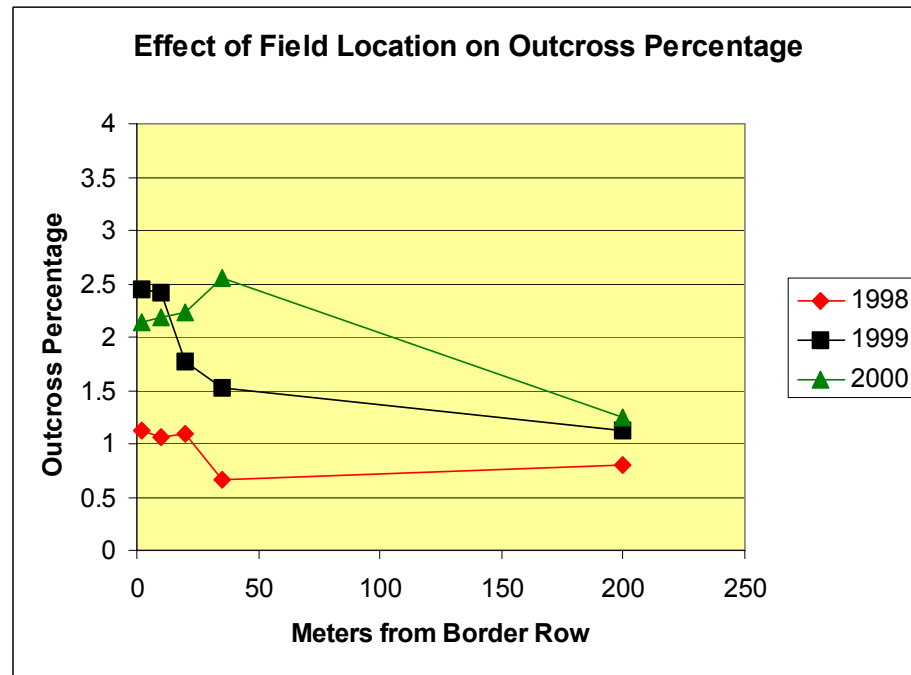
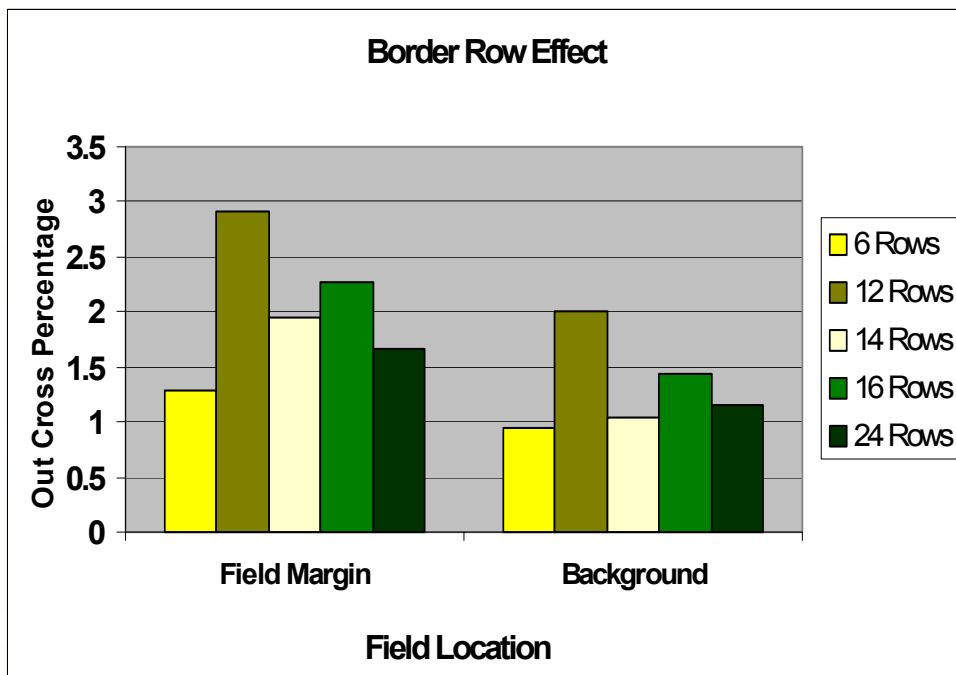
Associated inefficiencies

- *Mismatch of production and processing infrastructure*
- *Germplasm not well adapted to new production regions*
- *Production cycles might be problematic*
- *Acres might be limited*
- *Incremental production and transport costs*

Production relocation & infrastructure mismatch



Pollen flow, outcrossing, and seed obsolescence



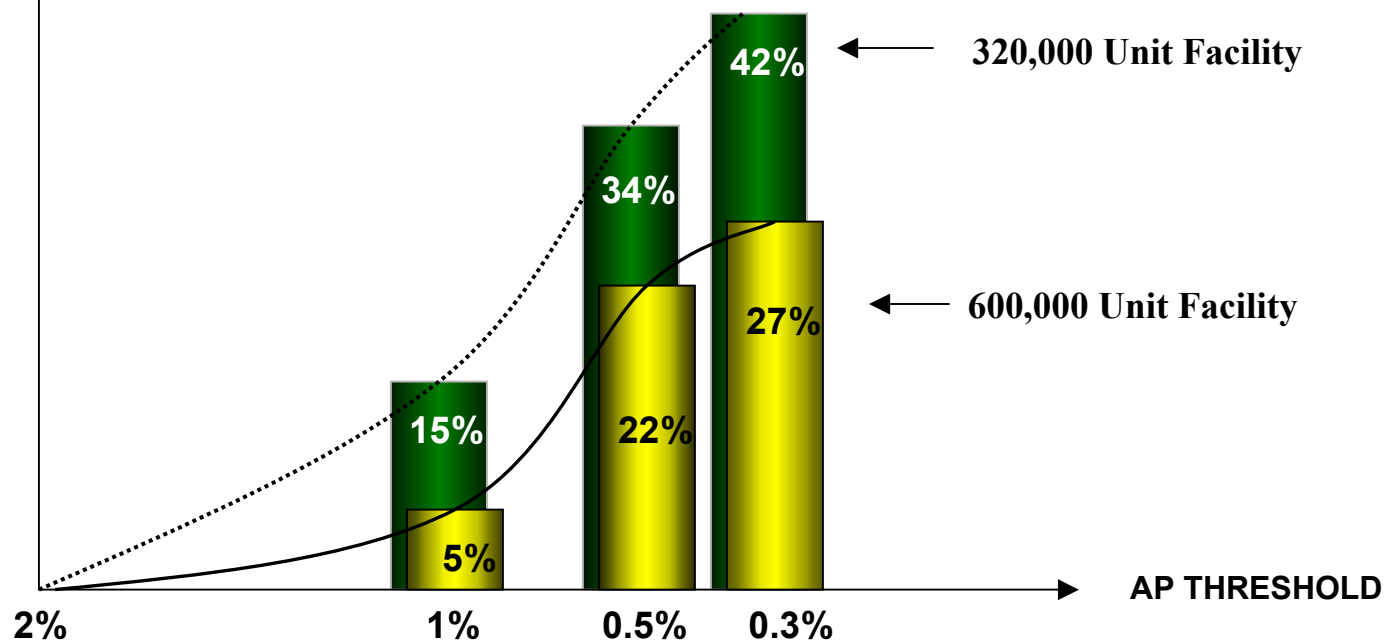
Source: Joe Burris/ASTA

Some Results

Incremental costs for various AP thresholds: The case of two representative facilities in the Midwest

INCREMENTAL COSTS

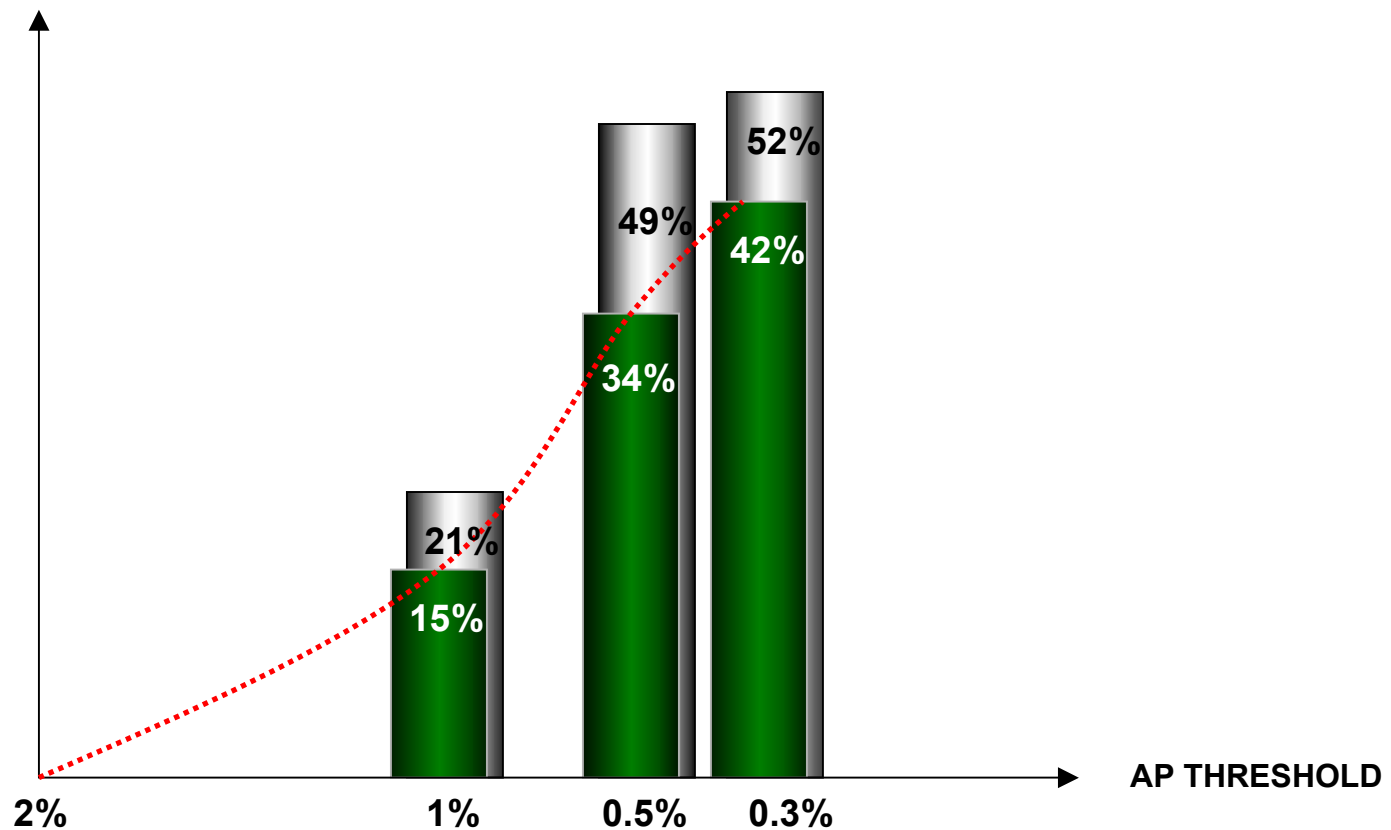
(% increase
over baseline)



Incremental costs for various AP thresholds: Accounting for risk—worse-case scenarios

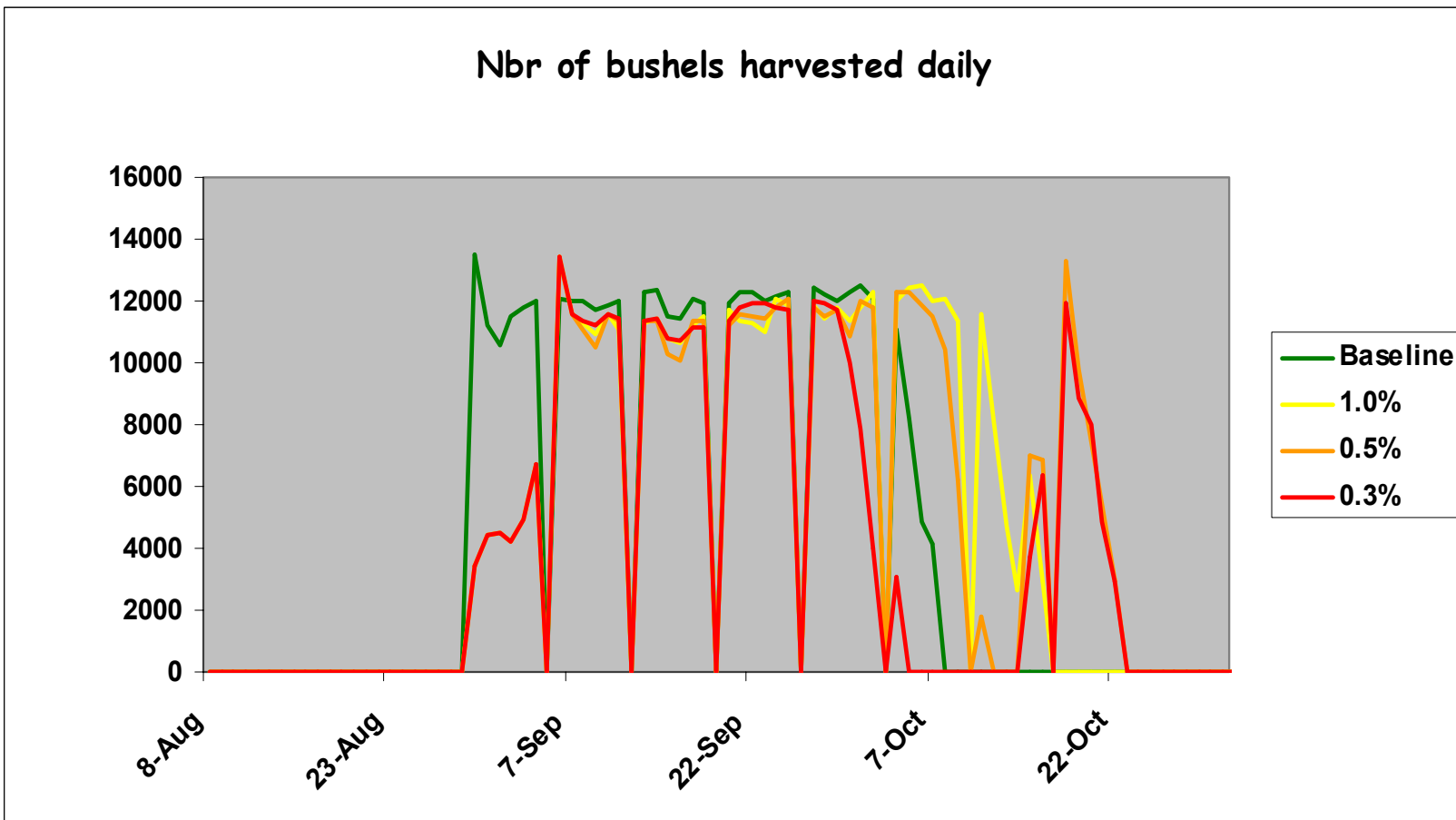
INCREMENTAL COSTS

(% increase
over baseline)

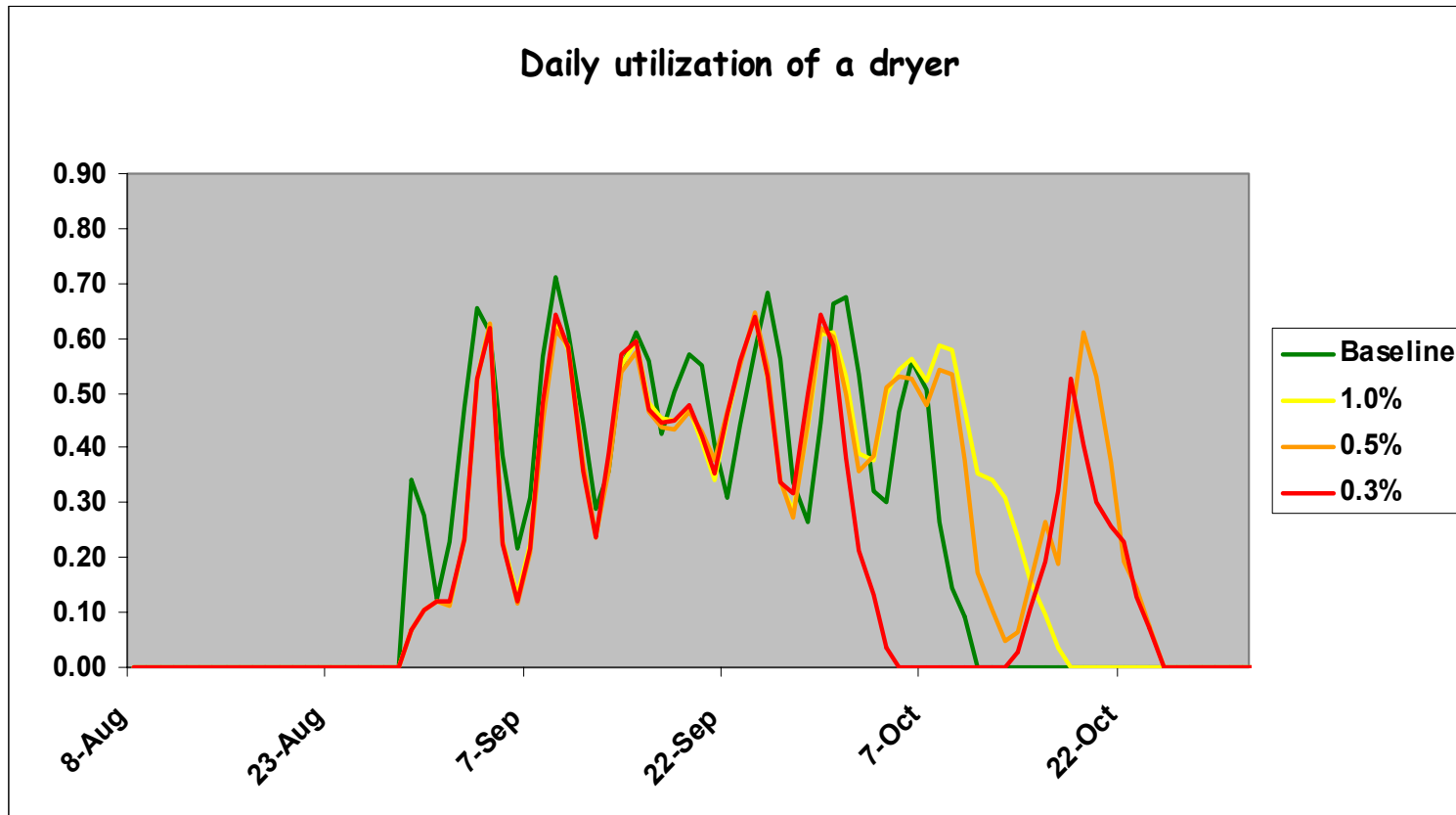


What factors contribute to such non-linearities & incremental costs in case of strict thresholds?

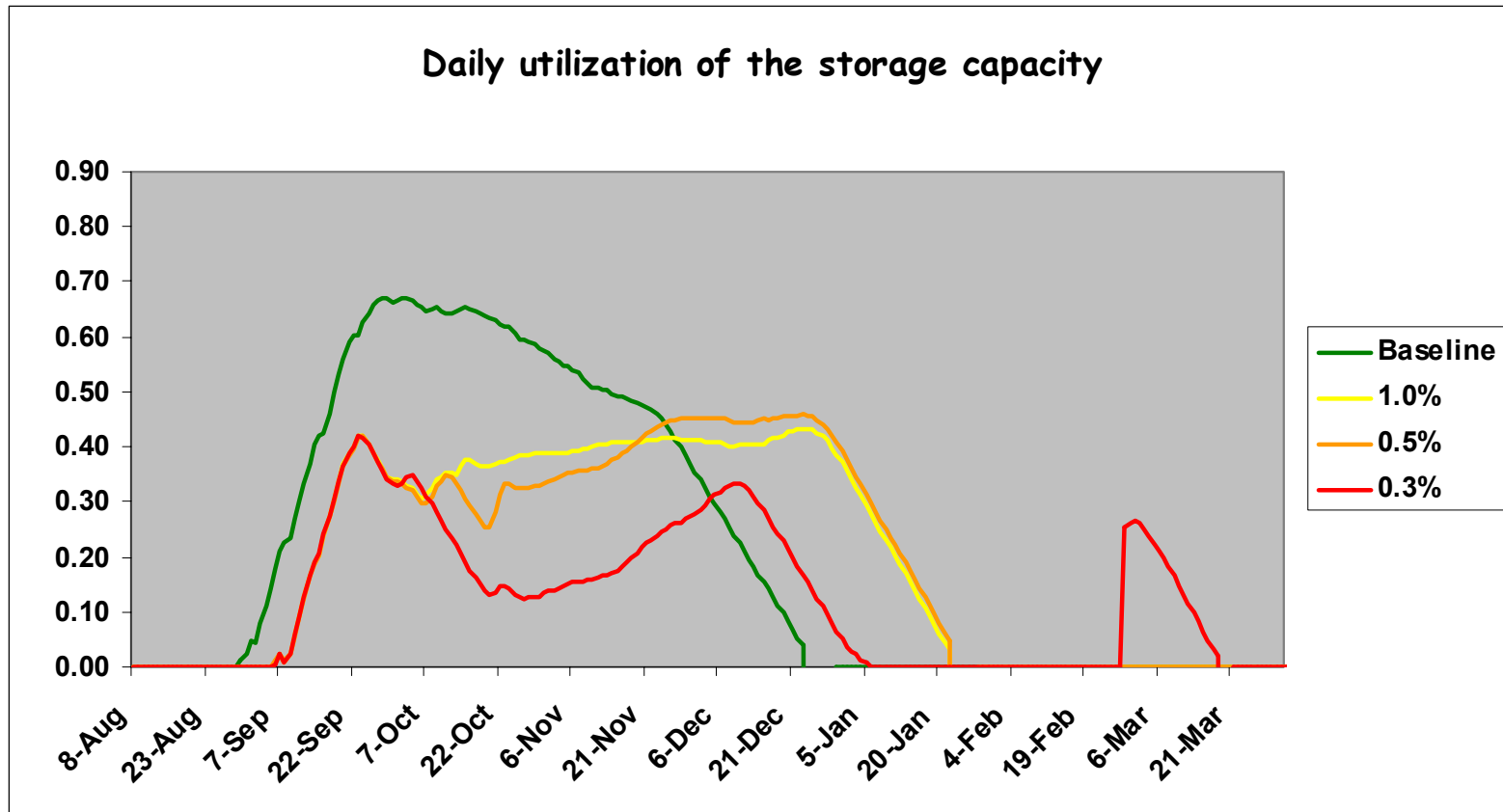
Inefficient use of assets



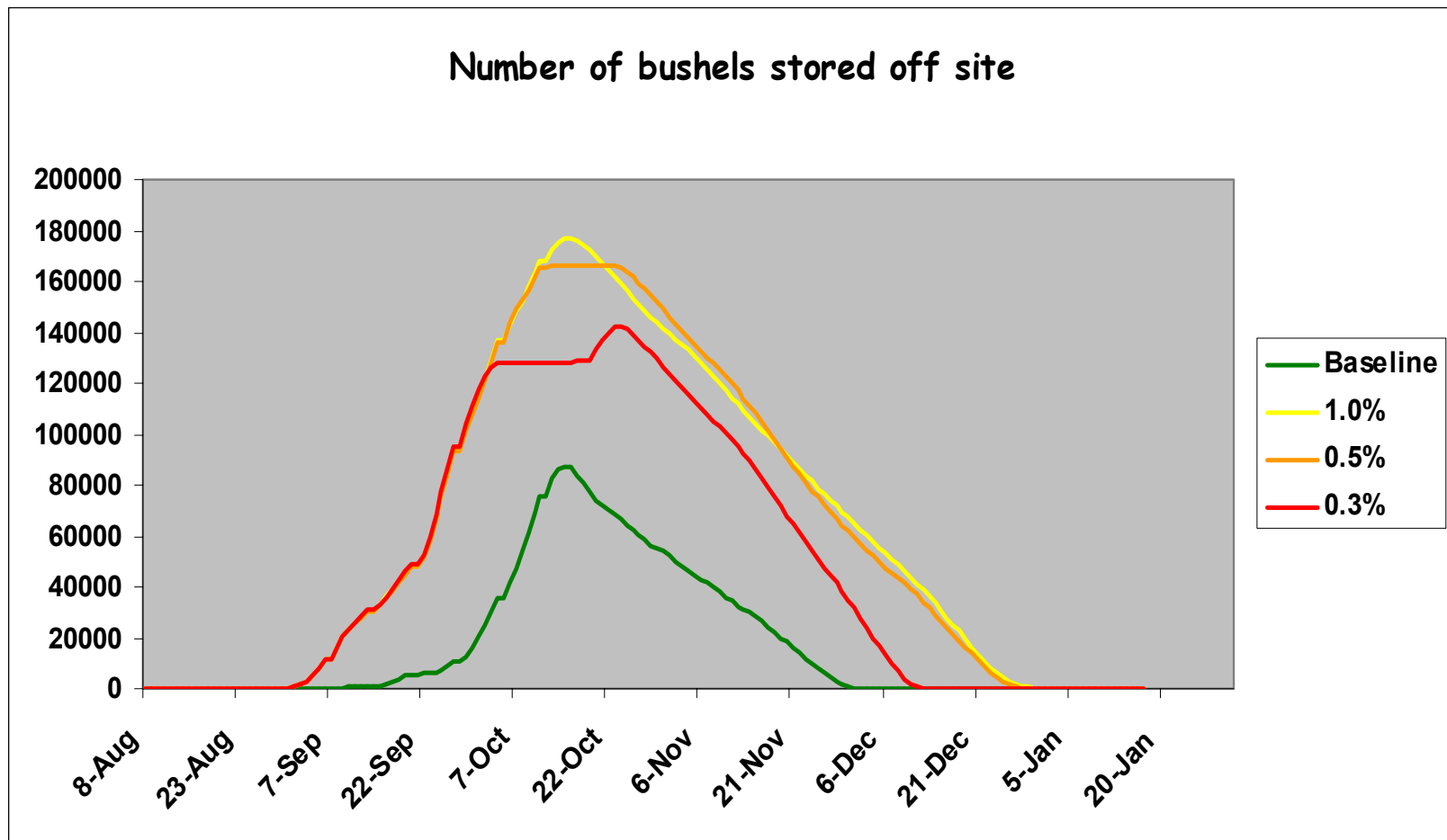
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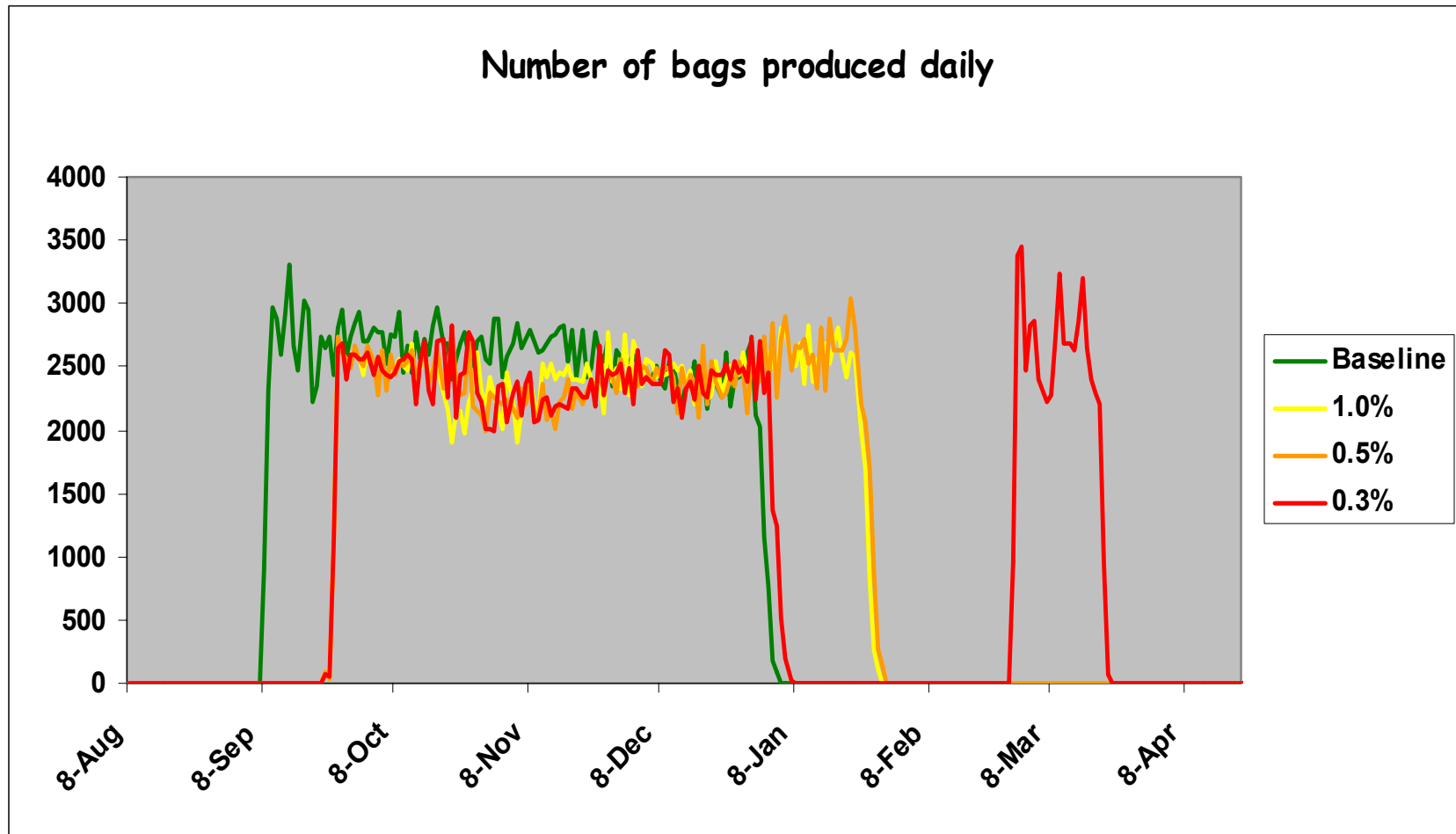
Inefficient use of assets



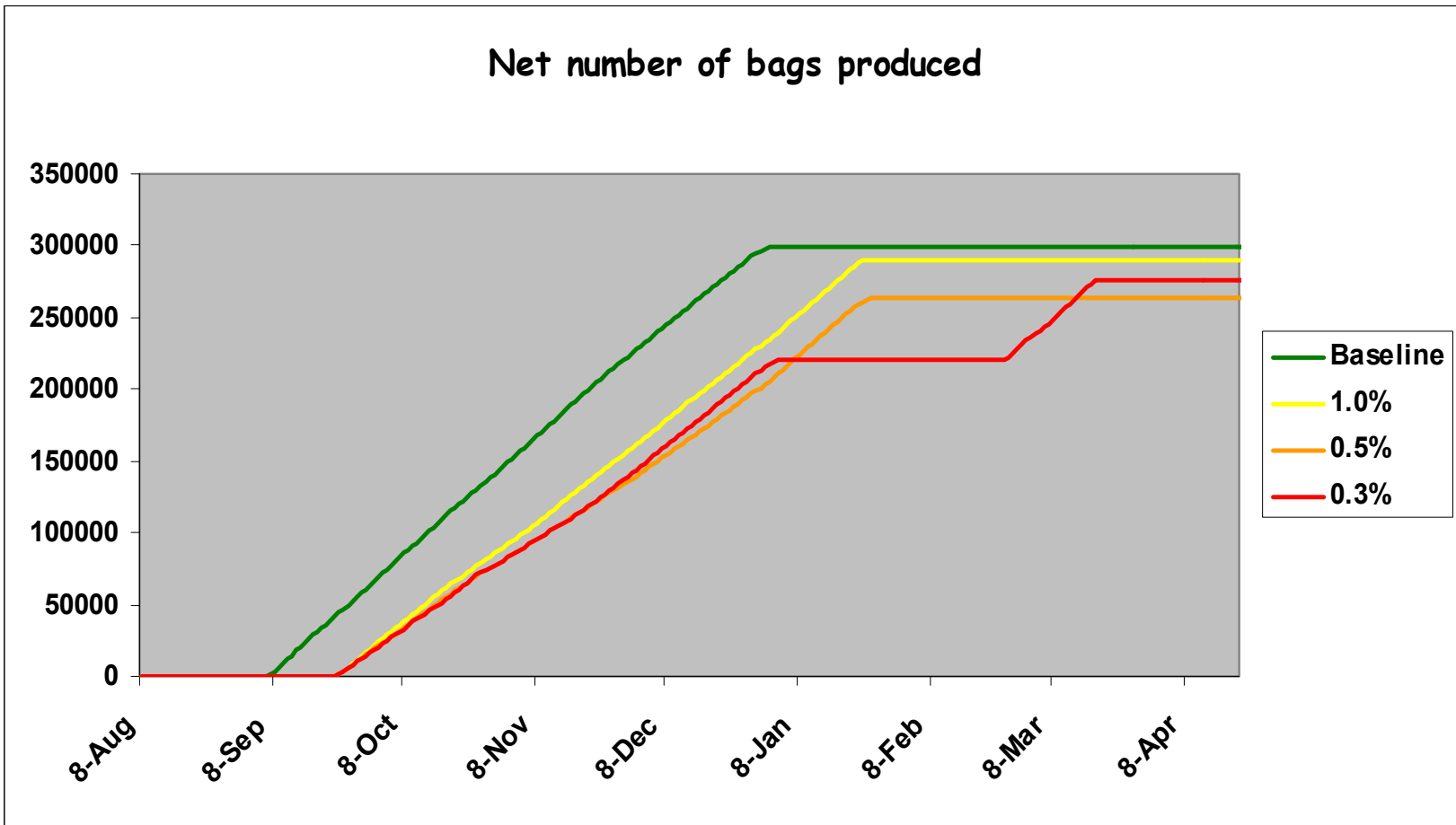
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Inefficient use of assets



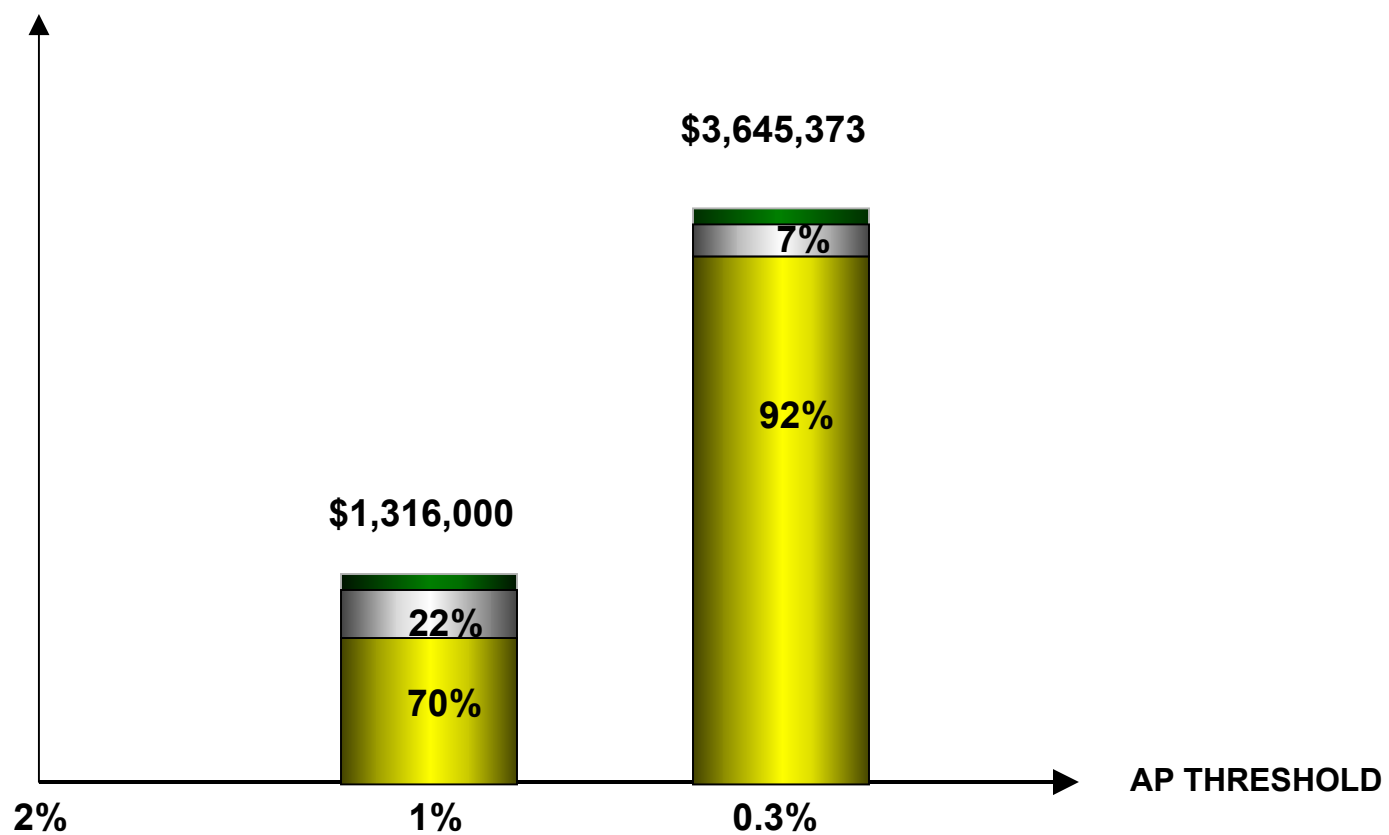
...and substantial output losses



Incremental costs for various AP thresholds: The case of a representative facility in the Midwest

INCREMENTAL COSTS

(in \$)



Incremental field costs



Incremental processing costs



Other incremental costs

Concluding Comments

- AP thresholds of GMOs have been used here as a case study to demonstrate how regulatory impacts can vary significantly in response to different regulatory standards, ..but also to highlight the significant knowledge gaps that exist.
 - Far too little attention has been given to the economics of standards and thresholds. Beyond certain purity standards, significant cost non-linearities exist
 - Accordingly, certain AP standards/thresholds can cause significant inefficiencies and social welfare losses
 - Emerging EU standards for AP presence of GM content in seed could be extremely difficult to implement in the future under “co-existence” and could disrupt the agrifood supply chain
 - Whole chain analysis would likely demonstrate that AP regulation could be difficult to implement but also justify