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HOLiFOOD Platform

Digital Tools Co-Designed for Safer Food Systems

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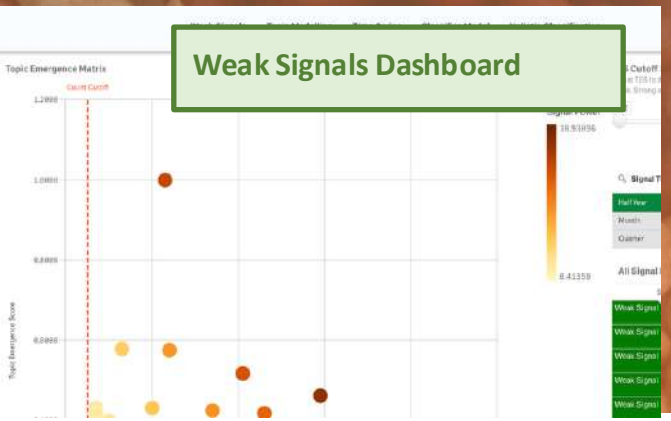
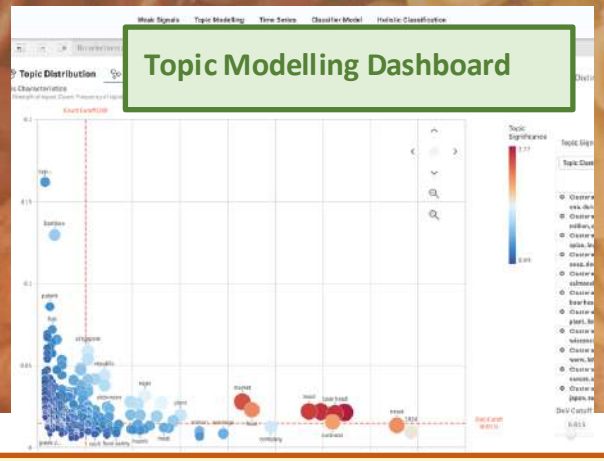
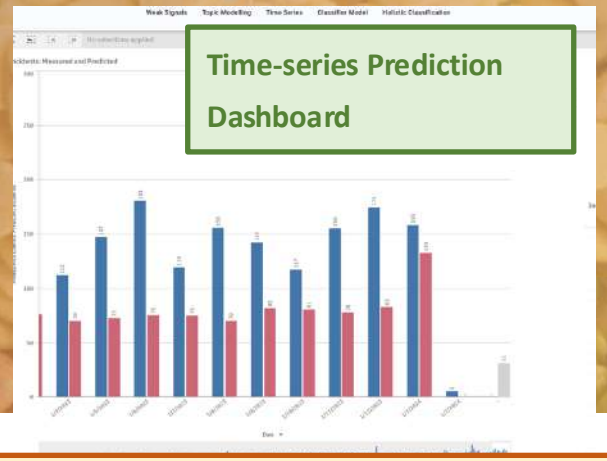
The HOLiFOOD Platform is

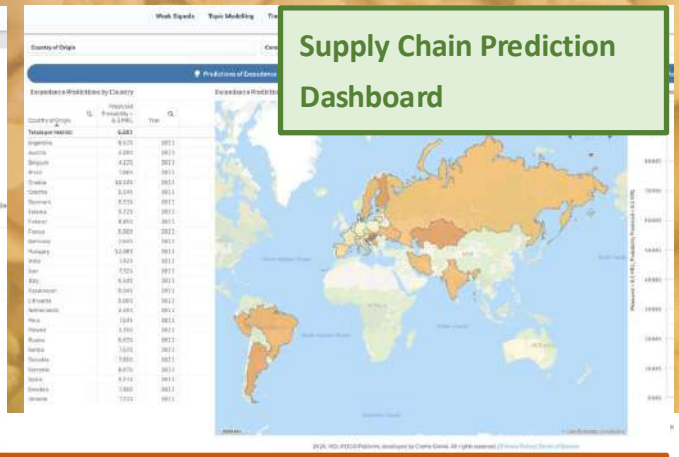
HOLiFOOD

Future-Proofing Food: Transforming Risk Analysis for a better and more adaptive food system









What the HOLiFOOD Platform Offers to Users

- **Exploration tools** to detect new topics and trends
- **Early-warning tools** to identify weak signals
- **Forecasting tools** to predict incidents
- **Risk analysis tools** for specific hazards and commodities
- **Interactive dashboards** that make complex data easy to understand

Who the HOLiFOOD Platform Serves

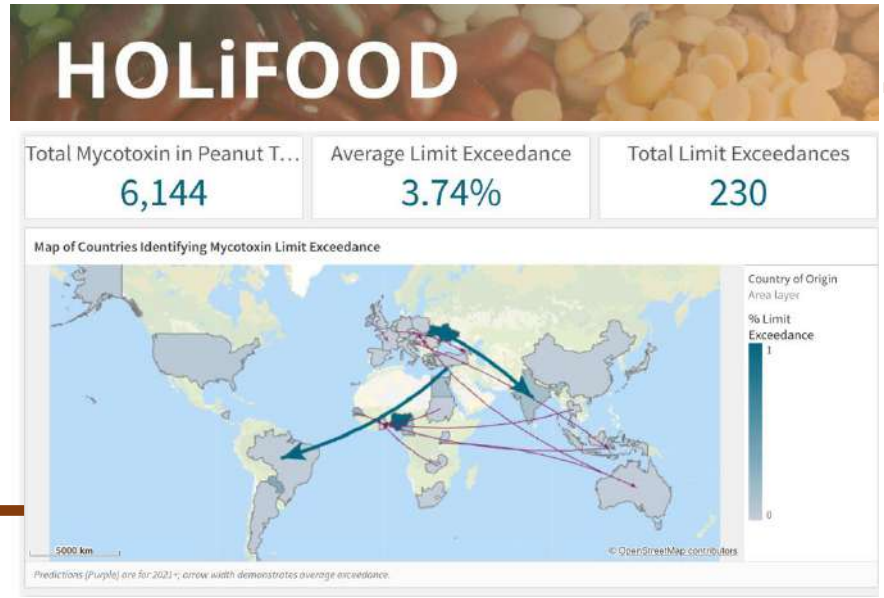
Policy Makers

Researchers & Analysts

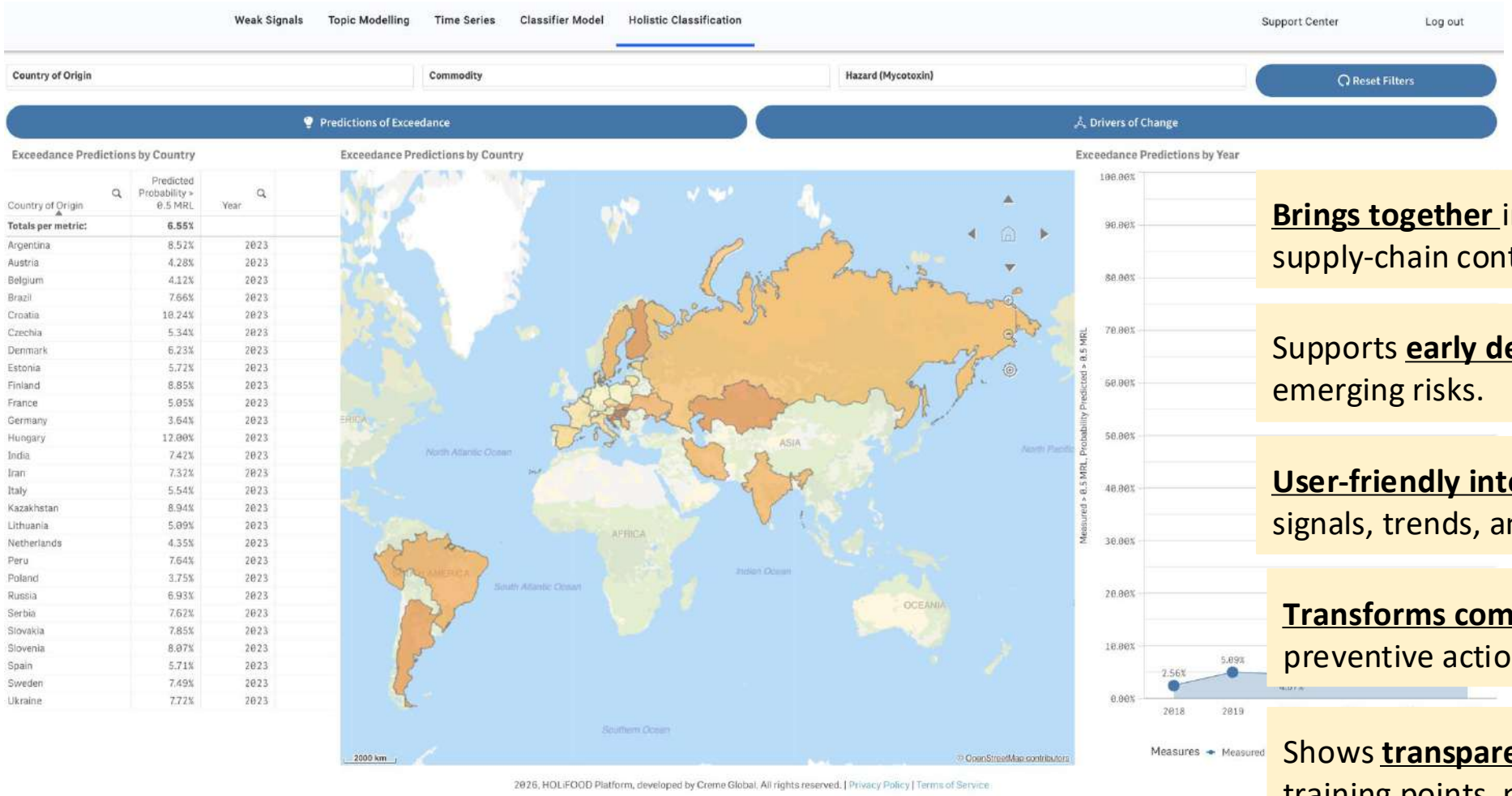
Regulators & Risk Assessors

Laboratories & Control Authorities

Food Industry Professionals



HOLiFOOD Core Functionalities



Brings together incidents, hazards, literature, and supply-chain context.

Supports **early detection** and anticipation of emerging risks.

User-friendly interactive dashboards to explore signals, trends, and emerging issues.

Transforms complex data into clear priorities and preventive actions.

Shows **transparen**t details on data sources, training points, model behaviour, and predictions

Successful HOLiFOOD Platform Use Cases

Use Case #1

Analytical Reliability Issues in Aflatoxin Monitoring

Use Case #2

Predicting Mycotoxin Incidents in bakery (cereals) products to Support Proactive Quality & Monitoring Decisions

Use Case 1: Analytical Reliability Issues in Aflatoxin Monitoring (through the Weak Signal Miner)

Leveraging AI to **detect weak, fast-emerging analytical reliability issues** in **aflatoxin testing** (such as sampling variability and HORRAT/Horwitz deviations) to provide **early warnings** that traditional monitoring tools cannot capture.

Pain point:

- - Aflatoxin testing shows variability due to sampling errors.
- - These issues appear rarely in literature & monitoring systems.
- - Traditional dashboards detect only strong, frequent signals, missing early analytical concerns.

Which is the specific need:

- - Detect weak, fast-emerging topics that standard tools cannot detect.
- - Capture early indicators of precision issues, HORRAT/Horwitz deviations, and sampling uncertainty.

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How the Weak Signal Miner Helped Food Safety Teams

Use the Weak Signal Dashboard to **Identify the Emerging Weak Signal from the Topic List**

All Signal Details

Signal Type	Signal Power	Topic Emergence Score	Count	Representation
Weak Signal	1.27611	0.2552	5	agilisi', 'salivariusi', '1003', 'pr biotic', 'il', 'cgmcc20700', 'genome', 'antibacterial', 'proteincoding' 'hydrophobicity
Weak Signal	1.21108	0.2422	5	butyrate', 'sodium', 'sics', 'se', pa', 'macrophage', 'enterocytes',
Weak Signal	1.20938	0.2419	5	aflatoxins', 'sampling', 'horrat', 'aflatoxin', 'iflavii', 'section', 'precision', 'horwitz', 'ufrphplcfddad', 'endeavors
Weak Sign l	0.65559	0.1311	5	lut', 'ammonia', 'lymphocytes', 'poisoning', 'splenic luteolin 'protective', 'mmoll', 'caspase1', 'mitochondria
Weak Signal	0.58232	0.1165	5	nwt', 'barns', 'bedding', 'ecoffs', 'sponge', 'ontario', ayer', 'fecal', 'onsubss1bsub', 'onsubss1asub
Weak Signal	0.55324	0.1106	5	dex', 'dexa', 'splenocytes', 'myogenesis', 'dexamethasone', 'nfb1', 'mncd', 'wnt3a', 'litaf', '10sup6sup
	0.53892	0.1078	5	dehp', 'deht', 'plasticizers', 'orthophthalates', 'ptenpi3kakt', 'gloves', 'fast', 'phthalate', 'replacement', 'burritos
	0.52604	0.1052	5	sarscov2', 'virus', 'surrogates', 'atrftir', 'discrimination', 'seafood', 'viral', 'fish', 'coronaviruses', 'spectra
Strong Signal	30.93096	0.3819	81	residues', 'veterinary', 'method', 'antibiotic', 'drugs', 'antibiotics', 'otc 'cyromazine', 'cip', 'residue
Strong Signal	27.30121	0.4627	59	phage', 'phages', 'cocktail', 'bacteriophages', 'biocontrol', 'lytic', 'isalmonellai', 'bacteriophage', 'mesocosms', 'salmonella
Strong Signal	23.56511	0.3801	62	campylobacter', 'jejuni', 'icampylobacteri', 'campylobacteriosis', 'cold', 'colonization', 'spp', 'ps216', 'subtilisi', 'jejunii
Strong Signal	23.00000	1.0000	23	slp2', 'lc2029', 'll37', 'caco2', 'ht29', 'nc8chil217b', 'immunomodulatory', 'crispatusi', 'vaginal', 'trained
Strong Signal	21.23762	0.5180	41	ipscs', 'embryos', 'embryo', 'amp', 'ambisome', 'fetal', 'dmso', 'java', 'embryonic', 'super

Cluster with fewer occurrences (low Count)

Correlated terms: aflatoxins, sampling, precision, flavil, etc

Detect a weak signal: rare cluster with correlated terms

correlation around analytical reliability in aflatoxin testing

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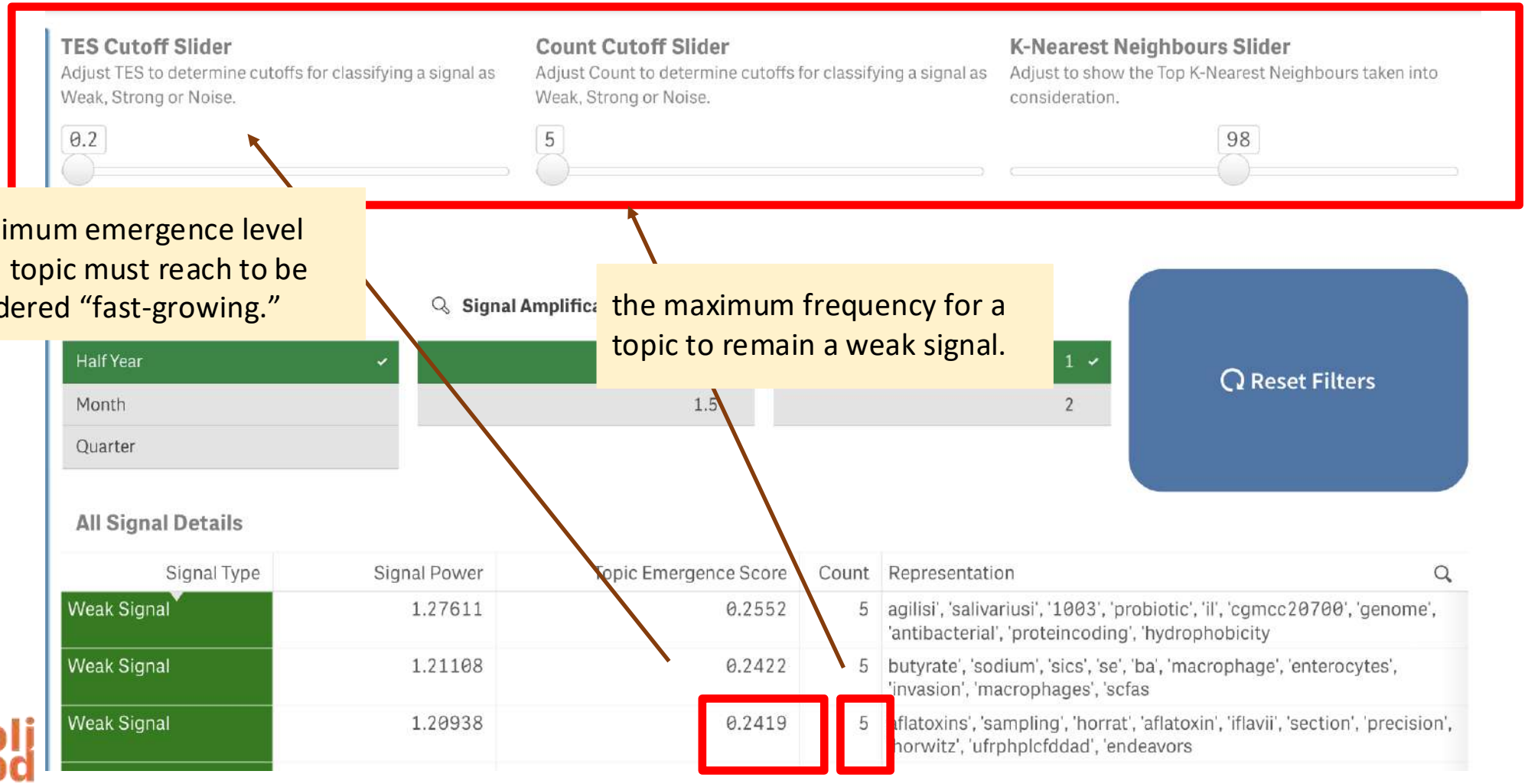
How the Weak Signal Miner Helped Food Safety Teams

How the dashboard settings define the weak signal quadrant



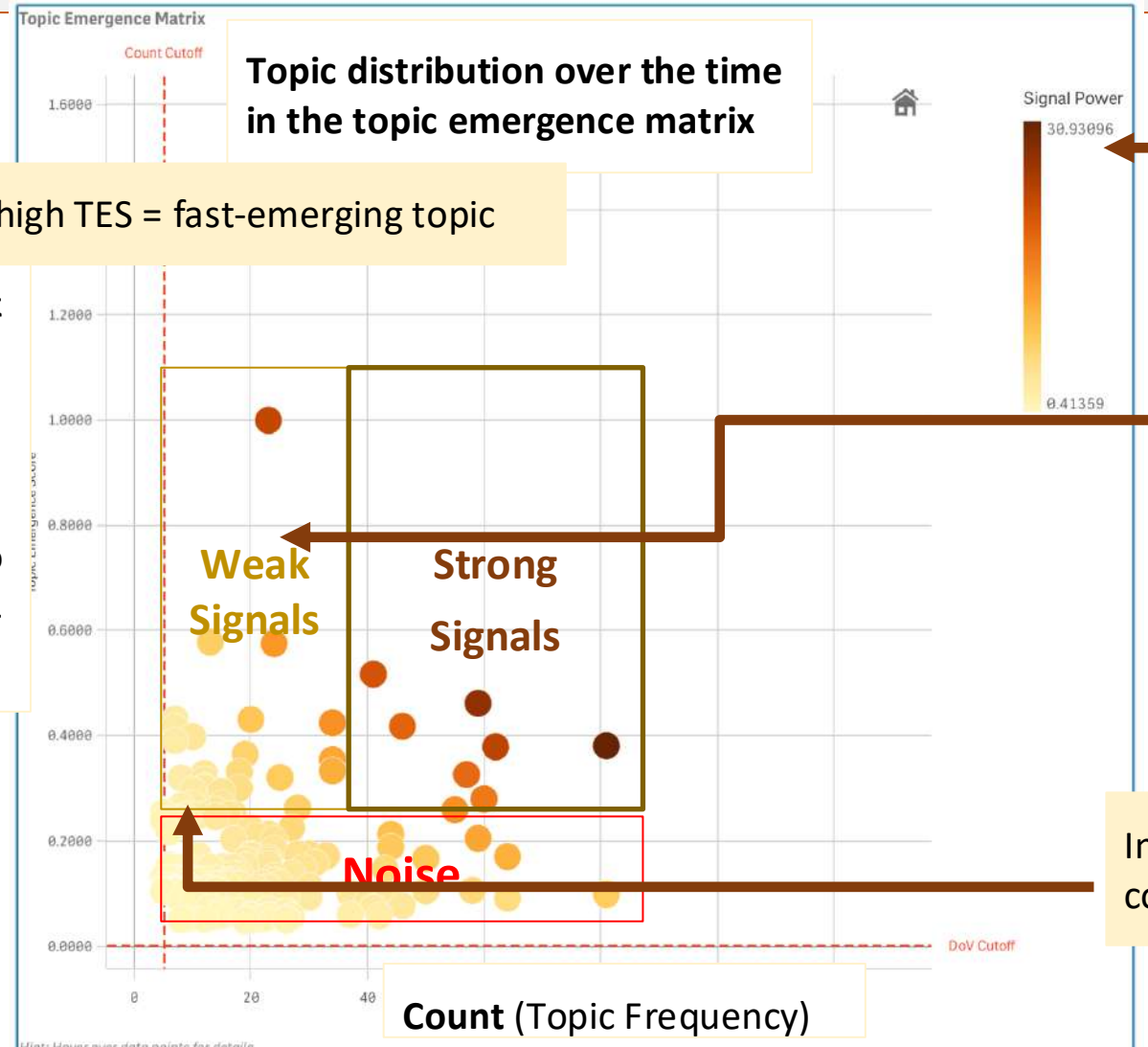
A minimum emergence level that a topic must reach to be considered “fast-growing.”

the maximum frequency for a topic to remain a weak signal.

By adjusting TES and Count cutoffs, the dashboard isolates **rare** but **fast-emerging topics**

How the Weak Signal Miner Helped Food Safety Teams

Use the Weak Signal Dashboard to determine the appearance of the **Weak Signal in the topic emergence matrix**



Topic distribution over the time in the topic emergence matrix

Low Count + high TES = fast-emerging topic

high Signal Power (red)

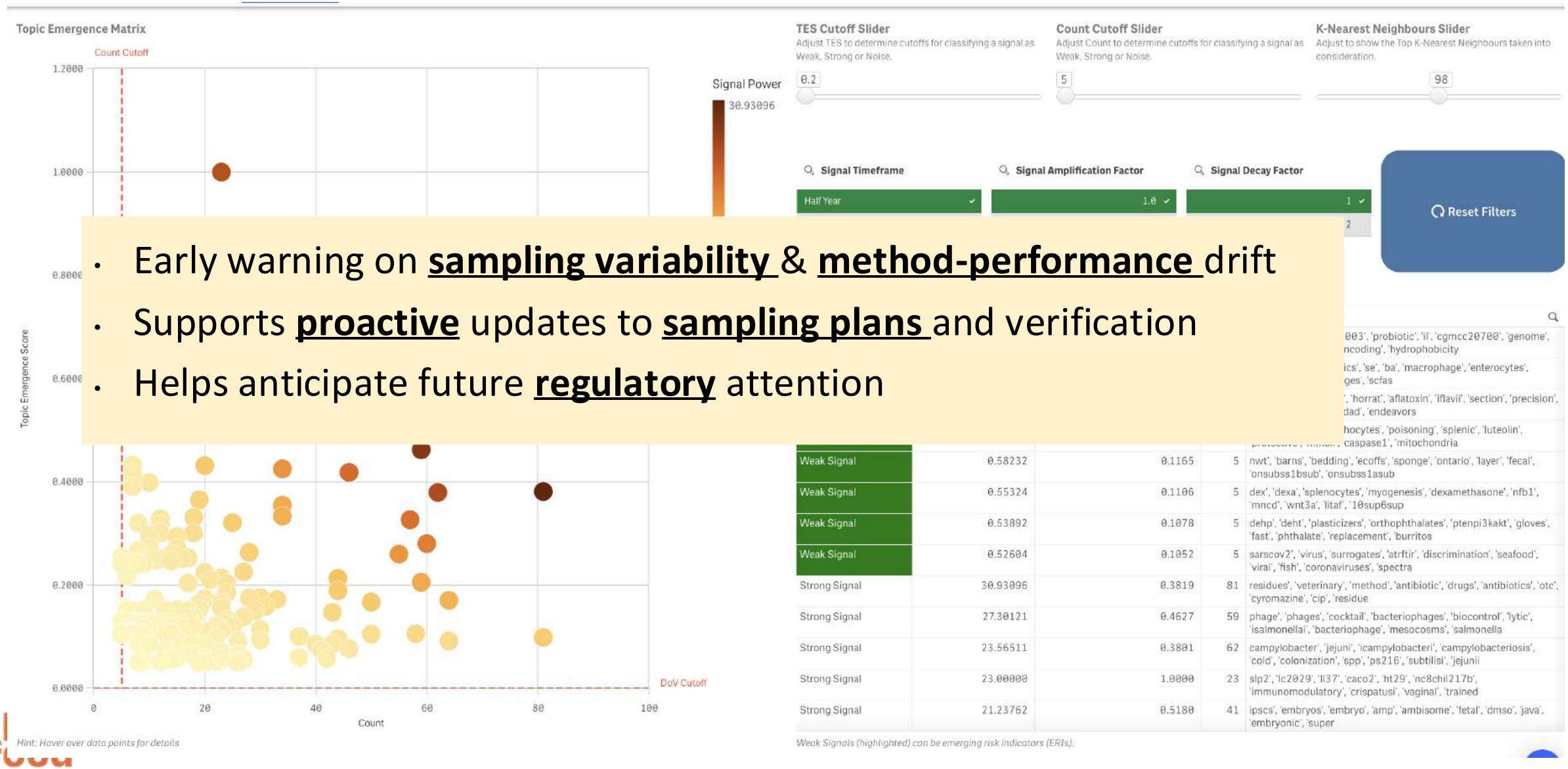
Topic Emergence Score - TES (degree of Visibility)

Weak Signal appears in the upper-left quadrant

Indicates emerging analytical reliability concerns in aflatoxin testing

Count (Topic Frequency)

How the Weak Signal Miner Helped Food Safety Teams



- Early warning on **sampling variability** & **method-performance** drift
- Supports **proactive** updates to **sampling plans** and verification
- Helps anticipate future **regulatory** attention

Use Case 2: Predicting Mycotoxin Incidents in bakery (cereals) products to Support Proactive Quality & Monitoring Decisions (through Time series prediction dashboard)

Using predictive modelling to help food safety and quality teams anticipate **mycotoxin risks** in **cereals and bakery products** and adjust monitoring and **testing strategies** before contamination incidents occur.

Pain point:

- Difficult to anticipate **upcoming spikes** in mycotoxin incidents-
- Monitoring plans are often static, not aligned with expected risk changes over the next months
- Mycotoxin behaviour is **seasonal** and weather-dependent, making manual forecasting unreliable

Which is the specific need:

- - A predictive dashboard that shows **expected mycotoxin incidents** for cereals
- - Ability to **compare actual vs predicted incidents** to understand model behaviour
- - A unified view combining **historical alerts & predictions** to guide testing intensity

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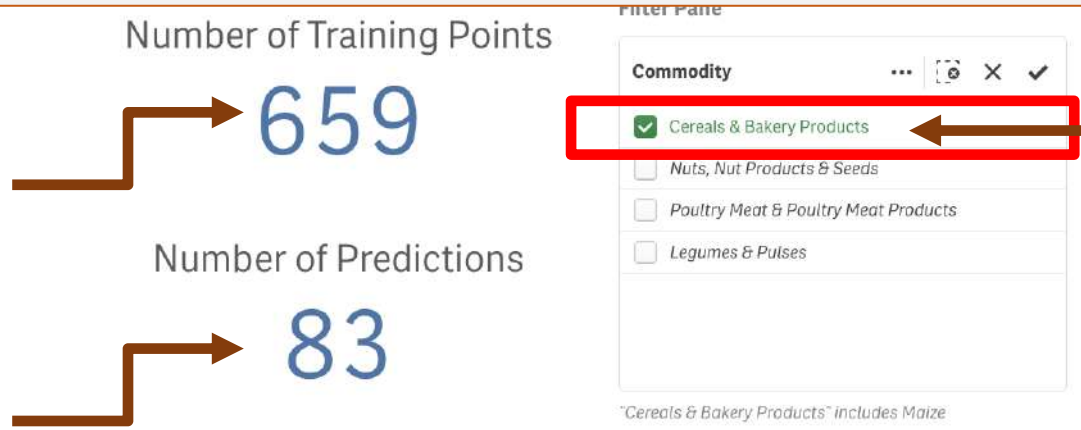
How the Timeseries Prediction Helped Food Safety & Quality Teams

Use the Dashboard to select the **commodity** and **review the data used** for prediction

Total number of training points used for the model

Number of predicted points generated by the model



For cereals-related mycotoxin incidents

Incident Analysis Table

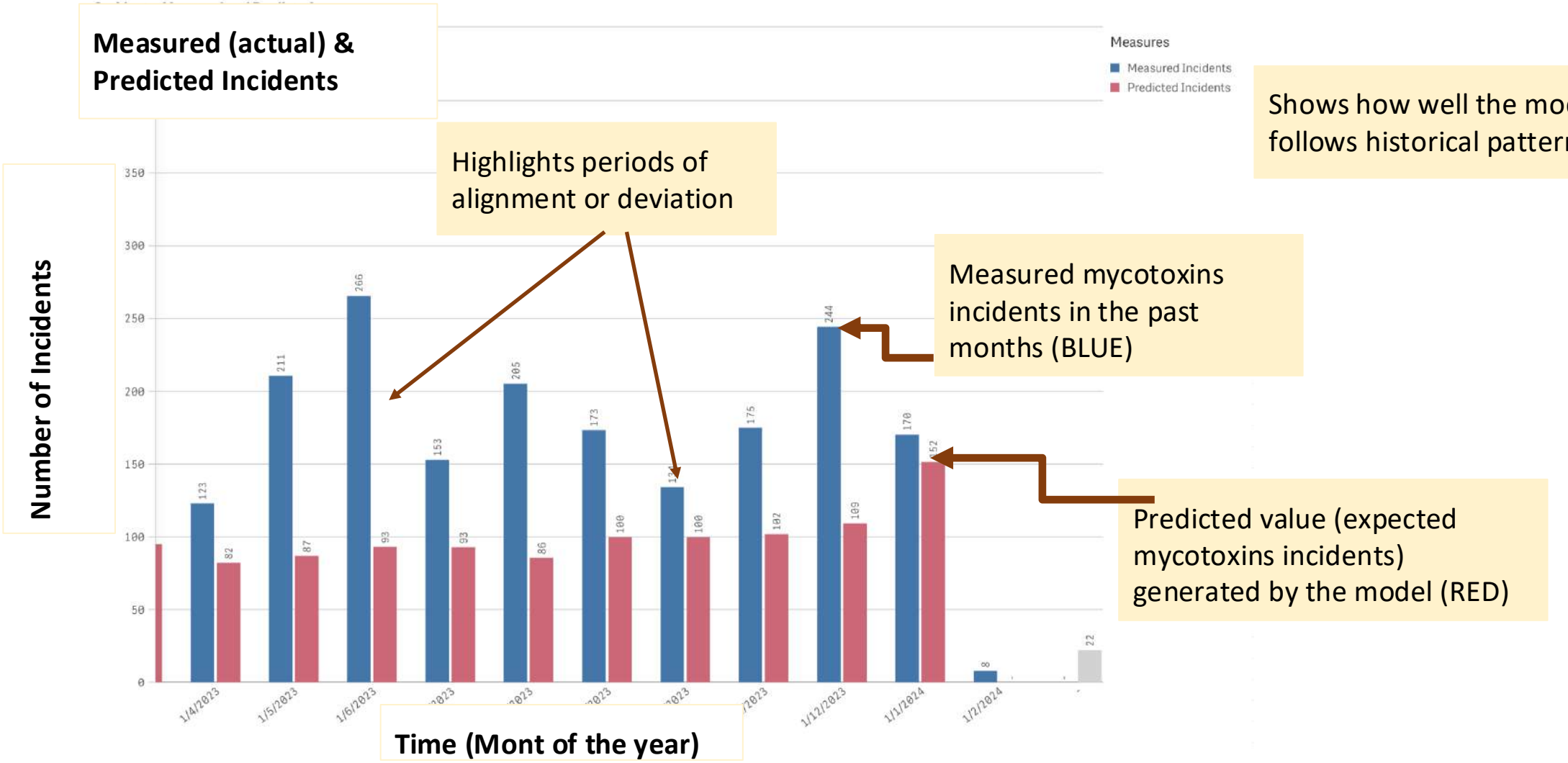
Date	Incidents	Commodity	Data Class
1/2/2000	1	Cereals & Bakery Products	Measured
1/3/2000	0	Cereals & Bakery Products	Measured
1/4/2000	0	Cereals & Bakery Products	Measured
1/5/2000	4	Cereals & Bakery Products	Measured
1/6/2000	0	Cereals & Bakery Products	Measured
1/7/2000	0	Cereals & Bakery Products	Measured
1/8/2000	0	Cereals & Bakery Products	Measured
1/9/2000	1	Cereals & Bakery Products	Measured
1/10/2000	0	Cereals & Bakery Products	Measured
1/11/2000	-	Cereals & Bakery Products	Measured
1/12/2000	0	Cereals & Bakery Products	Measured
1/1/2001	0	Cereals & Bakery Products	Measured
1/2/2001	-	Cereals & Bakery Products	Measured
1/3/2001	-	Cereals & Bakery Products	Measured
1/4/2001	0	Cereals & Bakery Products	Measured
1/5/2001	0	Cereals & Bakery Products	Measured

Incident list (historical actual data) used to train the model.

How the Timeseries Prediction Helped Food Safety & Quality Teams

Use the Dashboard to compare the historical Mycotoxin incidents with predictive values

Measured (actual) & Predicted Incidents



Highlights periods of alignment or deviation

Shows how well the model follows historical patterns

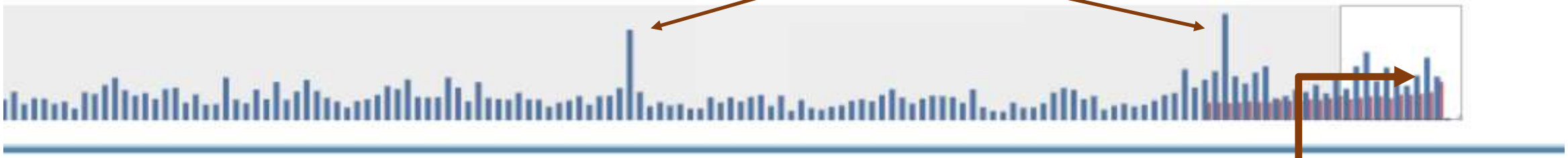
Measured mycotoxins incidents in the past months (BLUE)

Predicted value (expected mycotoxins incidents) generated by the model (RED)

How the Timeseries Prediction Helped Food Safety & Quality Teams

Use the **Trend Line** to understand the direction of mycotoxin risk

Highlights seasonal peaks or gradual rises



Shows the predicted incident curve across future months

A month-by-month view of how mycotoxin risk is expected to change.

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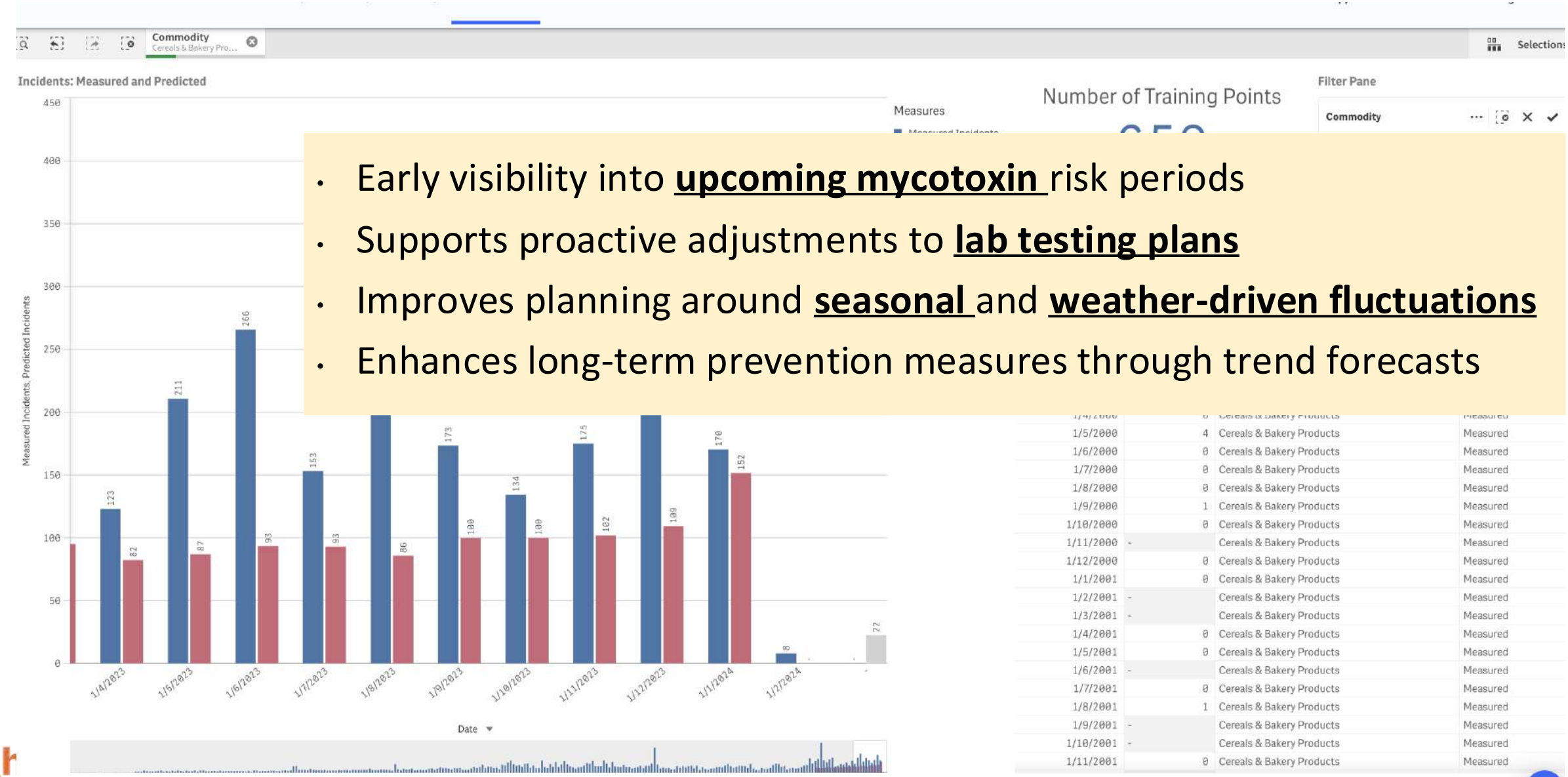
How the Timeseries Prediction Helped Food Safety & Quality Teams



- Early visibility into **upcoming mycotoxin** risk periods
- Supports proactive adjustments to **lab testing plans**
- Improves planning around **seasonal** and **weather-driven fluctuations**
- Enhances long-term prevention measures through trend forecasts

1/5/2000	4	Cereals & Bakery Products	Measured
1/6/2000	0	Cereals & Bakery Products	Measured
1/7/2000	0	Cereals & Bakery Products	Measured
1/8/2000	0	Cereals & Bakery Products	Measured
1/9/2000	1	Cereals & Bakery Products	Measured
1/10/2000	0	Cereals & Bakery Products	Measured
1/11/2000	-	Cereals & Bakery Products	Measured
1/12/2000	0	Cereals & Bakery Products	Measured
1/1/2001	0	Cereals & Bakery Products	Measured
1/2/2001	-	Cereals & Bakery Products	Measured
1/3/2001	-	Cereals & Bakery Products	Measured
1/4/2001	0	Cereals & Bakery Products	Measured
1/5/2001	0	Cereals & Bakery Products	Measured
1/6/2001	-	Cereals & Bakery Products	Measured
1/7/2001	0	Cereals & Bakery Products	Measured
1/8/2001	1	Cereals & Bakery Products	Measured
1/9/2001	-	Cereals & Bakery Products	Measured
1/10/2001	-	Cereals & Bakery Products	Measured
1/11/2001	0	Cereals & Bakery Products	Measured

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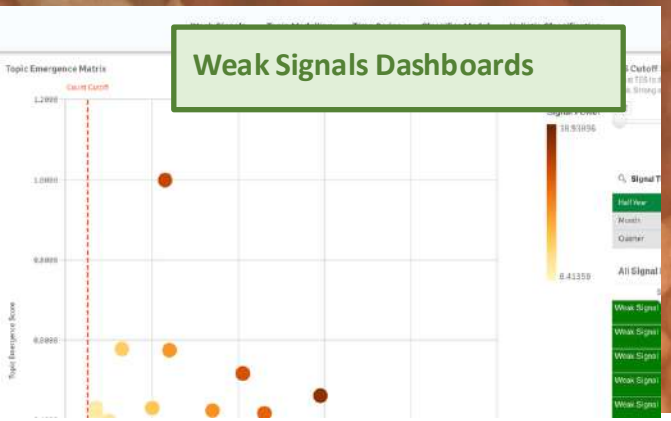

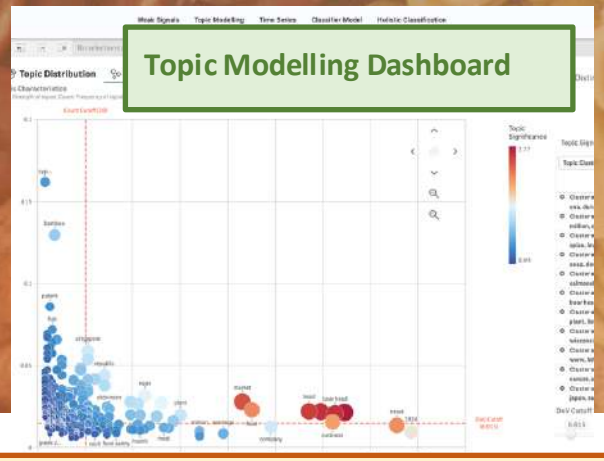

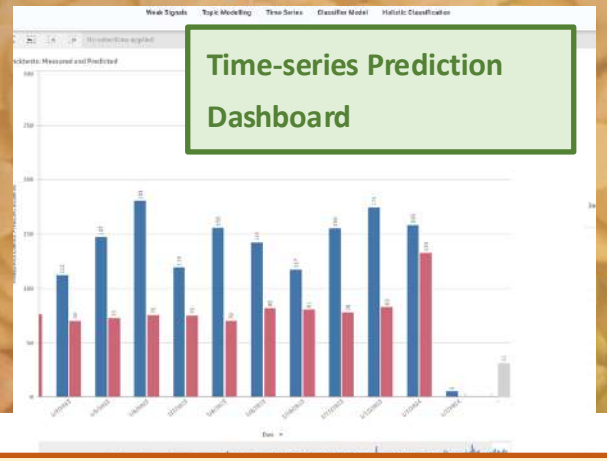

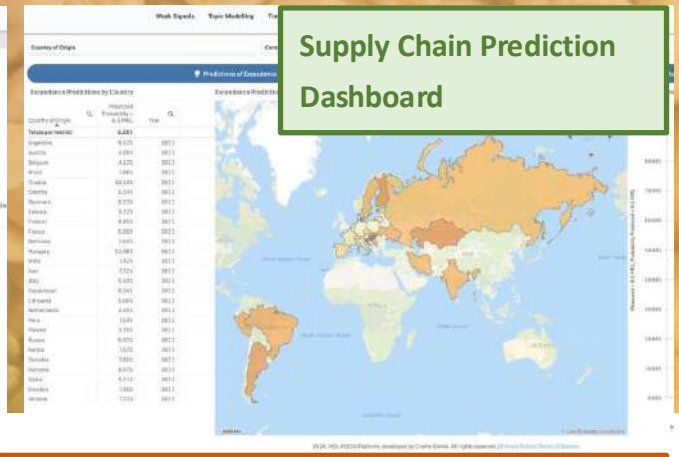

Overall Impact

- Transforms data into **actionable intelligence**
- Supports **early detection** and **future risk anticipation**
- Empowers food safety & quality teams to act proactively and make evidence-based quality decisions

Thank you!

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