

# ALTA

AGRICULTURAL LABORATORY  
TESTING ASSOCIATION

## Overview:

- Illinois Soil Testing Association (ISTA) was founded in 1981 to help address Illinois growers' needs for quality soil test information.
- In Dec. 2020, ISTA rebranded as the **Agriculture Laboratory Testing Association (ALTA)**.

## ALTA's Purpose:

- ALTA's mission is to promote the interests of the Ag testing industry and advance high-quality soil & plant-tissue analysis data for farm profitability, and sustainability in the US.



- **ALTA is committed to ensuring the quality of data to agricultural communities by encouraging the development, use, and acceptance of proven agricultural testing methods.**
- **Our goal is to be the industry leader in ensuring consistency, precision, and accuracy across Ag laboratories nationally, through outreach, education, and certification programs.**

### **2020 Membership:**

- **20 current member laboratories located primarily in the Midwest.**
- **We are looking to expand this in 2021.**

# Laboratory Quality Management Preparing for 2021

*Robert O. Miller, PhD*

*ALP Technical Director  
Fort Collins, CO*

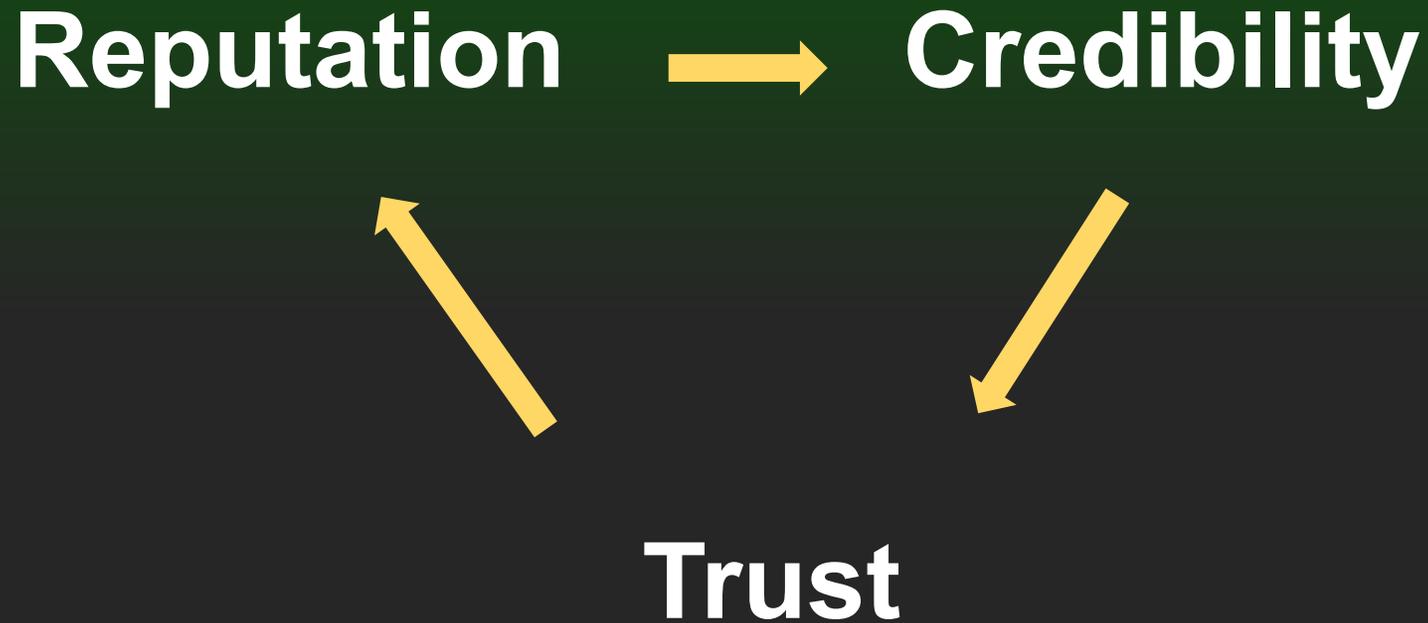
*Rmiller@soiltesting.us*

ALTA Webinar  
January 19, 2021



# The laboratory and the client

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# Preparing for 2021

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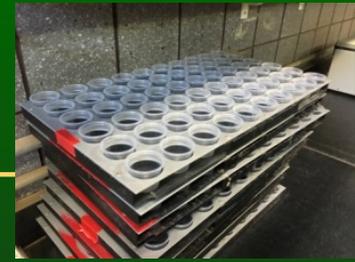


2020 was a challenging year for the lab testing industry with the pandemic, supply issues, and low commodity prices. And despite these challenges, grower and consultant sample submissions increased.

As labs transition into 2021, the winter “off season” is an opportune time to review fall busy season operations and retool lab processes.

# Lab operations

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Most lab issues that arise during the fall workload peak can be anticipated: inventory, instrument service, and most importantly lab staffing.

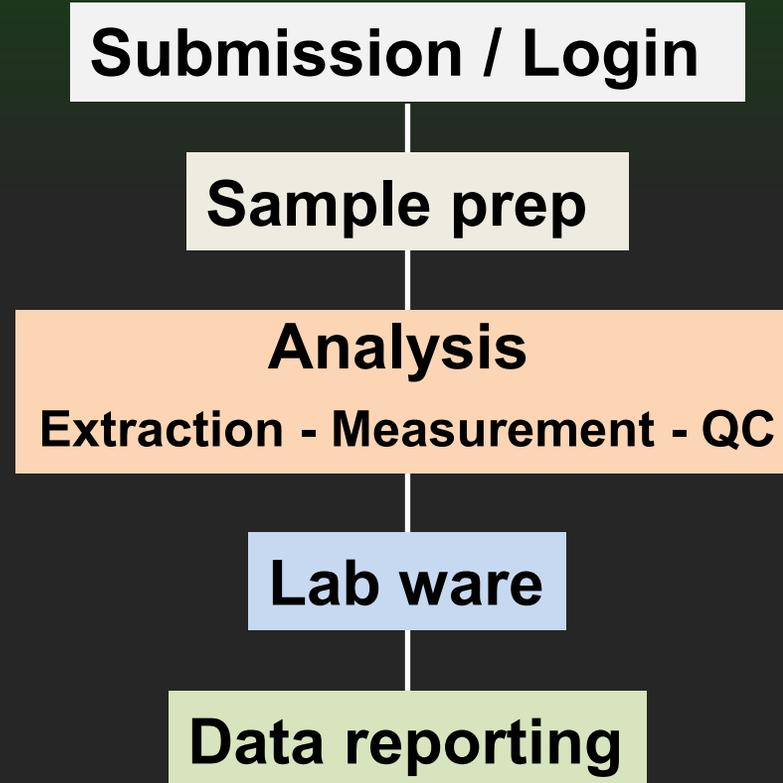
However, unforeseen issues can impact lab safety, increased lab workload, analysis quality, and delay reporting, all of which generate *anxiety* and impact the client.

*Issues impact client trust*

# The operational review



January is an ideal time for lab staff to meet as a group and review the five components of the sample processing:



# The operational review



The review should include all staff and the development of an “operational review plan”, noting:

- Issues that arose that impacted lab operations
- Comments from each lab staff member
- Identification of lab errors vs productivity issues
- A list of suggested lab changes and their priority
- The development of an outline of proposed changes
- Establishment of a timeline of implementation

*The 5 components*

# Operational review: *submission*



The review should address client submission issues which impacted sample identification, login, traceability, storage and billing.

- Were there issues with login data accuracy
- Were there issues with client sample labeling
- Were there organizational issues in sample processing
- Were there issues with sample internal tracking
- Does the sample login SOP need revision

<sup>1</sup> All staff within each sample processing component should take part.

<sup>2</sup> Example list , additional issues may be laboratory specific.

# Operational review: *sample prep*



The review should address sample prep issues which impacted sample drying, grinding, organization and storage.

- Did prep space and equipment meet needs
- Were there organizational issues in sample prep
- Were there sample prep health/safety issues
- Were there scooping ergonomic issues
- Does staff training procedures need revision
- Does the sample prep SOP need revision

<sup>1</sup> Example list , additional issues may be laboratory specific.

# Operational review: *analysis*



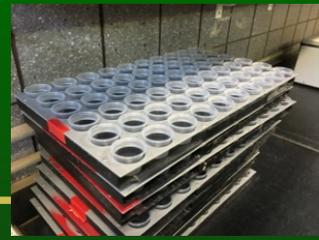
The analysis review should address analytical issues which impacted lab accuracy, precision, reporting of results and client comments on lab quality.

- Did QC lab R-charts and X-charts identify method issues
- Were there precision issues, what was the problem
- Were there repeated QC failures and corrective actions
- Did proficiency testing indicate method bias issues
- Was there client feedback on problematic analysis data
- Does the method SOP need revision

<sup>1</sup> Example list , additional issues may be laboratory specific.

# Operational review: *labware*

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The review should address analysis labware which impacted cleaning, extraction processing, and maintenance.

- Are there sufficient extraction racks for peak workload
- Were there issues with cleaning extraction labware
- Was there adequate deionize water for rinsing labware
- Were there issues in cycling labware washing and drying
- Does staff training procedures need revision
- Does the labware cleaning SOP need revision

<sup>1</sup> Example list , additional issues may be laboratory specific.

# Operational review: *reporting*



The reporting review should address lab reporting issues which impacted: sample IDs, client contact info, listing of tests performed and analysis results.

- Were there issues with client reports, what was source
- Were there sample ID issues, what was the problem
- Were the correct test results reported
- Does the LIMS meet the lab needs / client needs
- Client feedback on problematic lab data reports
- Does the lab reporting system SOP need revision

<sup>1</sup> Example list , additional issues may be laboratory specific.

# Errors vs productivity



The operational review should identify process issues and separate lab errors from those of lab productivity.

## Error issues

- Login errors
- Lost samples
- Instrument calibration drift
- QC failures
- Client reporting complaints

## Productivity issues

- Insufficient staff for login
- Drying oven capacity
- Labware cleaning
- pH instrument productivity
- Process bottle necks
- Deferred equip maintenance

<sup>1</sup> Example list , additional issues may be laboratory specific.

# Error Issues



Analysis errors, how many occurred? What methods?  
Was their incidence tied to a specific lab event?

- New calibration standard source
- Reoccurring QC failure
- Staffing change / training
- Equipment failure

Analysis / reporting errors, how many were reported in the past 6 months by clients? What action(s) were taken to prevent future occurrences.

# Errors impact

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Reducing lab errors, improves internal productivity. Errors result in a negative cascade, example:

A soil method QC failure results in re-analysis of samples, thus additional lab workload, delayed reporting, and reduced confidence of method performance.

Delayed reporting, can result in client phone calls which adds to the lab workload, and impacts client trust.

**An error cascade affect**

# Errors investigation

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## Root Cause Analysis – RCA

A procedure for investigating a laboratory method or process error to identify its source and resolution.

**Example 1.** Instrument drift, source attributed to unstable HVAC temperature of the laboratory environment.

**Example 2.** Reference soil X-chart indicates high M-3 analysis bias over ten weeks, source worn soil scoop.

# Productivity issues

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What are staff suggestions on “bottle necks” issues?

What lab processes (preparation, scooping, analysis) are production bottle necks?

Are these the result of staffing, ergonomics issues or instrumentation limitations?

Are bottle necks the result of needed strategic operational improvements? Equipment? Instruments?

# Productivity impact

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Improving lab productivity, reduces makeshift fixes, boost lab capacity, and reduce staff workload, example:

Upgrading an auto-sampler from 120 to 600 positions reduced staff workload and improved productivity.

A lab processing 2000 samples per day, reducing sample processing by 5 seconds per sample, reduces workload 2.7 hrs/day, 14 hrs/week, +200 hrs each fall.

**A positive cascade affect**

# The operational review

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The operational review final step, set priorities and a schedule of implementation for each component of sample processing.

It should address: benefits, cost, necessary lead time, required training and testing/evaluation of the proposed changes.

Last, method SOPs should be revised with changes.

# Operational survey comments



A survey was conducted of ALTA lab managers of their lab changes made in 2020, suggestions:

- Purchased premade Mehlich 3 standards, quality and time savings.
- Ergonomic Improvements for soil storage and faster scooping.
- Created better communication plans between lab shifts.
- Continue to simplify visual display of day to day lab quality.
- Cross training of labs staff across multiple instruments.
- Added ESI sample introduction to ICPs running to speed analysis.
- Standards made with distilled H<sub>2</sub>O are superior to DI H<sub>2</sub>O.

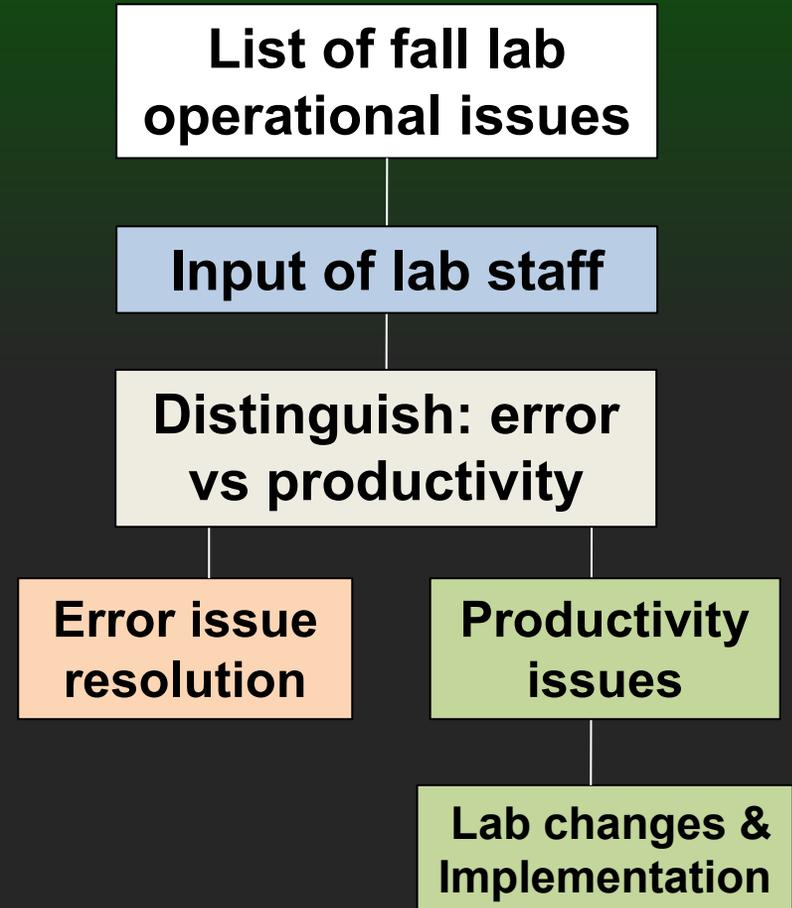
# Conclusion: operational review



A lab operational review is crucial to reducing future laboratory errors and improving productivity.

It provides insight in addressing lab: maintenance issues, organization, staff training and process SOPs.

It identifies priorities and a timeline for implementation, with the goal to assure lab quality and enhance productivity.



# Lab SOP

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Through this presentation there have been references made to the laboratory SOP(s).

The SOP (Standard Operating Procedure) is the foundation document that provides instructions on a laboratory method and/or process.

It is essential document for training lab staff, identifying critical process steps and setting quality criteria.

A SOP webinar will be scheduled March 2021.

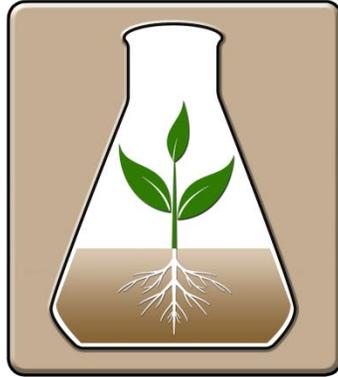


**Thank you for your time and attention**

**Thanks to ALTA participants  
for their support**

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# ALTA

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TESTING ASSOCIATION**

## Next ALTA Meeting:

- **Tuesday February 16**
  - **Webinar / 10 a.m. CST**
- **ALTA Business Meeting**
  - **Two Guest Speakers**

