

Assuring Seed Germination Quality from the Laboratory to the Marketplace to the Grower

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Disclosure:

I have no actual or potential conflict of interest in relation to this presentation.

So what actually is the critical connection between “Food Security” and “Seed Germination Quality”???

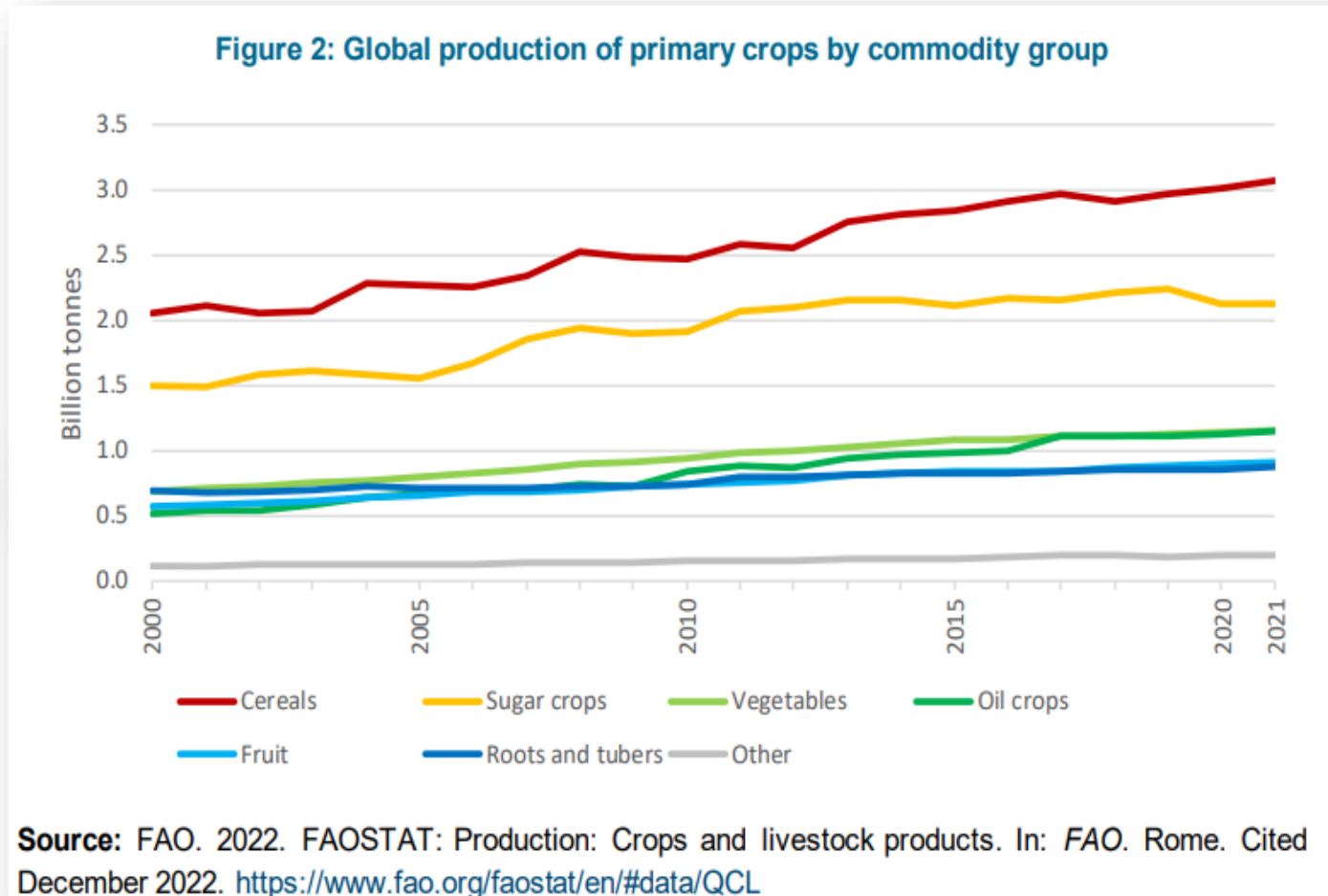


It's really very simple when it comes to sowing seeds.

“If the SEEDS don't grow...

....NOTHING else matters!!!”

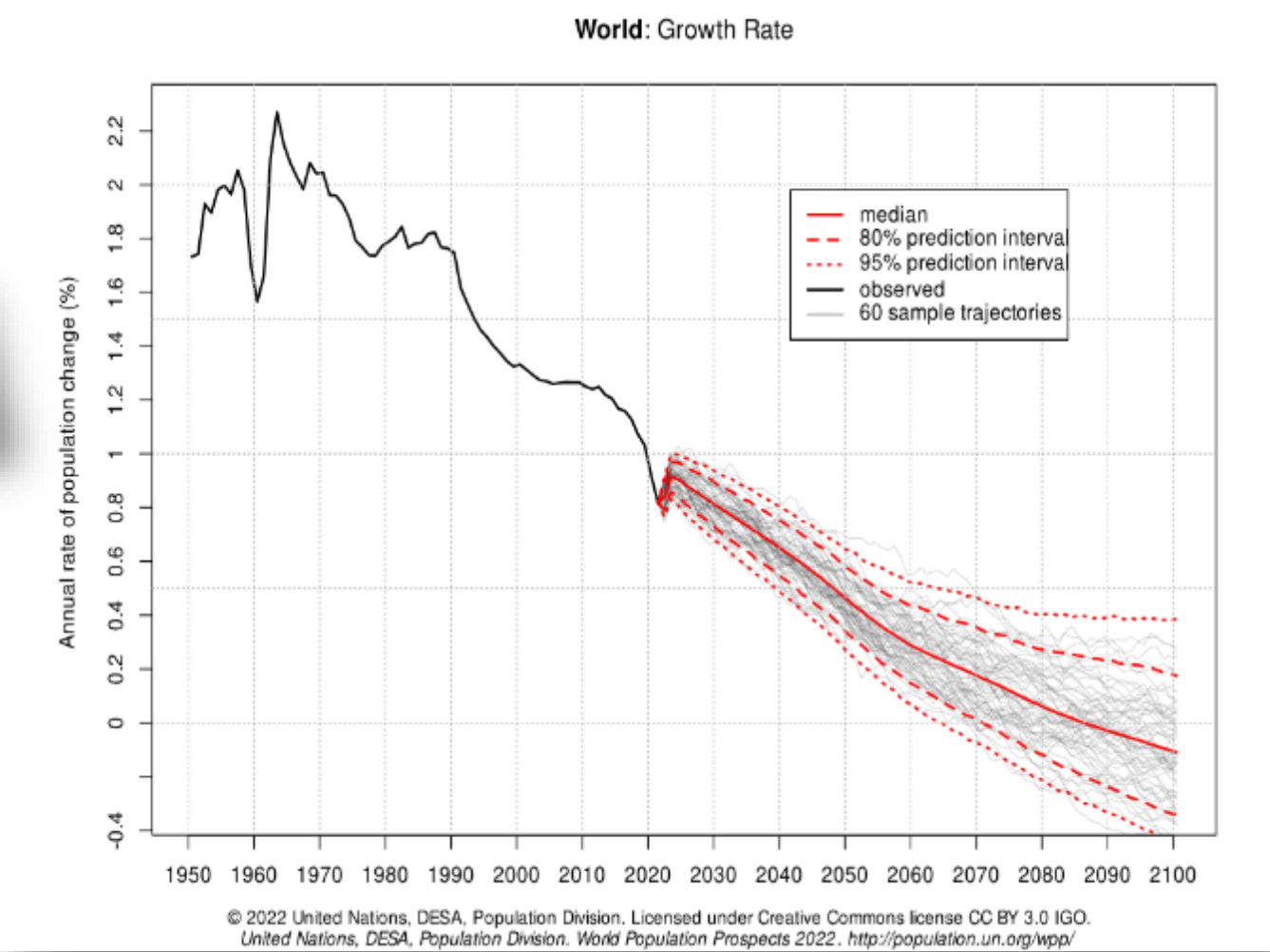
Some Good News – Global Food Production Up



Source: <https://openknowledge.fao.org/server/api/core/bitstreams/58971ed8-c831-4ee6-ab0a-e47ea66a7e6a/content>



Some Good News – Global Population to Slow?



Source: <https://population.un.org/wpp/Graphs/Probabilistic/POP/GrowthRate/900>



Role of the Laboratory



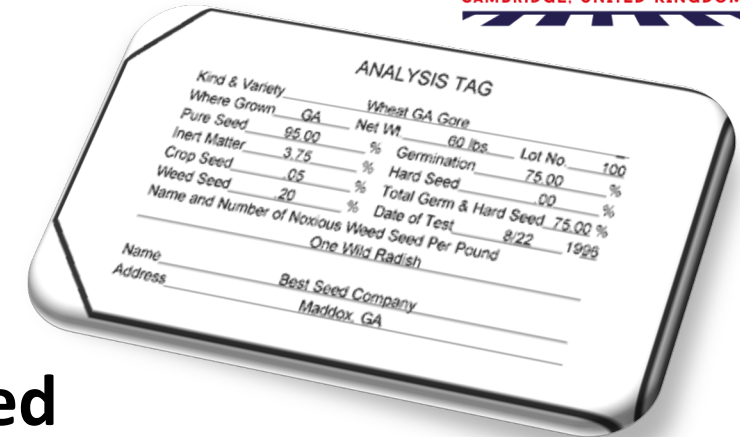
- Laboratory **follows ISTA Rules** to determine seed **germination quality**.
- Laboratory might even be **ISTA accredited**.
- Laboratory might **issue test results on OICs**.
- Reliable **germination test results** achieved and **reported** to the “customer”.
- Lab’s **responsibilities meet**.
- Now what?



Are the Actual Laboratory Results Shared?



- Are the germination test results **REQUIRED** to be **stated** on the product label? Month/Year tested?
- Are the **actual** laboratory **results** stated on the product label?
- Are the **actual** laboratory results “**artificially**” **lowered** and then stated on a label? (*e.g. min. germ. stated on label; min. cert./grade standard stated on label*)
- Is the **end user** of the seed ever provided the **actual germination** determined by the testing lab? (*i.e. OIC*)
- Are any of these **factors important to the grower???**



Seed Germination Quality in the Marketplace

- **Transplant growers sow seeds very precisely** to maximize very expensive greenhouse space.
- **Farmers often have very sophisticated sowing equipment** that actually **counts the number of seeds sown** in a field.
- Can the **end user sow the seeds properly** if they do not know the **actual germination** of the seed they are sowing??? (*e.g. plants per meter of row, potential transplants per rockwool cube/block*)
- **Needlessly sowing excessive amounts of seeds** is very costly and a **waste of seed resources** that should be put to better use sowing more fields/greenhouses.



Seed Germination Quality in the Marketplace

- Biotech seeds and other **high value crops** are increasingly more **expensive...worth their weight in gold!!!**



- **Seeds** are typically packaged and **sold, not by weight** of the container but **by the number of seeds** in the container.
- Who ensures the **germination quality** of the seed once in the **marketplace? The labeler...the retailer...the government?**



Seed Germination Quality in the Marketplace



- Seed **labelers** typically do an **excellent job** obtaining and maintaining accurate **seed germination** data and ensuring only quality seed is offered for sale.
- Seed **retailers** typically do an **excellent job** selling only quality seed.
- **Government** seed laws and regulations typically require very specific **information on seed products**.
- **Government** seed laws and regulations typically require very specific shipping information for seed products for **traceability**.
- **Government** agencies often operate **import/compliance programs** to ensure seed laws and regulations are followed.
- **Government** agencies often **obtain samples** in the marketplace to test seed products for compliance... “truth-in-labeling”.



Seed Germination Quality in the Marketplace



*Good advice found in
an old Russian proverb???*

“Doverey, no proverey.”



The statistical “tools” are available to verify seed germination quality.

ISTA Rules - Germination Test Tolerances

Table 5F. Tolerances between results of two tests made in different laboratories on the same or different samples from the same seed lot (two-way test at 5 % significance level) on 400 seed tests. Updated by ISTA Statistics Technical Committee, based on Miles (1963) Table G5, column C, 400 seed tests.

Average germination percentage of 2 tests		Tolerance
0-50 %		
51-100 %		2
99	2	3
98	3	4
96-97	4-5	5
94-95	6-7	6
91-93	8-10	7
88-90	11-13	8
84-87	14-17	9
79-83	18-22	10
74-78	23-27	11
68-73	28-33	12
60-67	34-41	13
51-59	42-50	

Germination Tolerance Calculator

(tolerances for tests between labs)

Reproduces standard tolerance in ISTA Rules
from ISTA Rules Table 5F

Germination Tolerances for tests in different laboratories

2-way test equivalent at 5% significance level

of tests

of seeds/test

Average germination

Reported germination

Maximum range

Change any value in a yellow cell

Yellow cells are inputs
Blue cells are outputs

In accordance with Miles (1963) Table G5, columns C, F and I, 400 seed tests

Tolerance of standard germination test in two labs on same seed lot



Source: <https://www.seedtest.org/en/services-header/tools/germination-committee/germination-toolbox.html>



Seed Germination Quality Accuracy

“How critical is the accuracy of the germination percentage stated on a product label or stated in the grade/certification standard?”



Actual germination significantly lower: **Actual germination significantly higher:**

- Sower receives less quality than they paid for and expected.
- Sower uses represented germination for a specific plant population.
- Sower underplanted desired plant population not achieved.
- Production less than expected.

- Sower receives greater quality than they paid for and expected.
- Sower uses represented germination for a specific plant population.
- Sower overplanted desired plant population not achieved.
- Production may be more or less than expected.



Can providing more accurate germination information to the Sower assist with assuring more food security?

- Seed germination quality is **critical** to addressing global food security.
- More **accurate germination** information results in more **accurate sowing** rates and **better production** rates.
- More **accurate sowing** rates result in **less over sowing**.
- **Less over sowing** results in **more seed** available to sow **more fields**.
- **More fields** sown results in **higher food production**.
- **Higher food production** results in **more food security**.



*Trust me, as a farmer....
“If the SEEDS don’t grow...
.....NOTHING else matters!!!”*

YES indeed....
“Seed Germination Quality”
is **CRITICAL** for “Food Security”.





Thank you!!!

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