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Commercial Standardization of Instrument Testing of Cotton: Instrument Testing and its Verification




Axel Drieling
Faserinstitut Bremen e.V. (Bremen Fibre Institute "FIBRE")
ICA International Quality Testing and Research Centre Bremen




CFC/ICAC/33 Final Seminar
 January 18 and 19, 2012



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Content







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- (The CFC/ICAC/33 Project)
- The Quality of Cotton
- Kinds of Quality Evaluation and Perspectives
- Benefits of Instrument Testing
- Test Result Verification
- Summary

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CFC/EU – ICAC Project: CSITC


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Commercial Standardization of Instrument Testing of Cotton for the Cotton Producing Developing Countries in Africa

CFC/ICAC/33



- For supporting global benefits of instrument testing for cotton quality assessment – based on the CSITC Task Force aims
- To assist developing countries to meet the requirements of standardized and harmonized instrument testing, so that they are not at a disadvantage



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CFC/EU – ICAC Project: CSITC


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- Project Executing Agency: Faserinstitut Bremen, Germany
- Supervisory Body: International Cotton Advisory Committee (ICAC)
- Project duration: Dec. 2007 to Nov. 2011 / March 2012
- Project Partner: CIRAD, Montpellier, France
- **Regional Technical Centre West/Central Africa**
 - At: CERFITEX, Segou, Mali
 - Partner: SOFITEX, Burkina Faso
- **Regional Technical Centre East/Southern Africa**
 - At: Tanzania Bureau of Standards, Dar es Salaam, Tanzania
 - Partner: Tanzania Cotton Board, Dar es Salaam, Tanzania






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Instrument Testing

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CFC/EU – ICAC Project: CSITC





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•Financing:

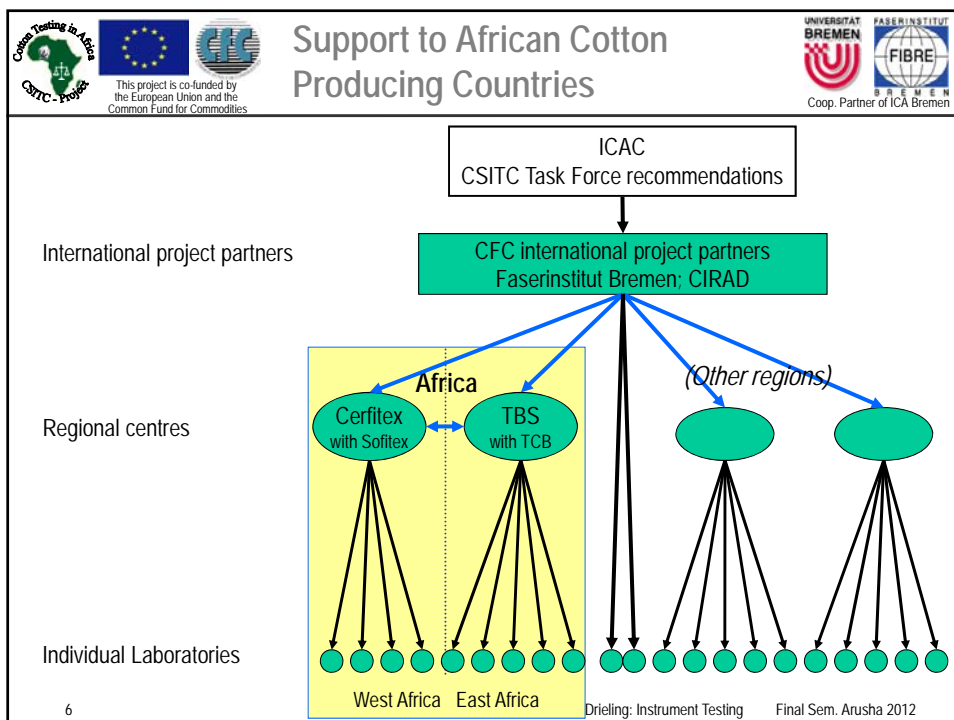
- Funded Financial Volume: 5 Mio USD
- European Commission (as part of its EC –ACP Agricultural Commodities Programme) – 3 Mio USD (2.4 Mio EUR)
- Common Fund for Commodities (CFC) – 2 Mio USD
- Counterpart contribution / external contributors: - 3 Mio USD
- External Contribution:
 - USDA,
 - Bremen Cotton Exchange
 - Uster, Premier
 - Additional



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The Quality of Cotton

It is important to obtain reliable information about the actual quality of cotton – independently from the source of the according data

- Cotton growers need the information
 - to obtain an equitable price for the cotton
 - to enhance cotton quality (breeding/research)
- Ginning needs the information
 - To optimise the ginning process
- The trade needs the information
 - to fix the price of cotton
 - to satisfy the customers
 - To avoid claims
- Cotton spinners need the information
 - to assure a properly running process
 - to achieve the required quality of yarn
 - to minimize the raw material costs

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Kinds of Quality Evaluation

- Manual Classing
- Standardized Testing
- High Volume Testing
- Low Volume / Detailed Testing
- At-line Testing of fibre properties
- On-line Testing of fibre properties



Uster



Trützschler

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Manual/Visual Classing

- Manual Classing is a common method for estimating the quality of cotton
- Manual Classing is the actual basis for trading cotton
- But Manual Classing is
 - not sufficiently objective
 - not sufficiently reliable / precise
- Global cotton trading is more and more accepting and demanding instrument test results
- Cotton spinning requires instrument test results, not Manual Classing results



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Standardized Instrument Testing / High Volume Testing

Standardized Testing ↔ High Volume Testing

- Standardized Testing → CSITC Prerequisites
 - Standardized calibration, testing procedures and result parameters for worldwide comparable results on the same level
 - Objective, reliable test results for chosen characteristics
- High Volume Testing
 - All important quality characteristics are tested
 - High speed testing, capable for testing every single bale
 - Should be based on standardized testing, although still some deviating methods are used (e.g. "ICCS" calibration)



Uster



Premier






Textechno



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Detailed Testing

- Low Volume / Detailed Testing
 - Done for additional properties/parameters/information that is not included in High Volume Testing,
 - Staple Length Distribution
 - Fineness, Maturity
 - Nep Count and Size
 - Gravimetical trash content
 - Stickiness
 - Instruments:
 - Fineness & Maturity Tester (FMT)
 - Uster AFIS
 - Premier aQura
 - SCT, H2SD
 - Not a topic of this project, but helpful for e.g. breeding and processing

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On-line Testing / At-Line Testing

- On-line testing is used for obtaining test results directly during fibre processing
 - On-line testing of fibre characteristics
 - On-line testing of process characteristics
- On-line testing is mainly used for process control
- On-line testing is e.g. obtaining importance in the gin
 - For process control
 - For giving in-bale variability information (Length / Length distribution)
- On-line testing of fibres is obtaining importance in spinning for automatic process control
 - E.g. for reducing waste
 - E.g. for optimizing the drafting process
- At-line measurements add to on-line testing
 - E.g. for fixing the length settings during drafting

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The worldwide accepted and demanded way for the evaluation of cotton quality is inevitably moving towards Standardized / High Volume Instrument (SITC) testing

- Classing of the cotton production is shifting from manual classing to instrument testing worldwide
- Spinning mills are using SITC results regularly
- Research is using SITC results regularly
- Trade is moving towards SITC results to fulfil customers demands



Currently, in Africa less than 10% of the cotton bales are tested with SITC Instruments, but many countries are stepping towards instrument classing

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- Benefits of instrument testing for selling cotton
 - Ability to name the objective quality of the country's cotton production
 - Offer cotton with known quality for sale
 - Avoid price discounts due to unknown properties
 - Avoid claims
 - Secure/improve the market share
 - Use of the test results in the whole textile value added chain
 - Monetary benefit regarding higher achievable prices: approx. 3 US-ct for each kg of lint



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Benefits of Instrument Testing



- Benefits of instrument testing for producing cotton
 - Arrange homogenous lots for sale
 - Optimize quality
 - in breeding
 - in ginning
 - Pay farmers based on the quality their produce
- Benefits of instrument testing for cotton processing
 - Optimize cotton input for demanded yarn quality: economic use
 - Arrange bale laydowns

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Benefits of Instrument Testing



- Benefits of instrument testing for cotton production
 - James Knowlton, USDA-AMS
 - Gabriel Paposseco, IAM Mozambique
 - Priscilla Mutembwa, CARGILL
- Benefits of instrument testing for cotton selling
 - Priscilla Mutembwa, CARGILL
 - John Lupton, Consultant
- Benefits of instrument testing for cotton processing
 - Werner Bieri, Buhler Quality Yarns
 - Walter Simeoni, ITMF

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Cotton Characteristics with SITC



- Sufficiently reliable
 - Micronaire
 - Strength
 - Length, Length Uniformity
 - Color Rd and b
- Not sufficiently reliable / expressive / meaningful
 - Elongation
 - Short Fibre Index
 - Trash area and count
 - Maturity

→ These should currently not be taken for trading, although they can be useful e.g. for cotton processing

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Verification of Test Results

How does the laboratory know
that the measured results are meaningful / true?



How do the final users of the measured results
know that the results are meaningful / true?

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Verification of Test Results







- How does the laboratory know and prove that the measured results are meaningful / true?

a) CALIBRATION ...



- Take all measures to assure reliable testing
- Do the instrument calibration with official calibration cotton standards
- Do daily calibration checks before / during / after operation

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Verification of Test Results







→ Calibration is the central tool given in the instrument to come to similar test results on different instruments

→ The Regional Technical Centres can assist you for any questions



- But
 - With this you still do not know, if you are on the same level as other laboratories
 - With this you still cannot prove your ability to meet the international test result level and precision

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Verification of Test Results

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- How does the laboratory know that the measured results are meaningful / true?

B) COMPARISON IN ROUND TRIALS

- Participation in large worldwide Round Trials
→ CSITC Round Trial, USDA HVI Checktest, Bremen Cotton Round Trial
- Participation in Regional Round Trials on cottons from the region



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<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="display: flex; align-items: center;">    </div> <div style="text-align: center;"> <h2>Cotton Round Trials in Comparison</h2> <p><small>This project is co-funded by the European Union and the Common Fund for Commodities</small></p> </div> <div style="display: flex; align-items: center;">   </div> </div>			
Attribute	USDA HVI Checktest	Bremen Round Trial	CSITC Round Trial
Number of participants	50 to 80 HV instr.	130 to 150 HV instr.	110 registered labs (2011) 115-137 HV instr. (2011)
Kinds of instruments	Restricted to High Volume Testing	Every kind of Testing instrument	Restricted to High Volume Testing
Cottons: Origin and type	USA; Upland	World; broad range of prop.	4 US Upland; 1 international
Costs	Annual fee	Free of charge	Annual fee: 2012: 1000 USD
Frequency	12 times/year each 2 samples	3 times/year each 1 sample	4 times/year each 5 samples
Number of tests per sample	Asked for 12 tests per sample	Proposed: 6 tests per sample	30 tests per sample (fixed)
Aim	Information for the laboratory	Information for the laboratory	Official laboratory evaluation and detailed analysis for the laboratory
Evaluation of	Laboratory average	Laboratory average	Laboratory average and all single data
Evaluation of	Trueness only	Trueness only	Trueness and precision
Additional benefit			Calibration Material delivered with the RT samples (starting 2012)





Verification of Test Results

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- With this you can prove that your instrument is capable of producing results on the internationally accepted result level; you can use the analysis for improving; you can prove your performance to the final users of the results
- Please register to the CSITC Round Trials (most important RT for classification of cotton production)
- Please contact the RTCs for Regional Round Trials
- But
 - With this you still do neither know nor can you prove to be consistent on every day
 - And certainly it does not replace calibration etc.

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Verification of Test Results

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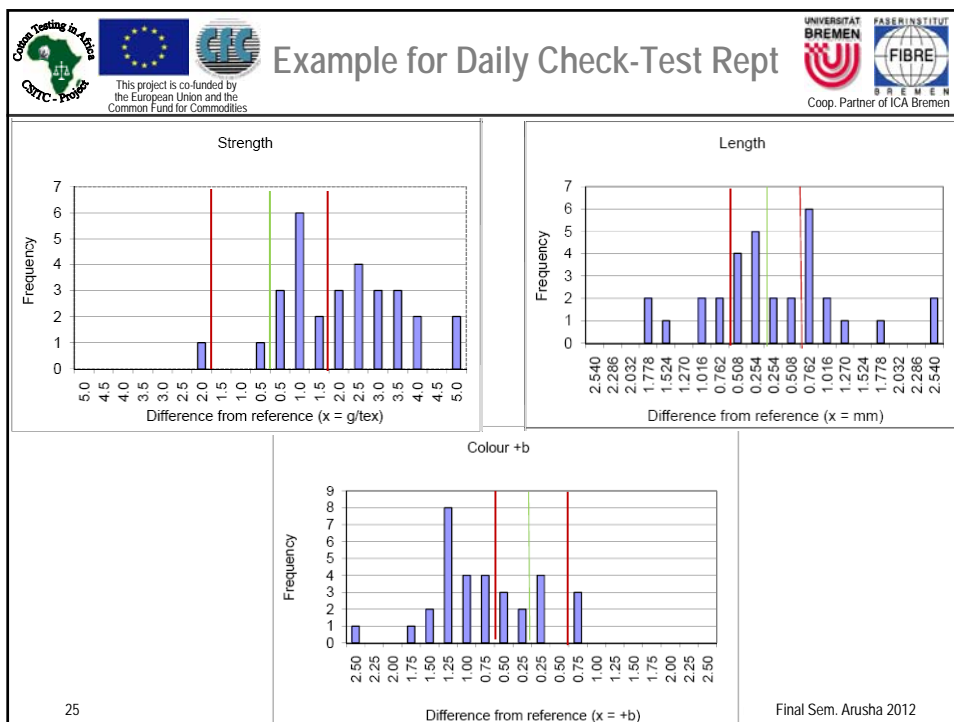






- How does the laboratory know and prove that the measured results are meaningful / true?

C) CHECKTEST ON DAILY SAMPLES

- Send a fixed subset of the samples tested in one laboratory to another for a second, more intense test
 - Sending of samples to be done in short term
 - Checktest and reporting to be done in short term



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Example for Daily Check-Test Rept

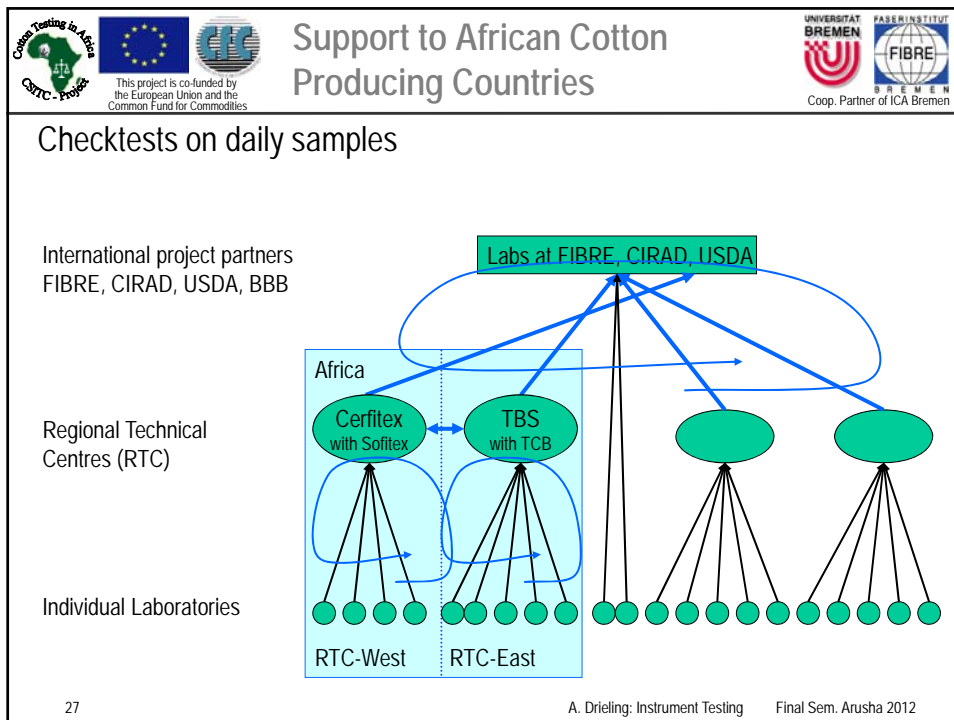



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Outside Reproducibility Limits						
	Mic	Str	Len	Unif	Rd	+b
Limits	0.1	1.5	0.508	1	1	0.5
No. of tests	32	32	32	32	32	32
Share outside, %	91	63	59	63	34	72
Share inside, %	9	38	41	38	66	28
Comparison: Av. of all labs at RTC						
Comparison: USDA 2000, %	80	76	79	86	93	94

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Verification of Test Results

- With daily check-tests a valid reference information according to all test results produced in one laboratory is given.
- The RTCs offer this unique service, assuring your daily performance and reliability
- But
 - Certainly it can neither replace calibration but Round Trial participation



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Verification of Test Results

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- How does the laboratory know and prove that the measured results are meaningful / true?

D) CERTIFICATION / ACCREDITATION



- Accreditation according to ISO 17025 helps assuring a proper Quality Management in laboratories
- An ICA Certification assures a high standard level of cotton laboratories involved in cotton trading

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Verification of Test Results

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→ With accreditation / certification you can prove your high level of quality assurance

- But
 - Both result in very high initial and annual costs
 - ISO accreditation is not adapted to cotton testing specific purposes
 - Accreditation as well as ICA Certification are mainly necessary for reference laboratories / superior laboratories



→ This should be strived by the RTCs

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Summary

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- The evaluation of cotton quality is inevitably moving towards Standardized / High Volume Instrument (SITC) testing
- Instrument testing is highly beneficial for cotton producing countries.
- Measures have to be taken by every laboratory to verify the testing data.
- The CSITC Round Trial is a central tool for proving performance and improving reliability
- The RTCs will help for all kinds of verification of the test results from laboratories in their region

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Axel Drieling
Faserinstitut Bremen e.V. (Bremen Fibre Institute "FIBRE")
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Thank you for your kind attention !

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