MISSION REPORT

Activity 5.4.b

Upgraded NPAL's Chemist and Inspectors Knowledge on development of statistical design on sampling used for Field and Market Monitoring for fruits and vegetable.

DCI-ASIE/2012/023-158

Date of Report: 08 December 2015
Reporting Period: 24 November to 04 December 2015
Author of Report: Klaus Röder, Short-Term Expert

AECOM

With Crown Agents, DIN and GFA

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1. ACRONYMS

AECOM	AECOM International Development Europe
BAPTC	Benguet Agropinoy Trading Centre
BPI	Bureau of Plant Industry, Philippines
DA	Department of Agriculture
DTI	Department of Trade and Industry, Philippines
EC	Commission of the European Communities
IPPC	International Plant Protection Convention
ISPM	International Standard Phytosanitary Measures (provided by the IPPC)
NAIA	Ninoy Aquino International Airport (Manila)
NPAL	National Pesticide Analytical Laboratory
PC	Phytosanitary Certificate
PFA	Pest Free Area
PRA	Pest Risk Analysis
RP	Republic of the Philippines
SPAL	Satellite Pesticide Analytical Laboratory
SPS	Sanitary and Phytosanitary
STE	Short-Term Expert
TRTA	EU-Philippines Trade Related Technical Assistance Project
WTO	World Trade Organisation

2. EXECUTIVE SUMMARY

The purpose of the workshop is to provide BPI technicians and analysts and other technicians of the Philippines Department of Agriculture (DA), instruction on how to apply statistical sampling methodologies in their work. This will ensure that sampling methodologies used in the country are consistent.

One workshop was provided in this TRTA Activity, in Baguio City. The workshop had 30 delegates representing mainly the different NPAL ad SPAL staff members together with experts form the contaminant laboratory of the Department of Agriculture and members of the Plant Quarantine Services - Department of Agriculture to control the sea ports in the Philippines in view of possible occurrence pesticides in imported fruit and vegetable.

The delegates of this workshop were provided with background information on the importance of their work and how using correct sampling methodologies can both protect public health and facilitate export trade.

The workshop delegates were introduced to statistical reasoning, the overarching and maybe the most important subject, to understand the difference and the relationship between a sample and the population.

The workshop had four sections:

1. An introduction to statistical basics and denominations
2. An introduction to statistic sampling and to various sampling strategies
3. An outlook on testing on samples together with the concepts of statistical error and confidence intervals
4. A brief outline of regression theory

Due to the restricted time frame of two and a half days these subjects could not be dealt with in theoretical depth but with sufficient relation to practical obligations of the delegates.

The lectures have been supported with about 80 PowerPoint slides in two presentations and further EXCEL files prepared for Exercises and samples of real data from NPAL and AMAS.

All of the lectures were followed by practical group work. The participant had formed 6 groups: NPAL and the 4 SPALs (Baguio, Cagayan de Oro, Cebu and Davao) and another group by the contaminants section. The delegates of the Philippine Plant Quarantine Services joined SPAL-Davao for their group work

The group work (4 times during the WS) consisted of two tasks each: Discussion in groups of the importance and relevance of the subjects treated in the lectures and a practical exercise in EXCEL or done with the calculating functions of a Smartphone related with practical background of the Laboratories to the mentioned subjects. (e.g.: ->). Exercises have been done mostly on several Laptops with EXCEL but also Smartphones were used.

Questions:
What Mean, Mode and Median would signify in the context of sampling of NPAL and other organizations.
Why and how are these concepts important and apply for the work of NPAL and other organizations
Exercise:
Please use the file “ExD01_1_Mango Yields Region IX.xlsx”, a list of farmers from Region IX with supposed mango yields
Please calculate Mean. Variance and Standard Deviation
Try also Kurtosis and Skewness
What would you say about the data. Are these yields ?
All Exercises based on data collected at NPAL or the Department of Agriculture

At the end of the two lecture days a spokesperson of each group presented the results of the reasoning and the exercises. These presentations were done verbally or via computer using the presentation device which was also used for the lectures.

The lecturer presented the delegates with two questionnaires, one at the beginning, and one at the end. The reason was to test for improvement of statistical knowledge through the Workshop. (Section 6 : Impact, Findings and Recommendations)

Through the workshop discussions, a few areas were identified (Section 6: Impact, Findings and Recommendations) that require follow-up by the organizers. The main issues are:

- Adaptation of the sampling plans by using complete sample frames for sampling fields and markets, if possible. .

- Application of tests for verification and assessment of samples after sample results.

- Harmonization of sampling schemes through the regions and for all the SPALs, other organizations to be included if feasible

The scope of work of the delegates was rather inhomogeneous: some sample in the fields, other markets, most are responsible for analysing samples in the analytic laboratories established for this purpose. So a simple on the job training: how to sample in an explicit environment would not respond to the necessities of a majority of participants not immediately confronted with this type of work. However, as the TOR stated: The workshop was intended to “provide the workshop participants with the statistical tools for designing a sampling plan for monitoring fruits and vegetables”.
It was thus intended to make participants aware of the principal basics of statistical sampling design, execution and testing. It was felt that a practical workshop for specific groups of delegates: e.g. sampling units on markets, packing houses or ports would benefit some participants in more practical, on-the-job aspects in addition to this workshop.

The results of the statistical assessment showed an increase in knowledge of participants due to the workshop; some practical issues would need some intensified training as could also be proved by the statistical assessment.

3. BACKGROUND AND CONTEXT

The National Pesticide Analytical Laboratory Quezon City (NPAL) conducts sampling and analysis of fruits and vegetable products at the 4 different types of sapling points: fields, markets, packing facilities and export facilities (ports), (the latter are tested by PQS) to detect contamination of these products. The detection of contamination by the 5 laboratories of NPAL and SPALs then prevents further use of these products either for consumption or export. So far the sampling of the mentioned products has been done without much of a statistical design and this should be improved to respect scientific design criteria and internationally acclaimed methodology.

INTRODUCTION

This report covers the period from 24th of November until 6th of December of return date of the STE from Manila.
As no background info for this mission was given to the STE beforehand, all information on practical work of the work of NPAL and other institutions on sampling and further activities had to be acquired after arrival at Manila.
The support by the NPAL staff was of extraordinary help for the preparation but it was clear even before the mission, that a sampling workshop for practitioners can only be useful if examples and material can be adapted to the reality of the participants. All of practical material for the workshop had to be prepared just before the workshop. However, practical data sets, if not abundant, but existent were handed over by NPAL staff and the Department of Agriculture and were used in examples in the workshop.

PRESENTATION OF THE MISSION

The number of days assigned to the expert was 10 working days, with the assignment commencing on the 24th of November 2015 and ending on the 6th of December 2015. The mission comprised preparations of the workshop, elaboration of workshop material and preparations, in liaison with the beneficiary organization (BPI), and delivery of one workshop in Baguio.
The Short-Term Expert has been engaged for the period and dates indicated on the following Timetable for the activities given by the author:

Activities on days	Tasks	Nov./Dec. 2015 WD per activity
Nov. 24	Briefing at BOI (Board of Investment) with Florian Alburo (Teamleader TRTA3), Key Expert Ian Watson, personnel from NPAL and FDA to get overview over program scope and purpose. Preparing exercises and evaluation and assessment documents	1
Nov. 25	Discussion with beneficiaries/mentoring. Meeting the workshop participants and data producers at NPAL- Manila. Meeting at NPAL and then proceeding with visits to the supermarkets and trading post in Manila. Specially important the discussion with data producers at NPAL to learn about documentary and possible computer based exercises at Workshop	4
Nov. 26-27	Visiting markets in Region 4 and farm and packing houses in Region 3. This will be conducted to see the actual conditions in the places where NPAL collect their samples which will give an idea of the acceptable sampling approach that you will be taught later.	

Activities on days	Tasks	Nov./Dec. 2015 WD per activity
Nov. 28-29	Compiling the final WS documents and fixing final programme schedule. Preparing exercises and evaluation and assessment documents	
Nov. 30	Travelling to Baguio and finalizing Workshop documents, photocopying and assuring final preparations on site	
Dec. 01-03	Workshop and Assessment	3
Dec. 04	Debriefing, Report writing. Analyzing WS assessment and results of exercises delivered by participants.	1
	Analyzing and numerically assessing (statistical analysis) of WS results and extended post WS questionnaire. Analysis of participant's WS results and contributions. In depth content analysis of recommendations for continuation and design of further program considering sampling in the NPAL context.	2
	Total WD	10

EXPECTED RESULTS AND TARGET OUTPUTS

The TOR state: "For the purpose of the present activity it is expected the STE will provide the workshop participants with the statistical tools for designing a sampling plan for monitoring fruits and vegetables ". For this a number of sample designs should be dealt with in the workshop:

- *Simple random sampling*,
- *Stratified random sampling*,
- *Systematic random sampling*,
- *Cluster random sampling*,

All this was dealt with in the workshop, however the subject of statistical sampling was extended to sampling comparison by tests and statistical characteristics of regression as this touched more of the area of work of analyst, representing the majority of participants. It should be stated that NPAL and SPALS use a mixture of Quota sampling and Random sampling and Area sampling, also introduced in the workshop, seems to be a more appropriate method for many of the applications of the delegates.

ORGANISATION OF THE REPORT

The outline of the Activity 5.4b report is as follows:

Executive Summary
Background and Context
    Introduction
    Presentation of the mission
    Expected results and target outputs
Purpose of the Mission
Description of the Mission Activities
Findings and Recommendations
Annexes

4. PURPOSE OF THE MISSION

The overall objective of the TRTA project is to contribute to the Philippines´ integration into the international and regional trading and investment system, thereby strengthening economic development, inclusive of growth and poverty reduction.

The specific purpose of the Activity 5.4b is to Upgrade NPAL's Chemist and Inspectors Knowledge on development of statistical design on sampling used for Field and Market Monitoring for fruits and vegetable and so to enhance the capacity of the BPI workshop participants in sampling and by this improving quality for testing food and food products.

5. DESCRIPTION OF THE MISSION ACTIVITIES

Time list of Activities during the mission

The Time list is in comprehensive tabular form. Detailed lecture subjects and exercise contents can be found under course documents activities are described in the ANNEX 2 - WORKSHOP MATERIALS

Day	Location	Activity
Nov. 24	Metro Manila	Briefing on Project and Preparation of Workshop at BOI with Ian Watson, Marilyn M.Pagayunan - FDA Phil.. Albina M.Mendoza PDA Phil., German T. Yatco, BPI-Passo, Florian A. Alburo Team Leader Technical Assistance Team TRT3 and Gerry Jatco - Analyst at NPAL.
Nov. 25	Metro Manila	Visits to the markets in Metro-Manila : • Supermarket in SM Mall Quezon City • Balintawak Wholesale Market • Pure Gold Supermarket Balintawak • Nepa Q Retail Market Quezon City
Nov. 26	Metro Manila, Central Luzon	Visits outside Metro-Manila : Tarlac in Central Luzon , Visit of 2 markets, 1 Packing factory and 1 Okra field: • Tarlac vegetable and retail market in Tarlac • Jelfarm Fresh Produce Enterprise in San Manuel • Okra Field delivering regularly to Fresh Produce Enterprise in San Pascual (nearby San Manuel) • Pulilan vegetable and retail market in Pulilan
Nov. 27	Metro Manila	Briefing on Analysis of samples at laboratories at NPAL on the technical explanation of the procedures how work is done at the analytical laboratories and working situation at the laboratories at NPAL (Metro-Manila). Visiting the extraction (physical preparation of analytical specimen in liquid form) and the technical calculation laboratories (where the further separated sub-samples are finally analyzed on specialized machines and test results are generated as computer outputs). Computer generated result are then subsumed in EXCEL tables and graphs. The explanation of how the samples are analyzed and technical procedures to detect and eventually reject a contaminated sample was explained. In the afternoon discussion on the quality assumptions and characteristics of the sampling at the ports of imported vegetables and fruits. This sampling is not done by NPAL but by the Quarantine Department. In the late afternoon a visit to the Department of Agriculture and the Agribusiness and Marketing Assistance Service (AMAS), receiving an incomplete list of the farming universe in the Philippines and the regions.
Nov. 28/ 29.	Metro Manila	Preparing Workshop material, ,handouts, exercises
Nov. 30	Metro Manila / Baguio	Travelling form Manila to Baguio
Dec.01	Baguio	Workshop : Day 1

Day	Location	Activity
		Opening of Workshop Lectures and Group Work With presence of Renea Cruz-Tan Knowledge Management Officer of TRTA3 and assistant
Dec.02	Baguio	Workshop : Day 2 Lectures and Group Work
Dec.03	Baguio / Metro Manila	Workshop : Day 3 Synopsis, Assessment and Closing Travelling form Baguio to Manila
Dec.04	Metro Manila	Debriefing on Project and Workshop at NPAL with Ian Watson, Maria Araceli S.Escobar Chief International Affairs Division DA, Florian A. Alburo Team Leader Technical Assistance Team TRT3, , and Maria Lourdes de Mato, Division Chief NPAL and assistants.
Dec.05	Metro Manila	Preparing report and recommendation for pursuit of sampling strategy and training at NPAL

6. IMPACT, FINDINGS AND RECOMMENDATIONS

Findings about NPAL and sampling procedures

NPAL owns an impressive laboratory for processing and further testing of plant samples. Visits to various sampling points showed a knowledgeable approach to sampling and procedures. However, the selection of markets and fields, likewise of packing facilities and probably also to containers arriving for import seemed to guided by administrative necessities instead by scientific statistical sampling methods. Likewise is the work in the laboratories guide by experience and on the job training, the theoretical knowledge of the used regression technique for sample processing, testing and comparison seem to be limited. NPAL was, however, very transparent and frank to disclose the used methodology and techniques. The same is true for the SPAL laboratory of Baguio where the local head of SPAL Joy S. Calaunan was extremely helpful to inform about their work and procedures.

Baguio Workshop Findings

The Standard operation procedures of random sampling of The National Pesticide Analytical Laboratory Quezon City (NPAL) to conduct sampling and analysis of fruits and vegetable products at the 4 different types of sampling points: fields, markets, packing facilities and export facilities (ports), (the latter are tested by PQS) to detect contamination of these products has seen to be of good quality. These sampling methods are claimed to be of pure random characteristics but at least in the area of markets and fields they are not. Big markets as fields are administratively attributed and no sampling frame for stratification and strata selection is applied. This is a combination of quota sampling with random sampling at the last stage. The information of sampling techniques of PQS could only be derive from explanation of the present junior technicians of PQS.

Or the sampling of packing facilities and export facilities (ports), only the following two recommendations will apply because the statistical conditions for sampling are easier and less prone to sampling errors

Recommendations:

- Adaptation of the sampling plans by using complete sample frames for sampling fields and markets, if possible. Feasibility study on costs and limits of these activities (regional characteristics might not allow sampling according to sampling frames – mountainous, islands, remote access). Access to sampling frames and the Philippine Statistics Authority should be contacted for this purpose.

Test procedures of samples (is the test acceptable- are we confident that two tests show the same results) are inadequately developed and left to estimates

- Application of tests for verification and assessment of samples after sample results due to standard operating procedure lead by NPAL

Different regions in the Philippines have very different characteristics. Different plants are grown and access facilities to markets and fields. However, sampling characteristics in many cases (like using sampling plans or random stratification) do not differ between regions. Regular communication between the SPALs and NPAL should allow for better harmonization of this

- Harmonization of sampling schemes through the regions and for all the SPALs, other organizations to be included if feasible. Distant learning facilities should be considered.
- Application of on the job training courses for sample collecting technicians to apply true sampling methodology in the working area, This presupposes sample frames for the corresponding area. It further will requires a feasibility analysis and comparison of cost related restrictions due to enlarged sampling through the use of sampling frames.

General Findings of Learning Progress

The above mentioned questionnaire (pre- and post) has been assessed initially, More should be as done as it shows (from the questionnaire) that **elementary concepts of statistics, induction from sample to the population, error concept and testing of samples, confidence intervals in sample estimates need still to be improved**. This was possible after a more elaborate evaluation of the two questionnaires.

The questionnaires were quickly to be completed using only tick marks. The second questionnaire "Questions to Upgraded NPAL(Post-Course)_Sol_KR151130.docx" together with correct solutions marked in color, the questions 1, 3-9 had been asked before in the first questionnaire (all documents mentioned are to be found on ANNEX 2 - WORKSHOP MATERIALS

A brief interpretation of the results in Box 6-1:

The maximum points in Questionnaire 1(pre) was 16, 26 in the second. The two means of the relative frequencies were compared and a t-test should indicate if the Hypothesis (H_0) that no change of knowledge can be detected between before and after the course. This hypothesis can be refused with a probability of more than 99.999 %, meaning there has been an improvement of knowledge (increase of the mean). The appropriate p-value has been marked. The results were calculated with a EXCEL Add-on (STATIXL), which was also briefly introduced to the delegates.

Specific Findings of Learning Progress

A brief interpretation of the results in Box 6-2:
As seen from the Questionnaire in ANNEX 2 - WORKSHOP MATERIALS, Question 8 in Questionnaire1 (pre), Question 8 corresponds to Question 9 in Questionnaire2 (post). "Confidence intervals are used to "It is easy to compare the results from both tests: The percentage of correct answers was quite high but has not increased and stayed the same. Despite the fact that this subject was treated extensively during the course. The assumption of a lack of understanding the basics of statistics is further enhanced by the results of question10: "Which of the following examples are randomized samples?" in Questionnaire2 (post). Only 41% gave a correct answer. A rather positive outcome is the result of question14 in Questionnaire2 (post).: "If we want to interpret statistical results, which of the following remarks are correct ? " has a correct answer rate of 86%, which may allow to summarize briefly."

The general knowledge of statistics among the participants was rather high and in general knowledge has been increased, but the awareness of basic theoretical statistical concepts should be improved. A majority of participants is aware, that "statistical results should improve the reasoning for more profound research in order to improve Pesticide control in general"

	Sample 1 (before)		Sample 2 (after)		
	8 Questions(max =16)	16	14 Questions (max=26)	26	
	Sample values		Sample values		
	Frequeny	rel.Frequency Sampl1	Frequeny	rel.Frequency Sampl2	
1	7	0,44	10	0,38	
2	6	0,38	15	0,58	
3	5	0,31	11	0,42	
4	7	0,44	13	0,50	
5	8	0,50	14	0,54	
6	6	0,38	16	0,62	

..Shortened to save space..

27	5	0,31	9	0,35
28	6	0,38	12	0,46
29	6	0,38	13	0,50

escriptive Statistics for: put Range = Sheet1!$C$5:$C$34		Descriptive Statistics for: Input Range = Sheet1!$E$5:$E$34	
	rel.Frequency Sampl1		rel.Frequency Sampl2
ean	0,373	Mean	0,500
d Error	0,014	Std Error	0,017
d Dev.	0,076	Std Dev.	0,091
ariance	0,006	Variance	0,008
oeff. Var.	20,276	Coeff. Var.	18,157
ange	0,250	Range	0,385
ount	29,000	Count	29,000
kewness	-0,320	Skewness	0,560
urtosis	-0,814	Kurtosis	0,020

Test Result for Datasets:
t 1 Range = Sheet1!$C$5:$C$34
t 2 Range = Sheet1!$E$5:$E$34

escriptive Statistics

Variable	Mean	Std Dev.	Std Err	Lower 95% CL	Upper 95% CL	N
l.Frequency	0,373	0,076	0,014	0,344	0,402	29
l.Frequency	0,500	0,091	0,017	0,465	0,535	29

tailed t-Test

Ho. Diff	Mean Diff.	SE Diff.	T	DF	P
0,000	-0,127	0,022	-5,796	56,000	0,000

Test for Equality of Variances

Variable	Variance	F	DF 1	DF 2	P
l.Frequency	0,006	1,442	28	28	0,169
l.Frequency	0,008				

Box. : 6-1

	Sample 1 Q8	Sample 2 Q9	Sample 2 Q10	Sample 2 Q14
1	0	1	0	1
2	1	0	0	1
3	1	1	0	0
4	1	1	1	1
5	0	1	0	1

..Shortened to save space..

25	1	1	0	1
26	1	1	0	1
27	1	1	0	1
28	1	1	0	1
29	1	0	0	1
	76%	76%	41%	86%

Box. : 6-2

7. ANNEXES

ANNEX I - TORS

EU-Philippines
Trade Related Technical Assistance Project 3

TERMS OF REFERENCE
Activity 5.4.b Upgraded NPAL's Chemist and Inspectors Knowledge on development of statistical design on sampling used for Field and Market Monitoring for fruits and vegetable.
DCI-ASIE/2012/023-158
Implementing Agency: Bureau of Plant Industry (BPI)/Department of Agriculture (DA)
Type of Expert: Short-Term Expert
Title of Expert: Short Term Expert on IPPC Standards

General Information

The Trade Related Technical Assistance Project 3 (TRTA 3) is a development cooperation project by and between the Republic of the Philippines (RP) and the Commission of the European Communities (EC). The implementation arrangements in this cooperation, including the role of the Department of Trade and Industry (DTI) as requesting authority and coordinating agency for the project, are prescribed under Financing Agreement DCI-ASIE/2012/023-158.
The overall objective is to contribute to the Philippines' integration into the international and regional trading and investment system, thereby strengthening economic development, inclusive growth and poverty reduction. The specific objective is to enhance the capacity of selected government agencies and private sector organisations to facilitate further integration into the international and regional trading and investment system.

It has six components, as follows:

1. Component 1: Trade Policy Development – to strengthen the capacity of the Government of the Philippines (GoP) to successfully implement the Philippine International Trade Strategy through a series of capacity-building initiatives including developing research and analytical tools; undertaking research (involving academe, government and industry); enhancing research networks and integrating industrial policy research with trade policy research;
2. Component 2: Competition Policy Development – to enhance capacities to effectively implement competition policy through studies on competition in selected sectors, provision of advice on drafting implementing legislation on competition policy, inter-agency coordination for competition procedures, among others;
3. Component 3: National Quality Infrastructure – to support consultations with public and private sector, including consumers, on content of a National Quality Infrastructure strategy and policies;
4. Component 4: SPS Conformity – to enhance capacities to develop and implement sanitary and phytosanitary (SPS) management and control

systems in-line with international standards and of producers to comply with these standards;

5. Component 5: Trade Facilitation – to strengthen capacities to comply with the Revised Kyoto Convention and to upgrade National Single Window and Warehousing operations in the Bureau of Customs;
6. Component 6: Rapid Response Facility – to provide a rapid response to unforeseen technical assistance needs from the public sector and business associations.

The project has an operational implementation period of 45 months – from 3 December 2012 to 3 September 2016 – and an estimated cost of EUR 8,975,000, of which EUR 8,000,000 and EUR 975,000 are to be contributed by EC and RP, respectively. It is to be implemented through "decentralized management" under which DTI will be the contracting and paying authority for certain expenditures including for training, seminars, workshops and operating costs.
For technical assistance, EC remains as the contracting and paying authority and for which ACE has been contracted as Service Provider. The expected period of execution of the EC-ACE service contract is 45 months and shall not in any case go beyond 3 September 2016.

Justification and Objective

Overall objective

The overall objective of the project is to contribute to the Philippines´ integration into the international and regional trading and investment system, thereby strengthening economic development, inclusive of growth and poverty reduction.

Specific objectives

The specific objective for Component 4: SPS Conformity is to enhance capacities to develop and implement sanitary and phytosanitary (SPS) management and control systems in-line with international standards and procedures to comply with these standards.

Justification

Sample survey methodology is used to gather information about a "population" by selecting and measuring a "sample" from that population. The sample is a fraction of the population studied. The population could consist of sampling units, which could be people, animals, plants, foods, etc. In the present activity the samples are fruits and vegetables from different extraction points.
Furthermore, the sample should be chosen on a statistically viable basis, such that each sampling unit has a measurable probability of being selected. Characteristics of the sampled items are measured and used to extrapolate to and represent the population. Standardized procedures are used to collect the information. Because sampling units have varying characteristics, scientific sample designs are used to reduce the risk of a distorted view of the population. The size of the sample depends on the purpose of the study, the variability among the sampling units, the desired precision, and the sample design. The sample designs includes the following type of sampling:

- *Simple random sampling*, which gives all units in the population an equal chance of being selected and randomly selects a subset of these units;
- S*tratified random sampling*, which divides the population into homogeneous subgroups and then takes a simple random sample from each subgroup;

- *Systematic random sampling*, which numbers the units in the population, selects a unit at random, and then systematically samples every n^{th} unit;
- *Cluster random sampling*, which divides the population into clusters, randomly selects a subset of these clusters, and measures all units in the selected clusters; and
- *Multistage sampling*, which combines any of these four sampling methods.

For the purpose of the present activity it is expected the STE will provide the workshop participants with the statistical tools for designing a sampling plan for monitoring fruits and vegetables

Scope of Work

The activity is focused to the BPI / NPAL chemists and official inspectors. The development of the activity will centred in a workshop on the development of statistical design on the collection of fruits and vegetables in the market and field for BPI-NPAL and processed products in market shelves as to improve the current monitoring system.

Workshop

The workshop will be pointed to the professional and official staff of BPI and FDA and their related agencies.
The initial programme is considering 30 total participants a three (3) days long course.
The course content will be in agreement with FAO Sampling for marketing research statistical procedures

Expected results

- Enhanced criteria on the selection of vendors/farm where samples will be collected. This will be provided through final evaluation and case studies though is the main target of the workshop. Other system to achieve the output will be indicated in advance.

Expert Profile

Qualifications and skills

- A degree in statistics or relevant background.
- Experience in market sampling is exclusively required.
- Excellent command of the English language verbally and in writing (knowledge of the Filipino language would be an advantage).
- Proven ability to work and interact with high level officials especially in a multi-disciplinary and multi-cultural setting
- Proficient in Microsoft Office (Word, Excel, PowerPoint) and relevant internet and email software

General and specific

- Demonstrable minimum 10 years' experience in market sampling.
- Experience in the region is an advantage.
- Demonstrable experience in development EU projects or with international donors would be an advantage

Timing, Logistics and other Arrangements

The selected expert shall be engaged for the period and dates indicated on the following Timetable for the activities:

Activities	Tasks and sub activities	**Four months 2015**			Total WD per activity
		1	2	3	
Activity 5.4.b Upgraded NPAL's Chemist and Inspectors Knowledge on development of statistical design on sampling used for Field and Market Monitoring for fruits and vegetable.					
	Briefing		.5		**.5**
	Discussion with beneficiaries/mentoring		5		**5**
	Workshop & preparation		4		**4**
	Debriefing		.5		**.5**
Total WD			**10**		**10**

Should travel outside Metro Manila be required, the cost shall be charged against the budget for Incidental Expenditures of the EC-ACE contract. The per diem or daily subsistence allowance covering food, lodging and local transport shall be in accordance with the approved and published rate in the EC website. **The expert shall bear the cost of travel within Metro Manila to be incurred in the performance of the duties and responsibilities spelled out in this Terms of Reference.**

A briefing meeting shall be convened by DTI on the first day of the engagement to discuss and ensure common understanding of the objective, tasks, expected outputs, and working arrangements set forth in this Terms of Reference. DTI shall notify the EU Delegation, and other concerned parties on the date, time and venue of the briefing meeting.

At the briefing meeting, the detailed schedule of activities and performance of the tasks as indicated in 3 above shall be discussed and preferably agreed upon and shall be prepared and submitted to the Team Leader within 5 workdays after the debriefing.

On or before the last day of the engagement, the STE shall present the substantive findings and recommendations at a debriefing meeting to be convened and notified by DTI. All concerned parties shall have the opportunity to react to the findings and recommendations to be reflected in the expert's Report at that meeting.

In accordance with ACE standard operating procedure, the expert will accomplish and sign a monthly timesheet for approval and signature of KE1/Team Leader and a responsible official of DTI, and to be noted by the TRTA 3 Imprest Administrator, reflecting the actual number of workdays rendered, briefly indicating the place where, and the task for which, these were rendered.

The following documents are attached to this ToR for guidance of the STE :

1. Guidelines for Preparation and Review of TRTA 3 Mission Report
2. Template for TRTA 3 Mission Report
3. Template for Timesheet
4. Guidelines for Funding of Training, Workshop and Seminar Activities
5. Guidelines for Preparation of Design of Training, Workshop and Seminar

ANNEX 2 – (I.E., SEMINAR/TRAINING/WORKSHOP MATERIALS : PPT. PRESENTATION, ETC.)

The Workshop PowerPoint Presentations and Exercises and test results have all been distributed to participants and are all be available from this website:

The Workshop Programme, The Questionnaire (post) with correct answers (red), Handouts (Day1 and Day2)

The Workshop Programme

Workshop

Upgraded NPAL's Chemist and Inspectors Knowledge and development of statistical design on sampling used for Field and Market Monitoring for fruits and vegetable

Sampling methods for food and food products and how to establish a sampling plan for improving quality through standardization and testing, Regression theory applied for the needs of related testing

Dec.01: Subject - Introduction to sampling and (the necessary) basic statistical knowledge

8:00-10:00 1st Morning session:
Opening of course
Introduction by lecturer
Questionnaire Pre (and Post) Course Knowledge (Questions to Upgraded NPAL.docx)
Lectures:

- Deduction and Induction
- Sampling—why and how?
- Descriptive Statistics for Samples
- Discrete Example
- Continuous Example

10:00-10:30 Coffee break

10:30-12:00: 2nd Morning session:
Lectures:

- Centre of a Distribution
- Introduction to and comparison of Mean, Median, and Mode
- Spread of a Distribution

Group work by participants:

- Group Work on what Mean, Mode and Median would signify in the context of sampling of NPAL and other organizations.
- Why and how are these concepts important and apply for the work of NPAL and other organizations

12:00-13:00 Lunch break;

13:00-15:00: 1st Afternoon session:
Lectures:

- Probability

Introduction to Probability
Concept of Probability
Elementary Properties of Probability
Probability Distributions

15:00-15:30 Coffee break;

15:30-17:30 2st Afternoon session: Day's synopsis by lecturer and lecture:
Lectures:

Random sampling
Systematic sampling
Stratified samples
Sample sizes within strata
Quota sampling
Cluster and multistage sampling
Area sampling

Group work by participants:

Calculation of Probabilities Distributions characteristics of samples of NPAL and other organizations. Which sampling method applies to practices of the work of NPAL and other organizations and how and which method could be applied for the work of NPAL and other organizations - (if possible for the 4 different types of sampling points)

Dec.02: Subject - Advanced (and useful) statistical knowledge for sampling

8:30-10:00 1st Morning session:
Lectures:

Sampling and statistical testing
The null hypothesis
Parametric tests and non-parametric tests
Type I errors and type II errors
Standard Error
Example calculations of sample size
Introduction to statistical regression
The least square solution

10:00-10:30 Coffee break

10:30-12:00: 2nd Morning session:
Lectures:

To continue from 1st Morning session

Group work by participants:

Group Work on which statistical testing method applies to practices of the work of NPAL and other organizations and how and which method could or should applied for the work of NPAL and other organizations – Formulate of Test Hypothesis and distinguish between the two possible errors, when to induct from the sample on the population (if possible for the 4 different types of sampling points)

Applying exercises on Regression Theory, if this falls into the area of work of the group participants

12:00-13:00 Lunch break;

13:00-15:00: 1st Afternoon session:
Lectures:

The Normal Distribution
The Central Limit Theorem
The Distribution of expected Mean from a Normal Population
The Distribution of expected Mean from a Non-normal Population
Confidence Intervals and t-Test
Hypothesis Testing
Hypothesis Testing Using Confidence Intervals
More on Regression theory:
Simplifying Assumptions
The Nature of the Error Term
Confidence Intervals
Example of Interval estimates
Dangers of extrapolation
Statistical Risk
Risk of an Invalid Model

15:00-15:30 Coffee break;

15:30-17:30 2st Afternoon session: Lecture: to continue from morning lectures, Day's synopsis by lecturer:

Group work by participants:

Calculation of Probabilities t-tests, confidence intervals, sample size Distributions characteristics of samples of NPAL and other organizations. Which calculation and sampling method applies to practices of the work of NPAL and other organizations and how and which method . Exercises on Regression Analysis for Agriculturalists, Chemists, Analysts prepared but not mandatory (if possible for the 4 different types of sampling points)

Second brief assessment of NPAL and other staff members: What are our needs? What do we want to improve?

Dec.03: Final Group works, exercises an Assessment

8:00-10:00: 1st Morning session:
Lectures:

Course's synopsis by lecturer and lecture:
In case of Omissions further questions and clarifications

Group work by participants:

Group Work:. Which method could and should be applied for the work of NPAL and other organizations- (if possible for the 4 different types of sampling points)
If required continuation of the application exercises on Sapling, Testing and Regression Theory, (if this falls into the area of work of the group participants).

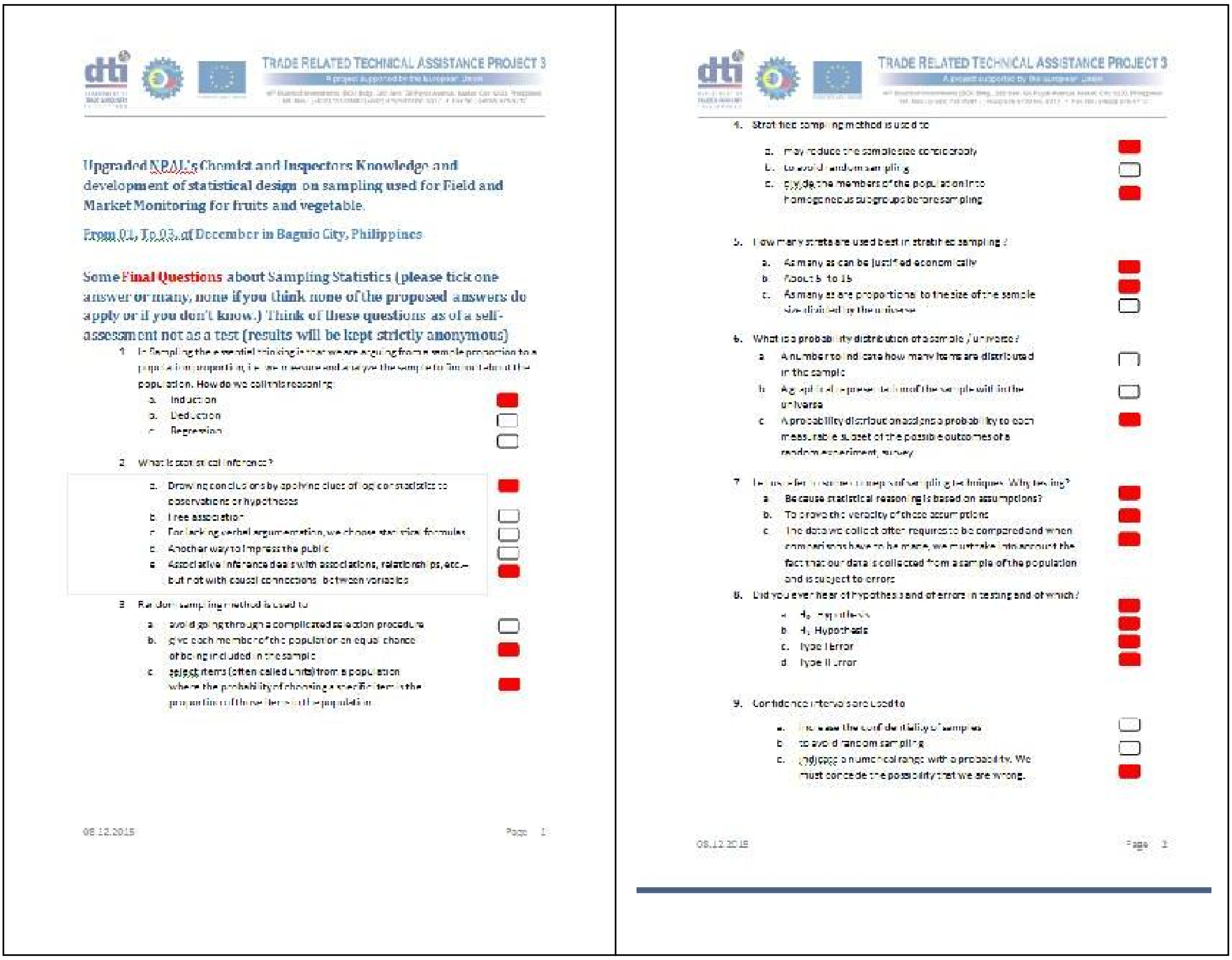
10:00-10:30 Coffee break

10:30-12:30: 2nd Morning session:

- If necessary continuation of previous group works by participants:
- Group Evaluation of Workshop and
- Presentation of Course Results by groups
- Opinion based Evaluation questionnaire by participants and
- Questionnaire (Pre and) Post Course Knowledge (Questions to Upgraded NPAL.docx)

- Closing of course

The Questionnaire:



TRADE RELATED TECHNICAL ASSISTANCE PROJECT 3

A project supported by the European Union

Upgraded NPAL's Chemist and Inspectors Knowledge and development of statistical design on sampling used for Field and Market Monitoring for fruits and vegetable.

From 01, To 03, of December in Baguio City, Philippines

Some Final Questions about Sampling Statistics (please tick one answer or many, none if you think none of the proposed answers do apply or if you don't know.) Think of these questions as of a self-assessment not as a test (results will be kept strictly anonymous)

1. In Sampling the essential thinking is that we are arguing from a sample proportion to a population proportion, i.e. we measure and analyze the sample to find out about the population. How do we call this reasoning:
   a. Induction
   b. Deduction
   c. Regression
2. What is statistical inference?
   a. Drawing conclusions by applying rules of logic on statistics to observations or hypotheses
   b. Free association
   c. For lacking verbal argumentation, we choose statistical formulas
   d. Another way to impress the public
   e. Associative inference deals with associations, relationships, etc. – but not with causal connections between variables
3. Random sampling method is used to
   a. avoid going through a complicated selection procedure
   b. give each member of the population an equal chance of being included in the sample
   c. select items (often called units) from a population where the probability of choosing a specific item is the proportion of those items in the population

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4. Stratified sampling method is used to
   a. may reduce the sample size considerably
   b. to avoid random sampling
   c. divide the members of the population into homogeneous subgroups before sampling
5. How many strata are used best in stratified sampling?
   a. As many as can be justified economically
   b. About 5 to 15
   c. As many as are proportional to the size of the sample size divided by the universe
6. What is a probability distribution of a sample / universe?
   a. A number to indicate how many items are distributed in the sample
   b. A graphical representation of the sample within the universe
   c. A probability distribution assigns a probability to each measurable subset of the possible outcomes of a random experiment, survey
7. Let us refer to some concepts of sampling techniques. Why testing?
   a. Because statistical reasoning is based on assumptions?
   b. To prove the veracity of those assumptions
   c. The data we collect often requires to be compared and when comparisons have to be made, we must take into account the fact that our data is collected from a sample of the population and is subject to errors
8. Did you ever hear of hypothesis and of errors in testing and of which?
   a. H_0 Hypothesis
   b. H_1 Hypothesis
   c. Type I error
   d. Type II error
9. Confidence intervals are used to
   a. increase the confidentiality of samples
   b. to avoid random sampling
   c. indicate a numerical range with a probability. We must concede the possibility that we are wrong.

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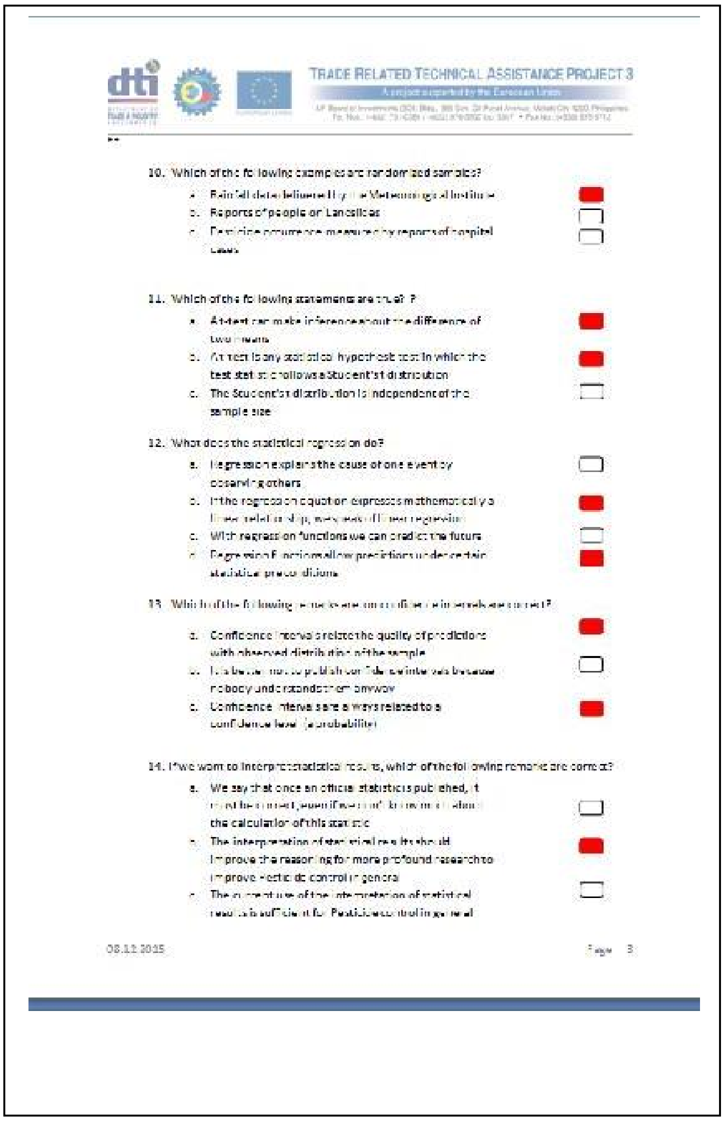

TRADE RELATED TECHNICAL ASSISTANCE PROJECT 3

A project supported by the European Union

10. Which of the following examples are randomized samples?
   a. Rainfall data delivered by the Meteorological Institute
   b. Reports of people on Landslides
   c. Pesticide occurrence measured by reports of hospital cases

11. Which of the following statements are true? ?
   a. A t-test can make inference about the difference of two means
   b. A t-test is any statistical hypothesis test in which the test statistic follows a Student's t distribution
   c. The Student's t distribution is independent of the sample size

12. What does the statistical regression do?
   a. Regression explains the cause of one event by observing others
   b. In the regression equation expresses mathematically a linear relationship, we speak of linear regression
   c. With regression functions we can predict the future
   d. Regression functions allow predictions under certain statistical preconditions

13. Which of the following remarks are on confidence intervals are correct?
   a. Confidence intervals relate the quality of predictions with observed distribution of the sample
   b. It is better not to publish confidence intervals because nobody understands them anyway
   c. Confidence intervals are always related to a confidence level (a probability)

14. If we want to interpret statistical results, which of the following remarks are correct?
   a. We say that once an official statistic is published, it must be correct, even if we don't know much about the calculation of this statistic
   b. The interpretation of statistical results should improve the reasoning for more profound research to improve Pesticide control in general
   c. The current use of the interpretation of statistical results is sufficient for Pesticide control in general

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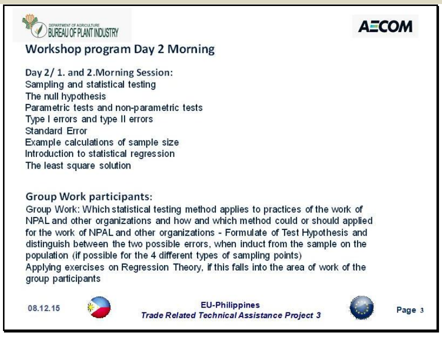
Handouts

Day1		Day2
Slide 1		

Day1	Day2

Slide 2



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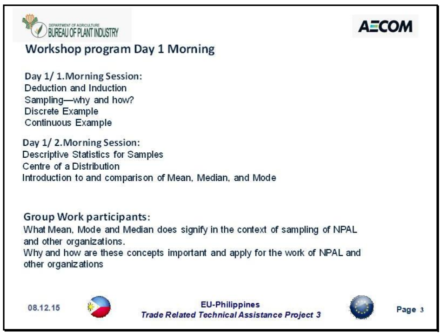

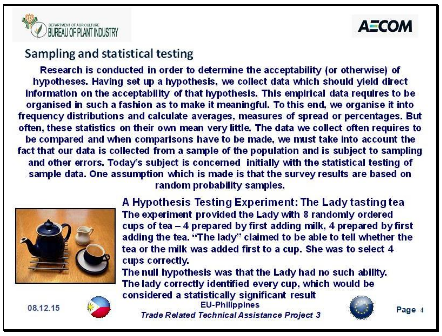

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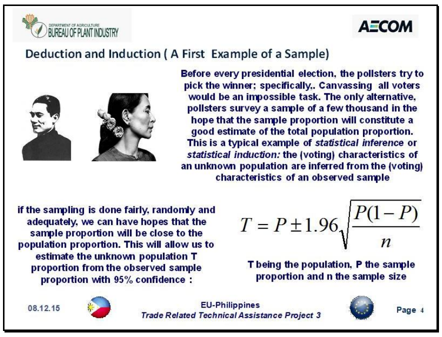

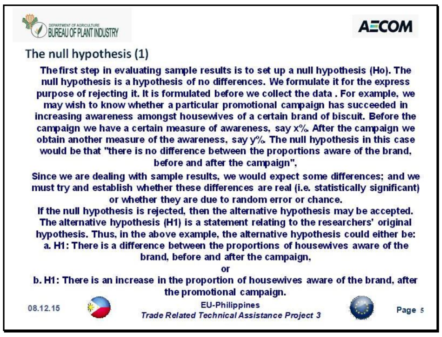

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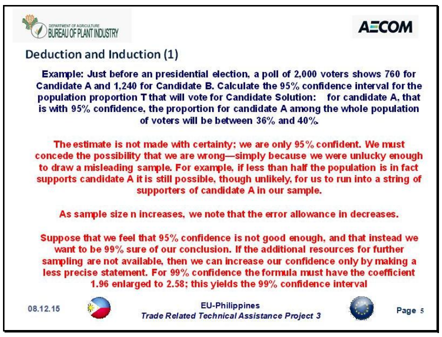

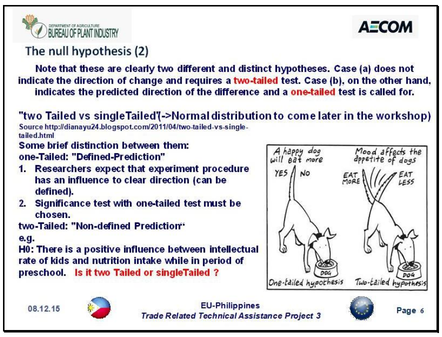

Day1 **Day2**

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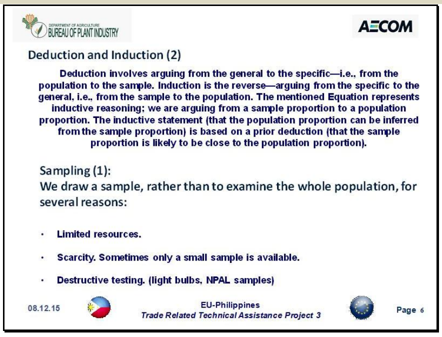

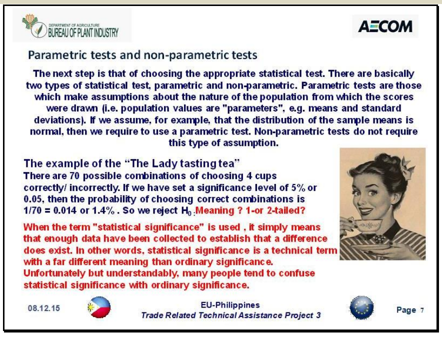

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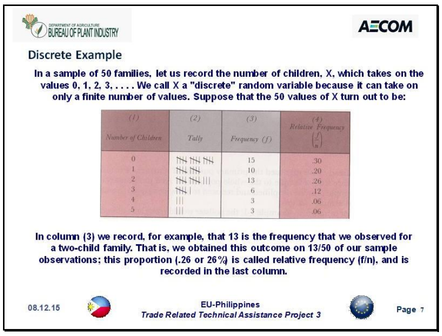

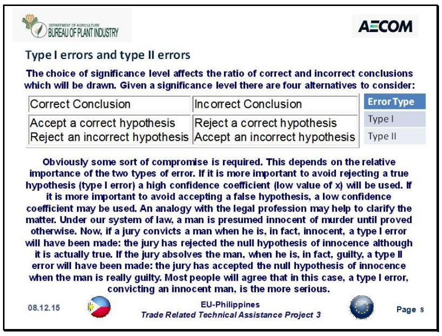

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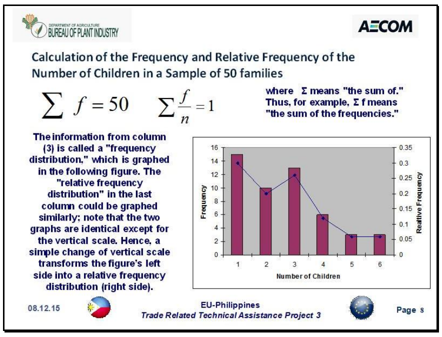

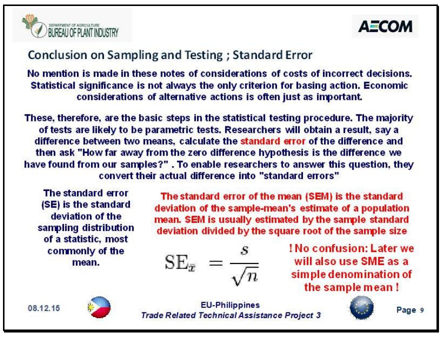

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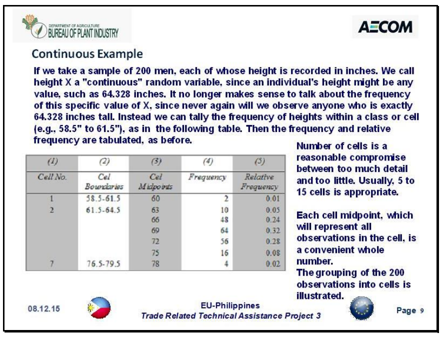

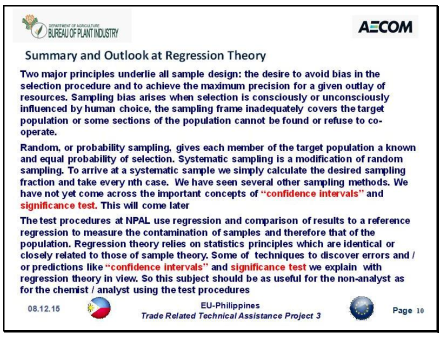

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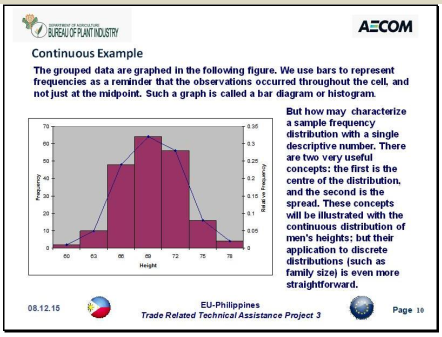

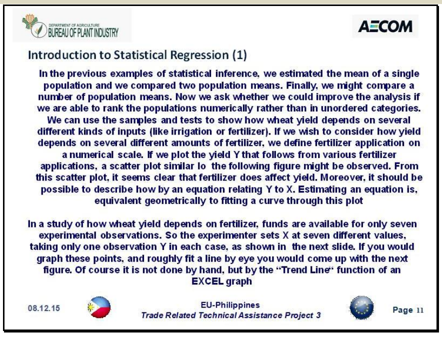

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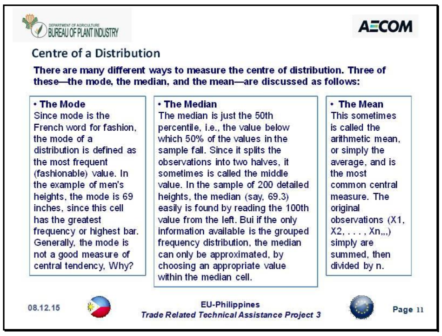

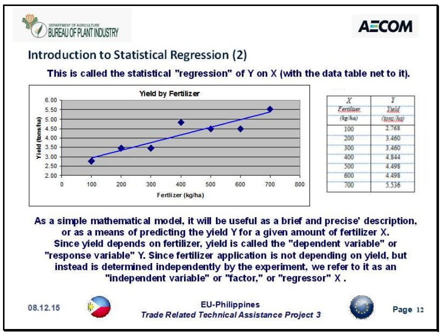

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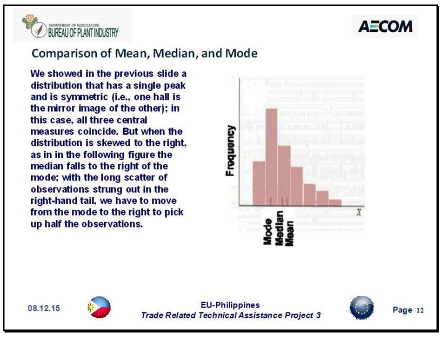

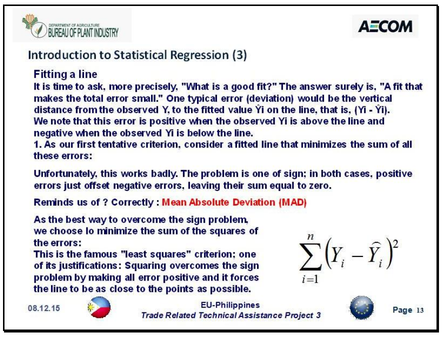

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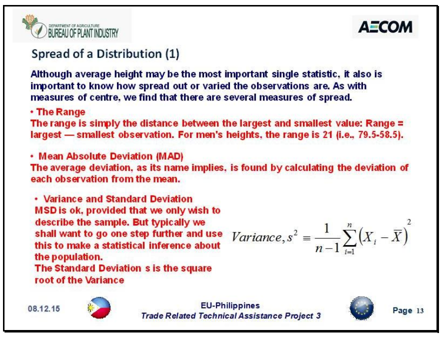

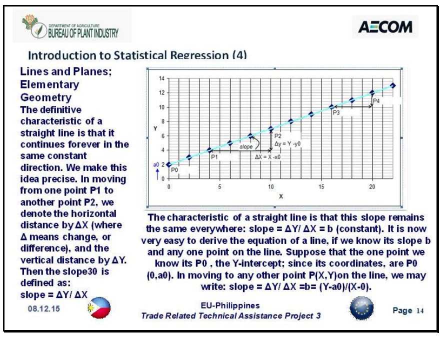

Day1		Day2

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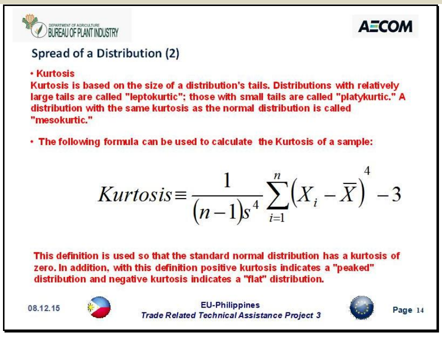

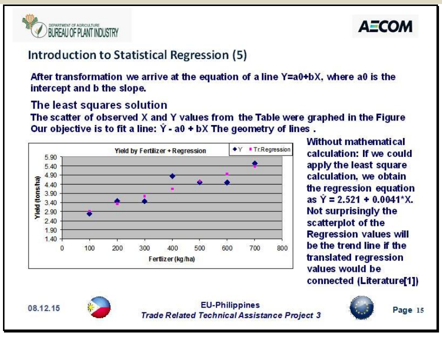

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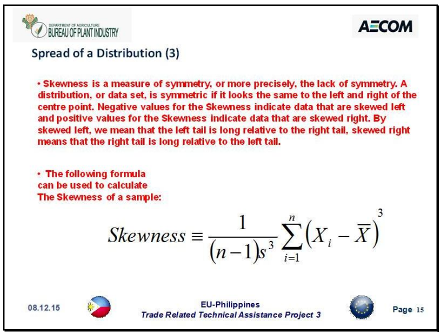

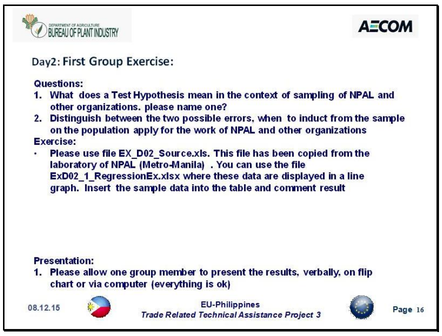

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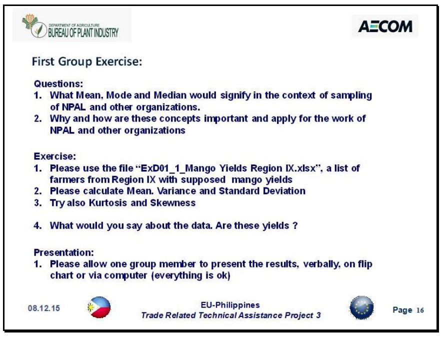

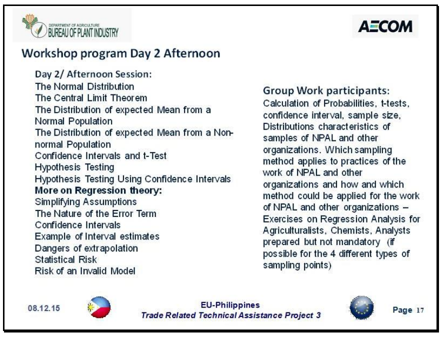

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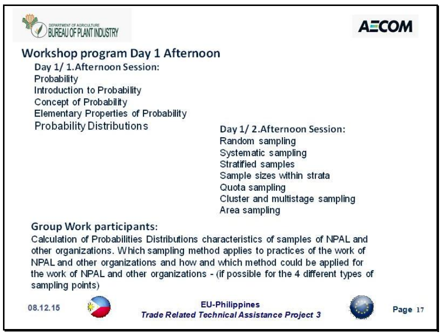

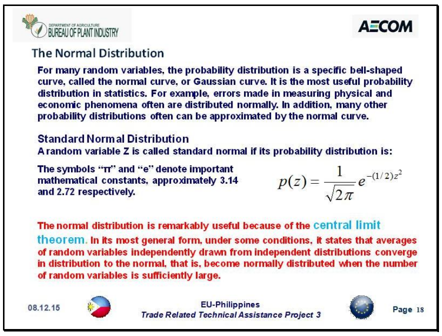

Day1	Day2

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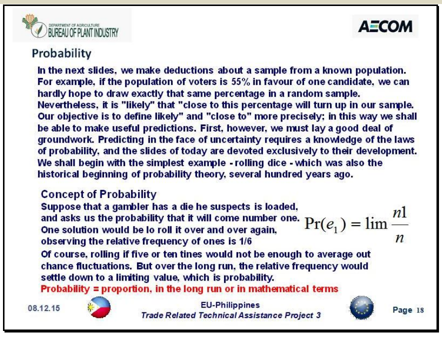

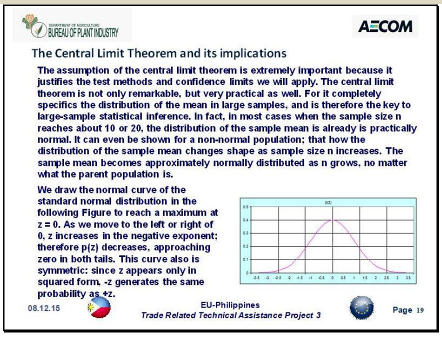

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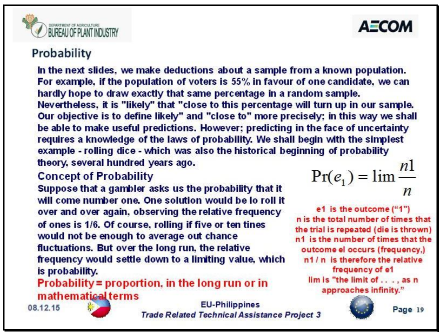

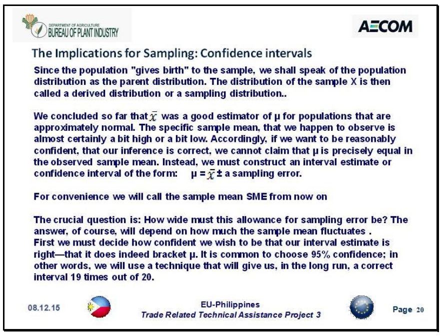

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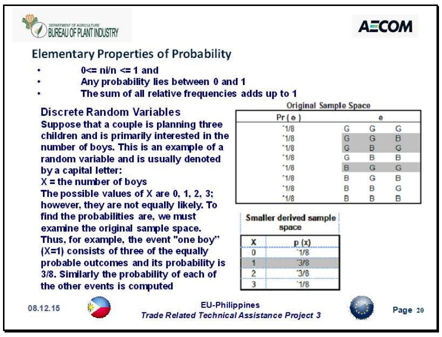

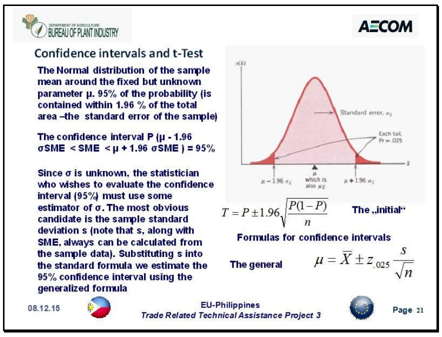

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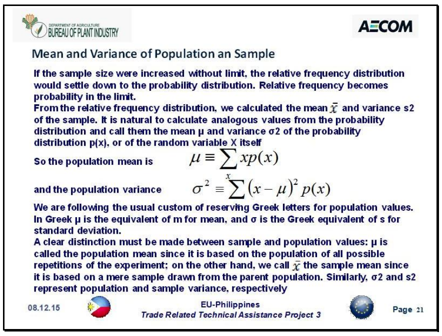

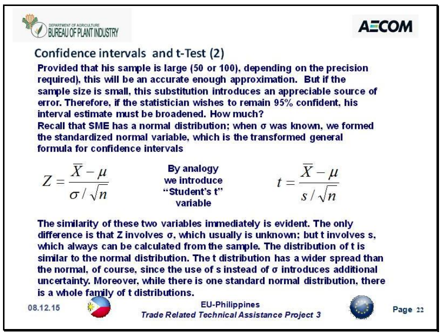

Day1	Day2

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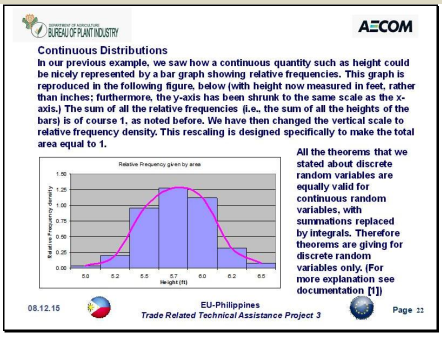

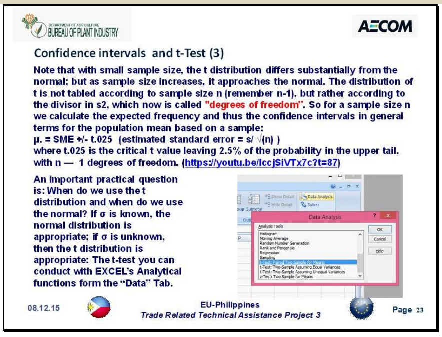

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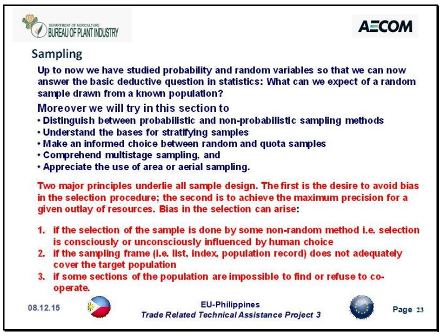

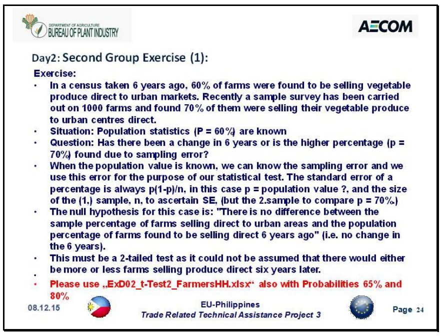

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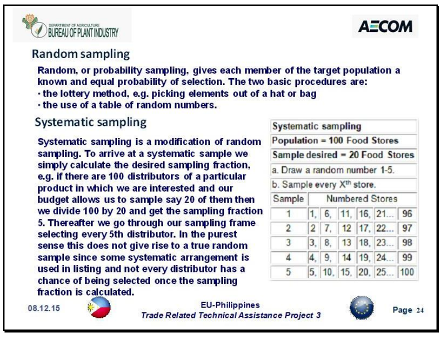

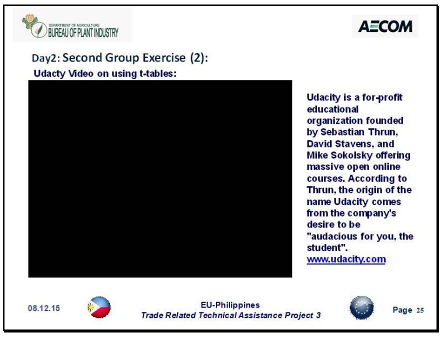

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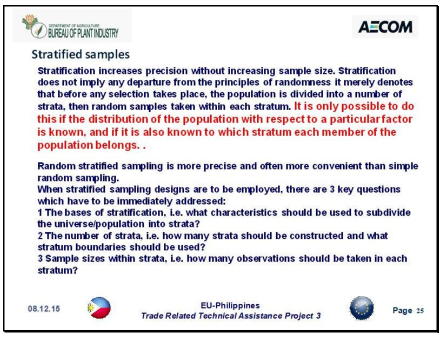

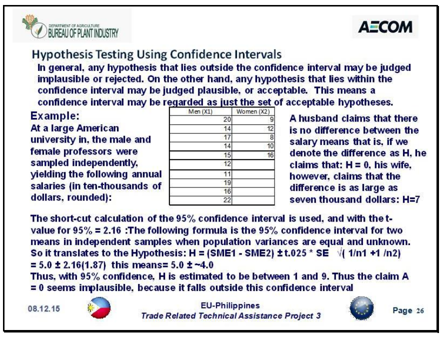

Day1	Day2

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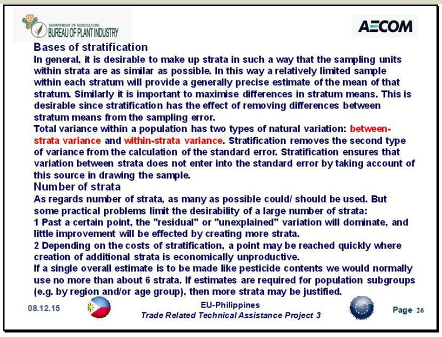

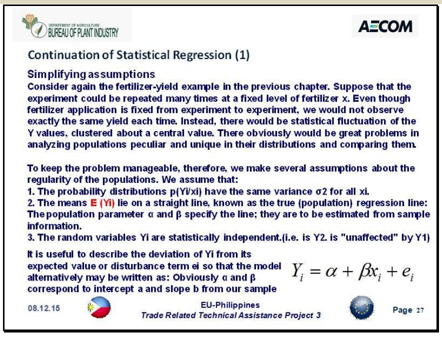

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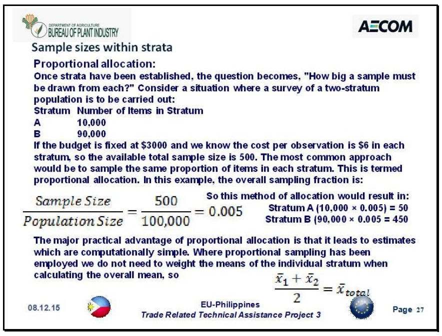

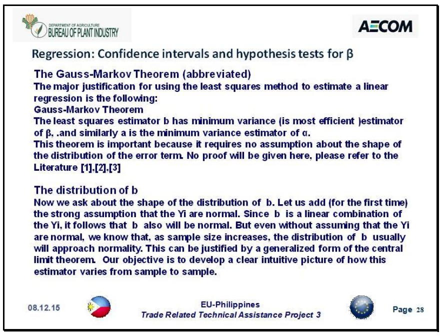

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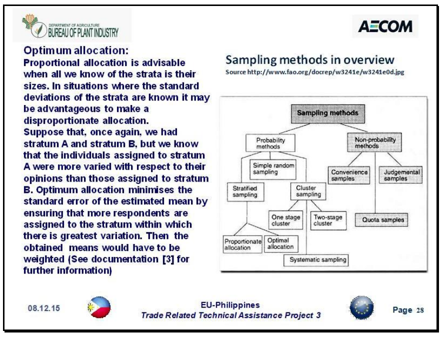

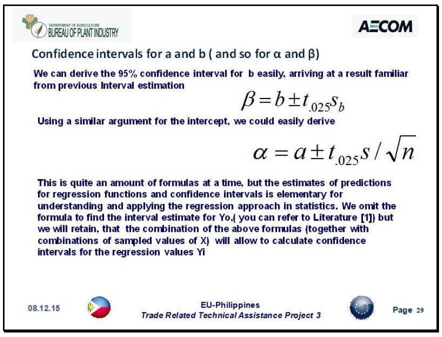

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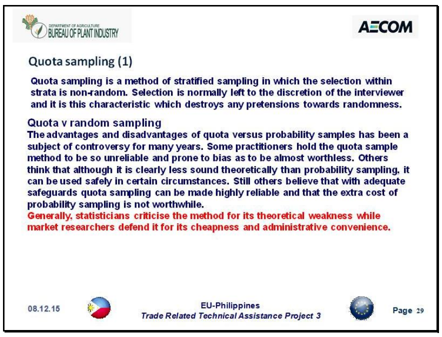
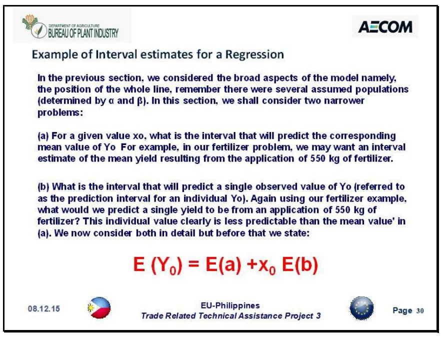
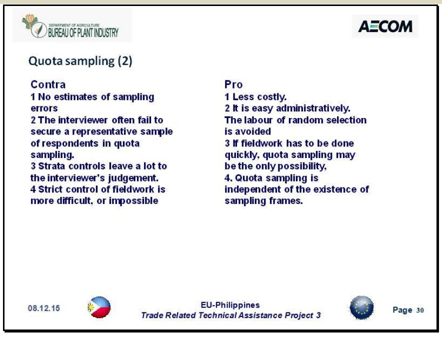
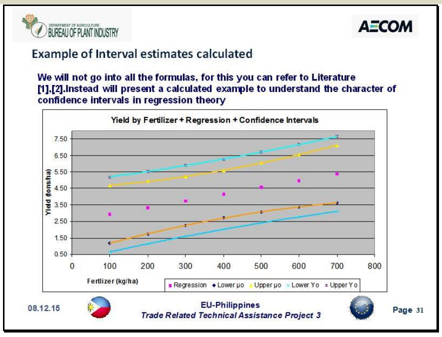




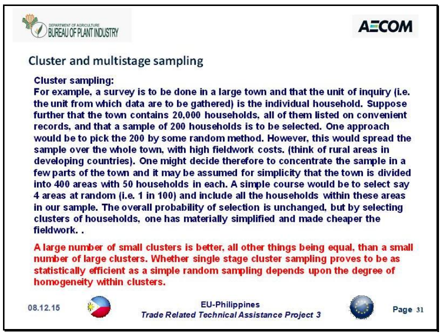
Day1 **Day2**

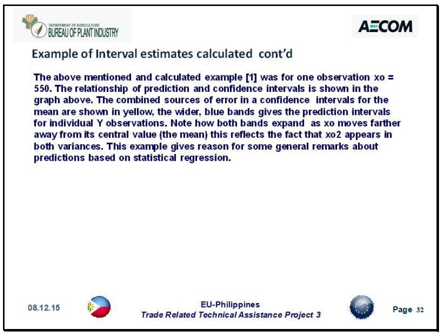
Slide 30



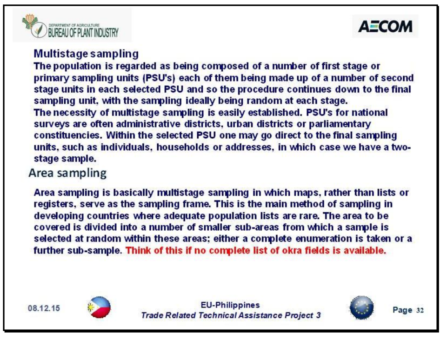


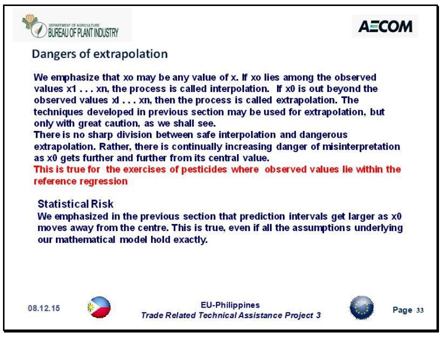
Slide 31



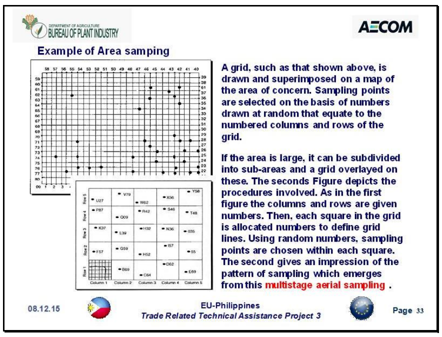


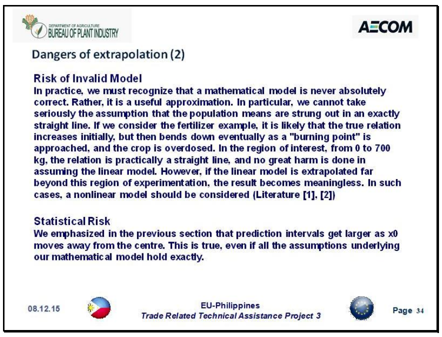
Slide 32





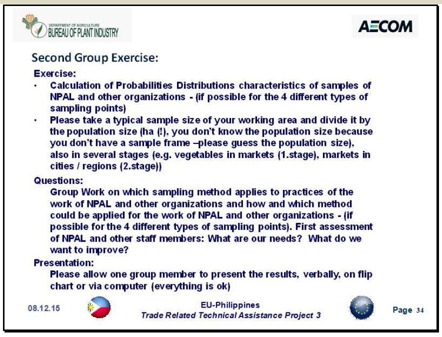
Slide 33

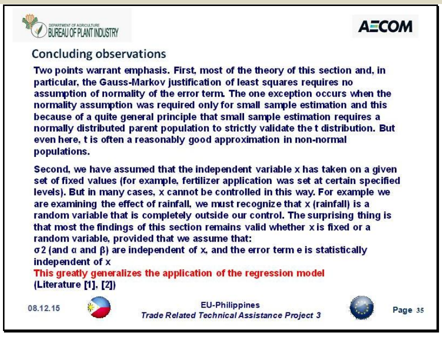




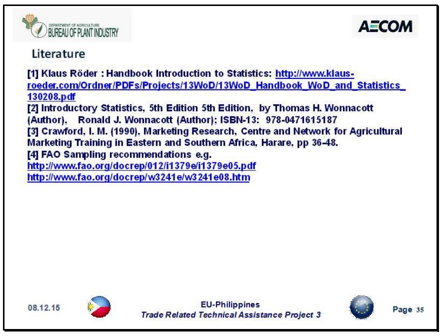
Day1 **Day2**

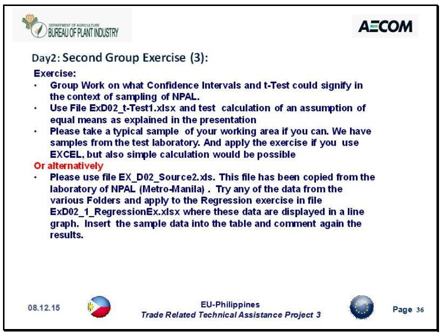
Slide 34



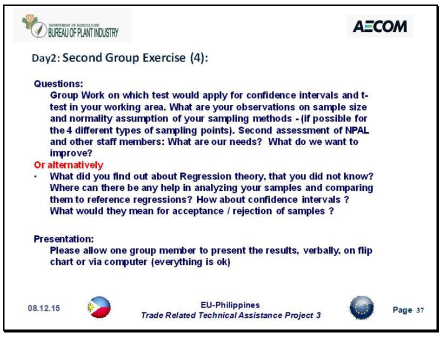


Slide 35





Slide 36



The Workshop PowerPoint Presentations and Exercises and test results will all be available from this website:

http://www.klaus-roeder.com/4_Projekte/projekte.html