Building Regional Climate Capacity in the Caribbean (BRCCC) Program

Face to Face course in Statistics in Applied Climatology (f-SIAC)

f-SIAC Workshop Report

CIMH, Husbands, St. James, Barbados

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The Building Regional Climate Capacity in the Caribbean (BRCCC) Program was established out of a need to:

- Enhance capacity at the Caribbean Institute for Meteorology and Hydrology (CIMH) and across the Caribbean to effectively convert climate data to products and services to better inform decision-making in key climate-sensitive sectors;
- Enhance CIMH climate monitoring and forecasting, feeding into early-warning systems, and improve data acquisition networks across the Caribbean;
- Establish the Caribbean Environmental and Climate Computational Centre to provide CIMH staff and regional scientists with the necessary resources to simulate regional environmental and climate processes to better inform regional decision making in areas of disaster risk reduction, water resources management and adaptation to climate change and increasing climate variability;
- Enhance the infrastructure at CIMH to enable it to sustain its core activities as well as the activities envisioned as an RCC under the Global Framework for Climate Services (GFCS);
- Initiate a "greening" programme at CIMH.

In order to provide effective Climate Services, particularly to sectors like agriculture, meteorological services, needed to enhance their statistical skills, as this is one that is very important to climatological applications. It is to this end that personnel from across the Caribbean region in the field of Meteorology and Agriculture were exposed to a face to face training in Statistics in Applied Climatology (f-SIAC). The two week training was conducted at the CIMH by experts from the Statistical Services Centre, University of Reading, UK; Dr Roger Stern and Mr Alexandre Ribacivil (see Appendix I for participant list).

The start of each day featured presentations by the participants with a recap of the previous day's activities. Some were very creative and presented in the form of poems or comical scenarios. One poem by participant Geeta Persad of the Trinidad and Tobago Meteorological Service is highlighted in Appendix II).

The training modules were conducted using the INSTAT[2] (v 3.37) and GenSTAT[3] (17th Edition) software packages. Of these two statistical packages; GenSTAT is more powerful in performing some climatic analyses, whereas the INSTAT software was meant to be a statistical training tool for learning and applying statistics in climatology (though it is used by many Services operationally because of its ease of application). The learning process was interactive as participants were able to use the software packages to complete exercises involving:

- The Start of the Rains and Dry Spells. Participants were able to define start of the rainy season for their countries as well as observe the length of dry spells (consecutive dry days as

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[2] Interactive Statistics package developed by the Statistical Services Centre
[3] Statistics package developed by the Statistical Services Centre

defined). These topics followed closely with Topics 2 to 7 of the e-SIAC[4] 2014 course, provided by the Statistical Services Centre[5].

Markov chains analysis was also demonstrated for its usefulness with short data records. The Markov chain analysis involved looking at the probability of rain given the conditions of the previous day(s); a method which clearly shows that the probability of rainfall on any given day can be dependent on whether the preceding day(s) was (were) rainy or dry.

- Analysis on the quality of data. Participants learnt that, in performing statistical operations for climatology, they need first to analyse the data for its quality. There may be instances where the data is incorrect and we need to be able to spot such occurrences, else we run the risk of obtaining misleading results. Statistics can support this. Box plot analysis is one useful approach to data analysis.

  The instance of erroneous data was observed as the participants analysed their own country's rainfall and temperature data using the GenStat software, thus reinforcing the importance of first analysing the data.

- Key concepts of statistical modelling were introduced. The materials covered were the same as some topics of the e-learning course, Statistics Made Simple 2015 by the Statistical Services Centre. These included estimation and hypothesis testing.

  Merging these two methods (estimation and hypothesis testing) allows for modelling (i.e. investing parameters e.g. trends). The use of the Analysis of Variance (ANOVA) was also introduced for its usefulness in explaining variability.

Participants also presented the analysis of their data using any method taught during the training and the statistical package of their choice. There was also a discussion on how the course would benefit each Service and their goals going forward Appendix III.

At the end of the training, participants were presented with certificates to show successful completion of the course. They were also given the opportunity to complete the full training of the Statistics Made Simple 2015 course online with the Statistical Services Centre free of cost. Participants were also given online access to the GENSTAT software to continue any statistical analyses they deemed necessary for their countries. During the closing ceremony, there was also a brief discussion on the possibility of collaborating on the publishing of one or two articles in peer-reviewed journals.

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[4] Electronic training in Statistics in Applied Climatology
[5] www.statistics-training.org

Appendix I: Participant List

	Last Name	First Name	Country	Email Contact
1	Ribacivil	Alexandre	University of Reading	a.ribacivil@reaading.ac.uk
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Appendix II

INSTAT Poem

INSTAT is a statistical tool
I hope we'll all master.
Take care in how you prepare
And results you'll gain a bit faster.

First format your data,
Complete importation,
Select options, generate columns
And run simple calculations.

Plot a graph, analyse results,
See how the climate behaves.
Beware of oddities; revisit the data
And please, don't forget to save.

--by Geeta Persad –

Appendix IV: Thoughts and Goals from Participants

Barbados:
- This course would help to improve the experience as a meteorologist as well as the office.

St. Vincent and the Grenadines:
- Knowledge will be used to further develop products currently being produced.
- The participant hopes to introduce the software to others at the office
- The participant should have something of substance from using the software packages to demonstrate within the next 6 months

Antigua and Barbuda:
- Advocates that persons draw knowledge from the data and share it
   o Utilize blogs and other social media platforms to share knowledge.

Grenada:
- Will report what was done over the two weeks to his colleagues as soon as he returns to the office.

Nevis:
- Goal is to computerize the rainfall data as well as increase the collection of such data

Belize:
Participant hopes to:

- Train colleagues
- Continue practicing the software
- Research and publishing