



Final Conference Report

November 5th - 6th, 2012

Prepared By: Mrs. Andrea Applewhaite
Administrative Assistant
CAMI Project

Caribbean Institute for Meteorology and Hydrology
Husbands
St. James
BARBADOS

This document has been produced with the financial assistance of the European Union. The contents of this document are the sole responsibility of The Caribbean Institute for Meteorology and Hydrology and can under no circumstances be regarded as reflecting the position of the European Union.

Contents

I. REPRESENTATION.....	3
II. WELCOME	3
III. DAY ONE - PRESENTATIONS.....	4
CAMI – The Project – Lisa Kirton-Reed, CIMH	4
GFCS and Agriculture - Robert Stefanski, WMO	4
Seasonal Climate Forecasting – Adrian Trotman, CIMH	4
Weather Forecasting – Glenroy Brown, Jamaica Meteorological Service.....	5
Climatological Data Analysis for Agriculture - Dr. Roger Stern, University of Reading, UK.....	5
Caribbean Climate Trends - Shontelle Stoute, CIMH/CAMI.....	5
Crop Water Requirements and Irrigation Management Using Weather Data - Graziano Ghinassi , University of Florence, Italy	6
Assessing Drought Tolerance in Sweet Potato - Dale Rankine, UWI, Mona.....	6
Pest and Diseases Modelling - Dr. Simone Orlandini, University of Florence	6
Guest Speaker - Dr. Michael Taylor, UWI, Mona	7
IV. DAY TWO - PRESENTATIONS.....	8
Crop Simulation Modeling – Gerrit Hoogenboom, Washington State University.....	8
Crop Simulation Models in Climate and Climate Change Analysis - Shontelle Stoute, CAMI.....	8
CAMI Regional Bulletins Adrian Trotman, CIMH.....	9
Agroclimatic Information: Publication and web interfaces - Robert Stefanski, WMO	10
Potential Role of Extension Services in Weather/Climate Information Dissemination - Philip Chung, RADA, Jamaica.....	10
Developing a Communication Strategy for Weather and Climate Information - Oumy Ndiaye, Communications Specialist	12
V. SET UP AND OBJECTIVES OF WORKING GROUPS – ADRIAN TROTMAN, CIMH.....	14
Group 1: Resources Needed for Sustainability of the effort	14
Group 2: Future of Modeling Applications (Including statistics)	14
Group 3: Policy Relative to Data Networks.....	15
Group 4: Sections for Policy Brief and Strengthening Communication (Policy Makers and Farmers) ...	16
VI. NEXT STEPS – ADRIAN TROTMAN, CIMH.....	17

I. REPRESENTATION

Attendees included representatives from the meteorological offices of nine of the ten CAMI member states, (Guyana was the only member state not represented at the meeting). Caribbean Institute for Meteorology and Hydrology (CIMH) (including CAMI Project) staff, were also in attendance, along with representatives from Caribbean Meteorological Organisation (CMO-HQ), Caribbean Agricultural Research and Development Institute (CARDI), World Meteorological Organisation (WMO), Caribbean Farmers Network (CAFAN), other regional and international agricultural organisations and a communications specialist.

(See full list of attendees at Annex 2).

II. WELCOME

The official welcome was given by Mr. Jeffrey Spooner. In his greeting he stressed on the importance of what to expect under climate change and urged participants to be prepared and ready to respond to severe extremes like Hurricane Sandy.

Mr. Glendell DeSouza of the Caribbean Meteorological Organisation also welcomed participants and one of his main points focused on service delivery to stakeholders, in this case farmers and agriculturalists, and using these stakeholders to help advance and refine the project.

The Honourable Robert Pickersgill, Minister of Water, Land, Environment and Climate Change, in his remarks started out by outlining some of the impacts of Hurricane Sandy in Jamaica. He indicated that we as a people often become complacent assuming that if nothing has happened before that nothing will, often to our detriment. He suggested that Sandy shows us we cannot run or hide from the effects of climate change which can compromise food security.

The Honourable Roger Clarke, Minister of Agriculture, gave the feature address advising that Jamaica is located in a high-risk zone for natural disasters, with the agricultural sector being affected by extremes in rainfall and temperature. He also suggested that weather related information is not taken seriously until a disaster occurs and that small scale farmers are the most vulnerable.

III. DAY ONE - PRESENTATIONS

CAMI – The Project – Lisa Kirton-Reed, CIMH

Ms. Kirton-Reed presented the background of the CAMI project and the history of activities over the past three years.

GFCS and Agriculture - Robert Stefanski, WMO

Mr. Stefanski mentioned five priority areas of WMO, one of which is the Global framework for Climate Services (GFCS). He mentioned WMO's eight Technical Commissions, one of which is the Commission for Agriculture Meteorology (CAgM). He talked about the four aspects of food security - availability, access and utilization and stability, and that weather and climate information can contribute to food security, particularly for availability and stability. He indicated that the goal of the GFCS was to enable better management of the risks of climate variability and change and adaptation to climate change at all levels, through development and incorporation of science-based climate information and prediction into planning, policy and practice.

Mr Stefanski further indicated that many countries lack the infrastructural, technical, human and institutional capacities to provide high-quality climate services. However, the framework will build on existing capacities and leverage these through coordination to address these shortcomings. The priority sectors of the framework are agriculture, disaster risk reduction, water and health. He gave an example of climate services based on drought, Famine Early Warning Systems and seasonal climate forecasting (that is supported by Regional Climate Outlook Forums) then mentioned the High level Meeting on National Drought Policies HMNDP to be held in March 2013 in Geneva.

Seasonal Climate Forecasting – Adrian Trotman, CIMH

Mr. Trotman highlighted the work of the Caribbean Climate Outlook Forum, launched in March 2012, in providing seasonal forecasts for rainfall and temperature. This is a collaboration between meteorologists and climatologists from the Caribbean (including English, Spanish and French Caribbean) to produce a consensus forecast. For a decade prior to this, CIMH was the sole provider of these forecasts He also outlined how another series of products under the Caribbean Drought and Precipitation Monitoring Network was utilized along with the seasonal rainfall forecasts during the drought of 2009/2010, that illustrated the usefulness of the forecast.

Weather Forecasting – Glenroy Brown, Jamaica Meteorological Service

Mr. Brown presented the products from the Jamaica Meteorological Service. He specifically elaborated on a regional specific five to seven day forecast for farmers which was initiated through discussions with farmers and Meteorological Service personnel at the 2011 Jamaica CAMI farmers' forums. He went on to say that the information is on the web and can also be accessed by cellular phones.

For the future the development of a farmers' mobile weather alert project was mentioned noting that the intention is for this to be free of cost.

Climatological Data Analysis for Agriculture - Dr. Roger Stern, University of Reading, UK

Dr. Stern started by mentioning the SIAC training programme, borne out of the need for Meteorological Services to add value to their data, rather than just sell them.

He reiterated the need for Services to have high quality data before working on value added products.

Forecasting for agriculture can be on three time scales, short – the weather forecast for example 7 to 10 days, medium seasonal forecast up to three months and long term forecast using historical data and improved using the medium and short term forecasts.

He also indicated that climate change is real and can be seen in clear temperature changes but however, rainfall changes cannot always be found due to its great variability, and smart approaches have to be taken to analyse the rainfall.

He also showed how the analysis of historical data can be used to provide meaningful information to the farming community.

Caribbean Climate Trends - Shontelle Stoute, CIMH/CAMI

Mrs. Stoute presented trend analysis of temperature and rainfall in CAMI states. The analyses showed statistically significant trends in temperature but less so for rainfall. Corroborating Dr. Stern's position on the trends of these two parameters. She indicated that another step is to try to fit polynomial functions to try to improve on the linear regression.

Crop Water Requirements and Irrigation Management Using Weather Data - Graziano Ghinassi , University of Florence, Italy

Dr. Ghinassi highlighted the role of weather parameters in crop water loss (or evapotranspiration). He suggested that there is evidence that users do not know how much water is required by the crop or how much water they apply. If inadequate moisture is present in the soil, this results in water related stress and yield loss. Similarly too much water can be just as bad for the crop.

He highlighted two pieces of software – Aquacrop by FAO to provide irrigation requirements and VE pro LG developed at the University of Pisa - in selecting the appropriate type of drip irrigation.

He emphasised the importance of strengthening the role of Meteorological Services to supply information first making sure of high data quality.

Assessing Drought Tolerance in Sweet Potato - Dale Rankine, UWI, Mona

Mr. Rankine is a PhD student at the University of the West Indies, Mona Campus, Jamaica. He is assessing drought tolerance in sweet potato varieties by comparing the productivity at four locations in Jamaica. His research showed that the variety “ganja” responded well in both drought and abundant water conditions unlike some other varieties that did not do well under drought. He is using Aquacrop to model the canopy development in these varieties as it is seen as an important element in estimating sweet potato yields.

Pest and Diseases Modelling - Dr. Simone Orlandini, University of Florence

Dr. Orlandini highlighted that twenty to forty percent of crop production lost annually is due to weeds, pests and diseases. He indicated the need for both meteorological and biological data in modelling pests and diseases. He further indicated that once a validated model has been developed it can be used as a forecasting tool and to assess the potential impacts of climate change.

Dr. Orlandini presented the process in developing a model for Black Sigatoka under the CAMI project. He reiterated the need for biological data and suggested it was a concern in the Caribbean. He also highlighted the importance of leaf wetness data and hourly meteorological data.

He ended with the output from the CAMI web-based Black Sigatoka model.

Guest Speaker - Dr. Michael Taylor, UWI, Mona

Dr. Taylor was the featured speaker at the CAMI dinner, informing guests that the Caribbean climate science is a science of ‘cow tails’, ‘fishing trips’ and ‘hungry dogs’, illustrating the vulnerability of our region due to a variable climate that threatens our viability particularly in the light of climate change.

IV. DAY TWO - PRESENTATIONS

Mrs. Lisa Kirton-Reed gave a recap of the activities and presentations made during day one.

Crop Simulation Modeling – Gerrit Hoogenboom, Washington State University

Dr. Hoogenboom, described the agricultural system as a complexed interaction between biotic and non-biotic factors, and is therefore not easy to simulate. He also defined a model as a mathematical representation of the real world, the more complexed it is, the closer it gets to the real world. Crop models in particular calculate or predict crop growth and yield as a function of: genetics, weather and soil conditions, and crop management. He further went on to say that crop models can be used to, inter alia, diagnose factors causing yield variations, to prescribe spatially variable management, for irrigation management, for water use projection, for soil fertility management, and to understand plant breeding and genotype interactions with environment, and yield prediction for crop management, and for climate variability and change impacts. He went on to show how crop simulation models like DSSAT (Decision Support System for AgroTechnology Transfer). can be used in assessing impacts of climate variability and change. Dr. Hoogenboom advised the need to hold meeting with stakeholders and farmers. He insisted that questions must be asked to determine their needs, and then go back and see how those needs can be met, using crop models. .

Crop Simulation Models in Climate and Climate Change Analysis - Shontelle Stoute, CAMI

Using the DSSAT crop model, Mrs Stoute showed how under future climates the yields of tomato and maize will most likely decline, and that there would be a greater demand for irrigation water. She also showed how, if driven by climate, the yields of these two crop would have been declining over the past few decades.

During the discussion, Mr. Meade queried whether studies were done on shorter time scales that farmers can use? Mrs. Stoute replied no but advised that it can be done.

Mr. De Souza asked if for agro climate data there was feedback from users.

CAMI Regional Bulletins Adrian Trotman, CIMH

Instead of going down the original intended path of presenting what was done at the regional level in the CAMI Regional Bulletin, Mr. Trotman asked each country representative to say what was being done in their country with respect to disseminating information into the farming community.

St. Lucia assured that though no national bulletin was completed to date, one will be done before the end of each month. It was noted that the challenge of getting information together and time was also a challenge. Some persons may have been trying to put too many things into their National Bulletins. He promised that they will review the structure and proceed to disseminate.

Jamaica – no national bulletin has been produced as yet, but the first one will be provided at farmers' forum on Thursday (two days after the Final Conference). Getting information is also a challenge, but they are working on a number of methods – web portal for getting information mobile weather alert free of cost, extension officers.

Dr. Farrell spoke on the distribution of bulletins. He advised that bulletins from OECS countries be distributed to the OECS secretariat as well so they are aware of what is happening. He advised that if funding is a problem, OECS has funding available, and that he would request funding as necessary as long as he has been notified.

Mr. Trotman noted that the funding agencies are aware of what is available globally, and all should start thinking about a 10 day bulletin.

Dominica's representative advised that so far they have issued six monthly bulletins. Two hundred copies per bulletin were printed based on available funding and placed at strategic locations where farmers can access them – chemical stores, seed stores – all where farmers frequent. There was little feedback from agriculture stations and they are seeking continued funding after CAMI and would like to incorporate GIS into their bulletin. Some discussion then centered on lunar phases. It was indicated that if farmers indicated that this is important to them, that its inclusion be considered for future bulletins.

Grenada advised that their first bulletin is with the printers. It will be ready by month end and will be distributed where farmers sell their produce. The Ministry of Agriculture will take on the task to continue producing the bulletin on a monthly basis. There is also a scroll at the bottom of the television screen during nightly weather bulletins.

Mr. Farnum advised that Barbados is looking towards bulletins which would impact on varying climate zones of the country and queried whether it was possible to have stations feed information in automatically, so as to assist with data gathering.

Ms. Ndiaye advised that in building confidence with farmers you need to be in tune with what they believe. Make sure farmers are included in information gathering

St. Vincent advised that previously they prepared seasonal bulletins and that they have recently started to produce the monthly bulletin under CAMI. She noted that in St. Vincent, moon phases are taken into consideration, and advised that bulletins were distributed but there has been no response from their Ministry of Agriculture or CAFAN.

The CAFAN representative advised that the bulletins were received and offered apologies for the lack of a response, but queried how relevant information collected at the airport was to farmers.

Mr. Trotman asked for suggestions on ways to include other organizations that have the relevant data.

Mr. DeSouza spoke on the Globe program which engages schools. Students make observations and upload them to the website – globe.gov. He suggested that all should seek to find out if schools in their respective countries collect information which can be used.

Mr. Trotter advised that we must start looking at a policy surrounding data since it would make the process much better and faster.

Agroclimatic Information: Publication and web interfaces - Robert Stefanski, WMO

Mr. Stefanski advised that the key is sustainability noting that it is a long term process in getting people into scientific thinking.

Dr. Farrell mentioned the Caribbean Precipitation Outlook and Mr. Fuller asked if the regional bulletin could be used on a local level. Adrian responded that the regional bulletin is not intended to replace the local one, but to provide information for those who may not have a national bulletin and also provide a regional perspective, which a national bulletin will not do..

Mr. Trotter commended Ms. Ndiaye on her presentation but noted that if funding stops with the project, it would be impossible for local institutions to continue with some activities started under the project. Information contained in the bulletin is mainly for farmers but serves others interested in meteorological information e.g. technicians.

Potential Role of Extension Services in Weather/Climate Information Dissemination - Philip Chung, RADA, Jamaica

After giving a brief background of Jamaica's agriculture and climate, particularly noting that there were 1500 farmers in Jamaica and there are many weather and climate related threats, Mr Chung went on to outline the structure and framework of the Ministry of Agriculture (MoA). Noteworthy were the following key aspects of the MoA:

- Island-wide Extension Service (www.rada.gov.jm)

- Strong Information and Communication Technology (ICT) base (ABIS farmer register, notebooks, 3G modems, mobile telephony)
- Training programmes
- Publications/Public Relations Units
- Regional R&D/diagnostics facilities
- Irrigation systems design/installation
- Agriculture Disaster Risk Reduction Management network (NADRRM)

He also indicated they work along with a number of partners/stakeholder groups including, inter alia the national Meteorological Service, the Climate Change Unit, Water Resources Agency, University of the West Indies, a multi stakeholder National ADRRM network, and the Jamaica CAMI tripartite committee.

Mr. Chung also noted a number of meteorology-related needs including weather and climate analyses and interpretation, weather station maintenance, appropriate crop models, policy and institutional frameworks, personnel and funding He indicated that a number of institutions had automatic weather stations including RADA that has 13 of its own.

Mr. Chung also provided some thoughts on the way for. He suggested:

- A formalized collaboration (Agric, Met, Water, Educ., R&D, media, Reg./Int'l orgs)
- Extension Officer and farmer training in Agrometeorology
- Multimedia information dissemination (Radio, Mobile messaging, Print media, DVD, cable channels, internet. **N.B. Schools**)
- Agromet programme within national ADRRM along with Climate Change initiatives
- Agromet Research and Development in
 - Crop/soil/water/pest management
 - Performance/production impact assessment (incl. climate change)
 - Modeling, forecast, early warning
- Policy support

Mr. Chung noted that there are some problems in Jamaica trying to get funding for climate change activities. Mr. Farnum asked if bulletins have information relating to cultivating specific crops at specific times. Information needs to be relevant to varying crop cycles so information given is more beneficial to farmers. Provision should be made so that when funds cease activities can still progress because we become more independent.

Dr. Farrell agreed on the point of sustainability noting that countries need to be sure where they want to go, then CAMI will assist.

The future of modeling applications was discussed and the constraints in the met office were noted. There is a need for someone in the met office to use models but there are not enough resources. There is also a lack of data. It was pointed out that assistance could be sought from students with respect to organizing data and having someone trained in statistics.

Developing a Communication Strategy for Weather and Climate Information - Oumy Ndiaye, Communications Specialist

Ms. Ndiaye reminded participants that initial work in outlining a Communication Strategy for CAMI had begun through a short consultation funded by the Technical Centre for Agriculture and Rural Development. She went on to outline what she saw as some of the main challenges of CAMI:

- Increasing the visibility
- Establishing a viable mechanism ensuring the use of weather information and climate services by farmers
- Attracting sustainable support to consolidate and upscale the results of the 3 years implementation phase

Ms. Ndiaye recognised that there were some real successes from the project. In outlining the successes, she particularly mentioned:

- Publishing a Regional bulletin for farmers
- Supporting National Meteorological Services and Agricultural Extension Services to develop national bulletins
- Establishing a User Interface System : Tri-partite Committee (National Meteorological Services, Extension Services and farmers groups as core) to expand and sustain the activity of the project once it is finished
- Establishing an on-line forum to enhance discussion and feedback, and ensuring they are continuous
- Facilitating regional capacity needs in weather and climate information in Caribbean Agriculture
- Investigating the potential use of other media for dissemination, particularly cellular phones , smartphone Apps (In collaboration with the Technical Centre for Agriculture and Rural Development, CTA)
- Breaking the collaborative and dialogue barriers between meteorologist, agriculture extension and farmers
- Catching the attention of agricultural decision makers in the region through the bulletins, Tripartite Committees and the regional forums ; In some countries, there have been requests for agrometeorological training for agriculture extension services

In recognising that the CAMI project was nearing its end, Ms Ndiaye outlined what she saw was the way forward from here as far as communicating with the farmers were concerned. This includes:

- Collecting feedback on the use of CAMI communications products : bulletins (regional and national) web products, sms alerts
- Strengthening the CAMI web site with tools facilitating interactive use (RSS feeds, Twitter, Facebook, YouTube, posting of blogs, comments)
- Promoting CAMI in Mainstream Media and negotiating the regular broadcasting of relevant information from met services and farmers
- Negotiating the dissemination of relevant information with mobile phone service providers
- Strengthening the Tripartite Committees and engaging all relevant stakeholders: communication specialist (staff of an agriculture /environment project, responsible for communication in a relevant Ministry, journalist specialized in agriculture/environment, etc...) extension specialist, mobile phone service provider staff
- Training in communications for farmers and Met. Services staff to better understand each other's needs and build confidence
- •Learning from successful experiences in the use of ICTs to respond to farmers' needs

Discussion

Various needs were identified from the discussion that ensued, including:-

1. The need for collaboration between met, statistical and agriculture within the respective countries in obtaining climate data and in a format that can be used for modeling.
2. The need for more statistical training.
3. There is need for a communication strategy and an outline for a policy brief to ensure that what was achieved by CAMI remains effective.
4. The need to close the gaps between met agri and farmers and this can be achieved by using the various communication tools available which include the bulletin, telephone hot lines and survey instruments.

Other needs include:

- Documenting food practices
- Partnering with the media to ensure delivery of info (print etc)
- Training for met and continuing of farmers forums
- Utilising secondary and tertiary students.

V. SET UP AND OBJECTIVES OF WORKING GROUPS – ADRIAN TROTMAN, CIMH

The participants were divided into four working groups that would pursue preparing recommendations going forward beyond CAMI to sustain and build upon the activities and successes thus far, and attempt to tackle the necessary areas that CAMI did not address. The groups therefore focussed on:

1. Resources Needed for Sustainability of the effort
2. Future of Modeling Applications (Including statistics)
3. Policy Relative to Data Networks
4. Commencement of a Policy Brief (identifying the relevant sections) and Strengthening Communication

Group 1: Resources Needed for Sustainability of the effort

1. Put in practice the national focal points within the met services. These focal points will liaise with CIMH.
2. Ensure that there is an agro-met liaison officer within the Ministry of Agriculture.
3. CIMH will provide the National Met Services with a template for collating agro-met data.
4. There needs to be greater collaboration between agricultural ministries and met divisions.
5. Policy needs to support this collaboration and this policy needs to be consistent.
6. We must demonstrate to the Ministries of Finance, the economic value of ensuring that agro-met systems are in place, to help promote resources for agro-met.
7. There must be public education of farmers and community groups to ensure that they are sensitized to the importance of agro-met information.
8. There must be greater inclusion of agriculture in regional meteorological meetings and the same for met in regional agriculture meeting e.g.
 - Caribbean week of agriculture
 - CDEMA's comprehensive disaster management meeting
9. Inclusion of agro-met in agricultural education curriculum.
10. Tap into climate change adaptation funds for human needs.
11. Use CCCCC as a liaison point for sourcing funds.
12. Proper land use management to ensure effective use of agro-met data.
13. Promote strong community groups who understand the importance of agro-met information.
14. Monitoring and evaluation system to ensure the expected impact is created.

Group 2: Future of Modeling Applications (Including statistics)

1. Identify a crop that is important to modeling (done earlier in the project).
2. Pest and disease modeling was good.
3. DSSAT useful when done on short-scale use of long term projections.
4. Need for dedicated staff, working under constraints.
5. Modeling plays key part.
6. Need to sensitize governments and management to the use of data capturing.

7. Strengthen the Human Resources sector.
8. Policy decisions impact climate change, productivity and capacity in terms of training.
9. Use of a wider variety of crops for modeling; different countries have different crops.
10. Lack of biological data; a lot more can be done.
11. Many questions of farmers can be answered from data available; use of FAO data; a range of questions cannot be answered by models.
12. Farmers' concerns are seasonal.
13. DSSAT requires dedication.
14. Problems of farmers is variability; period of drought;
15. Models very useful in supplying answers to drought issues,
16. Be aware of the difference between yield forecasting and climate change forecasting; yield forecasting requires a huge infrastructure; climate change forecasting is easier
17. More input from GIS based solutions at the national and regional level.

The followings points were also mentioned / discussed:-

We are busy

Model use is a challenge.

Training especially in statistics is required.

Concern about human resources.

Questions about weather and crop data.

Need for assistance in the climate section.

Closer collaboration between Agriculture, Meteorology and the Statistical Office

Use of SMS for timely receipt of daily weather data.

Establish contact with university personnel (both at the student and mentor level)

Climate section needs good data.

Group 3: Policy Relative to Data Networks

Caribbean Agromet Data Sharing Policy

Vision:

Establishing a data network for sharing agromet and crop data within the region

Mission:

To address the impact of climate variability and change on food security

Goal:

To provide a framework that will maximize the agromet and crop data contribution to regional sustainable economic development.

Objectives:

- a) To establish a concise system to ensure data is provided to a Caribbean data clearinghouse (CIMH).
- b) To ensure proper data management and quality control.
- c) To ensure that the data is maintained by standardized procedures.
- d) To ensure that the data products are regionally disseminated.
- e) To establish protocols for data information management sharing such as data dissemination.

Guiding Principles

- a) Applies to everyone – Public and private

- b) Agromet Data is for the public good therefore member states should have ultimate ownership

Agromet data – crop data – access to crop data

Sharing of data remains an issue even with MOU. One-sided data sharing – Met Services share

Bring all stakeholders together into national workshop / meeting

Countries need to make a policy statement

Information sharing is key.

Caribbean water information system (WISE) – supporting document

One database (repository) per country – Met & Crop

Including raster and spatial data

Met services could maintain weather / climate data

Public Access is available to all networks.

National policy needs to be in place to ensure that the regional policy is carried through

How do we standardize the data across the region

There should be national policy – regional policy

Group 4: Sections for Policy Brief and Strengthening Communication (Policy Makers and Farmers)

Communication Strategies

- How do we ensure that the communication strategies in CAMI are efficient and effective?
- Basic needs assessment of the farmers to ascertain what is available and what is required by the farmers (already done and on CAMI website).
- Close the gaps between farmers, meteorologists and extension officers.

Problems

- Feedback on the bulletins needs to be obtained from the country that has done the bulletin at both national and regional level (this should be done in the form of surveys).
- Bulletins, websites and telephones are some of the tools which have been used in the project and must be continued.

Needs

- Document the good practices (best management practices) through documentary etc. (these should be obtained from the region)
- Partner with media to bring across transfer the information through opportunities that come in the meeting (e.g. CWA, farmers forums and other national events)
- Training for met, media and continue farmers forum at critical times
- Utilize secondary and tertiary schools to disseminate agro-meteorological information (e.g. as done in Antigua and Barbados)

Policy Brief – needs to be targeted (Policy Makers and Farmers)

The following must be outlined:

- Objectives (link to food security/sovereignty)

- Advantages/benefits of agro-meteorology (why is this necessary and how will this bring positive economic, social and environmental benefits)
- Priority actions
- Agenda for the policy makers to be involved and to effect change (time line)

Challenges of met service to play their new role:

- No human resources (limited)
- Insufficient equipment/material
- Insufficient specialization
- Funding is not available (usually) to finance some of the key aspects

VI. NEXT STEPS – ADRIAN TROTMAN, CIMH

The development of the Policy Brief was virtually seen as the pillar to all the other recommendations, since it is believed that the resources (human and financial) needed hinged upon the national policy makers supporting the efforts. Further discussion that ensued suggested the priorities of the brief should be to:

- Outline objectives – can be linked to food security and food sovereignty
- Advantages of agro-meteorology – why is it necessary and how does it benefit the region
- Priority actions – things to be done in order to move forward effectively
- Have set agenda for policy makers
- Outline challenges impeding progress e.g. human resources

Mr. Trotman promised that these items will be fleshed out during the Final CAMI Steering meeting scheduled for the following day. In closing he also thanked all the participants for their input during the two days, and he indicated that even though CAMI the project had ended, the real work was only just beginning. He then turned the meeting over to Mr. Glenroy Brown representing the host agency, Jamaica Meteorological Services.

Mr. Glenroy Brown thanked all those participating in the conference noting that it was a pleasure hosting the conference. He specifically thanked the Project Manager - Mr. Adrian Trotman, the lecturers, and the other partners WMO, CARDI.