

CLIMATE SCIENCE TRAINING FOR SECTORS



SESSION 7 Climate and ocean information sector applications



Climate in Vanuatu

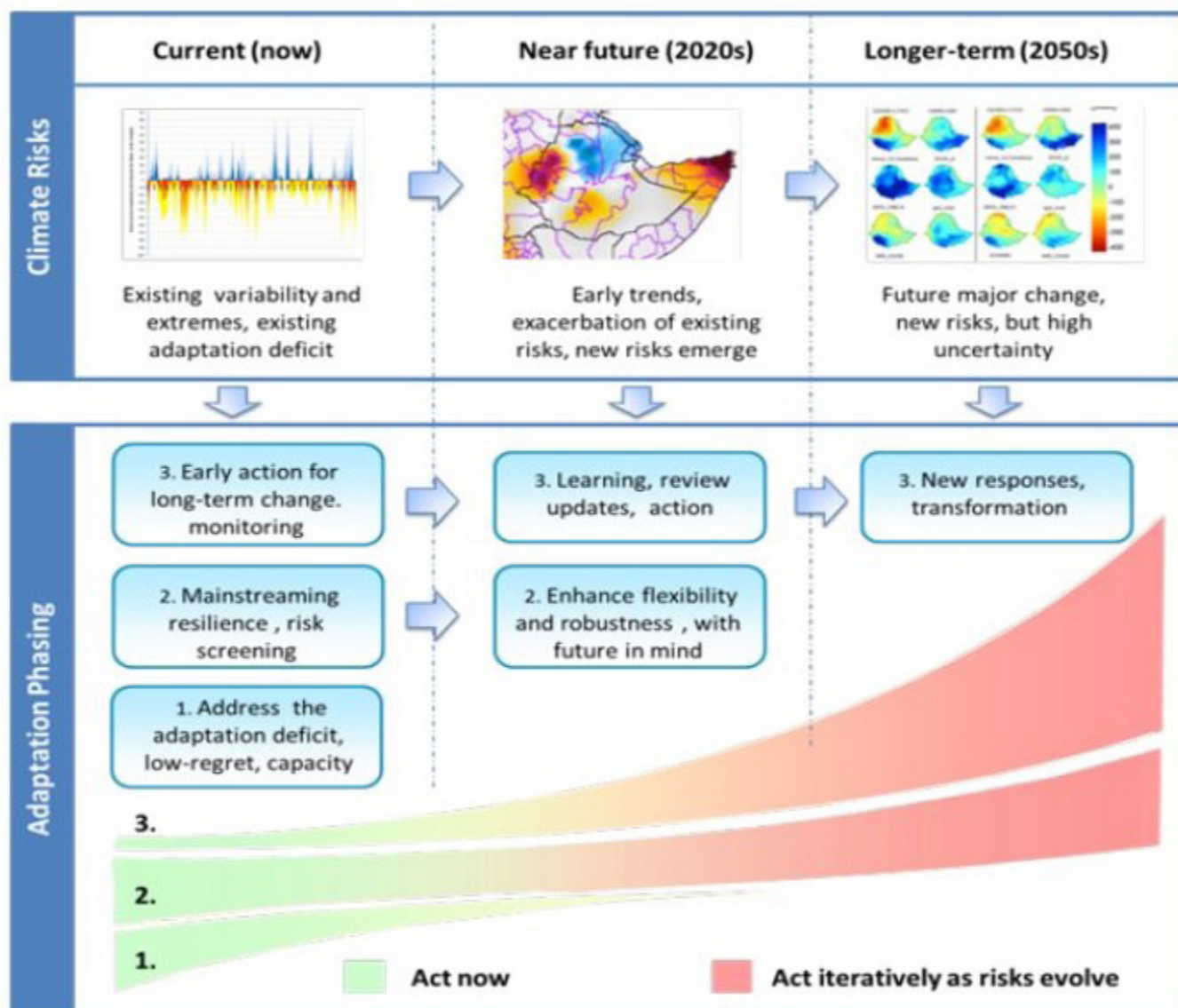
TOPICS

- Why climate and ocean information can be useful for sectors
- Decision making processes in sectors
- Group exercises – using climate and ocean information in decision making processes
- Questions
- Workshop Evaluation

Why climate and ocean information can be useful for sectors

- Enables foresight and informed planning
- Uncertainties in weather/climate patterns affect production, operations, policies, prices etc.
- Applying climate information in sectors will enable agencies to exploit opportunities in good seasons and manage the risks in the poor seasons.

Where climate information can be used in sectors?



ENSO updates, climate summaries, climate outlooks and EAR Watches can be useful sources of information for planning.

Go through each point on the slide

How climate information can be used in short-term and long-term planning

This diagram illustrates an example of how and where climate information can be used in adapting to climate change – this approach can be used in any sector

The timescales are:

Current

'what's happening now, and what action can be taken now'. Historical and current observed climate data can be useful.

Near future

Near future means in next 3 months, 6 months or 1 year - this is where seasonal outlooks and ENSO updates can be useful. Here, the risks are been monitored closely and appropriate actions are taken to minimise them as they evolve

Long-term

Longer-term refers to climate change projections

(Source: *Mainstreaming climate information into sector development plans: the case of Rwanda's tea and coffee sectors Second edition, December 2015*)

Mainstreaming climate and ocean information in sectors

Mainstreaming is the integration of adaptation into existing policies and decision-making, rather than through the implementation of standalone adaptation policies, plans or measures.

As you have seen throughout this training workshop, there are many climate and ocean products and information that can be useful to enable better planning, budgeting and resource management in different sectors. To get the most benefit out of the information, it is critical to mainstream climate and ocean information into decision-making processes (such as

planning and implementation stages) in your sector.

A critical component of the mainstreaming process is to find relevant entry points, in other words, to find opportunities in national, sector or local planning processes where the information can be used.

This table outlines examples of entry points that can be considered in your relevant sector. Some of these you may wish to consider during group exercises.

PLANNING LEVEL	ENTRY POINT
National government and cross ministries	National development vision (long-term) National development plan National budget allocation
Sector ministries	Sector development plans Sector budgets
Provincial authorities	Provisional plans Provisional budgets
Projects	Designing phase Implementation phase Environmental safeguards Climate safeguards

Decision making processes in sectors

Sector Operations - Agriculture

The table is from the AGRICULTURAL AND CLIMATE INFORMATION SERVICES (CIS): POLICY REVIEW, ACTION AND COMMUNICATION PLAN that was developed in early 2019 for Vanuatu by VanKIRAP.

It outlines the operations and decision-making processes in the agricultural sector where climate information can be applied for risk management. Applying climate information will enable agricultural agencies to exploit opportunities in good seasons and manage the risks in the poor seasons.

These climate products (marked in red) and information were covered in this training and are currently available from VMGD

SECTOR OPERATION OR DECISION MAKING PROCESS	INFORMATION/PRODUCT/TOOL	RESPONSIBLE PERSON
Soil erosion control	Early warning of heavy rainfall; seasonal forecast	Soil agronomist/DARD extension officer
Crop production slumps	Daily data feed for model run (e.g. DSSAT MODEL)	Researcher/ DARD extension officer
Extreme weather and agricultural impacts	Seasonal forecast and time series data	DARD extension officer
Drought; dry conditions; crop withering management	Early warning of dry periods and drought; seasonal forecasts; time series data, Riskscape	DARD extension officer
Livestock species	ENSO Update	Animal Health personal /Animal production
Egg production		
Growth rate		
Drop (Poultry)		
Changes of feed availability and prices		
Mating seasons		
Spreading of disease		
Drop in milk production		
Decrease in carcass weight		

Sector Operations - Water

The table is from the WATER AND CLIMATE INFORMATION SERVICES (CIS): POLICY REVIEW, ACTION AND COMMUNICATION PLAN that was developed in early 2019 for Vanuatu by VanKIRAP.

It outlines the operations and decision-making processes in water sector where climate information can be applied for risk management. Applying climate information will enable water agencies to exploit opportunities in good seasons and manage the risks in the poor seasons.

These climate products (marked in red) and information were covered in this training and are currently available from VMGD

CATEGORY	SECTOR OPERATION OR DECISION-MAKING PROCESS	INFORMATION/PRODUCT/TOOL	RESPONSIBLE PERSON
Peri-urban	Security (yield) and safety (bacteria safe standard), VDWQS, advisory notice, Water Demand Management Program (WDMP)	EAR watch, Vanuatu Climate Update (Monthly), Drought Monitoring tool, SCOPIIC, RiskScape	Technical Unit Manager, Operational Staff
Hydrology / Hydrogeology	Early warning systems, El Niño & La Niña events (flooding), water catchment management, water quality monitoring, hydro data collection	All the above including, CLEWS, PICASO, COSPPac	Hydrology team (M&E)
Rural Water Supply	Household, and community drinking water availability; droughts and conservation; advisory notice; water quality	All the above including, Monthly rainfall outlook	Technical Unit Manager, Operational Staff
Project Implementation	Construction designs (Cyclone proof) for RWCs + water supply systems (formal)	ENSO outlook	Technical Unit + Project Management Unit
	Project on ground implementation (construction of water infrastructure)	EAR, Vanuatu Climate Update, SCOPIIC	

Sector Operations - Tourism

The table is from the TOURISM AND CLIMATE INFORMATION SERVICES (CIS): POLICY REVIEW, ACTION AND COMMUNICATION PLAN that was developed in early 2019 for Vanuatu by VanKIRAP.

It outlines the operations and decision-making processes in tourism sector where climate and ocean information can be applied for risk management. Applying climate and ocean information will enable tourism agencies/operators to exploit opportunities in good conditions and manage the risks in the poor conditions.

These climate and ocean products (marked in red) and information were covered in this training and are currently available from VMGD

SECTOR OPERATION OR DECISION-MAKING PROCESS	INFORMATION/PRODUCT/TOOL	RESPONSIBLE PARTIES
Standard Accommodation	Cyclone forecast, rainfall bulletin, evacuation route, safe shelter	Sector Coordinator/ Principal Outer Island Officer
Scuba Diving/Snorkelling Business	Temperature, tide calendar, wind pressure, marine forecast, current	
Waterfall Tour Business	Rainfall forecast, drought,	
Hiking Business	Rainfall forecast/bulletin, cyclone, temperature	
Game Fishing Business	Marine forecast, cyclone bulletin, sea surface temperature, current	
Bush Trekking Tour	Weather forecast, cyclone bulletin,	
Kayaking Business	Weather forecast, tide calendar, wind pressure, current	
Water Skiing Business	Ocean outlook, Cyclone, current	
Yacht/Cruising Business	Cyclone Forecast, Wind bulletin, current	
Surfing Business	Cyclone Forecast, Wind bulletin, tide Calendar, current	
Canoe Race	Cyclone Forecast, Wind bulletin, tide Calendar, current	
Conservation areas for tour attraction	Rainfall Bulletin, Cyclone forecast,	
Horse riding	Weather forecast	
River Tour Business	Weather forecast, Rainfall bulletin	
Cycling Tour	Weather forecast, Cyclone forecast	
Caving/Spelunking/Canyon Climbing	Weather forecast, cyclone forecast, marine forecast, tidal information	
Cultural Activities	Weather forecast	

Sector Operations - Fisheries

The table is from the FISHERIES AND CLIMATE INFORMATION SERVICES (CIS): POLICY REVIEW, ACTION AND COMMUNICATION PLAN that was developed in early 2019 for Vanuatu by VanKIRAP.

It outlines the operations and decision-making processes in fisheries sector where ocean information can be applied for risk management. Applying climate information will enable fisheries agencies/operators to exploit opportunities in favourable conditions and manage the risks in the unfavourable conditions

Most of these ocean products and information were covered in this training and can be made available from VMGD.

SECTOR OPERATION OR DECISION-MAKING PROCESS	INFORMATION/PRODUCT/TOOL	RESPONSIBLE PARTIES
Teach them to save and process fish (solar freezers). Fiberglass Solar Freezers can last for weeks without sunlight	Monthly climate forecasts of rainfall. Sunshine hours	Development and Capture Division & Seafood Division
Near shore FADS and ocean productivity	SST, Chlorophyll, wave height, wind direction, sub-surface temperature, currents	Development and Capture Division & Management Division
Pelagic Fisheries/Deep water	SST, Sub-surface temperature, currents	
Ecosystem monitoring (seagrass, mangroves, coral reefs)	Coral bleaching information, sub-surface temperature, SST, rainfall, sea level, atmospheric temperature, currents, subsurface currents	Research and Aquaculture Division and Development and capture Division
Crown of Thorns spawning and outbreak	SST, Currents	Research and Aquaculture Division
Aquaculture (including Mariculture)	SST, Rainfall data (weekly), ENSO information, coastal inundation, atmospheric temperature, water temperature at major rivers, tides, currents, sub-surface temperature	Research and Aquaculture Division
Subsistence fishing and artisanal fishing	Currents, sub-surface temperature, wave height, wave direction, tides, ENSO information	Development and Capture Division
Ciguatera (fish poisoning)	SST, TC info, precipitation, subsurface temperature	Research and Aquaculture Division and Seafood Division
General awareness	All ocean variables, ENSO, rainfall and temperature in simple language	Management and Policy Branch

Sector Operations - Infrastructure

The table is from the INFRASTRUCTURE AND CLIMATE INFORMATION SERVICES (CIS): POLICY REVIEW, ACTION AND COMMUNICATION PLAN that was developed in early 2019 for Vanuatu by VanKIRAP.

It outlines the VMGD information required for different phases for a project to develop a Decision Support Tool.

It required only one of the products (marked in red) that was covered during this training for this project, nonetheless other information can be made available from VMGD.

Applying climate information can enable relevant authorities to exploit opportunities in good seasons and manage the risks in the poor seasons. This is something that can be explored during the group exercises.

SECTOR OPERATION OR DECISION-MAKING PROCESS	INFORMATION/ PRODUCT/TOOL	RESPONSIBLE PARTIES	COMMENT
Inception Phase (IP)	Decision Support System	Engineers and Decision Makers	This phase is where all the climate data is utilised to support the design
Design Phase (DP)	Design Software tools such as AutoCAD	Engineers / draftsman / architects	The design is made according to outcome of DSS
Implementation Phase (ImP)	Weather (one week or two-week forecast)	Contractor / Divisions / Engineers / Supervisors	To assist contractor in planning construction works
All three phases (IP/DP/ImP)	Three months rainfall information	VMGD/PWD Engineers/ Contractors/App developers	
All three phases (IP/DP/ImP)	Tide calendar including extremes	VMGD/PWD Engineers/ Contractors/App developers	

More examples of application of ocean information?

Fisheries:

Most fish in the sea depend either directly or indirectly on the presence of zooplankton (animal plankton), which in turn depends on the presence of phytoplankton (represented by the chlorophyll) for its growth. Fishermen targeting smaller pelagic (open sea) fish may be interested in the chlorophyll concentration in the ocean, because smaller fish are closer to phytoplankton on the food chain. But for large predators, such as tuna, there can be a very large time-lag and great distance between their appearance and that of phytoplankton. Therefore, longline fishermen targeting tuna are often more interested in sea surface temperature and ocean currents (Beverly and Choi, 2011).

Monitoring Ocean Health:

These measurements give scientists valuable insights into the health of the ocean environment, and help scientists study the ocean carbon cycle.

Fish Disease:

Reef fish diseases, such as ciguatera, can cause both gastrointestinal and neurological effects in humans who consume infected fish. Management of reef fish diseases is primarily achieved through limiting nutrient run-off. Monitoring phytoplankton blooms, which can occur in regions of high nutrient outflow near the coast, using remote sensed chlorophyll can help provide information about environmental conditions such as run off, which can provide an indication of potentially hazardous conditions.

Crown of Thorns Starfish:

The Crown of Thorns starfish (COTS), *Acanthaster planci*, is a coral eating pest that can consume up to 13 square metres of reef per year. When an outbreak occurs, a coral reef can be completely wiped out. Coral bleaching, cyclone damage, and COTS are the three biggest threats to coral reefs in the Pacific. COTS outbreaks are highly dependent on the large-scale success of reproduction and larvae development following a spawning event (Lucas, 1982). Feeding on phytoplankton, starfish larvae develop into coral consuming adults.

Aquaculture Site Selection:

Aquaculture sites thrive when the food supply is consistently abundant. Many filter feeders (i.e. oysters, mussels, clams, scallops) rely on plankton being readily available in the surrounding environment as they have limited to no abilities to forage. Identifying fertile grounds where regular and consistent fronts occur can aid in selecting a suitable site. Similar characteristics can be used to identify candidates for managed marine areas where ecological and biological marine species development can be stimulated and protected.

Coral Bleaching Response and Management:

When combined with the implementation of a management plan, advanced knowledge of potential bleaching events can reduce the severity of the bleaching event and aid in recovery. Following a bleaching event, coral recovery can be inhibited by opportunistic algae growth. Limiting fishing in the region can increase fish populations, which in turn maximises the consumption of plant growth and limits their impact on the corals. Corals are also impacted by poor water quality. Therefore, land management practices which reduce chemical and sediment runoff can also help coral recover in the event of bleaching.

Group exercises – using climate and ocean information in decision making processes

To Action or Not to Action

*If you do what you've always done,
you'll get what you've always got!*

*“You cannot solve current problems with current thinking.
Current problems are the result of current thinking.”*

Albert Einstein

*Who and what is at risk and why?
Issues of vulnerability and risk reduction
Building resilience, increasing coping
capacity and institutional capacity*

Is it worth to take an action?

COST	BENEFIT
HIGH COST	LOW BENEFIT
HIGH COST	HIGH BENEFIT
LOW COST	HIGH BENEFIT

Remember sometimes, a decision to NOT take any action may result in high losses

The important question you should ask for every action that you take in response to minimise risk or increase benefit is: Is this action worthwhile? i.e. Is the cost too high? Is the benefit too low?

This table lists scenarios that you may wish to consider during your group discussions.

Ask the participants the following questions:

Which scenario would you like your proposed actions to fall into?

Answer – Press enter Yes, the preference would be to have low cost actions and high benefits.

Press enter – It should also be noted that NOT to take any action may result in high losses; and taking HIGH cost actions may result in high losses if the forecast does not eventuate.

Therefore it is important to read and understand the VMGD products especially what is the current rainfall/ocean/ENSO status; what are the outlooks saying? Are the confidence levels high? What are other factors should you be aware of during that time of year?

Exercise Title

Materials Required

- 4 x media releases outlining different scenarios per group
- 1 x latest ENSO bulletin per group
- 1 x latest VCU bulletin per group
- 1 x latest VCS bulletin per group
- 1 x latest EARW bulletin per group
- 1 x latest VOO bulletin per group (this may be relevant to fisheries and tourism only)
- 1 x butcher paper per group
- 1 x whiteboard marker per group

Instructions

Step 1: The facilitator will instruct everyone to arrange themselves into groups of not more than 5 people and will then hand out the four media releases to each group.

Step 2: All groups will be asked to designate one person as their scribe and another as their chair who will lead the discussion.

Step 3: After allowing time for everyone to read through the four media releases, the facilitator instructs each group to choose one to conduct the exercise with.

Step 4: The facilitator asks each group to identify and note down two areas in their respective sectors where climate information will be useful. These may be either operational (e.g. planting) or administrative (e.g. financial budgeting or future planning). They may choose the ones already outlined in their sector action plan (presented during the session 7) or come up with new ones.

Step 5: Groups are then asked – given the information presented in their chosen media release – what actions they would take to minimise impacts or maximise benefits in the two previously outlined areas in their sectors.

Step 6: Each scribe will then present to all participants on behalf of their respective groups on the following:

- What information the group was able to understand/interpret from the media release
- What possible risks or benefits the group identified regarding their sector
- Which two operational or administrative decision-making processes the group highlighted as relating to their sector
- What actions the group would take in order to minimise impacts or maximise benefits.

Step 7: The facilitator then instructs each group to select a different media release and repeat steps 4-6.

Step 8: The facilitator will then reveal the outcomes of each scenario (i.e. what happened 3 months after each media release was issued). This will lead into a round-table group discussion.

The facilitator will then ask each group: if they made the right decisions for the scenarios they chose; did they gain or lose from those decisions; what would they do differently in the future?; what key lessons have they learned from this exercise?

Step 9: The facilitator then distributes one copy of the latest ENSO, VCU, VCS, VOO and EARW bulletins to each group. Using this information, everyone is asked to again repeat steps 4-6. The intention here is for the participants to start thinking about what actions can they take when they go back to their respective agencies.

Expected Outcomes

Participants are able to:

1. Identify and understand relevant climate and ocean information coming from VMGD
2. Use information from the bulletins to come up with appropriate actions to minimise impacts or maximise benefits in each respective sector.
3. Apply cost and benefit logic to their decision-making processes when using climate and ocean information.

SESSION 7

GROUP EXERCISE: Applying climate information into sector decision making processes

Scenario A:

VMGD has issued a media release informing the public that we are transitioning into El Niño like conditions. Whitegrass Tanna recorded below normal rainfall over the past 3 months (July, Aug, Sep). The outlook for the coming 3 months (Nov, Dec, Jan) continues to favour below normal rainfall with high confidence. What advice or action will you take?

Senario B:

VMGD has issued a media release informing the public that we have entered into El El Niño like conditions. Pekoa station has recorded below normal rainfall over the past 3 months (Mar, Apr, May) . The outlook for the coming 3 months (Jul, Aug, Sep) favours below normal conditions with low confidence. What advice or action will you take?

Senario C:

VMGD has issued its second ENSO update media release advising the public of the active La Nina and outlook for the coming Cyclone season. Rainfall recorded at Bauerfield station over the past three months (Sep, Oct, Nov) has been above normal. The outlook for the coming 3 months (Jan, Feb, Mar) continues to favour above normal rainfall with moderate confidence. What advice or action will you take?

Senario D:

ENSO conditions remain at Neutral. Rainfall for the past 3 months (Apr, May, Jun) has been normal at Sola. Outlook for the coming 3 months (Jul, Aug, Sep) favours above normal rainfall with low confidence. What advice or action will you take?

All to do: Scenario E:

using current ENSO update, VCU, VCS and EAR Watch

SESSION 7 - OUTCOMES

GROUP EXERCISE: Applying climate information into sector decision making processes

Scenario A:

VMGD has issued a media release informing the public that we are transitioning into El Niño like conditions. Whitegrass Tanna recorded below normal rainfall over the past 3 months (July, Aug, Sep). The outlook for the coming 3 months (Nov, Dec, Jan) continues to favour below normal rainfall with high confidence. What advice or action will you take?

Situation after 3 months:

White grass Tanna had less than half of its normal rainfall for Nov to Jan period.

Senario B:

VMGD has issued a media release informing the public that we have entered into El El Niño like conditions. Pekoa station has recorded below normal rainfall over the past 3 months (Mar, Apr, May) . The outlook for the coming 3 months (Jul, Aug, Sep) favours below normal conditions with low confidence. What advice or action will you take?

Situation after 3 months:

The rainfall for Pekoa was near normal for July to September.

Senario C:

VMGD has issued its second ENSO update media release advising the public of the active La Nina and outlook for the coming Cyclone season. Rainfall recorded at Bauerfield station over the past three months (Sep, Oct, Nov) has been above normal. The outlook for the coming 3 months (Jan, Feb, Mar) continues to favour above normal rainfall with moderate confidence. What advice or action will you take?

Situation after 3 months:

Rainfall for January to March was near normal rainfall.

Senario D:

ENSO conditions remain at Neutral. Rainfall for the past 3 months (Apr, May, Jun) has been normal at Sola. Outlook for the coming 3 months (Jul, Aug, Sep) favours above normal rainfall with low confidence. What advice or action will you take?

Situation after 3 months:

Below normal rainfall was recorded for Sola during July to September.

All to do: Scenario E:

using current ENSO update, VCU, VCS and EAR Watch

CLIMATE SCIENCE TRAINING FOR SECTORS

EXERCISE: Self - Evaluation Form

	Assessment of how important a skill is to your sector			Assessment of how you rate your skill or knowledge of this topic			
	Unimportant	Useful	Essential	Poor	Below average	Average	Above average
Session 2: Key Climate Drivers							
Session 3: Understanding Climate Change and its impacts							
Session 4: Climate in Vanuatu							
Session 5: Seasonal climate forecasts and drought monitoring							
Session 6: Ocean Information and Products							
Session 7: Climate and ocean information sector applications							

