



CLIMATE SERVICES in VANUATU



Vanuatu Meteorology & Geo-hazards Department

Salesa Kaniaha

RA-V Seminar on Climate Services

Honiara, Solomon Islands

1 November 2011



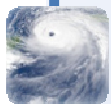
Outline

Hazards in Vanuatu

Climate Services

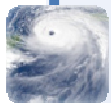
Seasonal Forecasting & Climate Change Adaptation

Recommendations



Background Information

- Vanuatu has over 83 islands (Pop: 250,000)
- 70% of the population live rural areas
- Wide range of hazards
- Central Gov. emphasis on Decentralization of Services to Communities
- Integration of CCA and DRR



Ministry of Infrastructure & Public Utilities

DG

Communication/Transport

Meteo.

Civil Aviation

Ports/Harbor

PWD

4

5

20

7

7

2

3

Geo-Hazard

Observation

Forecast

Climate

Climate Change

IT/Engineering

- Volcanology
- Seismology
- Geo-Research
- Geo-Monitoring

- Synoptic Obs
- Upper Air
- Metars
- Cyclone Warning

- Cyclone Warning
- Aviation Forecast
- Marine Forecast
- Public Weather
- Tsunamis Warning

- Seasonal Forecast
- ENSO Alert
- Awareness
- Auxiliary RF Netwk
- Archive/Research

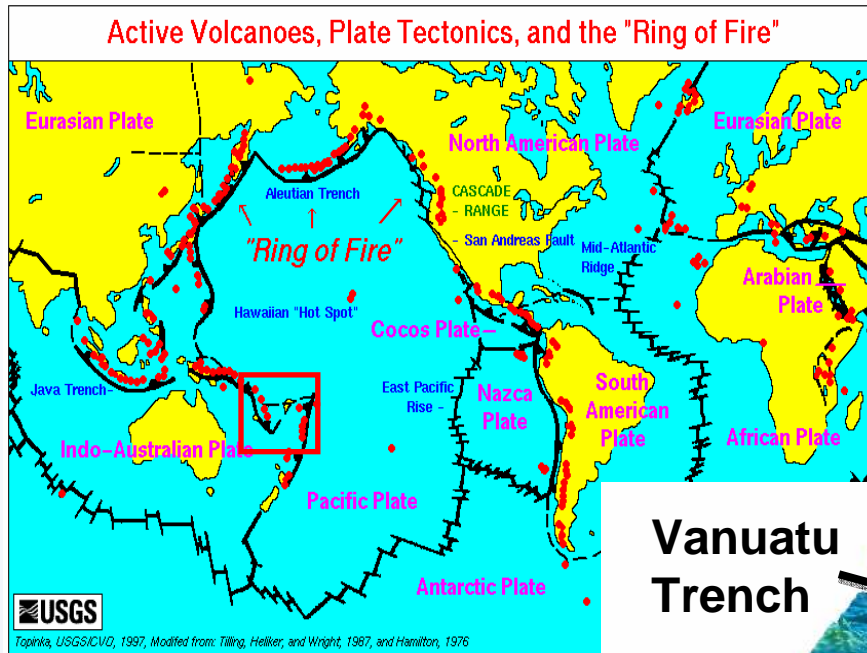
- Adaptation
- Mitigation
- Negotiation
- Awareness

- Maintenance
- Calibration

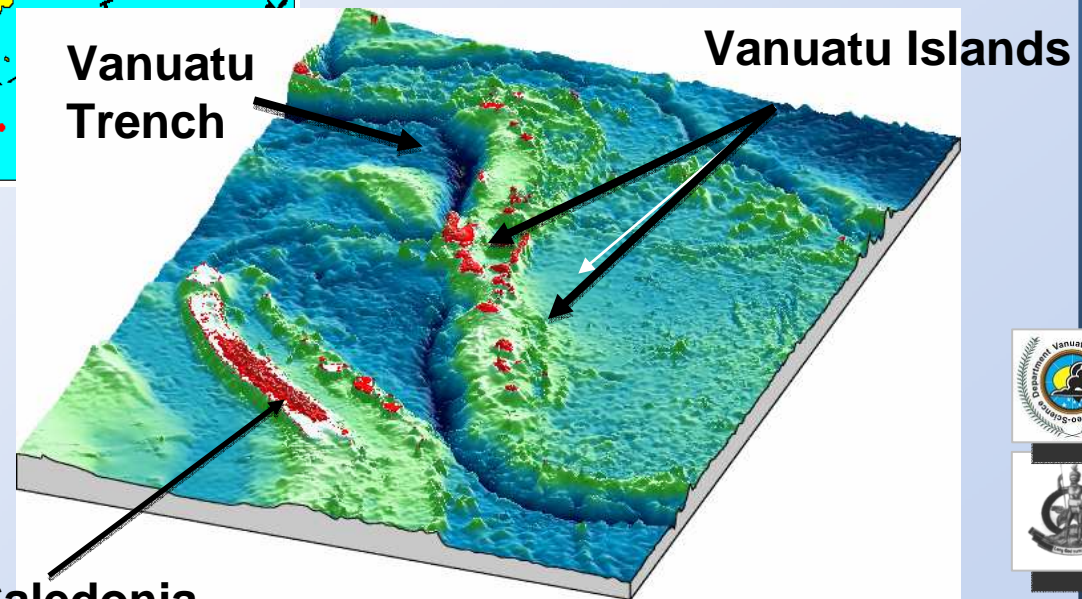
Total of 60 Staff

Geographic Location

Geo-physical hazard drivers



Vanuatu tectonic setting and subduction zone

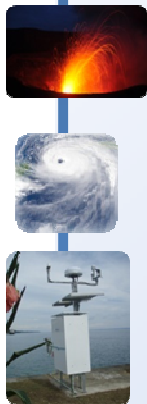
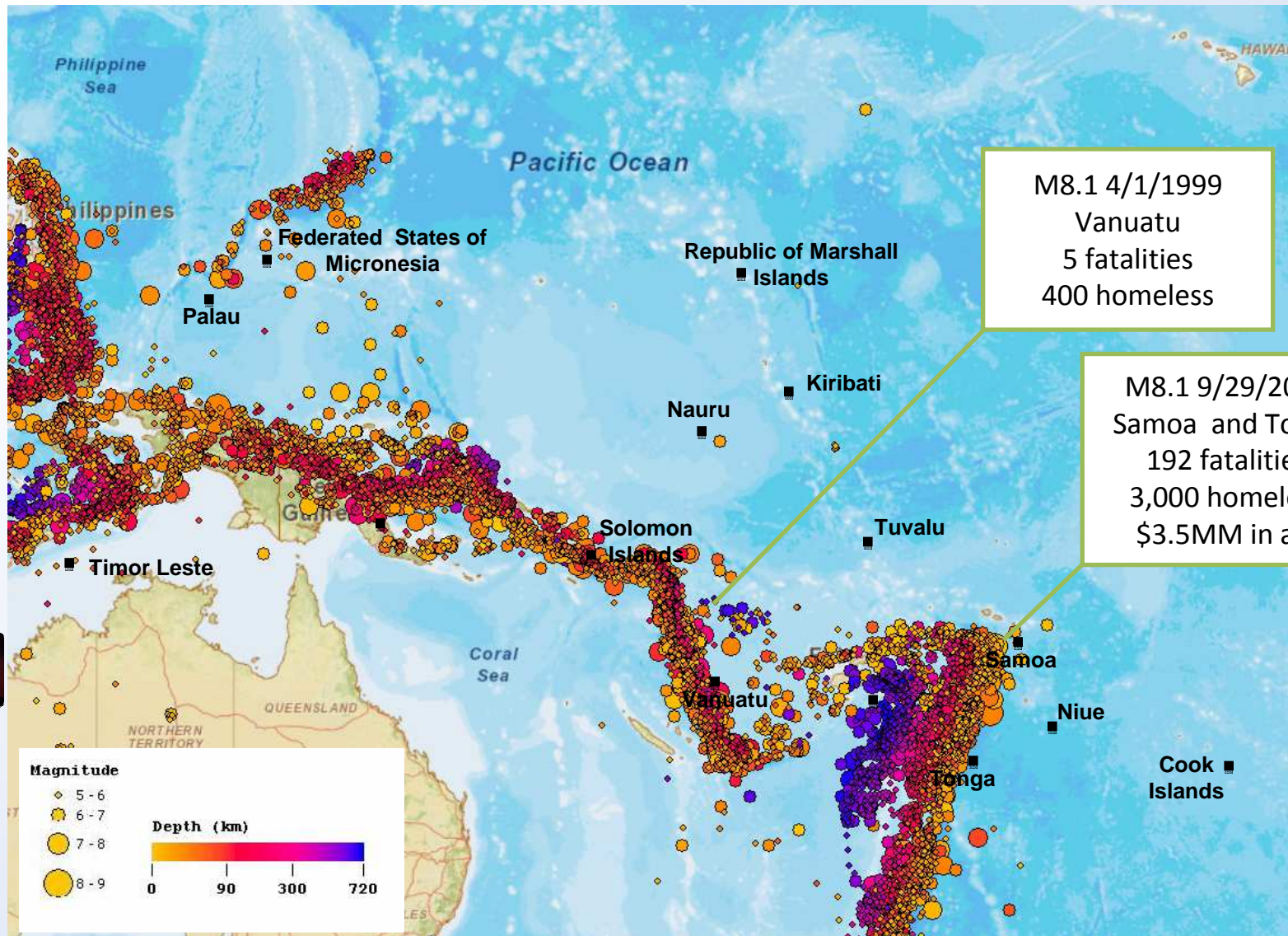


Being located on the trench between 2 subducting plates, Vanuatu is vulnerable to **volcanic eruptions, earthquakes and Tsunami**

New Caledonia

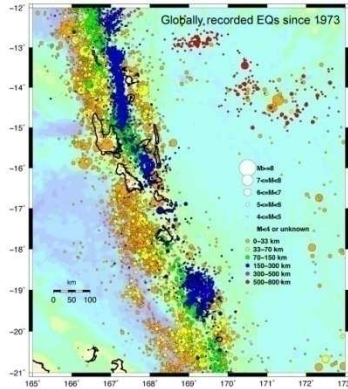


Historical Earthquakes 1900-2009

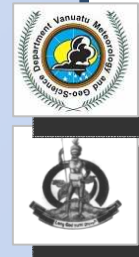


Impacts

Geo-hazard Archives

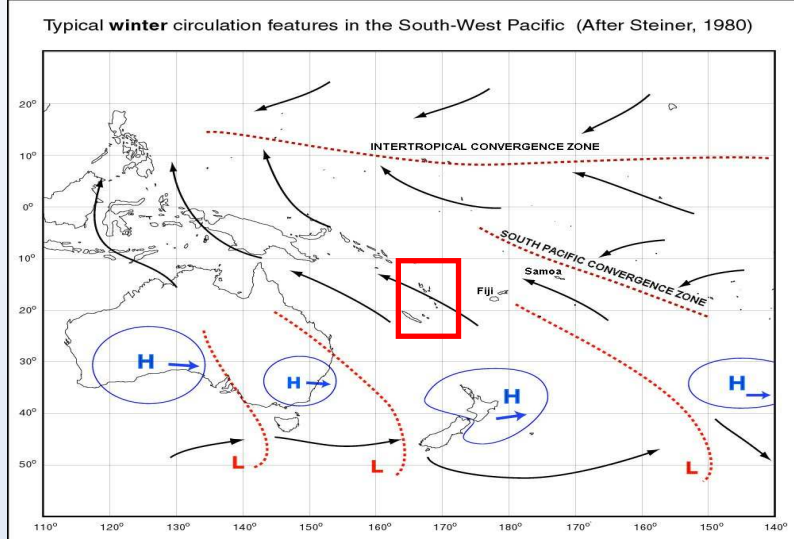
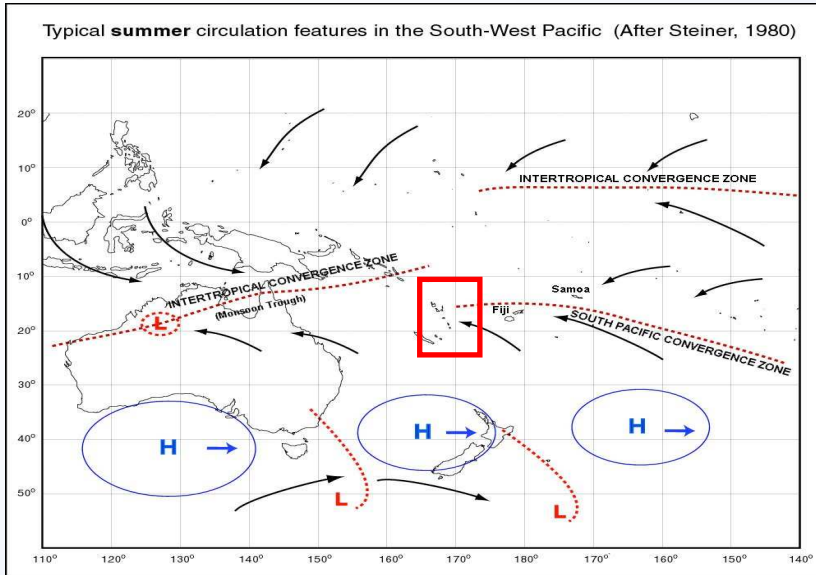


Earthquakes, Tsunami and Ash fall

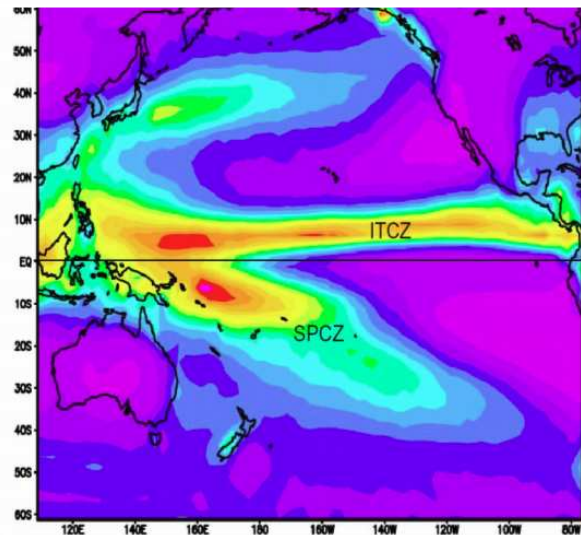
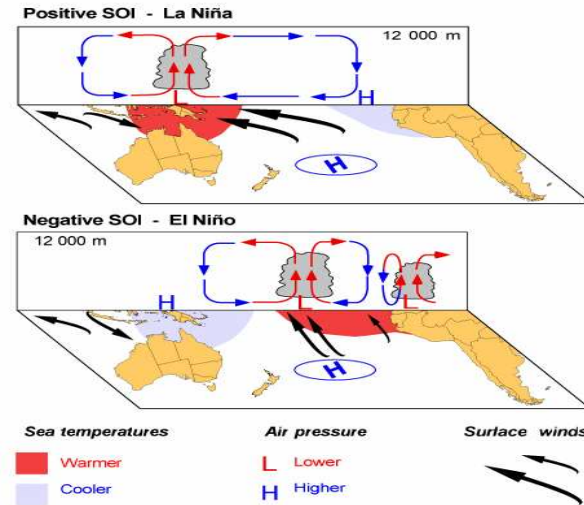


Geographic Location

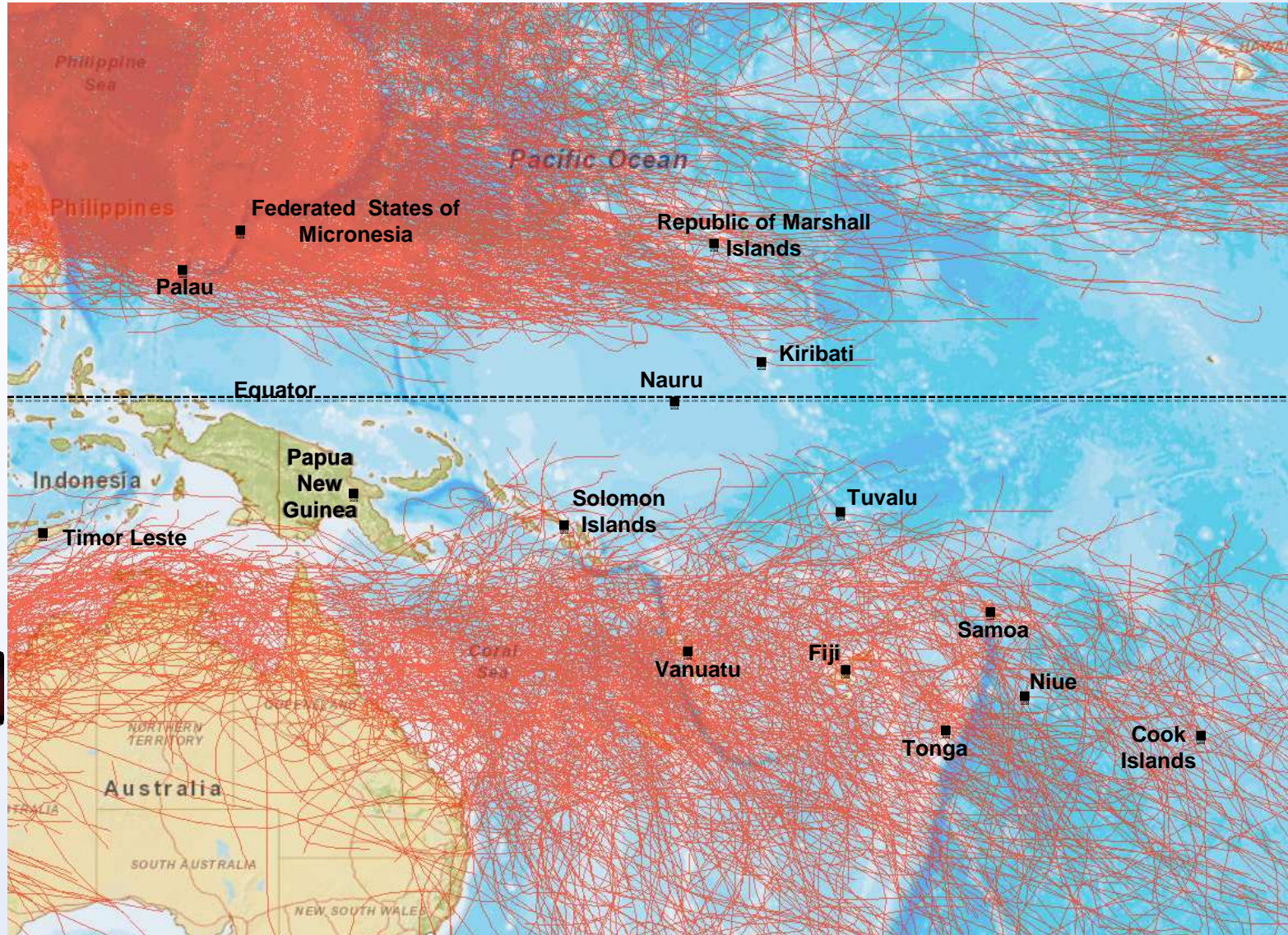
Meteorological Phenomena & drivers



THE WALKER CIRCULATION



Historical Tropical Cyclones 1948-2009

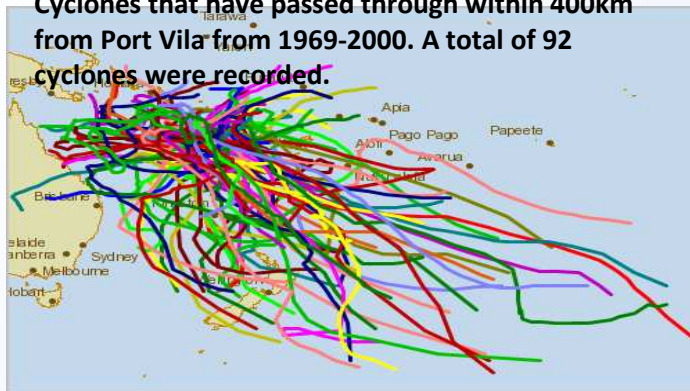


Courtesy World Bank

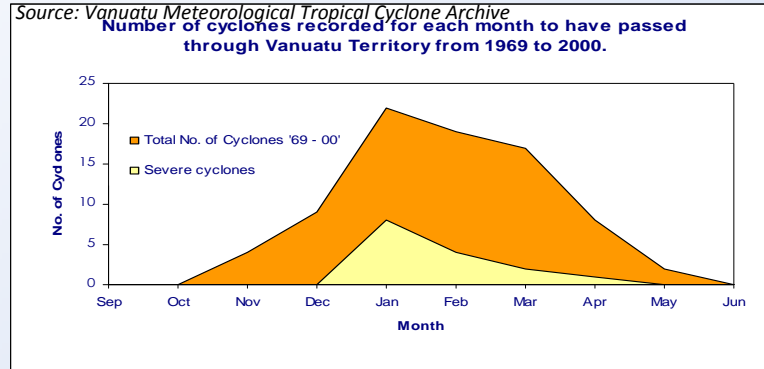
Impacts

Meteorological Archives

Cyclones that have passed through within 400km from Port Vila from 1969-2000. A total of 92 cyclones were recorded.



January to March represent about 72% of the cyclones.



Increased cyclones, Flooding, droughts, waterlogging



NATURAL HAZARDS IN VANUATU

Weather-related events

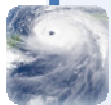
Meteorological

- Cyclone
- Severe Storms (storm surges)
- Droughts/Flooding
- Thunderstorms and lightning
- Wind
- Hailstorm
- Landslides
- High rise Sea-Level
- **Climate Change ***

Geo-physical events

Geo-physical

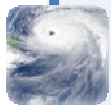
- Earthquake
- Volcanic Activity
- Tsunami
- Landslides



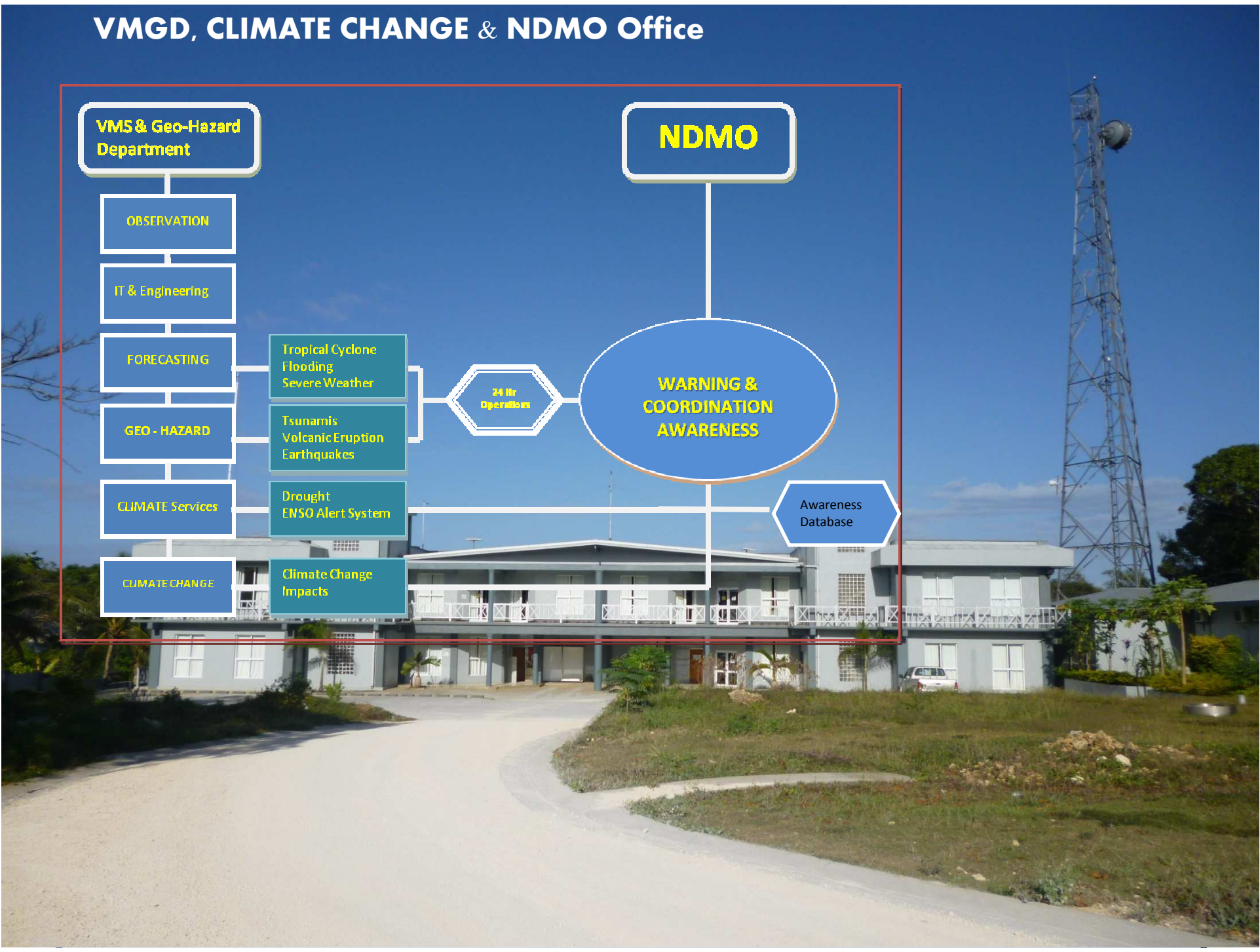
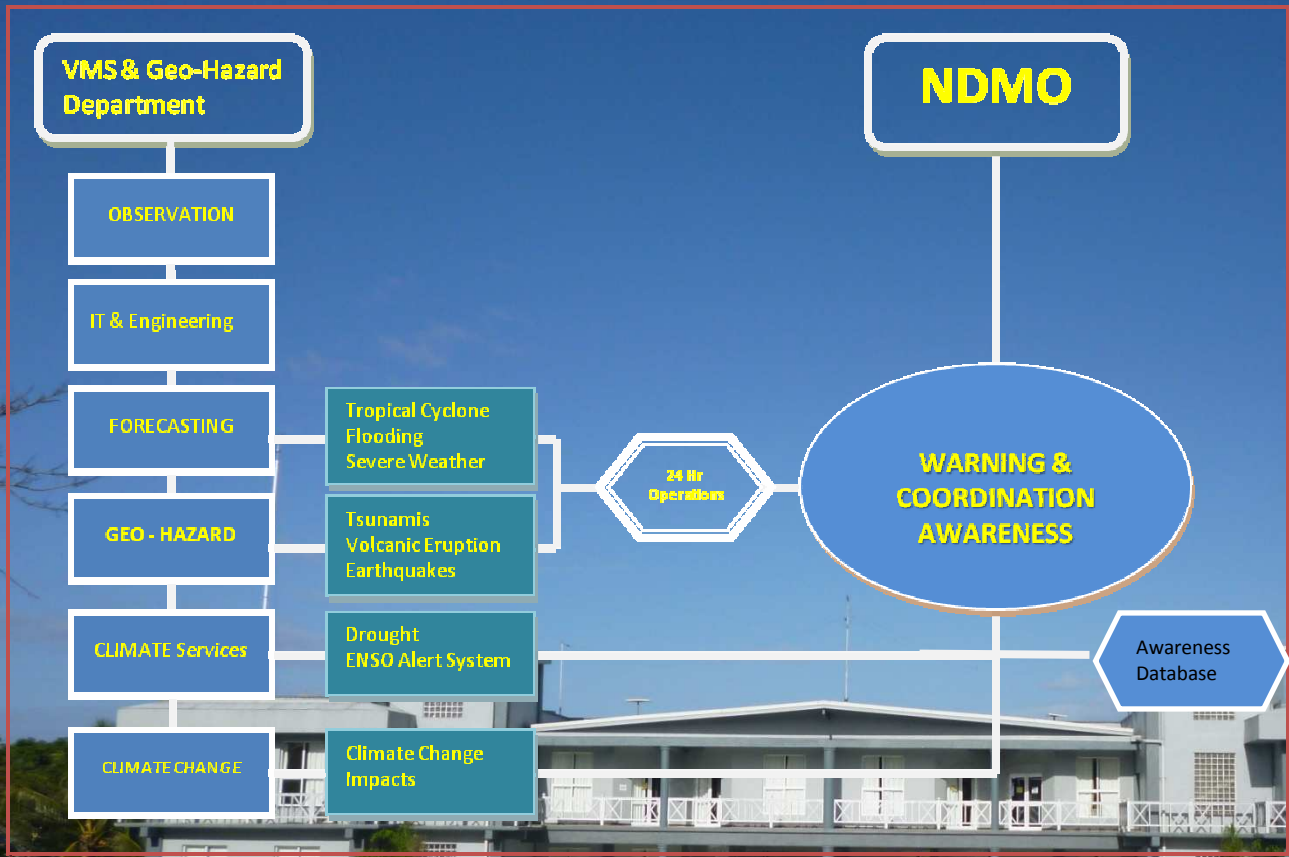
Climate Prediction and Adaptation For Whom

OTHER CHALLENGES

- Rural vs Urban Communities
- Literacy Levels
- Communication/Isolation
- Different Languages
- Different Cultural Backgrounds
- Sector Responsibilities /Strategies

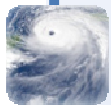


VMGD, CLIMATE CHANGE & NDMO Office



Climate Services of the VMGD

- 1. Climate Data Services and Analysis**
- 2. Climate Change Science (IPCC, PCCSP)**
- 3. Providing Awareness to Communities**
- 4. Expanding the Rainfall Monitoring Network to provide site specific warnings/advice**
- 5. Advisory and Seasonal Forecasting**
- 6. Other in-direct contributions**





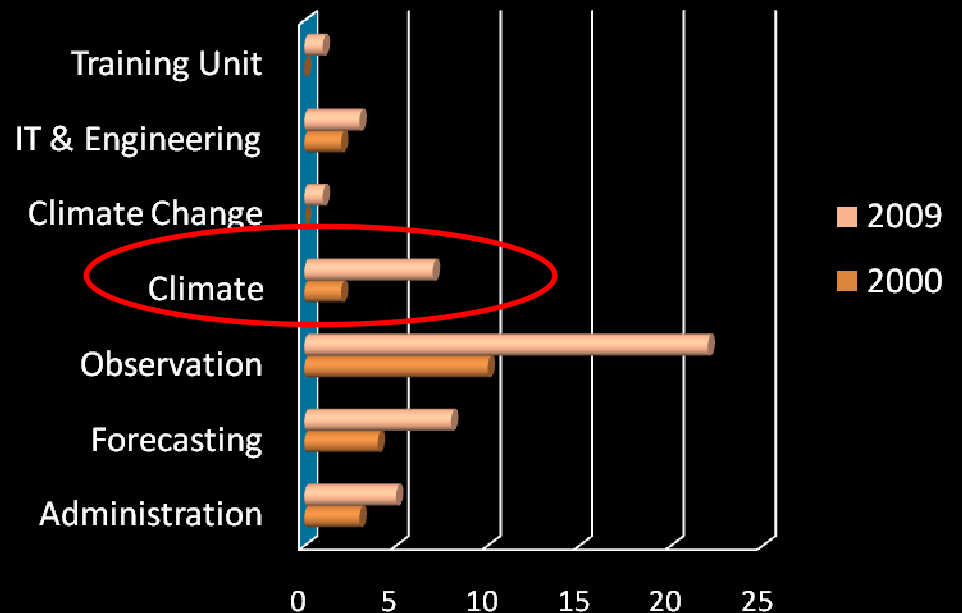
Climate Staffing in Vanuatu = 7

JD's Cover:

- ❖ Data Entry and Data Management,
- ❖ Strengthening the Rainfall Monitoring Network,
- ❖ Seasonal Forecasting Services,
- ❖ Agro-meteorology and Research and Development
- ❖ Climate Analysis & Climate Change Science
- ❖ Community Awareness Strategy



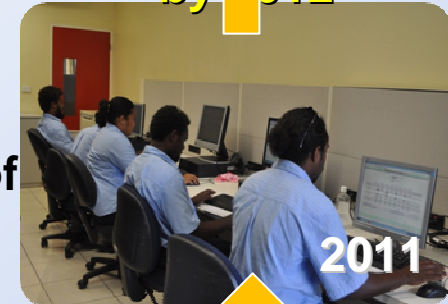
2000 vs 2009 Staff in each program



1. Climate Data & Services

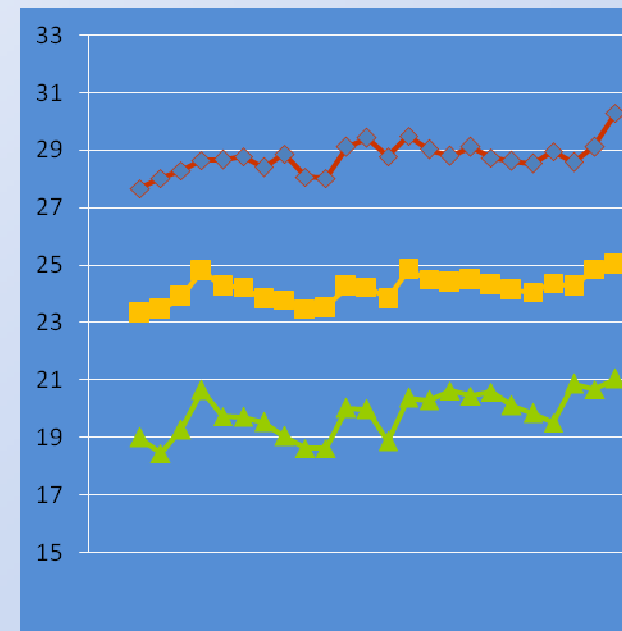
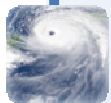
- Data Rescue & Storage from 2008-2009
- Digitization (Clicom, Climsoft, Clide)
- 7 month Digitization program in 2009 (70% of data digitised)
- 6 month joint Program to complete digitization planned for 2012 supported by PASAP
- Data Quality management is still a challenge

Complete Digitization by 2012



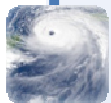
2. Climate Change Science

- Data Analysis
- PCCSP Project for Climate Change Science
- Contribute to Policy
- Adaptation should be guided by the Climate Change Science
- Still limitation with resolution and ??



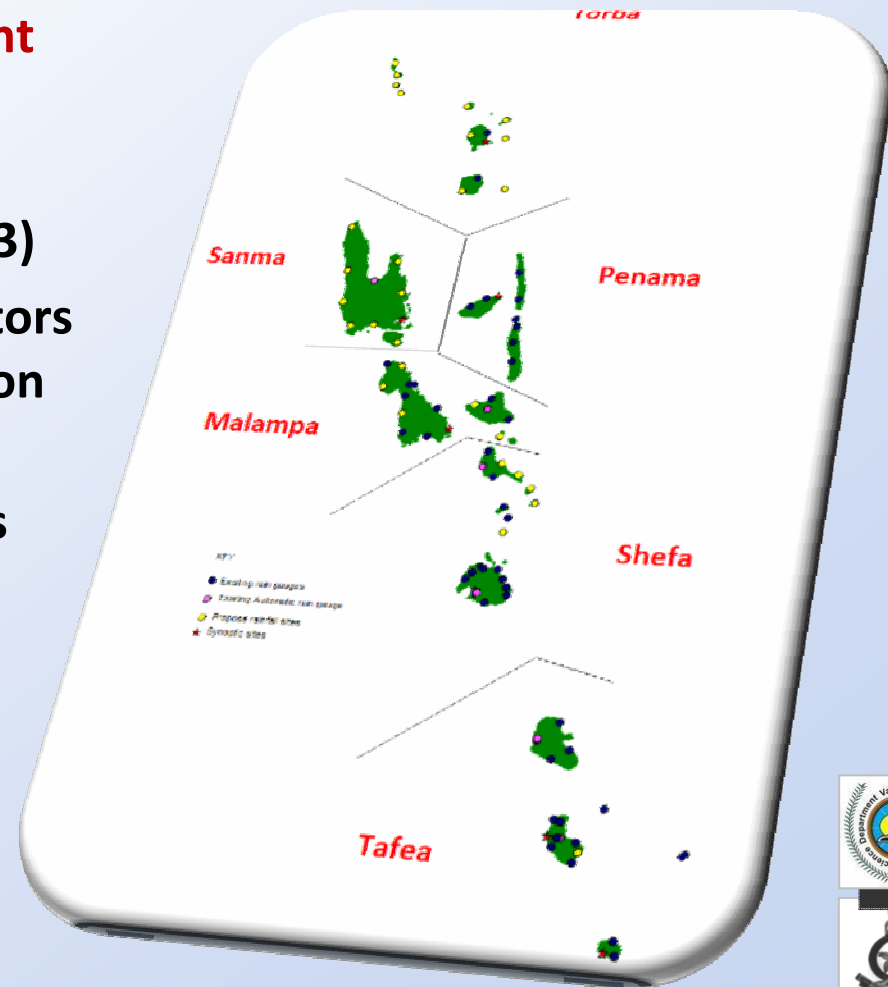
3. Community Education

- Awareness at all levels
- Understanding of both climate change adaptation and climate services
- Communities relate climate change impact to **extreme events and variability**
- Standardisation of Awareness Materials & involvement of Civil Society
- **National Awareness Database** is key to long term program



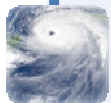
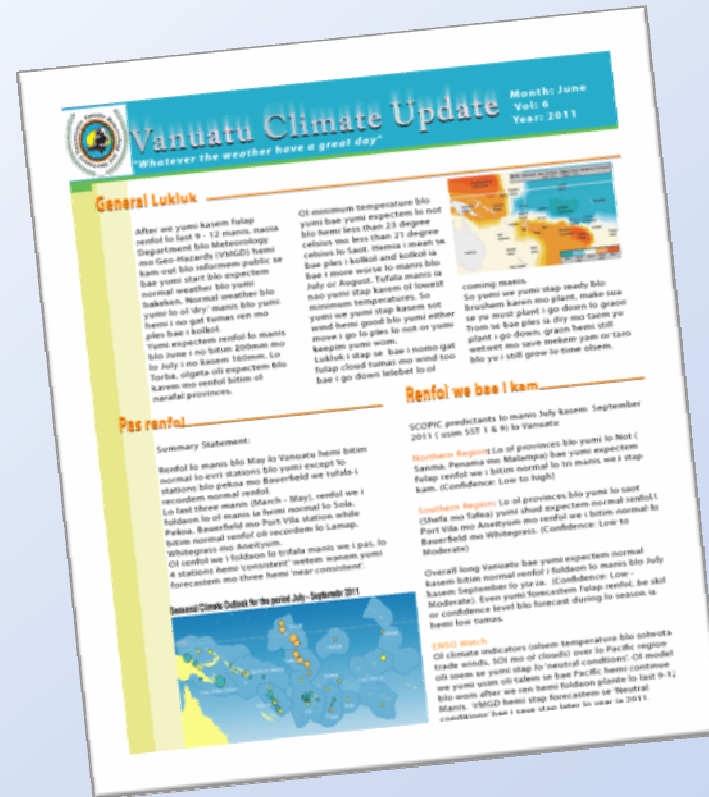
4. Monitoring

- **Rainfall is the most important variable**
- **National Rainfall Network Policy (60 Gauges by 2008-13)**
- **Strategic sites to inform sectors or development or adaptation (hot spots)**
- **Long term: tailored products for each sites**
- **Clide-esc type products**

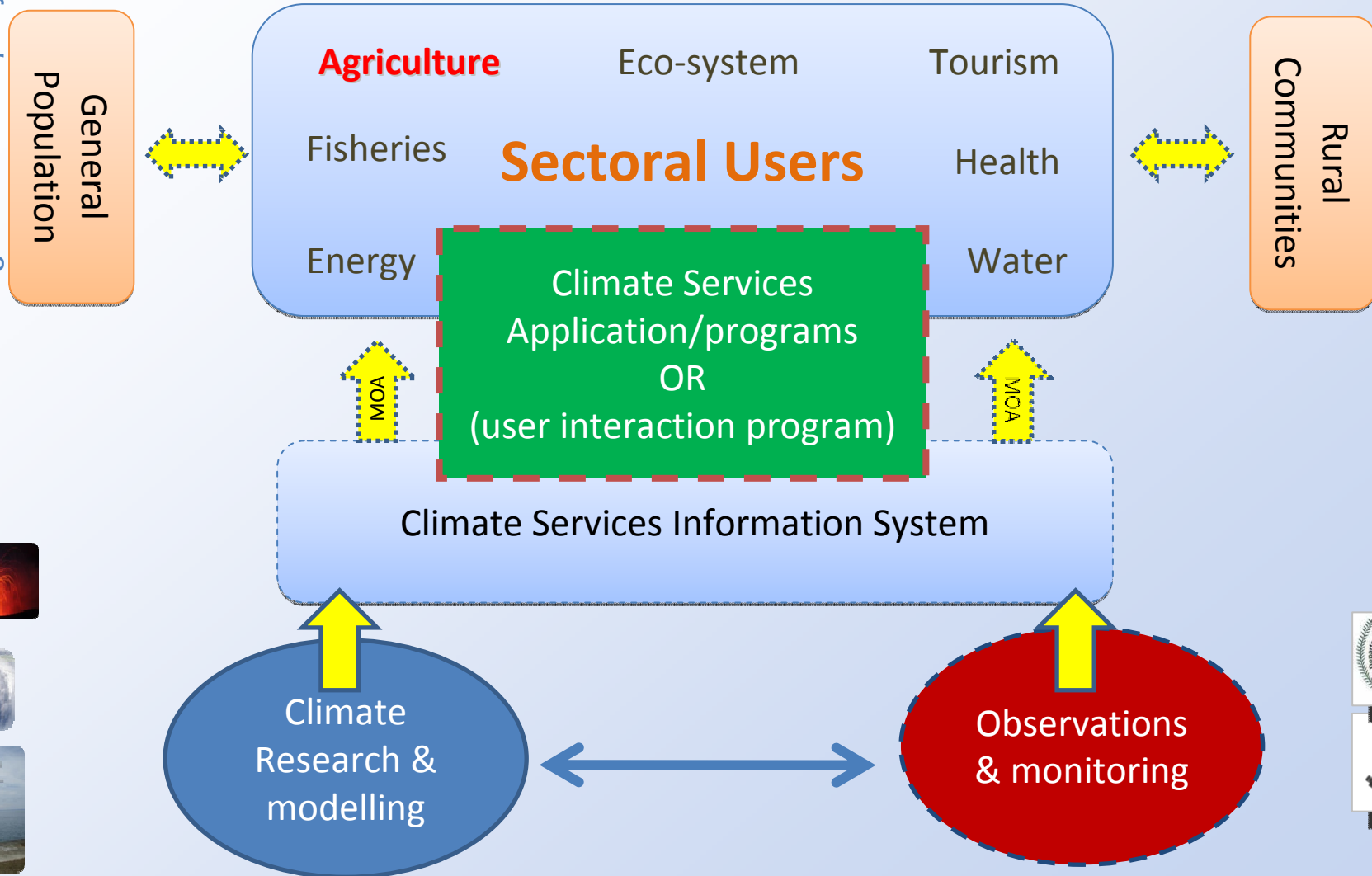


5. Seasonal Forecasting and Advisory Services

- Delivery guided by GFCS
- Guiding principles for Climate Services; **availability, dependable, usability, credibility, sustainability**, etc may be a challenge and has to be addressed strategically
- Means of delivery
 - *Web-site, e-mail*
 - *Monthly Bulletin*
 - *Stakeholder Forums*
 - *Media Releases*
 - *Impact Assessment Survey*



Delivery Components



National Delivery Mechanisms for Farmers

Vanuatu Meteorology & Geo-hazards Department

Protecting Lives

GCC, RCC,
Monitoring

Climate
Information,
VMGD

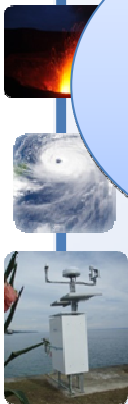
MOA

Agriculture
Department

Agri-field
assistance
Officers

Information
delivered to
FARMERS
for informed
Decision

Farmers Association
OR
Chamber of
Commerce
OR
Civil Society



Effective Dissemination

- ❖ Communication Strategy to reach the last mile
- ❖ Providing Catalyst/incentives/mechanisms to ensure information reach the last mile
- ❖ What are catalysts;
 - ❖ *Binding MoA, Reviewed JD's, National Plans such as BP & CP*

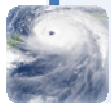
❖ Example for Effective Dissemination of Climate Prediction using an MoA

- ❖ Training workshop (**Climate Field Schools**) in Dec 2010 with Auckland Uni, Dept of Agriculture, Farmers & extension Officers

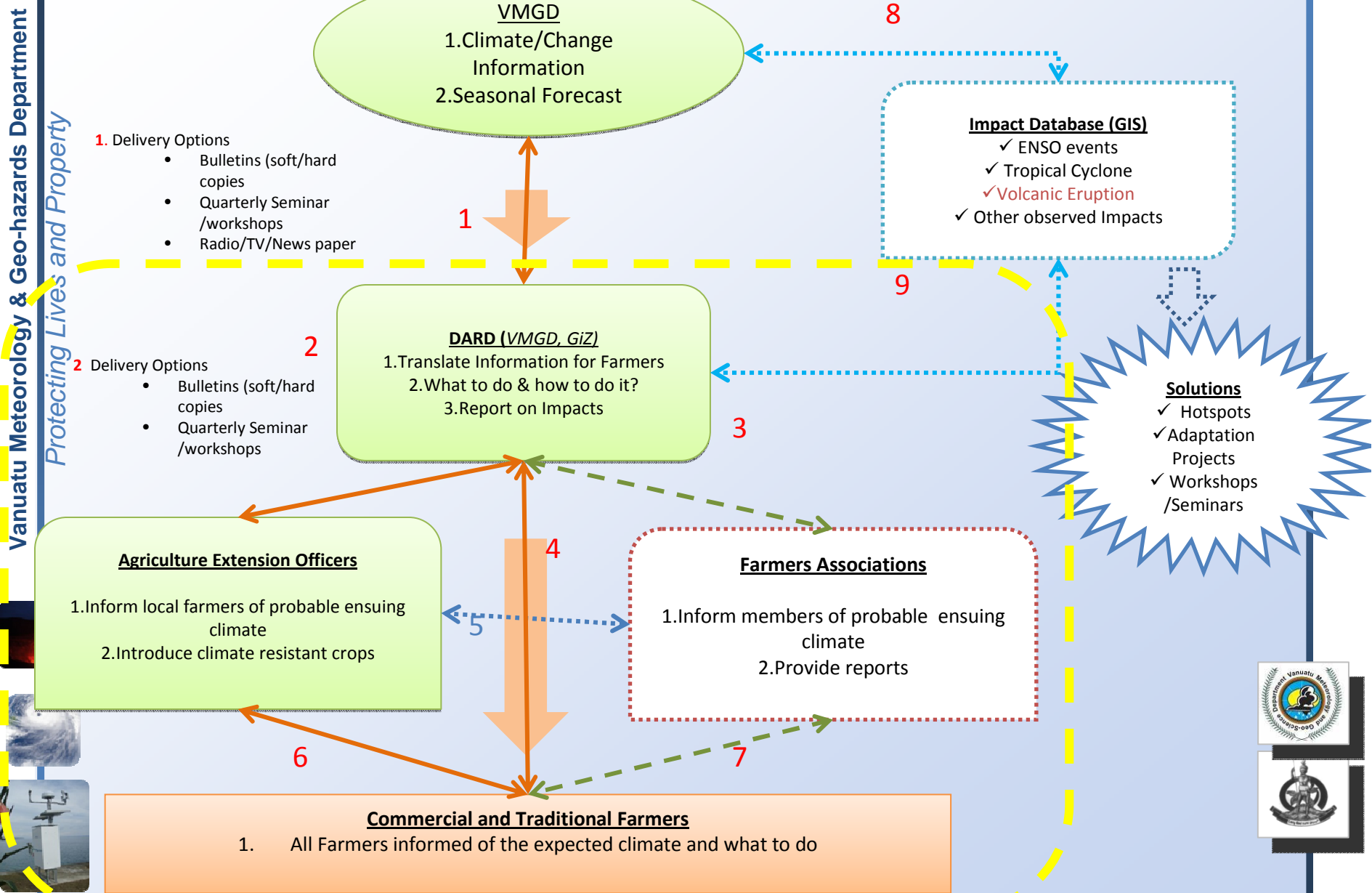
- ❖ Follow-up training workshop planned for Mar 2012 to be supported by COSPACC



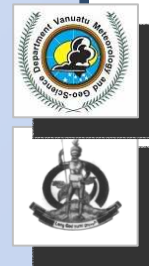
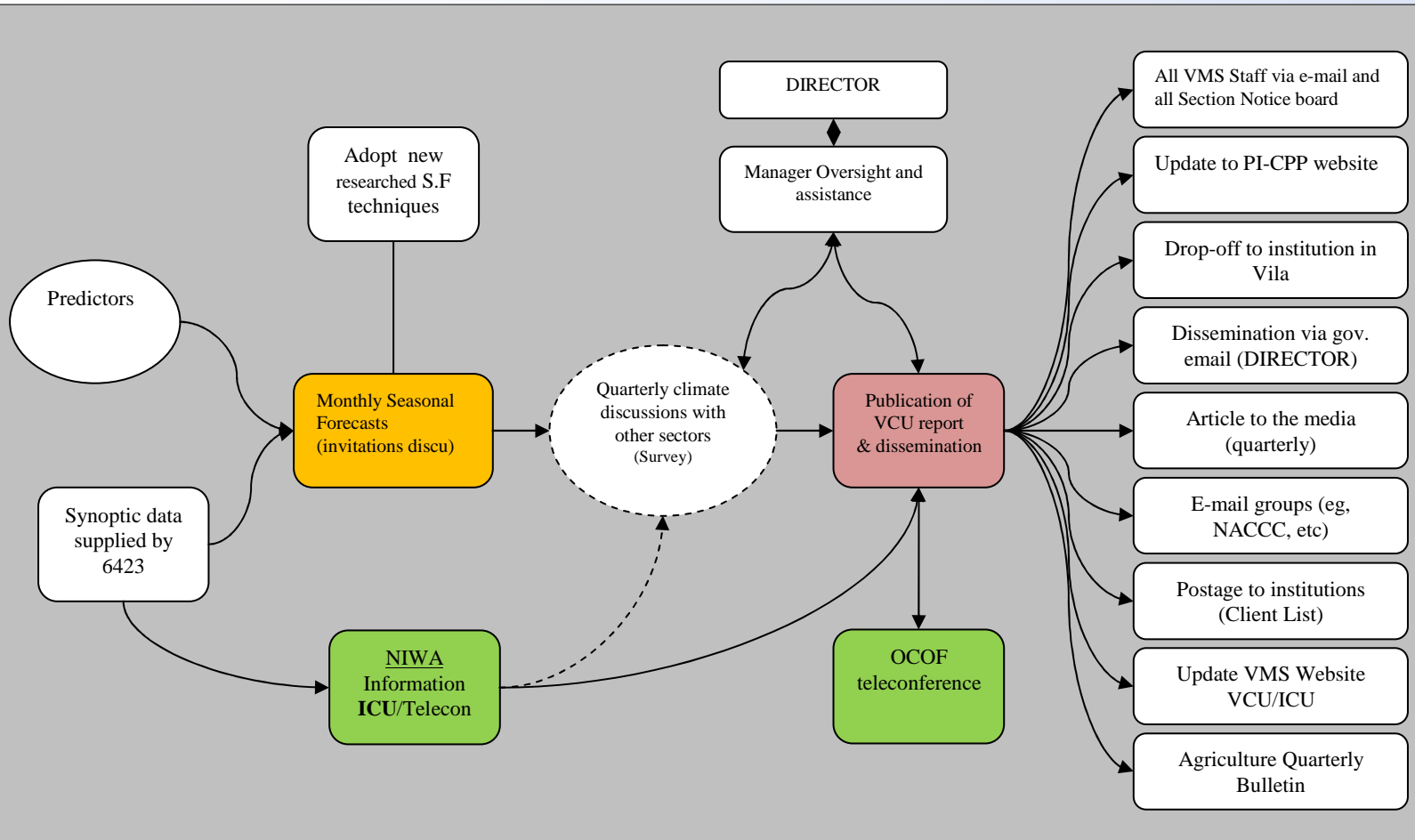
VMGD, DARD & GiZ finalizing MoA & Workshop

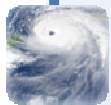


Proposed Approach through an MoA for Agriculture



First Approach for Dissemination from 2000-2008

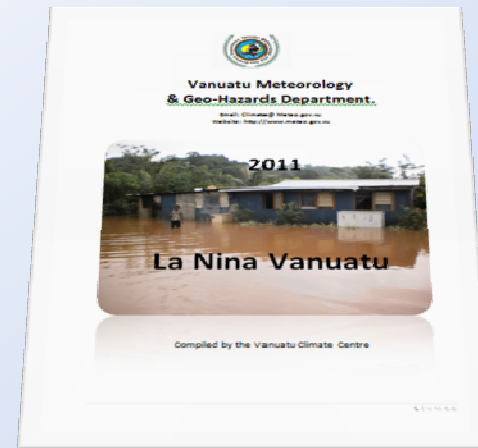




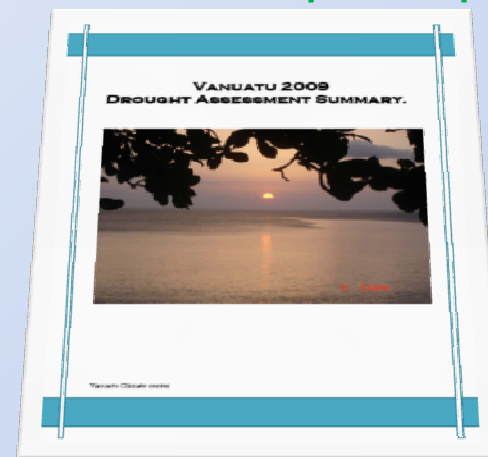
Impact Reports

- **Develop Mechanisms to allow Civil Society & DMO to participate in the process**
 - *Civil society and DMO are very interested in this approach*
 - *RED CROSS has agreed to develop the Impact Database*
- **Developing “What to do.. Manuals” for all crops for each climate extremes**
- **Understand your impact for each event to build the database or to adapt**
 - *Document impacts of events such as ENSO*

2011 La Nina Impact Report

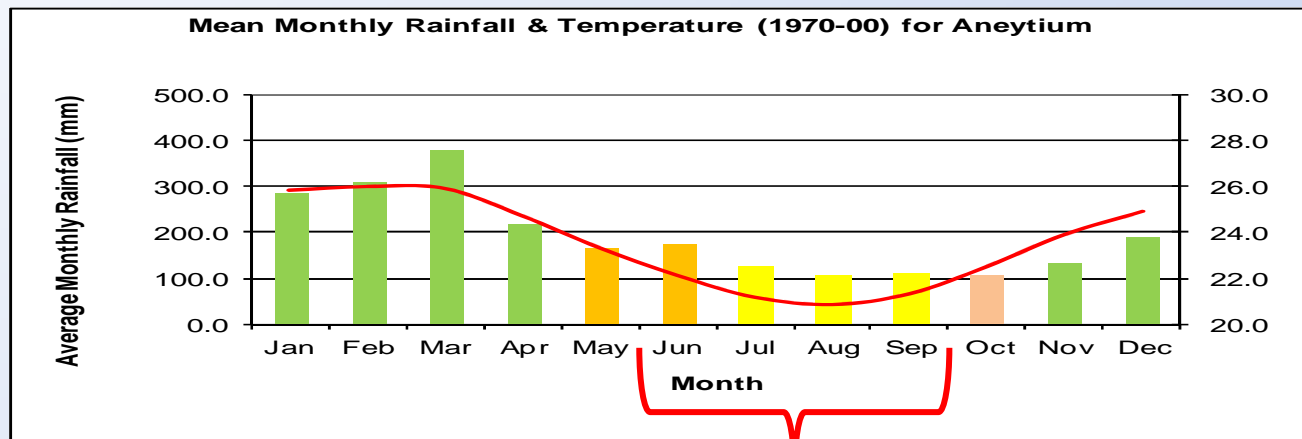


2009 El Nino Impact Report

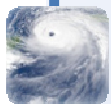


Integration of Traditional knowledge and Seasonal Forecasting

- Each crop has different calendars
- Calendar for Yam Planting in the most of South Vanuatu



ENSO status needs to be Clear



Example of Specific Adaptation Strategy : Crops

(Dec 2010 by VMGD, SPC/GiZ, Auckland Uni, VAC & DARD)

- Taro (water, dry-land, Fiji)
- Manioc (Cassava)
- Kumala (Kumara)
- Yam
- Island Cabbage (Kabi)
- Banana
- Vegetables



Island Taro, Taro Fiji, Water Taro & Niavia Adaptation Strategies

El Nino (Drought)

- Plant heat and sun tolerant varieties like navia and taro with small leaves, and those pointed away from the sun.
- Utilize Cover crops to provide nutrients and moisture to soil; up to 3 years before planting dryland taro
- Use light Agro-forestry and shade trees intercropped among taro (NOTE: taro requires good sunlight to thrive)
- Use shade cloth (green net – 60-80% sunlight) to protect taro plants from sun (may be an expensive option).
- Preservation of Taro planting materials, especially suckers during excessively dry times (for example take suckers to house nurseries)
- Collect taro seeds and sow to encourage new varieties, maintain biodiversity, and find climate resistant strains.
- Be conscious of the timing for planting of Taro: follow Met climate advisories, for example if Met predicts an el nino, plant 5-6 month Taro that will be ready for harvest and immune to the dry season.
- Use Open and deep hole planting of Taro, dig a deep hole, place taro inside, do not bury so as to allow cooling of the growing taro.
- Practice targeted Irrigation around the roots of the Taro (may be an expensive option)

La Nina (Excessive Rainfall)

- Plant water tolerant species like Wota taro and soft mud taro
- If growing Dry land taro, plant on well draining or sloping areas.
- Site Selection (Select soil types that will not hold water, or sites where water does not pool or flood (sloping areas, porous soils etc.)
- Encourage/Dig Drainage canals in flat land for dry-land Taro
- Practice Mix Cropping of Taro with species that utilize lots of water and can help control water logged soils (use species with long Tap roots eg. Papaya or those that can quickly drink large amounts of water banana)
- Use pesticides against taro beetle and other insects
- Encourage existing Cultural practices that prevent pests & diseases, eg in Torba, before planting, a special bush rope can be buried around the garden 1 month before planting taro. The smell and scent of the rope discourages beetles from invading taro plants
- Use regional networks that have experience with locally appropriate pest and disease controls



Banana: Adaptation Strategies

El Nino (Excessive Rainfall)

Impacts felt by farmers

- Drying of leaves
- The fruit is not yet mature but the banana dries and dies as if were time for harvest
- The fruit is very small when it ripens
- Insects attack the fruits before they are mature
- Offshoot suckers do not bear fruit as much as the mother stalk
- The inside of the ripe-looking banana is rotten
- Wildfires burn the bananas
- Root rot kills the banana
- The stalk of the banana becomes dry and the stem loses turgor and falls down

Adaptation Strategy

- Intercrop bananas with forestry species or legume trees to provide shade and soil nutrients
- Cover banana fruit bunches with plastic bags to prevent insect attacks
- Remove all but two young banana shoots away from the mother tree and replant in a different area (to relieve water stress during dry seasons)
- Encourage more planting of Vietnam Banana as a hardy and climate resilient variety
- Make fire breaks between banana gardens and forested areas
- Physically remove diseased or pest infested banana trees
- Rotate banana plants inside disused livestock pastures to take advantage of manure fertilizers
- Prop up weak banana stems with wood to prevent toppling

La Nina (Excessive Rainfall)

Impact

- Bananas grow well with excess moisture; good productivity
- Roots can rot with excessive moisture
- Nematode infestations occur with flooding or undrained soils
- Heavy rains after a period of drought will cause banana toppling
- Runoff, floods and landslides can uproot bananas

Adaptaton

- Relocate banana gardens to drier and flatter areas, and well drained soils
- Select other crop species that may be better water adapted than banana (water taro etc)
- Plant trees that can hold soils in place and prevent excessive erosion
- Prop up bananas with stakes
- Remove nematode infested suckers and allow roots to dry for a short period to remove pests



Vegetables

El Nino (Excessive Rainfall)	La Nina (Excessive Rainfall)	Pest/Disease
<ul style="list-style-type: none"> • Select drought and sun resistant crops (e.g. beans, whitebun cabbage, lettuce, tomatoes, pumpkin, capsicum, cucumber, spring onions) • Do not burn gardens as cleaning methods, rather weed and leave grass as a mulch to hold soil moisture and nutrients • Practice shade management of plants (with shade cloth or living shade trees/plants) • Utilize all parts of vegetables (e.g. pumpkin fruit and leaf tops, sutsut fruit and shoots) • Use alternative farming systems (mulching, alley cropping, mix planting etc) • Use sheltered nurseries to protect vulnerable seedlings from sun and heat over exposure • Utilize traditional vegetable crops (ferns or vines) • Take stock of and re-promote traditional foods 	<ul style="list-style-type: none"> • Utilize raised beds to prevent seedling flooding • Use drainage canals in vegetable gardens • Use polybags to plant vegetables that are off the ground and cannot be flooded • Utilize animal manure to counteract soil nutrient leeching in rainy times • Shelter seedlings in covered nurseries during heavy rains • Grow wet tolerant vegetable species (e.g. Susut and cucumber) 	<ul style="list-style-type: none"> • Weed grass and maintain gardens to remove plants that could harbour pests and diseases • Avoid the use of synthetic chemicals for pests, but utilize traditional knowledge (e.g. Chilli –water mixes) • Plant wind breaks to prevent wind-dispersing pests from entering gardens. • Plant around times of the year that insects are less likely to outbreak or damage crops • Physically remove or kill caterpillars or other pests that are found within the garden



Cassava Adaptation Strategies: Brochures/Videos

ogy & Geo-hazards Department
Lives and Property

Long Mekem long Manioc long ong Sik mo Disease?

- Katem act ol stampa blong manioc we ol kasem disease. Yu mas traem blong stopem kasem ol narafala manioc blong yu.
- Planem ol narafala crop wetem manioc. sli ia i kasem ol narafala manioc blong ol fas long nara crop blong ol no kasem ani narafala karem.
- Planem ol bi mo narafala plan raen long karem blong stopem ol pipet blong ol pipet kam asaed.
- Jerem pies blong yu stop planem manioc blong ol pipet ol no stap kulap long graen ol usum spolem manioc blong yu (olusam pima weta o sam narafala kaen kaen wei).

Wanem ia ADAPTATION long Climate Change?

Yumi ol man Vanuatu yumi kat pona blong yumi save adapt long Climate Change.

Adaptation i minim se yumi eriwani i mas traem sam nidafala wei blong wok wetem weta we yumi stap experience nara long Vanuatu.

Blong yumi winim Climate Change, bae yumi no mas faet kaka, yu save kontaktem Dapaten blong Agriculture, Dapaten planem gud fuja blong ol haosho mo korosho blong yumi. Sapata yu wantem save mo about Climate Change mo agr- blong Merico o ringin SPC-GTZ Climate Change Vanuatu. Mafala i wantem holsem eriwani long Vanuatu blong ol sewe long Climate Change mo hap blong ol wetem.

MANIOC & Climate Change

giz

Hao blong Dil Wetem (adapt long) Climate Change long Vanuatu

For More Information Contact:
The Department of Agriculture and Rural Development Tel: 22525 -NACCC Tel: 24686

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Wanem ia Climate Change?

Climate Change hemi minim se weta we yumi, mo ol bubu blong yumi, i bin eriwani perenem bifo, bae i stap change long fuja.

Climate Change hemi kos bae yumi ol usum gas (pollusen) i ko antap long sky. Polusen bus, bonem ol rabis blong yumi, raen long Climate Change i stap hapen fetis long yumi long Vanuatu mo raen long wot. Long Vanuatu bae i save minim bigfala ren. Bigfala san, drae seen, fiad mo ol level rise (we saletota i kam antap). Taen weta i jeng bae i save atektem legwan ol crops blong yumi mo Agriculture long Vanuatu.

Se yumi no mas faet, oksen we Climate Change hemi kos by yumi ol man, yumi tu ol man yumi save di wetem.

Blong winim Climate Change yumi mas jenjem smol smol ol wei blong yumi stap ia: oksen wei blong mekem karem, we blong mekem haos, mo wei blong yumi asi.

Hemia nao minig blong adaptesen long Climate Change!

Manioc mo Climate Change

Climate Change i save spolem manioc blong yumi, Bigfala san i save bonem ol li; mekem se kakai i no gud. Bigfala ren i save mekem se kakai i atik nomo long graen mo ol ka mo diis i mekem manioc i no gud. Ol sektion ol save brok-broken li manioc mo spolem kakai blong hem.

Wanem blong Mekem long Manioc long Taem blong Bigfala Ren? (La Nina)?

- Mulching hemi taem yu putum ol wid no gras we yu putumact taem yu kinim garen. Yu no mas bonem ol wid nomo ston long stampa blong manioc blong protektem kakai long san mo ren. Sembae yu luk se graen hemi kokaol mo wetet nomo andant long mulching.
- Planem ol forestry tri raen long karem manioc blong givim seed long strong san. Yu save planem ol kaen tri oksen giricida we Agriculture i stap givimact. Ol tri ia bae ol givim seed be sem taem tu bae ol save fidim graen balagen mo holsem taet wota i stap long garen.
- Usum cover crops long karem bifo yu planem manioc. Ol crops ia oksen miusuna i save holsem taet gudfala graen mo tu i save holsem taet wota long graen. Lego ol cover crops ol stap long karem taem yu planem manioc, yu no kinim graen tumas, bae san i save taem bifo yu kakai.

Wanem blong Mekem long Manioc long Taem blong Bigfala Ren? (La Nina)

- Usum ol sida blong manioc blong taem proa aot ol didifen kaen manioc we mas samfala save ol wetem ren mo baem ol narawan.
- Usum ol wei blong presevem manioc, oksen manioc loc four we i save holsem taet manioc long ren taem save stap kulap long karem.
- Dapem ol didifen (rod blong wota) blong ren i no long ren taem.
- Jusum ol didifen kaen manioc we yu luk se ol gud long ren taem.
- Mukunatol manioc karem i ko long wan pies we bae i no save fiad long hem (long store o long drae pies).

Wanem blong Mekem long Manioc long Taem blong Saekten?

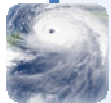
- Katem act ol branch blong manioc antap, blong save kasem, o pies we i stap haed oksen blong manioc.
- Planem manioc long ol pies we strong win bae i no short short nomo we han i no save ko antap tumas blong kasem wind.





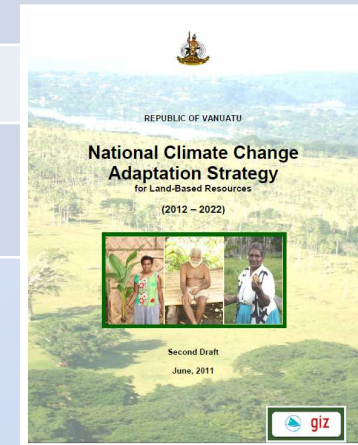

Information Collection

- Collect and document traditional adaptation strategies
- Document and integrate Traditional Cropping Calendar and Seasonal Forecasting
- Creation of *“What to do Manuals”* for Farmers

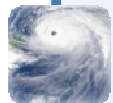


Community Land Based Adaptation Strategies (Led by GiZ/SPC)

Land Sectors	Tropical Cyclone	Drought (El Nino)	Flooding /Rainfall (La Nina)	SLR	Who will implement
Agriculture					
Livestock					
Forestry					
Water					
Environment (Biodiversity)					



❖ Joint effort led by SPC/GiZ



❖ Identified over 1000 Community-based Adaptation Activities



❖ Activities complement Seasonal Forecasting for ENSO-type impacts

❖ Tested in the June Forum





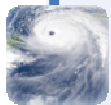
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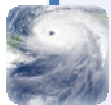
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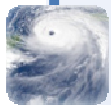


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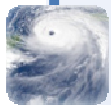


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NCCAS Strategy #371



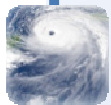


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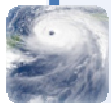
➤ West Coast Santo Drought Tolerant Cassava



Tolerant Crop Nurseries and Seasonal Forecasting

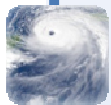


- Partnership with Agriculture Research institute (VARTC)
- Under the MoA, GiZ to establish nurseries in all provinces
- Readily available for farmers during an ENSO event
- Procedures for ENSO developed in line with WMO & BoM information (*ENSO Directive*)



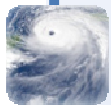
Conclusion & Recommendation

- The Meteorological Services has a big role in adaptation
- Must have a strong **communication strategy in-country to deliver informative services**
- Implementation Strategy **MUST INCLUDE** all players (Churches and Civil Society) to tackle coverage
- Availability of a pool of Experts and Funds to **support national driven strategies** (eg. Sector trainings)
- Recognise that Community Education is still key to the success of implementing CCA and monitoring & management tools (database) are necessary
- Automation of Data Capture from GTS (WIS) into ClIDE to free staff time to develop user products and quality management

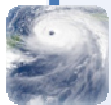
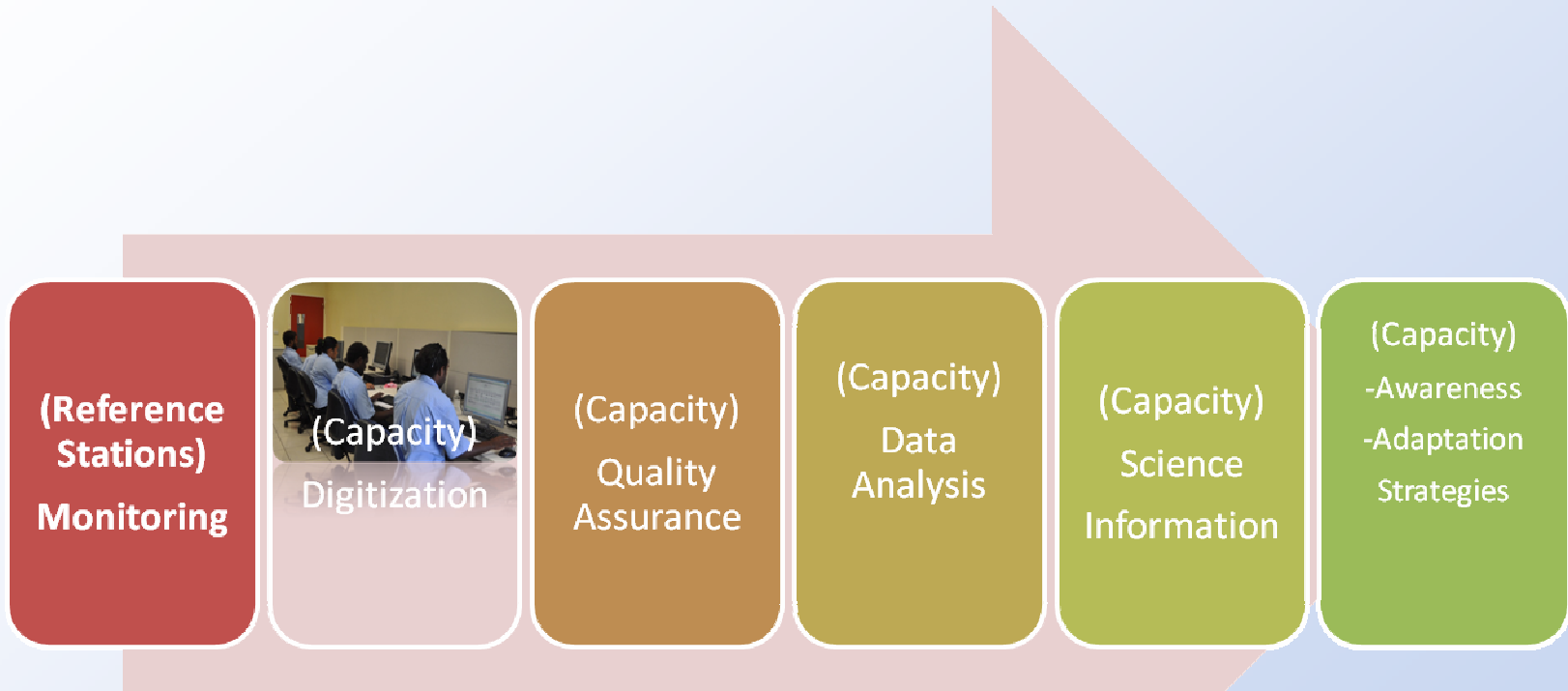


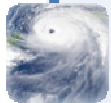
Conclusion & Recommendation

- Establish **hazard based (GIS) database** to capture hotspots or high risk communities to allow climate advice and projects to be targeted
- Document Traditional Cropping Calendars for each crops and for each area's and **integrate** with seasonal forecasting
- Need **analysis tools** to improve & diversify products
- **Quality Management Tools** (homogenisation)
- Region V training opportunities to capture best practices
- Regional Strategy for **Strengthening Monitoring** (will strengthen Climate Services Delivery)



The Missing Component





TANK YU TUMAS

Salesa Kaniaha
Manager, Climate Services

