

National Workshop on “Climate Change Education”



Organised by the Curriculum Development Unit, Department of Education with support from Coping with Climate Change in the Pacific Island Region (CCCP-IR)

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Draft Workshop Report and Documentation



Report prepared by

James Melteres

National Secondary Curriculum Coordinator
Department of Education (Curriculum Development Unit)

CDU PMB 9006 Port-Vila, Vanuatu

Tel: +678 23508

jmelteres@vanuatu.gov.vu

and

Hanna Sabass

GIZ Adviser on Climate Change and Education
SPC/GIZ Coping with Climate Change in the Pacific Island Region (CCCPIR)

German Technical Cooperation
Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH
Module 2, Level 3, Plaza 1,
Downtown Boulevard
33 Ellery Street, Suva
P.O. Box 14041, Suva

Tel: +679 3305 983; +679 3307 543 ext. 105

Fax: +670 3315 446

Email: hanna.sabass@giz.de

www.giz.de

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Abbreviations

BMZ	German Federal Ministry for Economic Cooperation and Development
CC	Climate Change
CCE	Climate Change Education
CDU	Curriculum Development Unit
DARD	Department of Agriculture and Rural Development
EE	Enterprise Education
ESD	Education for Sustainable Development
FEdMM	Forum Education Ministers Meeting
IAC	Industrial Advisory Committee (VNTC)
K-3, 4-6	Kindergarten to Year 3, Year 4 to Year 6
METEO	Vanuatu Meteorological Services (under VMGD)
MoE	Ministry of Education
MoYDST	Ministry of Youth Development, Sport and Training Vanuatu

NACCC	National Advisory Committee on Climate Change Vanuatu
NDMO	National Disaster Management Office
NGO	Non Governmental Organisation
PACE-SD, USP	Pacific Centre for Environment and Sustainable Development, University of the South Pacific
PCEP	Pacific Islands Climate Education Partnership
PEDF	Pacific Education Development Framework
PESDF	Pacific Education for Sustainable Development Framework
PHES	Pacific Heads of Education Systems
PICs	Pacific Island Countries
PIFACC	Pacific Islands Framework for Action on Climate Change
PIFS	Pacific Islands Forum Secretariat
PREL	Pacific Resources for Education & Learning
PRIDE	Pacific Regional Initiatives for the Delivery of basic Education
SERREAD	Scientific Educational Resources and Experience Associated with the Development of Argo
SEO	Senior Executive Officer
SI	Science
SS	Social Science
SPBEA, SPC	South Pacific Board for Educational Assessment
SPC	Secretariat of the Pacific Community
SPC/GIZ CCCPIR	SPC/GIZ programme 'Coping with Climate Change in the Pacific Island Region (CCCPIR)'
SPREP	Secretariat of the Pacific Regional Environment Programme
STEM, PREL	Science, Technology, Engineering and Mathematics - Pacific Resources for Education and Learning
TECCC	Training and Education Committee on Climate Change Vanuatu
TTCs	Teacher Training Colleges
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
USP	University of the South Pacific
VANGO	Vanuatu Association of Non Governmental Organisations
VITE	Vanuatu Institute of Teacher Education
VMGD	Vanuatu Metereology and Geo-Hazard Department
VNCS	Vanuatu National Curriculum Statement
VNTC	Vanuatu National Training Council
VQIS	Vanuatu Quarantine and Inspection Services
VRDTCA	Vanuatu Rural Development Training Centre
VTCs	Vocational Training Centres

1 Introduction, Workshop Overview and Background

On November 14 to 15 2011 a two day workshop on climate change (CC) education and disaster risk reduction (DRR) for curriculum writers for Kindergarten to year 6 (K -6)and the Vanuatu National Training Council took place at the Melanesia Hotel in Port Vila, Vanuatu. The workshops' aim was to enable curriculum writers (formal and non formal) for K-6 to develop learning outcomes (including knowledge, skills and attitudes) on climate change and disaster risk reduction and options for mitigation and adaptation in Vanuatu (Agenda see Annex I).

Specific objectives were to

- provide Vanuatu-specific messages on CC & DRR by local experts for inclusion in teaching/learning processes
- enable K-6 curriculum writers to understand impacts, vulnerabilities and adaptation strategies for CC and DRR in Vanuatu
- agree on an approach for integrating CC & DRR into curriculum that is appropriate, balanced, sensible, and builds on existing methods and content
- (start) determining the sequencing of CC & DRR messages in education
- begin the development of CC & DRR learning outcomes

The workshop was organised by the Curriculum Development Unit, Department of Education Vanuatu with support from the Secretariat of the Pacific Community (SPC)/ Gesellschaft fuer Internationale Zusammenarbeit (GIZ) GmbH program Coping with Climate Change in the Pacific Island Region (CCCPIR) on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), that is implemented in collaboration with the South Pacific Regional Environment Program (SPREP) and the University of the South Pacific (USP).

Participating were representatives of the Curriculum Development Unit and the Director of Education Services, New Zealand Aid Programme-funded technical advisers of the CDU, Vanuatu Meteorological and Geohazard Department (VMGD, whose director is currently chairing the National Advisory Committee on Climate Change (NACCC), National Disaster Management Office (NDMO), the Vanuatu National Training Council (VNTC), the Vanuatu Institute for Teacher Training (VITE), Save the Children and CCCPIR. (Participants list see Annex II).

At the first regional planning workshop on Climate Change Education (CCE) that was held on September 27 to 29 in Nadi, Fiji Islands, each of the five pilot countries Fiji, Kiribati, Samoa, Tonga and Vanuatu developed their plans of operations (with activities, responsibilities, timeframes, milestones). This workshop was one of the first steps to implement the activities defined (report and presentations see http://www.spc.int/lrd/index.php?option=com_docman&task=cat_view&gid=285&Itemid=48).

Climate Change Education is one of the six components of CCCPIR and started in June 2011 and will run until December 1015. Other components relate to climate change adaptation and mitigation in the natural resources sectors (agriculture, forestry, land use, fisheries and the environment), tourism and energy (see project brief at http://www.spc.int/lrd/index.php?option=com_docman&task=cat_view&gid=210&Itemid=48).

The Climate Change Education component aims to strengthen capacities of education ministries (including ministries in charge of technical and vocational education & training TVET), training institutions, schools and teachers to develop and deliver education on climate change adaptation and mitigation in Fiji, Kiribati, Samoa, Tonga and Vanuatu. This supports the overall objective of CCCPIR to strengthen the capacities of Pacific member countries and regional organisations to cope with the impacts of climate change (An outline of the rationale, objective, indicators and recommended areas of intervention is given in Annex III).

In Vanuatu Climate Change Education supports the Vanuatu National Curriculum Statement (VNCS) that addresses the need to educate children on climate change as one of the cross curriculum components on Environment and Sustainable Production:

“Every child and student needs to know how human interventions contribute to such occurrences as climate change, soil erosion, or the death of reefs which adversely affect the human environment and how these changes impact on human lives.

We need to ensure that:

- We harvest our land and sea in sustainable ways;
- Promote awareness of the fragility of the physical environment and how human activity affects it;
- Young people appreciate that the land and sea are finite resource.” (VNCS 2011)

At the regional level, the Climate Change Education component supports the Pacific Islands Framework for Action on Climate Change (PIFACC) Principle 4 on “Education, Training, and Awareness” and intends to increase the adaptive capacity of significant parts of the population by supporting the spread of adaptation knowledge. The threats of climate change to ecosystems are acknowledged under the crosscutting theme 5 “Education for Sustainable Development” in the Pacific Education Development Framework (PEDF) from 2009. The joint initiative on “Education for sustainable development: Integrating Climate Change into Pacific Educational Frameworks” (presented to the Pacific Heads of Education Systems Meeting in August 2011, Palau) is understood as the umbrella for our implementation and coordination efforts with other partners and programmes. The Pacific Framework for Food Security is also relevant especially with regards to TVET.

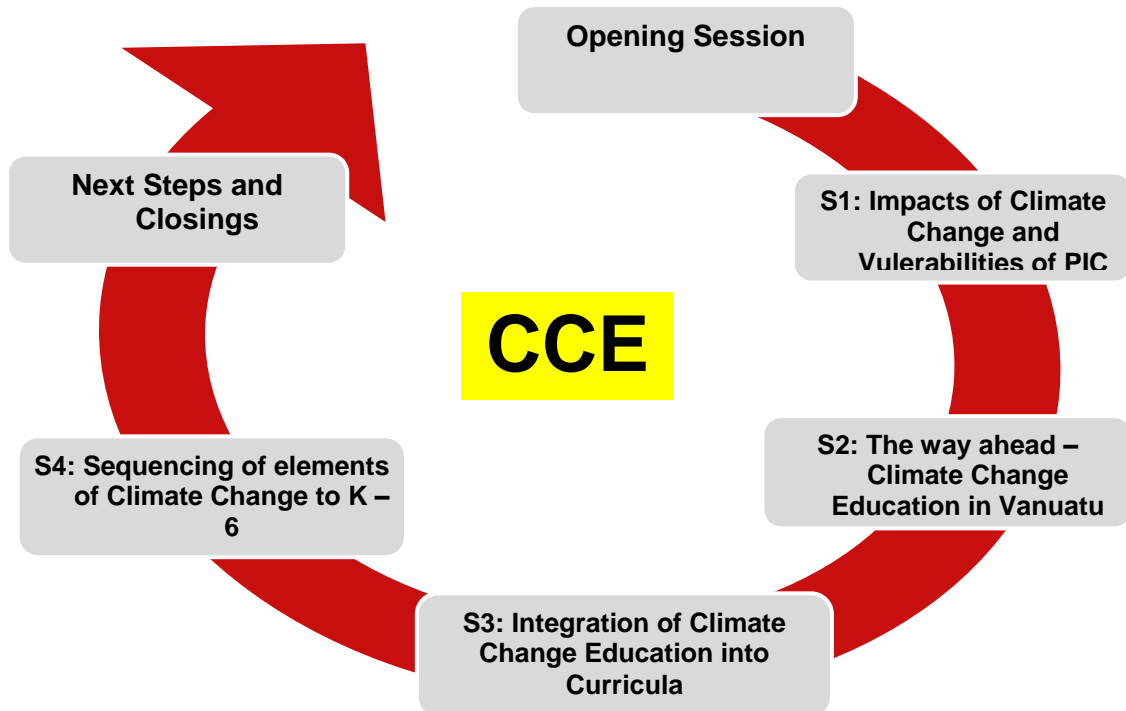
2 Summary of Outcomes

During two intense days the participants have

- Learned about the impacts of climate change in Vanuatu and the major concepts related to climate change: change phenomena, impacts, mitigation, adaptation and DRR.
- Been presented a first draft collection of key learning messages on climate change and DRR from officers within Vanuatu government departments: NDMO, VMGD, Department of Agriculture and Rural Development (DARD), Department of Forestry, Vanuatu Quarantine and Inspection Services (VQIS) and Department of Environment - this collection will be further completed on regional level).
- Learned about the activities and outputs on climate change education as defined by the Vanuatu representatives at the regional planning workshop held on Sep 2 to 29 2011 in Nadi, Fiji Islands.
- Discussed how to best integrate climate change and DRR in the new curriculum for K-3 and 4-6.
- Completed a first exercise on sequencing relevant concepts on climate change to K-3 and 4-6.
- Identified next steps to be taken to write learning outcomes, indicators and activities that relate to climate change.

3 Workshop Process and Outcomes

The workshop process was subdivided into four main sessions:



3.1 Opening Session

Participants were warmly welcomed by Mrs. Leisel Massigow, the Senior Executive Officer (SEO) of the Curriculum Development Unit (CDU) on behalf of Mr. Charley Robert, Head of the CDU and James Melteres, the National Secondary Curriculum Coordinator, CDU, who facilitated the workshop. The SEO acknowledge the presence of CDU, NDMO and METEO Staffs and few words of thanks to Hanna Sabass and Dr Christopher Bartlett for their financial support and their expertise in term of Climate Change.

Mr. Roy Obed, Director of Education Services, made an opening address. He said that Climate Change must be included in the National Curriculum for the first time to be taught in schools from kindergarden to year 13 throughout the country to make sure that children in both high islands and low lying islands know what it means and recognise the dangers that go with it and what to do to cope with it.

Dr. Christopher Bartlett (Technical Adviser Vanuatu, CCCPIR) and Hanna Sabass (Adviser on Climate Change and Education, CCCPIR) welcomed the participants and presented the objectives of the workshop and gave a brief overview on the agenda.

3.2 Session 1: Impacts of Climate Change and Vulnerabilities of Pacific Island Countries

This session started with a presentation by Dr. Christopher Bartlett (CCCPIR) on Regional Impacts of Climate Change and Vulnerabilities of Pacific Island Countries and Vanuatu (presentation see [here](#)).

This was followed by an in-depth presentation by Mr. Robsen Silas (Vanuatu Meteorological and Geohazard Department VMGD) on the Climate of Vanuatu – The observed Climate, Climate Variability and Change (presentation see [here](#)).

Participants were provided with the new country brochure “Current and Future Climate of Vanuatu” of the Pacific Climate Change Science Program (Australian Government) (brochure and full report see <http://www.cawcr.gov.au/projects/PCCSP/publications.html>).

In order to understand the idea of adaptation, something that is usually still missing in school curricula as it is a rather new field of expertise, participants were grouped and invited to “apply a children’s and students’ lens” by going into a scenario of a primary and secondary school boy and girl and a student receiving training at an agricultural college. Participants were asked to discuss possibilities to deal with the expected changes (scenarios see Annex IV). Further participants have discussed where and how they (as a student) can access information and support (see table 1 to 4).

The four groups were facilitated by Annette Theophile (Lecturer at VITE), Charles Pierce (Lecturer at VITE), James Melteres (Curriculum Coordinator CDU) and Dr. Christopher Bartlett (Technical Adviser Vanuatu CCCPIR).

Table 1: Primary School Child Scenario one

What are the actual climate changes? (Changes)	What are the impacts on the environment that the student will see and experience? (biophysical impact)	How does this affect the students' life, he family? (Socioeconomic Impact – Vulnerability)	What can the student and the family do to cope? (Adaptation)	Where and how can the student get support ant information? (Problem solving.....)
Extreme events (heavy rainfall)	Empecher de traverser la riviere Empecher le pparar al' aller pecher Landslide / chute de tarrain Mort des corauz cause por la bone – disparition des poissons	Affect health, inocme, coral reef, water source, ressources, water Not enough quality time with my famliy Hard to follow school	More study of traitional knowledge Relocation Plant drought resistant crops Change techniques to plnat crops Food preservation (traditional) No gardening near the river Rain water harvesting (water tank) Replant mangroves Find another job or start a small business Look after ccoral reef Marine reserve	Parents Traditional knowledge Teachers Meteo, NDMO NGO Province Government officers Health centres Chiefs MP Pastors Radio/ TV/ Video News papers Telephone Police/ VMF Climate Change projects
Sea level rise (Montee du niveau de la mer)	Affect mangroves - No crabs and fish Coastal erosion (erosion cotiere) Disrupt school			
Drought	Dry river Death of plants			

Table 2: Primary School Child Scenario two

What are the actual climate changes? (Changes)	What are the impacts on the environment that the student will see and experience? (biophysical impact)	How does this affect the students' life, he family? (Socioeconomic Impact – Vulnerability)	What can the student and the family do to cope? (Adaptation)	Where and how can the student get support ant information? (Problem solving.....)
Sea level rise	Playing ground submerged Wharf eroded Coral depletion Affect beach ecosystem	Activity change Homeless Less fish for food and income	Water sports (swimming, fishing, other activities) Relocate Replant of mangroves Look at sources of income	Media Schools Provincial centres Father (PND) NGOS Elders Traditional knowledge
Drought	Dry soil Plants die	Shortage of food and water Chagen building materials	Food preservation: eg food smoking, food drying	See above, and: DO Agriculature, Forestry,

What are the actual climate changes? (Changes)	What are the impacts on the environment that the student will see and experience? (biophysical impact)	How does this affect the students' life, he family? (Socioeconomic Impact – Vulnerability)	What can the student and the family do to cope? (Adaptation)	Where and how can the student get support ant information? (Problem solving.....)
	Forest fires Affect ecosystem	Homeless Effect health Reduced income (poverty)	Change crops (hybride) Traditional knowledge of food Water management (cycle) Chagen ways of cooking (no water)	Fisheries, Health

Table 3: Secondary School Child Scenario

What are the actual climate changes? (Changes)	What are the impacts on the environment that the student will see and experience? (biophysical impact)	How does this affect the students' life, he family? (Socioeconomic Impact – Vulnerability)	What can the student and the family do to cope? (Adaptation)	Where and how can the student get support ant information? (Problem solving.....)
Drought	Changes in forest ecosystem Loss of some species Soil erosion Changes in soil structure	Food shortage Water shortage Higher cost of transport and food Reduced income	Rely on money from family working overseas Rely on traditional food Delay schooing and look for alternative work in town Return to island	Agriculture NDMO VGMD Redd Cross Society and NGO M/P, local pastor, church, chief Live and Learn Community Support Groups Teachers/ School community Use internet access Climate change (Vango) office Vanwods Best for women centre
Flooding	Change in water quality	Poor communication between families	Consult agriculutre extention, find new crops or animal varieties that are adapted to drier or wetter conditions	
Temperature Increase	Change in crop yield Decline of crop Fungal disease increase More humidity	More home duties and less time to study Maybe fail her courses and not become a doctor Cannot visit family so often Los of job (father, mother, uncle) Affect on health (negative)	Use compost toilets Build more watr tanks Improve water drainage Form community groups for tree planting, recycling and wste disposal Community gardens using hydro ponics Give service to their community Informal employment Exchange of goods and services Traditional cyclone proof houses	
More intense cyclones	Damage to roads, landslides Rise in sea levels Damage from cyclones and winds Cost of travel increases Damage to marine resources			

Table 4: TVET Scenario

What are the actual climate changes? (Changes)	What are the impacts on the environment that the student will see and experience? (biophysical impact)	How does this affect the students' life, he family? (Socioeconomic Impact – Vulnerability)	What can the student and the family do to cope? (Adaptation)	Where and how can the student get support ant information? (Problem solving.....)
Changes in Temperature	Lack of water: crops dead, trees, livestock dead, people	Can't work from rain and hot tumas	Identrig work than can be done in rainy or hot times	
Changes in Rainfall	Flooding – heavy rain, soil erosion Cyclone: damage to environment, crops, etc.	Reef fish not available due to soil erosion on reef, impact on food security May need blo faerieern wok, long taon Bisnes blem bae i brok daon economic Home damage from cyclone: school, store Vector bourne disease w/rain May not have enough food Finding sufficient funds for family	Technology improvement: air conditions, protective cloting New sources of fish: water, river Grass and vegetation growth Create water resrvoir Control develoment near reef Mangrove and tree planting Provide climate resilient skills and training Provide support with cooperatives and trainings Business training for hazards (climate, vulcanoes) location specific	

After the group work Dr. Christopher Bartlett and Mrs Alice Iarem from the NDMO presented the collection of key learning messages on major concepts of Climate Change and Disaster Risk Reduction from Vanuatu government institutions (see Annex V). This collection is to be understood as a first draft. It was perceived as being very useful for curriculum writers as a resource, but still needs to be reviewed and further resources added. It was agreed that CCCPIR invites regional level experts to comment and add to the already existing draft.

A summary of major outcomes of discussions:

- It should be avoided to create a feeling of hopelessness or panic – instead the focus should be on accurate information and improving every student’s capacity and self consciousness of being able and well equipped to deal with expected climate change effects and disaster risks.
- To transfer the key learning messages to the curriculum it still needs a careful look at what exactly Vanuatu want their children to learn and what the underlying concepts are. It was generally agreed, that this is the task to be done by the curriculum development unit, once a more comprehensive collection of key learning messages and resources is provided.

3.3 Session 2: The way ahead – Climate Change Education in Vanuatu, the Pacific Island Region and CCCPIRs role

The approach of GIZ, the CCCPIR programme and its Climate Change Education component in the Pacific and in Vanuatu were presented by Dr. Christopher Bartlett (Technical Adviser Vanuatu CCCPIR) and Hanna Sabass (CCE advisor CCCPIR – presentation see [here](#)).

Annette Theophile (lecturer VITE) and James Melteres (Curriculum Coordinator CDU) presented the major activities (outputs) that were planned to incorporate climate change into the early childhood, primary and secondary education and TVET in Vanuatu, that were planned at the regional workshop on climate change education of CCCPIR, held Sep 27-29 in Nadi, Fiji:

1. Vanuatu's Education and Training Policies, Plans, Strategies and Frameworks incorporate relevant climate change elements
2. Teachers (formal and non formal) are trained on relevant climate change topics and practical applications during in service and pre service trainings
3. CC elements are consistently and appropriately integrated into formal and non formal curriculums across all relevant subjects at all levels
4. National steering, coordination and sharing structures for formal and non formal climate change education are developed and strengthened
5. Teaching materials and resources on CC are available, tailored to local contexts, and effectively applied in the formal and non formal sector
6. Enhanced Climate Change education is implemented on pilot site basis in select RTCs and schools

(Presentation see [here](#)).

As circumstances allowed, the presentation and validation of high-level learning objectives on climate change education was (originally planned in session 3) was done earlier: Hanna Sabass (CCE adviser CCCPIR) presented briefly the latest regional level developments on CCE that led to joint SPC, SPREP, USP, UNESCO, PCEP/PREL and GIZ concept note on EDUCATION FOR SUSTAINABLE DEVELOPMENT: INTEGRATING CLIMATE CHANGE INTO PACIFIC EDUCATIONAL FRAMEWORKS Annex VI) that was presented to the Pacific Heads of Education Systems (PHES) Meeting in August 2011 in Palau. Here, the objective of CCE is to:“....increase levels of knowledge on the causes and local impacts of climate change, international as well as regional efforts to deal with climate change, and to build capacity for local adaptation and mitigation measures in Pacific Island Countries. [...]

Specific objectives are to

- Ensure relevance
- build service providers' capacities to deliver accurate information, integrate local content & promote critical thinking
- increase individual capacity to take action on mitigation and adaptation"

After discussions on what "service providers" means¹ participants generally agreed to these objectives.

It was briefly discussed that the Ministry of Education plans to address climate change in the Vanuatu Education Road Map as a cross-cutting issue.

Hanna Sabass presented further how climate change and disasters are already captured in the new Vanuatu National Curriculum Statement (Ministry of Education 2011). First she stated that the paramount learning outcomes like caring, sharing and participating, being independent, solving problems, planning and managing very well support skills and attitudes needed to deal with the effects and uncertainties of climate change and disaster risks. Further she pointed out that the essential cross-curriculum component on environment and sustainable development contains climate change considerations, it says:

"Every child and student needs to know how human interventions contribute to such occurrences as climate change, soil erosion, or the death of reefs which adversely affect the human environment and how these changes impact on human lives.

We need to ensure that:

- We harvest our land and sea in sustainable ways
- Promote awareness of the fragility of the physical environment and how human activity affects it
- Young people appreciate that the land and sea are finite resource"

Charles Pierce (Lecturer at VITE) presented the new proposed programme for year 13 in development studies (a provisional, not compulsory programme) that teaches major concepts of climate change in its strand "development and environment": nature, causes, impacts, mitigation and adaptation. The outcome to be achieved by students reads:

"Explain the impacts of climate change and natural disasters on humans and the environment, and offer solutions and means for adaptation at local, national, regional and international scales."

Furthermore Charles Pierce presented how climate change is offered in the new harmonized programme at VITE in science and social science in pre- and in-service training and showed some examples of student-centred activities to foster learning about climate change (presentation see [here](#)).

3.4 Session 3: Integration of Climate Change Education into Curricula

Participants split into three groups to discuss how to integrate climate change education and disaster risk reduction into the current curriculum of K-3, 4 - 6 and TVET.

In the groups K-3 and 4 – 6 (primary education) it was agreed to integrate relevant concepts into yet to be developed learning areas and strands. Clearly no one preferred the idea to have climate change and disaster risk reduction as an additional learning area or subject. Instead it was general consensus

¹ – all providers of education regardless if in curriculum development unit, teacher training institutions, agricultural colleges, NGO that provide vocational trainings or schools and kindergartens

that many underlying concepts of climate change and disaster exist, that needs to be identified and sequenced according to age group. Of these some concept are most probably already covered, such as weather or environment. K-3 is quite progressed compared to 4 – 6 in the development of the new curriculum and had comparatively clearer ideas.

The TVET group discussed in depth how to integrate CC and DRR in the qualifications framework of VNTC and came up with the following steps:

- Set up an Industrial Advisory Committee (IAC) on CC and DRR to advice on CC & DRM area development
- Identify areas with competency standards to integrate CC and DRR: forestry, agriculture, tourism, fisheries
- The IAC identifies the appropriate qualification units and certificate levels. E.g. if compulsory, should be a core unit in all levels
 - Common units – knowledge on what is CC and DRR (impacts, adaptation)
 - Specialized units, e.g. fisheries impacts and specific adaptation options
 - IAC will determine appropriate qualification level
- VNTC or contractor will write unit identified by IAC
- IAC must request VNTC that CC and DRR are required before accreditation

Furthermore the following ideas were developed to be considered in the framework:

- Ensure providers have the capacity to teach (require training, material and need assistance)
- Avoid to have separate courses on CC and DRR: these topics will be integrated as units within existing courses
- Incorporate DRR and CC into business risk management
- Take forecasting advise and disaster warnings seriously
- Take advanced preparations
- Integrate and build on cyclone proofing: materials, design, building code, training on building code, traditional housing, digging, wall to ground
- Disease awareness
- Use cultural practices to prevent agricultural diseases: plants for root rot, yellow flower for cacao ring worm
- Report agricultural diseases and seek advice from Department of Agriculture
- Prevent disease transmission: spray, mosquito coils, net, tanna flower-smell, oil, traditional food/product exchange (barter system)
- Include food preservation techniques: island specific practices eg. Stink banana (1 year), meet preservation with salt, Navia (a Taro variety that grows in dry conditions) (6-7 months after harvest)
- Introduce knowledge on CC tolerant crops like 3 month kumala
- Teach about self sufficiency (not dependence)
- Strengthen community management of food sources
- Agriculture preparations: manioc branch cutting, planting in multiple locations
- Introduce or rise awareness on existing savings programmes
- Promote alternative income sources
- Find opportunity from hardship (carving trees)

3.5 Session 4: Sequencing of elements of Climate Change to K – 6

After the major concepts have been wrapped up (see table below), to sequence CC the following approach was agreed upon:

1. Take the five major concepts of CC
2. Split into four groups, two for K-3 and two for 4-6 to discuss the sequencing of CC
3. Compare with existing framework (if already there: great!; if not: include!)

The concepts presented in the table below are not exhaustive. Due to the great complexity of both CC and DRR and the limited time of only one day, DRR was not specifically addressed at this stage. DRR should be looked at again with the updated collection of key learning messages, as soon as it comes to the writing of the curricula. The purpose of this exercise was to let the curriculum writers for K to 6 in Vanuatu sequence some major concepts of CC according to their expertise of ni-Vanuatu curricula and teaching and to add new knowledge and concepts during their work as and if required.

Participants were asked to refer to the presentations of day one on causes, change phenomena and impacts (biophysical and socioeconomic, including the concept of vulnerability), the concepts and options for mitigation and adaptation and Disaster Risk Reduction, the collection of “key learning messages” from Vanuatu and the new proposed curriculum on development studies.

Causes of Climate Change	Change Phenomena	Impacts of Climate Change	Mitigation	Adaptation
Natural Causes Causes Naturelles	Changes in temperature Changement des temperature	Impact on Environment & natural resources Impact sur l'environnement et les ressources naturelles	Reduce Emissions Reduce les emissions	Food Security (Fish, Agriculture, Diversification of Income, ...) Securite Alimentaire
Human induced GHG Emissions Gas a effet de serre (CO2, CH4, ...)	Changes in rainfall Modification de precipitations	Vulnerability: Exposure, Povery, Gender, Sources of Income Vulnerabilite: Expose au risqué, Pouvrette, Gendre, Source de Revenue	Forests as carbon stocks Foret...	Relocate Amenagement
	Sea-Level Rise Augmentation du niveau de la mer	Impacts on Livelihood (Income, Health, Nutrition, ...) Impacts dans leur vie (revenue, santé, nutrition...		

The following example for sequencing was given by Hanna Sabass, based on Food Security, CC and Agriculture:

Year 2:

We grow plants to eat. Their growth depends on water, air, minerals and light. If some places are too hot or cold, too dry or too wet, plants don't grow. When weather changes, plants we use today may not live anymore. We can find other varieties of plants and new methods of planting, caring harvesting.

Year 5:

There are different varieties of taro. Variety A grows well in wet conditions, but does not grow well in salinated soil. Variety B is more resistant to drought. Precipitation resp. the number of days it is raining in a season change. So the most appropriate variety of taro has to be chosen.

First the participants split into four small working groups – two for K – 3 and two for 4 -6. Then the groups got together to share their outcomes and combine them to finally have one sequenced concept for K – 3 and one for 4 – 6. In the end all was shared and discussed in plenary.

CC concepts sequenced for K – 3

Both groups for K – 3 took the major concepts of CC and sequenced relevant concepts according to K, year 1, 2 and 3. The merged outcomes of both groups (each groups outcomes see Annex VII):

Groups 1 and 2 combined- Sequencing of CCE (and DRR) in the curriculum of K-3

Year	Causes	Phenomena	Impacts	Mitigation and Adaptation
K	<p><u>Natural</u> Night and Day (role of sun) Season (role of sun, hot, warm, dry)</p> <p><u>Human</u> Pollution – burning plastics, tyres, leaving open waste Cutting and killing trees</p>	<p>Elements of weather: wind, sun, cloud, rain Cyclones</p>	<p>Effect of drought (food shortage, water shortage) Effects of heavy rain (flood)</p>	<p>Respect for/ care of environment: no litter, use local shopping and lunch bags, traditional knowledge of environmental care RRR Planting of trees and flowers Identify clean water sources</p>
1	<p>Natural (as for K and daily cycle)</p> <p>Human (same as K) and three types of pollution (water, soil and air)</p>	<p>Elements of weather: wind, sun, cloud, rain, weekly (monthly) summary traditional knowledge on cyclones drought plant growth sea level</p>	<p>Drought Floods Effect on organisms Water supplies Other effects on environment Health</p>	<p>Respect for and care for environment RR Protection and management of water and energy resources Traditional knowledge of gardening and water conservation Traditional cycles Relocation</p>
2	<p>Natural Rotation Orbit of moon</p> <p>Human Three types of pollution Gases CO₂ and O₂</p>	<p>Measurement of Changes in temperature, rainfall and land cover Sea level change (tides) Soil texture</p>	<p>Changes in sea shore (erosion) Changes in plants and animals Loss of biodiversity Problems in health and nutrition</p>	<p>Respect for/ care of environment RRR Management of soil, forests, reefs Care of plants and animals Traditional methods of agriculture, fishing and animal husbandry</p>
3	<p>Natural Revolution Seasons Volcanoes</p> <p>Human Pollution</p>	<p>Measurement of change in temperature, rainfall, clouds, wind speed, wind direction Drought</p>	<p>Comparison of environment (now and before) Disturbance of water cycle Food shortages Disturbance of</p>	<p>Respect for/ care of environment RRR Multiple water sources Relocation Replanting of mangroves Family size and resources</p>

	Water cycle CO ₂ , H ₂ O, O ₂	Flooding Sea level change	ecosystems Changes in land use	Traditional food preservation and water preservation
--	-------------------------------------------------------------------	------------------------------	-----------------------------------	------------------------------------------------------------

(Comment CCCPIR: Regarding adaptation also modern technologies should be considered)

CC concepts sequenced for 4 – 6

The two groups for years 4 to 6 took different approaches. Group 3 followed a similar approach to K-3 and looked at the major concepts of CC to sequence relevant concepts to all years 4 – 6 together. Group 4 decided to start with the current Vanuatu curriculum for 4-6 and integrated relevant concepts of CC into its learning areas.

Later these two approaches were presented and compared and merged (see links [in blue](#)).

Group 3 - Sequencing of CCE (and DRR) in the curriculum of 4-6

I. Human Causes of Climate Change

A. Names of gases, Sources of Gases

(SI B) Integrate in chemistry and/or science (B Energy – green house gases and green house effect)

B. Green house effect

Relate amount of emission from each country and source (fraction/ proportion)

(SII) Integrate in Science – Interdependence (Pollution. Comment CCCPIR: Green house effect is not pollution; it is a normal natural phenomenon)

II. Natural Causes of Climate change

- Orbit rotation, angle of axis
- El Nino and La Nina
- Volcano
- Natural bush fires

* ! traditional belief (climate change is not only caused by human emissions)

(SI A) Integrate in Science I a Weather and Climate

III. Attitudes

- Control activities that contribute to climate change (Greenhouse gas emissions) (e.g. no tekem bus usum G II)
- Consider carefully decisions made each day
- Do things that uplift the quality of life
- CC is serious, but don't be afraid. We can do many things.

(SS I A) Attitudes should be integrated across the curriculum. Especially in Life Skills and Social Science: Our Roles and Responsibilities

IV. Change Phenomena

- Temperature (compare)
- Rain (recording of rainfall, measurement, create graphs)
- Wind (understand the strength of wind by using traditional terms to scientific)
- (Sun, Sea Level Rise)

(SI A) Integrate in Science Weather/Climate

V. Impacts of Climate Change

- Floods
- Droughts

- Cyclones
- Landslides
- Erosion
- Sea level rise
- ~~Earth quakes, tsunami~~ (Comment CCCPIR: an earth quake and tsunamis are relevant for DRR, but are not an impact or effect of CC)
- Bushfire
 - destruction of crops, houses, loss of cattle and human life
 - loss of income
 - affect on health

(SII) Integrate in Science: Interdependence, Agriculture

VI. Mitigation

- Recycling
- Composting toilet
- Reforestation
- Encourage use of local baskets and bags
- No burning of plastics, wheels, etc.
- Keep reef safe
- No dumping of rubbish into the sea, don't use traditional way of fish poisoning
- Increase knowledge of conservation (land and sea)

(SSI) Integrate in Social Science: Our Roles and Responsibilities (Mitigation)

VII. Adaptation

- Food security
- Plant crops that are suitable for the season
- Water security
- Relocation

Integrate in:

1. (EE) Enterprise Education (skills for new and innovative ways to make a living (sustainable planning))
2. (SS I & II) Social Science: Our Roles and Responsibilities and How Communities Work

Group 4 - Sequencing of CCE (and DRR) in the curriculum of 4-6

Current Vanuatu 4-6 Curriculum (Unified Curriculum, General Studies and CC ideas) Science

- I. Science
 - a. (SI) Energy
 - (A) Weather and Climate
 - ✓ Weather patterns:
 - ✓ Changes in temperature (CC)
 - ✓ Changes in rainfall (El Nino- drought, El Nina – floods)
 - Climate and Climate Change
 - ✓ Natural causes of CC
 - ✓ Human causes of CC

- b. (B) Energy
 - Conservation of energy
 - Different forms of energy (solar, wind, hydro-electricity)
 - Greenhouse effect (greenhouse gases, ...)

- c. (S II) Interdependence
 - Pollution: reducing emissions (no plastic and nappies, turn off lights, walk and bicycle)
 - Population
 - Reuse, reduce and recycle (RRR)
 - Impact on environment and natural resources (e.g. development of resources by sea, litter, deforestation, over fishing, more cars = more GHG emissions)
 - Conservation of forests, mangroves, reefs
 - Ecosystems (mangrove, reef, forest)

- d. (S III) Agriculture
 - Soil types
 - Growing vegetables and plants
 - How to plant particular crops – methods of planting
 - Rearing animals – chicken, pigs, goats
 - Methods of fising
 - Life Skills: problem solving, critical thinking, decision making, planning and management (Paramount Outcomes)
 - Adapting which crops according to weather and soil

- II. (SS IA) Social Science (Civics and Citizen)
 - a. Our Roles and Responsibilities
 - Understand role as global citizens
 - Role in village and urban areas to keep people working in healthy environment
 - Mitigation / responsible use of resources (links with Science, e.g. eco tourism)
 - Adaptation – take action

 - b. (SS II B) How Communities Work

Traditional methods of conservation, preservation of foods (comment CCCPIR: traditional and modern technologies are relevant)

- III. (EE) Enterprise Education (marketing)
 - Skills for new and innovative ways to make a living (sustainable planning)
 - Design, technology, management, budgets, market
 - Make and selling goods (cooking, craft, arts, plants, research)

Final presentation and discussion of sequencing outcomes

After all outcomes have been presented in the plenary, the following was discussed:

- Avoid a tiring duplication of concepts and the same time make sure in each year you repeat and expand relevant concepts
- This first step was perceived as useful and productive. It needs further detailed work and elaboration. As soon as the curriculum writers for year 7 to 13 are contracted, a more holistic sequencing shall be done

- Not everything needs to be called or re-labelled to climate change. It has to be ensured that basic concepts are taught and understood, such as weather, ecosystems, inter-relations between rain and the growth of plants and food
- DRR still needs to be looked at in further detail.
- Traditional knowledge is as important as modern techniques
- Children should be taken out of the classroom and be involved in activities in the field: plant, do observation projects, measure rainfall, etc.
- It needs to be clearly defined how much a year 6 student should have learned about CC and DRR
- Participants stress to have further consultation with stakeholders like NDMO, METEO and the Department of Agriculture, Livestock and Fisheries to be aware of some modern methods for crops, animals and environment sustainability.

3.6 Session 5: Next Steps and closing session

The following next steps were discussed and decided, given the fact that the curriculum for K-6 has to be submitted in June/July 2012.

Next steps by CDU	Possible input by CCCPIR on CCE and DRR	Agreement during final discussion
1. Research: What is in the current curriculum? Guided by VNCS. Compare with other curricula (NZ, New Caledonia, ...)	Take stock of what is already there. Compare to outcomes of CCE workshop (for more detail consult "key learning outcomes, Vanuatu policies, documents and resources provided on DVD)	Curriculum writers will take care of this. In case further support is needed, CDU contacts CCCPIR, NDMO, VGMD
2. Writing of outcomes	One to one advice, provide further resources	K-3 curriculum writers won't need support. 4-6 writers would like support (one to one). CDU will let CCCPIR know when and how best to support.
3. Consult with task group (teachers, principals, head teachers)	Prior to consultation conduct a half day awareness on CCE and DRR	CDU will brief task group on the plan and status of activities regarding CCE and DRR integration in curriculum
4. Writing of indicators and activities	One to one advice, provide further resources	K-3 curriculum writers won't need support. Writing is done now. 4-6 writers would like support (one to one). CDU will let CCCPIR know when and how best to support. Writing is done in 2012. CCCPIR provides assessment on existing resources on regional level.
5. Consultation within CDU	none	
6. Panel of experts (one	Provide critical expert	All agree on this. Before the

meeting for one subject, three to five days)	feedback (possibly through TECCC and/or CCCPIR – including SPC, USP, SPREP, VITE; other development partners)	Panel of Experts Consultation, syllabus can be sent to CCCPIR for advice.
7. Validation of outcomes with schools	None	CCCPIR would be interested in feedback regarding CC and DRR
8. Trialling	CCCPIR works with SPC SPBEA (South Pacific Board for Educational Assessment) on benchmarking and assessment on CCE and DRR	CCCPIR would be interested in feedback regarding CC and DRR CCCPIR informs SPC SPBEA about next steps (year 8, 10, 12 and 13 exams – outcomes of prescriptions are automatically inside. No need for extra assessment on CCE and DRR).

After several statements and moving appreciations of the workshop, the official was done by Mrs Leisel Massigiow, SEO Curriculum on behalf of the Director of Education Services of the Ministry of Education.

Annex I Workshop Agenda

AGENDA

NATIONAL WORKSHOP ON 'CLIMATE CHANGE EDUCATION' ORGANISED BY CURRICULUM DEVELOPMENT UNIT, Department of Education with support from SPC AND GIZ IN COLLABORATION WITH SPREP AND USP
Coping with Climate Change in the Pacific Island Region (CCCPIR)

Monday 14 – Tuesday 15 November 2011
Melanesian Hotel, Port Vila, Vanuatu

Time	Topic	Content	Methodology	Facilitation/Moderator
Day 1				
09:00	Opening session			
09:00		Devotion	Plenary	tba
09:10		Welcome address	Plenary	Charley Robert (Head of Curriculum Development Unit)
09:20		Opening address	Plenary	Roy Obed Director of Education Services
09:30		Workshop overview, objectives and procedures	Plenary	Christopher Bartlett (Technical Adviser CCCPIR Vanuatu) and Hanna Sabass (Adviser on Climate Change and Education, CCCPIR)
09:40		Introduction of participants	Plenary	Facilitators (James Melteres)
10:00	Morning Tea			
10:30	Session 1: Climate Change and Vulnerabilities of Pacific Island Countries (special focus on Vanuatu)			
10:30		Impacts of Climate Change and Vulnerabilities of Vanuatu and Pacific Island Countries	Plenary with PPT	Christopher Bartlett (CCCPIR) and Robsen Silas (Vanuatu Meteorological and Geohazard Department VMGD)

Time	Topic	Content	Methodology	Facilitation/Moderator
11:00		Understanding impacts of Climate Change and developing ideas how to reduce vulnerabilities from children's and students' perspectives	Group Work	Facilitators (Charles Pierce, VITE; Annette Theophile , VITE; James Melteres, CDU; Christopher Bartlett, CCCPIR)
12:00	Lunch			
13:00		Overview on most important areas of climate change and disaster risk reduction	Plenary, PPT	NDMO and Christopher Bartlett, CCCPIR
14:00	Session 2: The way ahead – Climate Change Education in Vanuatu, the Pacific Island Region and CCCPIRs role			
14:00		CCCPIR in Vanuatu and its role in Climate Change Education	Plenary, Q&A	Christopher Bartlett (Technical Adviser CCCPIR Vanuatu) and Hanna Sabass (Adviser on Climate Change and Education, CCCPIR)
14:30		Climate Change in Vanuatu's Education System	Plenary, Q&A	James Melteres (Curriculum Development Unit), Annette Theophile (VITE)
15:00	Tea			
15:30		Climate Change in the new proposed year 13 curriculum	Plenary	Charles Pierce (VITE)
16:00	Session 3: Integration of Climate Change Education into Curricula			
16:00		Presentation and validation of high-level learning objectives on CCE	Plenary	Hanna Sabass, CCCPIR
16:10		Discussion on how to integrate Climate Change Education into current curriculum of K-6, 7 – 13 (formal education) and TVET	Two Working Groups (Primary/Secondary Education and TVET)	Facilitators

Time	Topic	Content	Methodology	Facilitation/Moderator
17:00		Agreement on next steps, wrap-up and Outlook next day	Plenary	Facilitators
17:30		Devotion and End of Day 1		tba

Time	Topic	Content	Methodology	Facilitation/Moderator
Day 2				
9:00		Devotion		tba
9:10		Wrap up of last day and outlook today	Plenary	Facilitators
9:20	Session 4: Sequencing of elements of Climate Change to K – 13			
9:20		Sequencing elements of Climate Change to K – 6	4 working groups (two K-3, two 4-6)	Facilitators and resource persons
10:00	Morning tea			
10:30		Continued sequencing elements of Climate Change to K – 6		Facilitators and Resource Persons
12:00	Lunch			
13:00		Presentation of results and conclusions	Two Working Groups (K-3, 4-6)	Facilitators and Resource Persons
15:00	Afternoon tea			
15:30		Presentation and final discussion	Plenary	Representatives of k-3 and 4-6, Facilitator
17:00	Session 5: Next Steps and closing session			
17:00		Agreement on next steps	Plenum	Facilitators
17:15	Evaluation			Facilitators
		Devotion		tba
17:30	End			

Annex II Participants List

No.	Names/Nom	Position/ Institution <i>Statut/ Institution</i>	Contact no.
1.	Leisel Massigiow	SEO Curriculum	23508
2.	Melteres James	Secondary Curriculum Coordinator	23508/7755102
3.	Homu Susie	Secondary Curriculum Coordinator	5694570
4.	Dolores Maltaus	Basic Curriculum Coordinator	5423599
5.	Richard Jenkin	Senior Technical Adviser for K-13	23509
6.	Marguerite Cantwell	Technical Adviser for kindergarten to year 3	23508
7.	Barbara Hodgins	Technical Adviser for year 4-6	23508
8.	Etul Clementine	Writer for kindergarten to year 3	23508/7104017
9.	Cyske Louise	Writer for kindergarten to year 3	23508/5602578
10.	Naviti Lucy	Writer for kindergarten to year 3	23508
11.	Lixie Joe	Writer for kindergarten to year 3	23508
12.	Celine Telukluk	Writer for year 4-6	23508/5669977
13.	Marie Chanel Manwo	Writer for year 4-6	23508
14.	Helen Maleb	Writer for year 4-6	23508
15.	Charley Morrison	Writer for year 4-6	23508
16.	Eileen Gele Kanas	Writer for year 4-6	23508
17.	Annette Theophile	Secondary Science Lecturer	23099/7760513
18.	Charlie Pierce	Secondary Science and Social science Lecturer	23099
19.	Lidcha Nanuman	Primary Science Lecturer	5358861
20.	Willy Kalo	Primary Social Science Lecturer	23099
21.	Jerol Joseph Arnhambat	Co-ordinator Training Package	22134/7757770
22.	Emmanuel Aru Garaesivi	Co-ordinator Training Package	22134
23.	Antoinette Bihu	Inspector	7106062

24.	Peter Turnbull	Disaster Risk Reduction Officer	7101507
25.	Alice Iarem Sanga	Disaster Risk Reduction Officer	7774307
26.	Phillip Meta	Provisional Liaison Officer	7102243
27.	Noel Steven	Training/Awareness Officer	7750119
28.	Silas Robson	PSO-Research & Development Officer	24686
29.	Salesa Kaniaha	Manager, Climate Change	24686
30.	Mike Waiwai	Climatologist	24686
31.	Geoff Robinson	Manager, Humanitarian Program	22794
32.	Hanna Sabass	GIZ Adviser on Climate Change and Education (CCCPIR)	+679 3305 983 105
33.	Christopher Bartlett	SPC-GIZ Coping with Climate Change in the Pacific Islands Region (CCCPIR)	29594

Annex III Outline of CCCPIRs component on Climate Change Education COPING WITH CLIMATE CHANGE IN THE PACIFIC ISLAND REGION (CCCPIR)²

CLIMATE CHANGE EDUCATION

Background and rationale

The potential negative impacts of climate change are of utmost significance for the small island states of the Pacific Island region, in particular for communities inhabiting atolls or coastal lowlands. Many of the region's countries are already affected by climate change impacts. Likely future impacts may be lowland flooding, saltwater intrusion and coastal erosion, changing rainfall patterns, increased drought periods, increased cyclone frequency and intensity and rising sea level. Pacific Island Countries (PICs) have no alternatives but to effectively addressing climate change issues through adaptation and mitigation measures.

On the other hand, most Pacific Island countries have insufficient financial and human resources to deal with the multifaceted impacts of climate change, be it on a strategic policy level or on a concrete implementation level. PICs are especially affected by the growing gap between increasing vulnerability and the lack of capacities to cope with the adverse effects of climate change.

Many programs on Climate Change have been implemented by various regional and national stakeholders over the years and generated knowledge, experiences and best practices on local climate change impacts, local options for adaptation and mitigation, and on awareness rising.

Now is the time to start make this knowledge available to the general public, and particularly to those generations that will feel the more severe impacts of climate change in 30, 50 or even 70 years – the children of today. Education can and should play an active role to bolster people's ability and stimulate the next generation to demand, generate, interpret and apply information on current and future climate and to be able to cope with the challenges of global warming. This has been stressed by article 6 of the UNFCCC and at the UNESCO World Conference on Education for Sustainable Development, Bonn, 2009. To ensure relevance and effective learning, the deliverance of knowledge on climate change should be oriented towards local contexts and experiences and prioritize traditional knowledge on dealing with changes.

Therefore, national education ministries and local/regional experts on Climate Change should take the lead in incorporating global and local climate knowledge into national formal and non-formal educational systems (including TVET).

Major findings of the SPC/GIZ appraisal mission on Climate Change and Education in November 2010: While climate change was present in the secondary and partly primary school curricula, depth and focus differed in every country. The assessed curricula and teaching materials concentrate on understanding the greenhouse effect and the effects of global warming. Adaptation knowledge and skills to enable the learners with the ability to decrease their vulnerability seem to be largely absent from textbooks and curricula. Teacher's education was found to not provide adequate knowledge and skills to teach climate change issues to the depth and complexity needed. While some regional teaching material and teacher guides exist, these materials are often in English instead of local languages and lack integration with official textbooks and curricula. In the vocational training sector climate change was found to be largely absent.

² Details on the overall program see CCCPIR project brief:

http://www.spc.int/lrd/index.php?option=com_content&view=article&id=478&Itemid=44

Though education is not one of the key climate-sensitive sectors (OECD 2009), in small island countries that are highly dependent on natural resources, the education sector is likely to incur indirect impacts from climate change. If for example extreme weather events destroy harvests and the affected population suffers from food shortages, dropout rates from schools might increase. Or school infrastructure might be damaged. The education sector in PIC is usually part of the national committees on climate change. Climate change policies designed at national levels have to be translated into sector policies, planning and budgets and the focal points within the Ministries of Education have to report back to the national climate change committee about their activities and achievements. So far it has not been considered to mainstream climate change into existing education policy frameworks, strategies and planning processes.

In this context the Government of the Federal Republic of Germany through the Ministry for Economic Cooperation and Development (BMZ) has extended its commitment under the SPC/GIZ regional program 'Coping with Climate Change in the Pacific Island Region (CCCPIR)' by a component on education and climate change. This supports the Pacific Islands Framework for Action on Climate Change (PIFACC) principle 4 on Education, training, and awareness and shall increase the adaptation capacity of significant parts of the population through the spread of applicable adaptation knowledge. The threats to ecosystems caused by climate change are also acknowledged under the crosscutting theme 5 'Education for sustainable development' in the Pacific Education Development Framework (PEDF) from 2009. The anticipated programme component will therefore support the implementation of the PIFACC and the PEDF – and accordingly the Pacific Education for Sustainable Development Framework (PESDF) from 2006.

Climate Change Education within the context of CCCPIR is defined as the transformative deliverance of knowledge on global causes and local effects of CC and local/regional options for adaptation and mitigation - based on global and regional research results and practical adaptation and mitigation experiences in various programmes and sectors, such as agriculture, fisheries, forestry, tourism and energy and in local contexts (*knowledge transfer; to be discussed and finally defined by PIC, see also UNESCO Climate Change Education for Sustainable Development: <http://unesdoc.unesco.org/images/0019/001901/190101E.pdf>*).

Component 6 Climate Change and Education Objective

Capacities of education ministries, training institutions, schools and teachers are strengthened to develop and deliver education on climate change adaptation and mitigation in Fiji, Kiribati, Samoa, Tonga and Vanuatu.

Indicators of component 6

Indicator 1: By 2015 test results in social science (grade x), geography (grade x), agriculture (grade x) and economics (grade x) prove, that X% of secondary students have achieved learning outcomes in climate change (source: national assessment results or specifically designed test; baseline to be defined until mid 2012).

Indicator 2: In 2015 75% of all trained primary teacher students conduct one teaching unit or lesson hour on climate change during teaching practice (source: curricula of pre-service primary teacher training; survey)

Indicator 3: XX TVET institutions in three countries provide training modules on agriculture, fisheries and forestry with subject-specific climate change content (focus on adaptation) according to the national qualification framework (source: national qualification frameworks, training course syllabus and reports).

(Objective and indicators are set and agreed upon between SPC, GIZ and BMZ, reporting towards BMZ has to be done on this basis. However, this does not exclude the development of or alignment to other indicators)³

It is acknowledged that Climate Change Education is of utmost importance and relevance to all PIC. However, due to limited funding, the broad thematic scope and wide regional coverage of CCCPIR it was agreed to implement component 6 on Climate Change Education in five pilot countries only. Nevertheless, all outputs (like e.g. teaching resources, assessment approaches, modules for teacher education) and lessons learnt will be made available for all PICs. All interested development partners are invited to share expertise, join forces and push forward the issue of Climate Change Education.

Preliminary results chain/ strategic framework⁴

Education ministries and regional as well as national training institutions for primary and secondary teachers and vocational training will be advised on the integration of climate change into policies, strategies, curricula and assessment standards, taking the activities on Education for Sustainable Development into account. These institutions will be supported to develop and offer corresponding trainings and supporting material (inter alia local, gender differentiated impacts of climate change and specific adaptation knowledge. Experiences from various programmes on Climate Change will be utilized). USP will be supported to play a central role in the training of trainers for the national institutions. Policies and guidelines for vocational training will be complemented with climate change aspects focussing on subject specific adaptation knowledge (outputs). Education ministries take climate change into account for their policies and strategies and ensure in cooperation with the training institutions that climate change is integrated into assessment standards, curricula and syllabi. Vocational training institutions supplement their training modules with expert adaptation knowledge. Teachers use their new methods, knowledge and training material on climate change (use of outputs). This leads to the following direct result: Capacities of education ministries, training institutions, schools and teachers in Fiji, Kiribati, Samoa, Tonga and Vanuatu are strengthened to plan and deliver education on climate change adaptation and mitigation.

Recommended areas of intervention³

Policy level: On the policy level the integration of climate change into regional and national education strategies and curricula can be supported. Major curriculum development exercises are currently carried out and provide a good entry point to sharpen the topic of climate change adaptation (linkage to component 2 on mainstreaming CC).

Primary schools: The pre-service training for primary teachers can be supported to equip the teachers with the skills to educate the learners on the causes of global warming and especially how responses can be developed. A feedback mechanism to incorporate local knowledge and lessons from community adaptation projects shall provide examples and link global warming to local livelihoods. The development of relevant teaching material in the taught language can be supported. Through the regional approach an exchange of teaching practices between the countries would provide the teaching institutions with access to best practices and tested approaches.

Secondary Schools: For the secondary teachers an in-service training on teaching climate change adaptation is proposed. The institutions carrying out in-service training could be supported in this (universities and colleges, curriculum specialists). The support could include the development of teaching units and lesson plans. It is envisaged to revise the prescriptions of assessments for year 13 to include adaptation to climate change in selected subjects (through SPC-SPBEA).

³ Science might be included in indicator 1

⁴ to be discussed and developed with relevant stakeholders at the planning workshop in September 2011

Technical and vocational training and education: The national quality assurance authorities for TVET training in the countries could be supported to integrate climate change into their national qualification frameworks. Trainings for training providers in the countries enable the integration of climate change knowledge into relevant technical trainings. Links to SPC's TVET programme and the SPC/SPBEAs Pacific qualification register will be elaborated in the planning process.

Schools in action: Extra-curricular activities could be supported at school level. This can encompass actions like drama on climate effects, field trips, competitions and actions in and around the schools to improve their 'climate readiness'.

Implementation

The Climate Change component supports mainly education institutions (ministries of education, ministries of youth and employment, teacher training institutions, schools and providers of vocational training).

SPC is the main implementation partner on regional level of the overall programme CCCPIR. Within SPC the SPBEA and CETC are the two functions charged with an educational mandate. The Climate Change component will be implemented in partnership with USP and SPREP.

CCCPIR generally welcomes and appreciates exchange and cooperation with further partners and supports regional efforts for climate change education.

The regional and national plans of operations (activities, responsibilities, time frame, resources) will be developed together with relevant stakeholders at the regional planning workshop in the end of September 2011.

Annex IV Scenarios to apply a students' lens to climate change

Primary Boy

You are a 9 year old boy attending primary school. You walk 3km to school each day with others from your village. You have to cross a river on your way and if it is a hot day you sometimes stop to have a swim with your friends after school.

You have one younger sister and one older brother and at the weekends you often go with your brother to set traps for crabs in the mangroves. Your mum works at the local nursing station assisting the nurses and your dad is a fisherman. When he catches more than the family needs he sells his fish at the market. This helps to cover your school fees. When you leave school you want to be a boat captain.

Primary Girl

You are an 11 year old girl attending primary school. You live in a provincial center in the islands. Your dad works for public works in the province and your mom stays at home. You live in a timber house built by the province many years ago, that sits right at the end of the main wharf. On the weekends, you and most of the other girls play volleyball down near the beach, and sometime you and your friends take out a neighbour's canoe to fish on the reef. You like to help your mom and dad planting in the garden behind your house. One day you would like to work on one of the cruise ships that sometimes comes to visit your island.

Secondary

You are a 15 year old girl attending secondary school. There is no secondary school in your village, so you have moved to your uncle and aunt's house in a town on the main island. You are the youngest of 5 children. One brother still lives in the village with your parents and helps to look after the crop plantations. Your other brothers and sisters are all working on the main island or overseas.

Every three months you return home during the school holidays. You take a bus, a boat and then walk 5km. Your mum works for a small virgin coconut oil company. Your dad is a wood carver and you take handicrafts back to town which are sold to tourists by your uncle. Your aunt works for the ministry of environment and is not at home much because she has to attend many conferences and workshops.

After finishing school you want to study to become a doctor.

TVET

You are a 24 year old woman studying at Agriculture College. Before starting the course you were working with the youth group in your community to start a small agricultural enterprise making jams which were sold to a shop in town. You grew up helping your parents with farming and fishing and are now keen to learn about modern practices too. Because of your academic achievement there is a certain respect for your opinion in the community. When you finish college you want to start your own business or apply for work at the Ministry of Agriculture.

Annex V Draft Collection of Key Learning Messages on CC and DRR from Vanuatu

**CLIMATE CHANGE MESSAGES FOR VANUATU CURRICULUM
Vanuatu Meteorological and Geohazard Department VMGD, National
Disaster Management Office NDMO, Departments of Agriculture,
Forestry, Environment, Lands and others**

DRAFT 14 NOVEMBER 2011

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4 The Science of Climate Change

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (E.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
Understanding weather, climate and weather variability	<p>Climate is the average weather in a place over many years. While the weather can change in just a few hours, climate takes hundreds, thousands, even millions of years to change.</p> <p>Weather is what the forecasters on the radio predict each day. They tell people about the temperature, cloudiness, humidity, and whether a storm is likely in the next few days. That's weather! It is the mix of events that happens each day in our atmosphere. Weather is not the same everywhere. It may be hot and sunny in one part of the world, but freezing and snowy in another.</p>	<p>Differentiate between weather and climate and understand weather variability</p> <p>Be able to identify certain crops, animals and activities that are suitable to Vanuatu climates, and suggest how climate change may change these activities,</p> <p>Climate is the main factor determining the livelihood of people in Vanuatu that makes us differ from other countries with different climate. Climate influences our decision on garments we wear, when to fish and plant, what structure of house to build and the choice of materials use and other daily activities. The climate also negatively impact our livelihood and knowing our current climate impacts coupled with our climate future will enable us to greatly reduce the impacts and minimise its risk and our vulnerability and build resilience among our communities.</p>	<p>Students should accept that daily or weekly weather patterns do not necessarily signify major climate changes or shifts</p> <p>Climate change is not always bad, there are many positives that can come with a different climate.</p>	<p>“Current and Future Climate of Vanuatu” – Pacific Climate Change Science Programme</p>	<p>Practice daily weather data collection or weather observations, and then make seasonal observations to observe climate.</p>
Atmosphere and climate	The atmosphere controls the amount of the sun's energy that stays on earth	Describe the role the atmosphere plays in creating and modifying the earth's climate.	El Nino and La Nina are normal part of Vanuatu climate variability, and their impacts do not always signify climate change	El Nino and La Nina brochures published by VMGD	= current proposed Vanuatu curriculum on development studies for year 13
	<p>El Nino and La Nina are common and regular climate driving phenomena that affect Vanuatu</p> <p>El nino –dry and cool conditions for Vanuatu, often drought</p> <p>La nina- wet and warm conditions</p>	<p>Be able to interpret and act on El nino/ La nina advice coming from the Meteo Office.</p> <p>Know food crops susceptible to different ENSO events</p> <p>Food preservation techniques during ENSO events</p>	Meteo can predict, with relatively good accuracy, what kind of climate conditions we will experience up to 6 months in advance. This should be used for decision making and advanced preparation	<p>www.meteo.gov.vu</p> <p>brochures on el nino, la nina and agricultural decisions- SPC-GIZ</p> <p>www.elnino.noaa.gov/</p>	

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	for Vanuatu, often flooding	Planting techniques during ENSO events How to utilise climate related information from VMGD to impact decision making Before you start planning for an activity, consult the VMGD to know generally about possible climate in the next few months or years. With that information, you will know when, where and how to plant in your garden, or what type of infrastructure to build. Planning for future using correct information is the best options to meets expected results		Published papers on climate are available on google scholar with very few on Vanuatu. Possible climate futures of Vanuatu will be available soon and will be made available for this.	
Temperature	Temperature follows annual and daily cycles, and is relatively predictable. Measuring temperature at different times of the day will yield differences, average temperature for a certain island takes into account these cycles Hot and Wet Season: November-April Dry and Cool Season: May-October	Describe different temperature regimes/patterns for different islands in Vanuatu Describe different rainfall regimes/patterns for different islands in Vanuatu Farmers and fishermen should make decisions based on climate conditions, not on the expected climate of any particular month.	Study and appreciate different climatic graphs for various stations. Climate patterns are not always set, cold periods can occur at any time.	Cc Science in Vanuatu Presentation- S. Kaniaha. Ppt.	= current proposed Vanuatu curriculum on development studies for year 13
Climate Drivers	In Vanuatu, climate is controlled by many factors, and variability comes from well known drivers:	Know and understand the following climate drivers: Intertropical convergence Zone (ITCZ) South Pacific Convergence Zone (SPCZ) Frontal system Subtropical Highs Walker circulation Madden Julian Oscillation(MJO) Pacific Decadal Oscillation (PDO) ENSO events	Not all climate variability is human caused climate change, some of the drivers of climate occur on naturally long cycles, and the variability is normal		
Rainfall	Rainfall is inherently	Know what to do when the Meteo	Rainfall can be positive and		

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	<p>unpredictable, depends on multiple factors</p> <p>Rainfall in Vanuatu is heavily influenced by the climate drivers listed above, especially the SPCZ.</p> <p>The SPCZ is a band of heavy rainfall, caused by air rising over warm waters where winds converge, resulting in thunderstorm activity. It extends across the South Pacific Ocean from the Solomon Islands to east of the Cook Islands. During the wet season the South Pacific Convergence Zone intensifies and moves further south, bringing higher rainfall to Vanuatu.</p>	Offices Offers an advisory regarding the rainy season.	<p>negative for people in Vanuatu, it provides drinking water and nourishes crops.</p> <p>Negative consequences arise when: 1. There is a drought or lack of rain. 2. There is flash flooding – excessive rainfall in a short period of time. 3. There is water logging flooding- continuous rainfall over a long period of time</p>		
Cyclones	<p>Cyclones are a natural part of Vanuatu Climate</p> <p>Vanuatu receives more cyclones than any other part of the Southern Pacific</p> <p>There is no clear scientific consensus on whether climate change is affecting the number and intensity of cyclones.</p>		Cyclones are and have been a normal part of climate in Vanuatu, and we need to find ways (and remember traditional ways) to cope with their impacts		
Natural and human factors that cause a changing climate	There are various factors leading to climate change, some are natural, some are human induced.	Ability to describe factors that influence the earth's climate	Be informed about causes of climate change and understand humans must control their actions	IPCC ...	
Climatic change		Study nature and causes of climate change.	Identify areas affected by climate change activities in Pacific islands.		= current proposed Vanuatu curriculum on development studies for year 13
Role of CO ₂	Carbon dioxide is a normal part of the atmosphere. It is not pollution, but large quantities can change the way the earth keeps heats.	Describe the role of CO ₂ in the atmosphere.	<p>Explain reasons for increasing CO₂ levels in the atmosphere.</p> <p>Realize that CO₂ is not always bad, but plays an important</p>		= current proposed Vanuatu curriculum on development studies for year 13

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			positive role in the earths human environment.		
Milankovich cycle: Long term changes to earth/sun orbit and orientation			Not all variability and change is due to human causes		
Short term cycles drive regional weather variability: El Niño -Southern Oscillation - ENSO			Things that happen in Australia and the rest of the pacific can influence Vanuatu weather. Vanuatu is part of a larger climate system.		
Changes in albedo and solar radiation					
Increased greenhouse gas concentrations as the most important contributor to recent global warming	<p>Greenhouse gas emissions come mostly from burning fossil fuels, but also from cutting/burning/clearing forests and bush, and also from agriculture practices, and changes to land use.</p> <p>Most scientists agree that humans are causing the increase in greenhouse gas concentrations</p> <p>There are many gasses that cause global warming, CO2, methane, silicon dioxide, water vapour and others. Some of these are more powerful than CO2.</p> <p>In Vanuatu, volcanos also contribute greenhouse gasses to the atmosphere.</p>	People in Vanuatu should know that their activities also contribute to climate change, it is not just the big developed countries. Things they do, like burning rubbish, clearing forests and burning gardens also contribute to greenhouse gas emissions.	<p>The chemicals that create problems for the ozone are not always the same as those that cause global warming and climate change. There is a difference between ozone and greenhouse gasses.</p> <p>Vanuatu students should feel a responsibility to reducing emissions in their own home and community. We are all a part of the global system and we all have a role to play.</p>		
Predicting future climate change	Global climate models are the best tools for understanding future climate change. Climate models are mathematical representations of the climate system that require very powerful computers. They are based on the laws of physics and include information about the atmosphere, ocean, land and ice.	Understand the major possible scenarios for the future, an industrial world based on fossil fuels, a world based on renewable energy, a world based on low carbon services	It is our decision what kind of future we want. Humans have the power to change to future if we can agree and work together.		

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Greenhouse Effect	The greenhouse effect is a natural phenomenon, and is a positive thing for humans. Without the greenhouse effect, the earth's climate would be too extreme for life.		Some greenhouse gasses are good. But too much, a lot of what humans put in the atmosphere, is changing how we live. We should feel bad and think twice about contributing these gasses unless very necessary.		
The Earth's atmosphere (including ozone layer)	The ozone blocks harmful sun rays and keeps them out. Greenhouse gasses trap heat energy inside.				
Types of greenhouse gases, their concentration and measurement	There are many kinds of greenhouse gasses, some are natural and some are man-made. Many are more powerful than CO ₂ .	Be able to identify the sources of the various greenhouse gasses, and make efforts to diminish the most powerful and unnecessary emissions	Have an attitude of stewardship, to reduce the amounts of GHGs they personally emit from their daily life. Walk or ride a bike to work, don't burn the hillsides without a good reason, take a canoe not a boat		
Natural processes and human emissions that enhance the greenhouse effect	...Pacific Island Countries' greenhouse gas emissions largely come from the agriculture and forestry sector.	Know how to do agroforestry, growing food inside the forests	We should keep our forests as healthy as possible, because when we burn and cut them we release GHGs into the atmosphere		
World and Pacific greenhouse gas emissions by sector			Know which activities emit the most GHGs and try to reduce these activities or find alternatives.		

5 Global, Regional Pacific and Vanuatu Impacts of Global Warming

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (E.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
Intergovernmental Panel on Climate Change (IPCC)	A major international body exists which is the global scientific authority on climate change. One or two studies is not enough to prove climate change, but this body collects studies, and results from around the world and hundreds of scientists.	Know where the future climate projections come from, and know that these projections are only guesses, not exact predictions.	Have an open mind to science, and see it as a way to find the answers that we need. Sometimes science is wrong but through ongoing questioning we will eventually find good answers. Science takes time and makes mistakes.	http://www.ipcc.ch/	
Projections of future climate change	We don't know what is going to happen in the future, it depends on if humans can reduce and control emissions, it also depends on how the atmosphere and oceans react to more CO2. We use climate models to help us predict what will happen, but these models are not perfect and only give us a rough idea for planning.	How to make best guesses of the future based on a collection of current facts	Future climate is uncertain, but projections can help us plan. We should not always completely believe or completely not believe a model, it is to help us think about the future possibilities.		Give students several observations about things happening today and ask them to guess what will happen tomorrow. Show them that sometimes their guesses are wrong, but with a good set of facts they can often guess the right answer.
Sources of Information: research with corals, ice cores, trees etc.					
Global Climate Changes					
Global average warming	Global warming is not just about average temperatures. It causes changes in Vanuatu like Hot nights. Extreme highs during the day. Hot days. Some parts of the world are warming faster than others. Vanuatu is not warming as fast as the polar regions.	Make the link between temperature and the life of organisms in Vanuatu: growth of plants, health of animals.	Vanuatu is changing, but other places may be changes even more, and the consequences are even greater.		
Melting of ice on poles	Melting is occurring, but is not the primary cause of sea level rise in Vanuatu, most rise is due to thermal expansion Much of the coastal erosion that Vanuatu is seeing is due to tectonic movements and not to	People should understand that the coast is in a constant state of flux and should attempt to place development away from the most vulnerable areas.	Coastal places are dynamic, and often not suitable for development and infrastructure. Land is eroding and has been eroding and accreting for thousands of years.		

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	sea level rise. Much erosion is also caused by unsustainable development practices (cutting mangroves, mining sand and coral, building on the coast)				
Changed rainfall patterns	Rainfall has already been measured to be changing in Vanuatu. But some places have been getting more rain while others are getting less. Changing rain depends on things like mountains, local winds and	Know how to build water storage and irrigation infrastructures.	Every effort should be made to store water and practice water conservation in times of drought . Humans controlling the rain has never been scientifically proven, although many people in Vanuatu believe this practice.		
Retreating of ice sheets and glaciers	Breaking of glaciers could mean very rapid increase in sea level, but this is not yet certain. The slow sea level rise is due mostly to thermal expansion	Pay close attention to coastal erosion, and observe when most erosion happens (during storms etc), and also when sea level appears to stay the same.	Things that occurring in other parts of the planet will affect livelihoods in Vanuatu.		
Increase in extreme weather events	It is not possible to state that a certain extreme event was caused by climate change. Rather climate change can contribute to the increased occurrence of extreme events.	Make a note of the extreme events that are causing problems currently, and make plans to solve these problems in the future if many more of these events were to happen. Build on existing coping strategies	Not every flood, and every drought is 'climate change;		
Ocean acidification	The ocean is becoming more acidic as ocean water absorbs CO ₂ . This is causing problems for many marine organisms including the coral reefs of Vanuatu. Ocean acidification is not directly dangerous to people. Humans cannot see when the water is become more acidic.	Recognize when the coral reef is dying and there do not seem to be any major problems (disease etc). Recognize that reefs are very sensitive to changes of the water, and most of the changes are caused by humans (toilets and waste, soil erosion, overfishing, dumping rubbish).	Some of the changes that are occurring are invisible, and we cannot see when natural resources are being damaged and stressed. We can't wait until signs start showing up before we take action, otherwise it will be too late.		
Mean sea level rise (20cm since 1870)	As ocean water warms it expands causing the sea level to rise. The melting of glaciers and ice sheets also contributes to sea-level rise.	Be able to observe when sea level appears to be rising over time, and take note of and report of any major erosion problems	Sea level is rising everywhere, and it is important to start planning now for coastal protection or shift development away from the coast.		

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Climate Changes in the Pacific				Link to regional research and information platforms...	
Increases in average and extreme temperatures: Average temperatures changed by 0.1-0.2° C per decade since 1970	Annual maximum and minimum temperatures have increased in both Port Vila and Aneityum since 1950. At Bauerfield Airport in Port Vila, maximum temperatures have increased at a rate of 0.17°C per decade and at Aneityum the rate of increase has been 0.18°C per decade.	Be able to hear and understand when weather services report high and low temperatures.	Temperature is already increasing in Vanuatu. Climate change isn't a future problem, it is a problem of TODAY.		
Changes to the seasonal and annual distribution of rainfall: Varies across the region - complex picture; Southwest Pacific 15 % drier; Central Equatorial Pacific 10-15% wetter	Since 1950, Port Vila has had decreasing wet season rainfall. However, there are no clear trends in annual and dry season rainfall at Port Vila or annual and seasonal rainfall at Aneityum. Over this period, there has been substantial variation in rainfall from year to year at both sites.	Take note of extreme rainfall events, report these to authorities, and make decisions on cropping and resource use based on observations and projections of rainfall	Rainfall highly determines what activities we undertake. Water security should be a priority for planning.		
More extreme weather events: No observed change in cyclone frequency but increased intensity (more category 4&5 cyclones) over the last 30 years	Tropical cyclones affect Vanuatu between November and April. The number of cyclones varies widely from year to year, with none in some seasons but up to six in others.	People should plan to experience cyclones during this period, including taking the recommended precautionary measures. Infrastructure and buildings can be built to be stronger by using the right materials and designs.	Cyclones are a normal part of Vanuatu climate, but how much they impact our lives depends on how much we plan and are prepared for them.		
Sea level rise: regional variability	Instruments mounted on satellites and tide gauges indicate the sea level has risen near Vanuatu by about 6 mm per year since 1993. This is larger than the global average of 2.8–3.6 mm per year. This higher rate of rise may be partly related to natural fluctuations that take place year to year or decade		High tides, storms and cyclones are often more important drivers of coastal erosion than the slow increase in sea level from thermal expansion or ice melt.		

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	to decade caused by phenomena such as the El Niño				
Changes in salinity of coastal aquifers					
Rising sea temperatures	Sea Surface temperature increase can lead to coral bleaching	Manage reefs and other natural resources carefully (close tabu areas) when the sea is very hot	The reef needs to be carefully managed, especially when it is stresses, during very hot times.		
Changes to pest and disease regimes	Like all living things, pests and diseases grow and change according to climate. Some pests and disease like more rain some like hotter weather. Climate change will change the growth, reproduction and distribution of these organisms.	Keep an eye out, and report any new pests and diseases or outbreaks of old ones.	Pests and diseases can be controlled, but require proactive management		
Changes in carbon dioxide concentrations	CO2 concentrations are not poisonous to humans CO2 can make plants grow faster (but they become less nutritious)		Recognize that CC is not always negative		
Ocean Acidification	About one quarter of the carbon dioxide emitted from human activities each year is absorbed by the oceans. As the extra carbon dioxide reacts with sea water it causes the ocean to become slightly more acidic. This impacts the growth of corals and organisms that construct their skeletons from carbonate minerals. These species are critical to the balance of tropical reef ecosystems. Data show that since the 18th century the level of ocean acidification has been slowly increasing in Vanuatu's waters		Be aware that not all changes are visible to humans, when we see the impacts it is often too late for the resource.		

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Uncertainties	Climate projections are not perfect visions into the future. We know that changes are happening, but we don't know how they will continue into the future.		We never know what will happen in the future, we can only make the best educated guesses		
Impacts of Climate Change on the Pacific Island Region and Vanuatu					
Impacts of Climate Change in Vanuatu on Food Security (agriculture, fisheries, forestry), Health, Ecosystems, Infrastructure, etc.					
Food security and poverty	Climate changes the amount and quality of food that is grown	Describe the effects of climate change on agricultural productivity and food security.	<p>People should be aware of changes in the amount of food that is available, and quickly find alternatives to find any gaps.</p> <p>Planning will ensure that there is never a major food or water shortage.</p> <p>Dont wait until the last minute to start preparing, planting and making changes to nehabaviour.</p>		<p>Participate in a seminar on strategies for food security.</p> <p>= current proposed Vanuatu curriculum on development studies for year 13</p>
... put here only increase in extreme weather events... general. Details on hazards under "hazards and risks"					

6 Hazards and Disasters

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Hazards and Disasters	A hazard does not automatically end in a disaster.	Distinguish between hazards, vulnerabilities, risks and disasters.			

	It is everybody's responsibility to reduce the disaster risks...				
Tropical Cyclones	...Date of Cyclone Season-Nov-April Alert levels	Be able to track the cyclone (Cyclone tracking map) Define the Measures to undertake during cyclone	An automatic recalls	(Book, brochure web page, Media)	(Include inside the current curriculum development for formal and informal education system).
Volcanoes	Types of volcanoes and their negative impacts	Be able to identify appropriate measures to reduce the risk.	Aware of the danger.	(E.g. Book, brochure, web page, government departments	(Include inside the current curriculum development for formal and informal education system)
Droughts	Factors of drought s	Define droughts and their effects	Understand the environment.	(E.g. brochure, Web page, media ,government department	Include in the student case study curriculum.
Floods	Understand different types of flood.	Better prepared to reduce the risk	Gain understanding of flood prone areas.	E.g. brochure, Web page, media ,government department	(Include inside the current curriculum development for formal and informal education system).
...Tsunami	Types of tsunami	Actions to undertake			

7 Vulnerability and Risks

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Vulnerability	Climate Change will happen, but we are only vulnerable to it if we don't plan well and don't have the right kind of development. People can live through cyclones and sea level rise if we can adapt.	Know how to identify the parts of our lives and communities that are most vulnerable to climate change (coastal roads, the elderly people, crops on steep slopes etc)	If we change our behaviour and the places that we do development, we can make ourselves less vulnerable.		
Human Dimensions of Climate Change/Disasters and Vulnerability					
Gender	Women and youth are often the most vulnerable to climate change	Find ways to make it easier for women to adapt to climate change	Everyone has a responsibility to help those who bear the biggest burden. Dont only think of yourself, but think of everyone in the community.		
Poverty	Poor people, or people without many resources can find it harder to adapt to CC. Adaptation will				

	take some money, some time and some materials				
Population Growth	Growing populations put pressure on natural resources. The more people there are, the more resources are stressed by overuse and will not be able to tolerate climate change.		Think about sustainable limits to resource use. Conservation and Taboo areas can help to reduce pressure from overuse.		
Human Rights					

8 Responses to Climate Change and increased Disaster Risks

8.1 Global policies and strategies to respond to Climate Change and Disaster Risks

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (E.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
UNFCCC	A major convention on Climate Change that Vanuatu has ratified. The majority of the countries in the world are now working together to fight climate change		Working together is the best way to solve problems. We can solve Vanuatu problems by working with countries from around the world.		
UNISDR					

8.2 Regional policies and strategies to respond to Climate Change and Disaster Risks

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (E.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
PIFACC	A Regional convention to deal with climate change in the Pacific		Sometime Pacific Island countries have special issues that we can approach by banding together.		

8.3 National policies and strategies to respond to Climate Change and Disaster Risks

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (E.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
National Forest Policy	Includes information on species to plant for adaptation and also on carbon credits for carbon storage	Know how to engage in carbon credit schemes, and be aware of false investors	Carbon credits do not make a lot of money, only help people get by through forest protection.		
Environment Act	EIAs can help to improve development projects that will be very vulnerable to climate change, or projects that will not enable adaptation	Know the rules for having EIAs done on development. Know which department controls EIAs and climate checks: Environment	All development should be screened for climate concerns		
Foreshore Development Act	Some development on the coast will be very vulnerable to climate change. The FDA helps to control development in the coastal zone.				
NAPA	The National Adaptation Programme of Action is a major government document that lists Vanuatu's climate change adaptation priorities.		The government wants to help us to adapt to climate change, and many solutions can already be found in national documents.	NACCC- Meteo	
NAP	National Action Plan on Disaster Management. Gives a plan for government to coordinate disaster management and include disasters in financial planning			NDMO	

8.4 Options for mitigation in Vanuatu

8.4.1 Understanding mitigation

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (E.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
Carbon credits	Landowners and communities can earn money by protecting forests, because standing forests are storing carbon Companies and overseas governments will pay people to store their carbon emissions in forests	Understand how carbon credits work, and what is required to get money.	People should not expect to get rich from carbon credits There are many investors who are stealing land and not telling the truth about carbon credits. People should get advice from the government before they sign any deals with investors.		

	Carbon credits is a small amount of money, and requires many thousands of hecatares of forests				
	There is no system in place yet for Vanuatu people to earn money from carbon credits				

8.4.2 Renewable Energy and Energy Efficiency

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information available at...	Additional Remarks, Ideas on methodologies, etc.
Energy Sources and Use of Energy	...	Differentiate between energy sources in Vanuatu that produce more or less carbon dioxide.	Advocate for low carbon lifestyles.		

8.4.3 Natural Carbon Stock Management

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (e.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
Carbon Storage and Sinks	Keeping our forests helps storing carbon!	Describe how forests and oceans are storing carbon.	Advocate for maintaining forests.		
Blue Carbon	oceans store carbon	Describe how carbon is stored in the ocean and its impacts on the Ocean	Advocate for maintain ace of coral ecosystem		

8.5 Options for adaptation in Vanuatu⁵

8.5.1 Understanding adaptation

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?)	Concept and Skills (What should your child, the farmer, fishermen or forester ... be able to do?)	Attitude (What kind of attitude would help your child, the farmer, fishermen or forester ...?)	References, more information, contact... (e.g. book, brochure, web page, government department xyz...)	Additional Remarks, Ideas on methodologies, etc. (e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...)
Adaptation	Adaptation is changing behaviours to reduce the impacts	Know that adaptation can be big or small, it can be hard or soft, and be free	Everyone can do adaptation, no matter where you come from or		

⁵ Sectors were chosen according to the departmental setup of Vanuatu. This might vary across countries. After Vanuatu other countries might want to follow this approach and adjustments will be discussed and edited as far as possible by CCCPIR.

	of climate change on people's lives The government has prioritized adaptation, climate is changing no matter what Vanuatu does, and so Vanuatu people have to find ways to cope with the changes	of costs billions of vatu Know where to get advice and information on adaptation options and strategies	where you live		
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8.5.2 Agriculture

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Production	The best way to adapt to CC is to increase agricultural productivity. Plant more crops. Plant different kinds of crops in case one suffers more from climate change Plant different varieties of a single crop in case one is more tolerant to climate change Find ways to store and better preserve agricultural produce Practice farming systems that will improve productivity (ally cropping , fallow improvement)	Identify climate tolerant and resistant crops Know the methods and technologies for food preservation Know the methods and technologies for improved farming systems	We can practice better agriculture to make it more productive and climate resilient. Changing agricultural practices is OK, even if it goes against custom timing and calendars. With climate change we need to alter the way we do things, even kastom activities need to be adjusted		

8.5.3 Livestock

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Production	The best way to adapt to CC is to increase livestock productivity. Grow more animals	Identify climate tolerant and resistant animals	Mixing different varieties of livestock may be a good way to help them adapt to climate change		

	<p>Grow different kinds of animals in case one suffers more from climate change</p> <p>Grow different varieties of a single type of animal in case one is more tolerant to climate change</p> <p>Find better ways to keep and hold animals in better shelters</p>	<p>Know the methods and technologies for animal growth and reproduction and shelter building</p>	<p>(e.g. mix wild with domesticated pigs)</p>		
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8.5.4 Forestry

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Trees and Adaptation	<p>Trees can provide shade for decreasing temperature</p> <p>Trees hold moisture in the soil in times of drought</p> <p>Trees serve as windbreaks during storms that protect houses , gardens and animals</p> <p>Trees provide fruit and nuts for food security</p> <p>Trees keep top soil in place and prevent erosion through their roots</p>	<p>Students should know how to plant and maintain trees, and know their adaptive properties</p>	<p>Trees and forestry is one of the best approaches to climate change adaptation</p>	<p>Forestry brochures at Dept of Forestry</p>	
	<p>Climate change can alter the flowering fruiting seasons of key tree species, and also the quality of the fruit.</p>	<p>People should be aware of when the flowering and fruiting occurs and how this might be linked to temperature and rainfall</p>			

8.5.5 Fisheries

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Fish Movement	Some fish, like tuna, will move from place to place according to the temperature of the ocean. Scientists think that climate change will make tuna move away from Vanuatu and further east into the Pacific.				
Coral Reefs	Coral Reefs will bleach when the temperature of the seawater is too high		When bleaching occurs, the reef is very sick, and extra care should be taken not to damage it.		
Mangroves	Mangroves help to protect the coast from waves and storm surges. Mangroves also help to prevent erosion with their large roots	People should know about the benefits of mangroves and how to plant them for climate adaptation	Mangroves are helpful for many reasons and should never be cut down to make room for development. Mangroves are protected by Vanuatu laws.		

8.5.6 Lands

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Land Use Planning	Appropriately using land, and planning for good use of land is one of the best ways to adapt to climate change. Planning in advance where to place development will help reduce ni-Vanuatu's vulnerability to hazards and disasters.	Know the steps necessary for land use planning including: consideration of existing resources (forests, soils, water and fauna), consideration of ideal development, consideration of risks, and finally making tradeoffs among possible land uses. Know where to get information and source expertise on Land Use Planning	Land is a finite resource, and cannot be used without proper management and planning.	Department of Lands, "Tok abaot Graon" poster and brochure series. Contact: Department of Local Authorities, Shefa provincial Office and Dept of Lands.	Have children imagine a scenario, family with a certain number of children, an island with a certain number of resources, and a climate change/disaster regime. Ask them to plan where and what to develop their family for the future.

8.5.7 Environment

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Soft Climate Change Adaptation and Mitigation	Importance of Mangroves as an Ecosystem and not just trees: including food security, material security, climate change protection, erosion control, windbreaks, nursery habitat for fish etc.	Know how to plant mangroves, considering the different types of mangroves and where they grow.	Advocate towards the protection of mangroves as they are among the most carbon rich forest species. Hold a conviction never to cut down mangrove forests, or only to cut mangroves if others are being replanted immediately in the same place.	Nature Geoscience, IUCN ,	Practical exercise, field trips, etc...
Protected and Conservation Areas	Role of Conservation and protected areas in carbon Mitigation, by protecting forests, we can keep carbon locked away and safe from going back to the atmosphere.		Advocate for Protected and conservation Areas In communities		
Waste Management	Burning of rubbish must be done in a controlled and sensitive way, There are some materials that should not be burned because they pose a health and climate change risk.	Know how to make a safe waste disposal area, and know which materials to burn and which to bury.	Keep community areas clean, and not to throw rubbish in areas not intended for it.		
Coastal vegetation Management	Understand the role of coastal vegetation in protecting shorelines from climate change.	Know which coastal species to plant that will survive on the coast, and the attributes of these species including salt tolerance and root structure.	An attitude to keep coastal areas covered with as much vegetation as possible, and not cut or clear existing coastal forests to make room for development.		
Sustainable development	Understand the importance of Sustainable Development, or development that does not compromise the environment.				
Ozone Depletion	What are Ozone Depleting substances and their impacts on the atmosphere				

8.5.8 Water Supply

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>e.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>e.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Water Supply	With changing rainfall patterns, it is important to be able to store and have available as much water as possible in case of a droughts	Know the different types of and how to build the different water storage and supply systems	While we depend on the rain, humans can develop storage systems that helps them always have as much water as they need.	Dept of Geology and Mines, manual and water system design	
	Small scale irrigation can greatly reduce the vulnerabilities of gardens and crops to climate change	Know how to build and maintain small scale irrigation systems			
	Extreme events associated with climate change can often damage water systems, it is important to prepare systems if advance warning is given (e.g. cyclone)	Know how to prepare water systems for an extreme event (e.g. remove spouts from water tanks, protect the source of underground supply etc).	We should take extra precaution with our water when an extreme weather event is expected.		

8.5.9 Disaster Risk Management & Reduction

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Climate & Disaster	Many disasters are not influenced by climate change (earthquake, volcano, tsunami etc). Some disasters are climate related (cyclone, flooding, drought, disease)	Know which disasters are climate related and which are NOT related	Climate change can contribute to disasters but it does not cause ALL problems facing Vanuatu		
	By preparing for and getting ready for disasters we are already starting to adapt to climate change				

8.5.10 Health

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Disease	Many disease are caused by	Know which diseases are climate	Climate change affects everything	Ministry of Health brochures	

	vector organisms that respond to climate variables (malaria-mosquito-water availability & boils-bacteria-temperature)	related, and how to prevent or treat these	including human health		
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8.5.11 Quarantine

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Pests and Disease	Many pests will grow better in new climate conditions of Vanuatu (e.g. laplap leaf disease). It is important to keep a lookout for new pests and diseases and report these to authorities as soon as possible		Pests and disease need to be managed by humans, otherwise they will cause even bigger problems. Don't ignore signs of a new pest and disease.		

8.5.12 Infrastructure and Public Utilities (Construction)

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Design	There are certain designs of building houses, roads and other infrastructure that are more tolerant to the impacts of climate change	Know and explain how various designs are more or less tolerant to climate change (e.g. dirt road versus sealed road)	People should build the strongest and most resilient type of infrastructure, and not try and cut out important features in order to get something done quickly and cheaply. It will cost more in the long run and may even be dangerous.	Public works department, manual on CC resilient construction (PACCC project).	

8.5.13 Tourism

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Tourism in Vanuatu	When there are major extreme weather events in Australia and New Zealand, the number of	Know the appropriate designs and locations for tourism infrastructure	Tourism can be a way to sustainably use resources, and protect forests and coral reefs.		

	<p>tourists to Vanuatu will decrease. This shows that climate change affecting other parts of the world will also affect tourism in Vanuatu.</p> <p>Tourist travel contributes to climate change through greenhouse gas emissions (flying on planes and travelling on cruise ships)</p> <p>The impacts of climate change in Vanuatu may make our islands less attractive for tourists (eroded beaches, bleached coral reefs, lack of water supply).</p> <p>We should not place tourism infrastructure directly on the coast as this will be vulnerable to climate change, and may also be dangerous for our guests</p>		But tourism must be managed well.		
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8.5.14 Energy

Content (Overarching topic) (Sub-topic) (current proposed year 13 curriculum)	Key learning messages (<i>What from your field of expertise do you want your children, a farmer, a fisherman or a forester ... to learn?</i>)	Concept and Skills (<i>What should your child, the farmer, fishermen or forester ... be able to do?</i>)	Attitude (<i>What kind of attitude would help your child, the farmer, fishermen or forester ...?</i>)	References, more information, contact... (<i>E.g. book, brochure, web page, government department xyz...</i>)	Additional Remarks, Ideas on methodologies, etc. (<i>E.g. teaching methodology, link to community activity or ongoing data collection, NGO, best practice...</i>)
Renewable energy	Solar, wind, hydro and geothermal energy can all reduce greenhouse gas emissions	Know how to build and design and the costs of establishing small scale renewable energy	We should all strive to use as much renewable energy as possible in our lives	Energy Unit brochures	
	Burning fuel wood emits greenhouse gasses. There are more efficient stove designs that better use the heat from wood and ensure that we use less wood	Know designs for more efficient stoves			
	We should replant areas that are harvested for fuel wood	Know how to replant with appropriate spacings and species	While forests do grown naturally, people should help to replant areas that are heavily used.	Dept of Forestry Brochures	

Annex VI EDUCATION FOR SUSTAINABLE DEVELOPMENT: INTEGRATING CLIMATE CHANGE INTO PACIFIC EDUCATIONAL FRAMEWORKS

*An initiative under the Pacific Education for Sustainable Development Framework
(endorsed by FEdMM September 2006)*

Background

The United Nations adopted the Decade of Education for Sustainable Development (2005-2014) in 2004 and appointed UNESCO as the lead agency. Sustainable development is seeking to meet the needs of the present without compromising those of future generations. It is a vision of development that encompasses populations, animal and plant species, ecosystems, natural resources and that integrates concerns such as the fight against poverty, gender equality, human rights, education for all, health, human security, intercultural dialogue, etc. Education for Sustainable Development (ESD) aims to help people to develop the attitudes, skills and knowledge to make informed decisions for the benefit of themselves and others, now and in the future, and to act upon these decisions. Due to its potential impacts in this broad spectrum, climate change is an area of key importance in the Pacific region.

The Pacific Ministers of Education adopted the Pacific Framework for Education for Sustainable Development in 2006, with the following goal:

To empower Pacific peoples through all forms of locally relevant and culturally appropriate education and learning to make decisions and take actions to meet current and future social, cultural, environmental and economic needs and aspirations.

The Pacific Education Development Framework (PEDF) identifies ESD as one of several cross-cutting themes. Priorities under Cross-cutting Theme 5 are: course material and sustainability content development in school and Technical & Vocational Education and Training (TVET) curriculum; incorporation of ESD principles in Pacific Regional Initiatives for the Delivery of basic Education (PRIDE) and Forum Education Ministers Meeting (FEdMM) mechanisms; and mainstreaming ESD approaches into teacher training programs. Support to educational initiatives on climate change and disaster risk reduction are key areas of sustainability content in education that will help to equip today's students with the necessary knowledge and skills for sustainable futures in the face of the potential impacts of climate change.

In 2005 the Pacific Forum Islands Leaders⁶ endorsed the Pacific Islands Framework for Action on Climate Change 2006-2015 (PIFACC) with the goal of ensuring that Pacific Island peoples and communities build their capacities to be resilient to the risks and impacts of climate change. Raising awareness, along with other education and training activities, are of utmost importance to deliver the expected outcomes.

The Pacific islands are highly vulnerable to the impacts of climate change due to their small isolated nature, food insecurity, and limited basic services. The majority of the Pacific's

⁶ The Pacific Forum Island countries are the Cook Islands, the Federated States of Micronesia, the Fiji Islands, Kiribati, the Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, the Solomon Islands, Tonga, Tuvalu and Vanuatu

populations live in coastal areas and therefore impacts such as sea level rise, increased storm surges and cyclones have direct and sometimes severe impacts on Pacific communities.

Changes that have already been experienced in the Pacific include an average temperature increase of 0.6° C, changes in rainfall patterns (some places drier and others wetter) and sea level rise of between 5 and 10 cm since 1990. The incidence of extreme weather events has also increased in some parts of the Pacific. Current predictions based on maintaining existing levels of greenhouse gas emissions indicate further increases in all of these impacts. Some of the key impacts likely to affect Pacific communities are reduced freshwater resources, increases in vector-borne diseases decreased agricultural yields, changes in ocean fish stocks, reduction in biodiversity and the increased occurrence of floods, droughts, and other extreme events.

Pacific island nations are responding to these impacts through their National Adaptation Plans of Action (NAPAs) focused mainly on assisting Pacific communities to respond to the changes that are happening. Developing an understanding about climate change in the community is essential to achieving these adaptation targets. Climate change education is supported by the PIFACC, especially principle 4 on 'Education, Training and Awareness' to "ensure Pacific island people build their capacity to be resilient to the risks and impacts of climate change".

There is also a strong regional consensus for the integration of climate change adaptation and disaster risk reduction work at all levels, including education. At the recent Pacific Platform for Disaster Risk Reduction (August 2011), a roadmap toward integration was developed. The strong links between the two make it practical to do this and therefore it is proposed that this should be the approach taken with regards to education in the Pacific.

Introducing Climate Change Education (CCE) through formal schooling, informal learning, and awareness activities can and should play active roles in stimulating the next generation to demand, generate, interpret, and apply information on current and future climate, and bolstering peoples' abilities to cope with the challenges of global warming and build adaptive capacity. This has been stressed by article 6 of the United Nations Framework Convention on Climate Change and at the UNESCO World Conference on Education for Sustainable Development, Bonn, 2009. To ensure relevance and effective learning, the deliverance of knowledge on climate change should be oriented towards local contexts and experiences, and should prioritize traditional and indigenous knowledge of dealing with changes, as emphasized in the guiding principles of the Pacific Islands Climate Education Partnership (PCEP)⁷.

As several Pacific-based organisations and partners (see Annex A) are currently working on relevant CCE issues, this paper is a collaboration as a first step in the development of a more cohesive and strategic approach.

Why Climate Change Education and what has been happening to date?

Climate change education is not necessarily new: much of the underlying scientific knowledge has long been part of school curricula across the Pacific. Similarly, awareness programs on climate change have been implemented in many places and with a wide variety of target groups from the media to women's growers' groups. Governments, regional agencies, development partners and civil society have all been active climate change educators for some time.

A key difference with the introduction of future CCE programs will be that linkages will be built both among the various earth systems (energy, matter, life; economic, ecological) and between

⁷ See Appendix A.

the scientific and applied knowledge underpinning climate change and relevant cultural, social, and economic consequences and responses. Pacific knowledge systems are rich in information about coping with environmental change, something that Pacific Islanders have been doing for hundreds of years. Adaptation may be about introducing new crops, migrating to a different island, or establishing new sources of drinking water. The integration of the various technical areas will assist with applied knowledge and increasing understanding, especially where that content builds on traditional and local knowledge and situations.

In addition to content, building skills in policy makers, teachers and teacher trainers is critical. Policy makers need to understand how to manage their school infrastructure (climate-proofing), reduce greenhouse gas emissions, and provide an educational environment that will meet the nation's capacity needs for the future. The quality of education is fundamentally linked to the ability of teachers. Providing adequate training and tools for teachers is therefore a key element to implementation.

Children are the Pacific communities of the future who are going to have to directly deal with the effects of climate change. They are also the decision-makers, practitioners and teachers of the future. Building understanding in this group through education programs will have benefits for assisting Pacific communities to live fulfilling, sustainable and just lives.

For the decision makers of the present, enhancing non-formal education programs through media, networking, and partnerships is also important. Increased "climate literacy" among all actors will benefit communities, governments, research institutions, and everyone living in the changing environment of the Pacific. Further, in the non-formal education sector, various groups are presenting climate change differently to community groups, sometimes with conflicting information. There is a gap between existing climate change knowledge, community climate change education and implementation of climate change projects in the Pacific. Further, with climate change financing coming in the form of programmes/projects with a capacity building or educational component from various sources, how will these interventions support a strategic approach?

Some ministries of Education in the region have long included segments on much of the underlying knowledge necessary to understand causes and effects of climate change, adaptation and mitigation. Key areas include units on weather, climate, water cycles, the atmosphere, biodiversity and aspects of chemistry and physics. Some countries have developed this further by the introduction of specific educational programs on climate or with aspects relevant to climate change such as SEREAD (Samoa) and Sandwatch (Cook Islands). Other government ministries are also actively involved in CCE, either through a technical advisory role to their Ministries of Education, or through their own awareness programs. These include ministries responsible for natural resources, environment, agriculture, fisheries, forestry, health, and youth.

Universities in the region have also sought to develop and strengthen the fundamental science necessary for understating climate change as well as mainstreaming of aspects of climate change into a range of other subject areas. This has resulted in some climate change courses and programs such as the University of the South Pacific's Post Graduate Diploma in Climate Change, Master of Science in Climate Change (MSc CC), and Doctor of Philosophy (PhD) in Climate Change programs.

Regional and international agencies have played a supporting role in some of these projects through funding, technical advice and resource materials. The key agencies involved to date have been Pacific Association of Technical and Vocational and Training (PATVET), PCEP, the Secretariat of the Pacific Community (SPC) through their partnership with GIZ (German Department for International Cooperation), the Secretariat of the Pacific Environment Programme (SPREP), the United Nations Educational Scientific & Cultural Organization

(UNESCO) and the University of the South Pacific (USP) (see Annexes A and B). In addition there is a significant body of knowledge generated over the last few years relating to our understanding of climate change in the Pacific, and practical adaptation and mitigation actions. There is a significant amount of regionally relevant information available via the internet and through outreach programs by agencies working on climate change. The inclusion of this knowledge into regional and national education systems would be of value.

Civil society efforts are more dispersed and conducted by a large number of other global, regional, and local NGOs. The types of NGOs range considerably from those with environmental concerns, educational concerns or business concerns, and others such as media groups and the Pacific Conference of Churches. There are even groups with dedicated web portals such as www.climatechangeeducation.org based in California.

See Annex B for a table highlighting existing and planned areas of work.

Developing a strategic and collaborative approach to Climate Change Education

As many of the current CCE initiatives have been developed separately, the need to collaborate and coordinate the activities has been identified; for example UNESCO and PCEP have independently inaugurated quite parallel endeavours for systemic, comprehensive climate change education in the South and North Pacific regions respectively. Also, initiatives for climate change under the umbrella of PIFACC and for education for sustainable development under PESDF can benefit from enhanced coordination and ensure synergies for the countries. This can be achieved through establishing a more strategic approach of shared goals, objectives, and coordination among contributing activities. In addition, the active participation and support of Ministries of Education and Ministries in charge of climate change are critical to achievement of the goals and all activities, and are implicit in all of the points outlined below.

The overall goal of establishing a climate change education initiative in the Pacific is to increase levels of knowledge on the causes and local impacts of climate change, international as well as regional efforts to deal with climate change, and to build capacity for local adaptation and mitigation measures in Pacific Island Countries.

The specific objectives of this initiative are to:

1. ensure that relevant aspects of climate change are included in formal and non-formal education in Pacific island countries at all levels
2. enhance opportunities to increase knowledge and understanding of climate change in a coordinated manner through the non-formal sector
3. build service providers' capacities to deliver accurate information, integrate local content, and promote critical thinking about climate change
4. increase individual capacity to take action on mitigation and adaptation

Priority Areas

Baseline

1. Establish current levels of climate change knowledge, beliefs and teaching practice amongst curriculum developers, principals and teachers
2. Establish current level of content on climate change and related topics in curricula
3. Establish current availability of accurate, localised educational resource materials related to climate change

Policy

1. Develop a school sustainability model handbook for mitigation and adaptation at country level
2. Develop national non-formal education policies and/or implementation strategies to include climate change into existing and proposed non-formal education activities
3. Mainstream relevant climate change considerations into education sector policies, strategies and legislation and strengthen education ministries' engagement with national climate change coordinating committees in each country

Curriculum

1. Develop a framework of key messages and learning content for all age groups, to provide Pacific students with a good knowledge and understanding of climate change
2. Adapt the generic framework by linking it directly to national curricula and develop supplementary materials where gaps are identified
3. Review content relevant to climate change in courses of various sectors such as agriculture, fisheries, energy and forestry
4. Develop curricula in areas where gaps have been identified
5. Develop a climate change training module and/or integrate climate change into existing modules for Community Employment & Training Centre (Women's Community Development Workers' course at SPC)
6. Develop and enhance specialised courses on climate change-related topics for university students
7. Develop country-specific community-based toolkits for engaging communities in relation to disaster management and climate change adaptation activities

Assessment of Learning

1. Develop assessment standards and tools for measuring understanding of climate change in secondary school students in selected subjects

Teacher training

1. Develop a pre-service module on integrating climate change for primary school teachers
2. Develop a series of pre-service modules on climate change or integrate climate change content into existing modules for secondary school teachers aligned to relevant subject areas
3. Integrate ESD and climate change within in-service training programs for primary school teachers
4. Integrate ESD and climate change within in-service training programs for secondary school teachers

Educational resources

1. Develop and disseminate widely story books / readers with relevant content for all age groups
2. Collect, develop, adapt and introduce educational resources with local content relevant to climate change and the Pacific for use in primary and secondary schools
3. Collect, develop, adapt and introduce training materials for Technical and Vocational Education and Training (TVET) and Non-Formal Education (NFE) such as the *Adapting to a Changing Climate* materials recently published by the Micronesian Conservation Trust and others
4. Collect, develop, adapt and introduce educational resources with local content relevant to climate change and the Pacific for use in universities targeted at teacher students and all other relevant areas of tertiary education

Monitoring & Evaluation

1. Review climate change knowledge, beliefs and practice in curriculum developers, principals, teachers and communities on a periodic basis
2. Collect and analyse educational results of secondary students in relation to understanding of climate change

3. Survey teaching practice for use of climate change materials, coverage of topics and effectiveness of teaching strategies
4. Develop a methodology to measure adaptive capacity in the Pacific context

Draft Recommendations

It is recommended that the PHES:

1. **endorses** the formation of a working group including national stakeholders (Ministries of Education, Ministries, agencies and committees in charge of climate change coordination, Teacher Training Colleges, NGOs) to develop the framework to be ready for endorsement by the next Ministers of Education Meeting and Pacific Climate Change Roundtable;
2. **endorses** the draft goal and objectives as the basis for developing the framework and priority areas;
3. **agrees** to the presentation of the draft Pacific Climate Change Education Framework at the UNESCO Small Islands States Climate Change Education Conference in the Bahamas, 20-22 September 2011; and
4. **agrees** to the presentation of the draft Pacific Climate Change Education Initiative at the CCCPIR regional planning workshop on Climate Change Education with representatives of regional organisations and of Kiribati, Fiji, Samoa, Tonga and Vanuatu in Nadi, Fiji, 27-29 September 2011.

Annex IV-A: Some climate change education initiatives in the Pacific

Pacific Association of Technical and Vocational Education and Training's (PATVET) mission is to be the principal interactive forum for the TVET sector to discuss and debate issues of concern to the sector, as well as advocate on behalf of TVET in the wider education and development sectors. The Association's goal is to be a united voice to advocate, influence, promote, lead and set standards for TVET in the Pacific. Two of its objectives are to influence TVET policy formulation and resource mobilization and promote measures to secure life skills and sustainable livelihoods in the Pacific. PATVET works to promote cooperation and support through the exchange of knowledge and the dissemination of information.

Contact;

Isimeli Nalomaca, Coordinator (Interim); Mail: PATVET, c/o SPC, Private Mail Bag, Suva, Fiji. Phone: (+679) 3391 033 ext 35586, Direct Line: (+679) 3349586, Fax: (+679) 3397 730, Email: isimelin@spc.int

Pacific Islands Climate Education Partnership (PCEP) is a collaborative network of Pacific Island communities and friends responding to the impacts of climate change in the Pacific Island region. Through collective impact with partners, and guided by the principles of honor and respect for the people of the Pacific, the traditional Pacific Island cultural values of identification with and respect for the natural environment, and the empirical and Indigenous knowledge of Pacific Islanders, PCEP strives for the following outcomes:

- (a) A network that will collaborate and coordinate across local community organizations, school districts, state and federal government entities, and academic disciplines
- (b) A general, multidisciplinary K-14 climate change science education framework
- (c) Processes to facilitate the adaptation of existing curriculum resources to the region's climates and cultures
- (d) A comprehensive, web-based information platform that enables the development and implementation of the PCEP climate change education strategic plan for the USAPI; see: <http://pcep.dsp.wested.org/>

Contacts:

Art Sussman, Senior Project Director, WestEd, Co-PI Pacific Islands Climate Education Partnership; asussma@wested.org 415.531.3110

Ethan Allen, STEM Director, PREL, allene@prel.org 808-441-1392

The **Secretariat of the Pacific Community (SPC)/GIZ** programme Coping with Climate Change in the Pacific Island Region (CCCPIR) has a new component on Climate Change Education aiming at strengthening capacities of education ministries (including ministries in charge of technical and vocational education & training TVET), training institutions, schools and teachers to develop and deliver education on climate change adaptation and mitigation in Fiji, Kiribati, Samoa, Tonga and Vanuatu. This supports the overall objective of CCCPIR to strengthen the capacities of Pacific member countries and regional organisations to cope with the impacts of climate change (project brief see http://www.spc.int/lrd/index.php?option=com_docman&task=cat_view&gid=210&Itemid=48).

Areas of support in education will be defined at a regional workshop in the end of September 2011. The Climate Change Education Component will be implemented by SPC/GIZ in partnership with SPREP and USP.

Contacts:

Hanna Sabass, CCCPIR-Adviser on Climate Change and Education, Tel.: (679) 3305 983, Email:

hanna.sabass@giz.de ; and

Mr Brian Dawson, SPC Senior Climate Change Adviser, Tel: (687) 26 01 31, Email: briand@spc.int.

Secretariat of the Pacific Environment Programme (SPREP) is producing children's readers on climate change – Building on successes of earlier story books (“[Jo and Ju Save the Mangroves](#)”, “Where has all the Rubbish Gone?”), SPREP is currently developing illustrated readers targeting early primary school children. The aim of the readers is to provide material that does not need to be part of national curriculum or assessment processes and can be used as either supplementary material in the classroom or outside.

http://www.sprep.org/publication/pub_detail.asp?id=361

Climate Change and Sea Level Rise: curriculum modules for Pacific Schools– published 1997. These 2-part modules provide comprehensive information and activities for science and social science teachers and serve as useful supplementary resource material for upper high school.

http://www.sprep.org/publication/pub_detail.asp?id=361

Factsheets on Climate Change (SPREP) – a series of factsheets providing information for the non-scientific audience on climate change, its impacts and potential solutions.

http://www.sprep.org/climate_change/PYCC/factsheets.htm

Contact:

Seema Deo (seemed@sprep.org)

The **United Nations Educational, Scientific and Cultural Organization (UNESCO)** Apia Office has a range of formal and non-formal education programs relevant to Education for Sustainable Development including CCE. In particular UNESCO is supporting the development of national ESD plans within which countries may include CCE and/or DRM. In conjunction with the national ESD planning, UNESCO has supported analysis of current curricula, with climate change specifically identified in some countries.

With Waikato University and the Ministry of Education in Kiribati, a draft curriculum framework for climate change is being developed. The framework identifies the key knowledge and skills necessary for a holistic education on climate, climate change, adaptation and mitigation at age appropriate levels and including locally relevant content. The Framework is intended for use in developing themes relevant to climate change across all curriculum areas. The Natural Sciences sector of UNESCO has commissioned the development of a Community Based Disaster Risk Reduction and Climate Change Adaptation toolkit for Samoa. The objective is to develop a facilitator's guide for community based service providers including government, NGOs and international organizations for the implementation of community based DRM and CCA interventions. The toolkit will be developed through the direction of the Samoan government and through consultations with the existing organizations that provide DRM and CCA services to the villages in Samoa. This toolkit is scheduled for completion by the end of 2011.

Through the Sandwatch programme seeks to modify the lifestyle and habits of children, youth and adults on a community-wide basis and to develop awareness of the fragile nature of the marine and coastal environment and the need to use it wisely in the face of climate change. A video on traditional knowledge of cyclones in the Cook Islands and a student project on traditional knowledge of disasters in Fiji are currently being developed.

Contacts:

Sue Vize Program Adviser UNESCO Apia Ph: (685) 24276; Email: s.vize@unesco.org

Kevin Petrini Program Adviser UNESCO Apia Ph: (685) 24276; Email: k.petrini@unesco.org

University of the South Pacific (USP), through the Pacific Centre for Environment and Sustainable Development (PACE_SD) offers Post Graduate Diploma in Climate Change, Master of Science in Climate Change (MSc CC), and Doctor of Philosophy (PhD) in Climate Change programmes. The post-Graduate Diploma in climate change includes four courses; EV414 (Climate Change, Impacts and Vulnerability), EV415 (Climate Science) are core courses, other courses such as BI442 (Biodiversity and Conservation), EC415 (Environmental and Natural Resources Economics), EV424 (Disaster Risk management), EV425 (Environmental Impact Assessment / Strategic Environmental Assessment), GE409 (Environmental Changes in the Pacific) and PH407 (Wind Power: Theory and Applications) are among the optional courses under the programme.

USP regularly organises non-formal training and capacity building on issues related to climate change. For example, a summer course on Human Rights and Climate Change will take place at USP in September 2011.

USP has also prepared a set of factsheets on climate change and related issues in the Pacific Island Countries. These factsheets will be distributed in the Pacific island Countries via the In-Country Coordinators of the EU-GCCA project. These factsheets, at present in English, will also be translated into vernacular language for a better access by Pacific Islanders.

Contact:

Prof Murari Lal, Director PACE-SD Email: lal_m@usp.ac.fj

Aliti Koroi, Project Assistant ESD Email koroi_a@usp.ac.fj)

Annex IV-B: Current and planned CCE initiatives in the Pacific (draft)

	Baseline	Policy	Curriculum	Assessment	Teacher Training	Educational Resources	M&E
Early Childhood Education		PCEP				SPREP UNESCO	
Primary		UNESCO CCCPIR PIFS? PCEP	UNESCO CCCPIR	CCCPIR SPC-SPBEA	national TTCs CCCPIR PCEP	UNESCO CCCPIR PCEP	UNESCO SPC-SPBEA Nat TTCs CCCPIR
Secondary	CCCPIR SPC-SPBEA	UNESCO CCCPIR PCEP	UNESCO CCCPIR	CCCPIR SPC-SPBEA	USP, national TTCs CCCPIR PCEP	UNESCO USP SPREP PCEP CCCPIR	UNESCO CCCPIR USP Nat TTCs
Tertiary		PCEP	USP, NUS, UPNG, UniTech, FNU	USP, NUS, UPNG, UniTech, FNU	USP, NUS, UPNG, UniTech, FNU CCCPIR PCEP	USP, NUS, UPNG, UniTech, FNU CCCPIR PCEP	USP, NUS, UPNG, FNU, UniTech
TVET		PCEP	CCCPIR SPC-CETC PAT-VET	CCCPIR (with SPC-CETC) PAT-VET	VTCs CCCPIR PCEP	CCCPIR PCEP	CCCPIR PAT-VET VTCs
NFE		UNESCO PCEP			PCEP	SPREP PCEP	SPREP UNESCO

Note: There some gaps in the table as we have not had responses from all organisations.

Some Resources

Adapting to a Changing Climate materials recently published by the Micronesian Conservation Trust and others

(<http://www.cakex.org/sites/default/files/SMALL%20Booklet%20FINAL.pdf>).

Marshall Islands Climate Change Portal <http://unfccc.int/resource/ccsites/marshall/index.html>

Tuvalu Climate Change SOS

<http://media.adelaidenow.com.au/multimedia/2008/10/tuvalu/tuvalu-perthnow.html>

UNESCO Climate Change education Clearing House

<http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/climate-change-education/>

Pacific Adaptation to Climate Change Project

http://www.sprep.org/climate_change/PACC/index.asp

Further resources added later by CCCPIR:

Pacific Islands Climate Education Partnership (PCEP) educates students and citizens across the Pacific about the urgency of climate change impacts in ways that exemplify modern science and honor indigenous cultures and environmental knowledge.

<http://pcep.dsp.wested.org/>

Climate4classrooms is a website supporting the teaching and learning of climate change in different languages using recognized scientific research.

<http://uk.climate4classrooms.org/teaching-resources>

SERREAD is an educational program and resource that provides regionally relevant and focused ocean science that is built upon Argo data in a format that fits directly into existing curricula of Pacific Island schools. <http://www.argo.ucsd.edu/SERREAD.html>

Unite for Climate is an entry point into the world of youth action on climate change.

<http://uniteforclimate.org/>

Sandwatch provides a framework for school children and local communities to work together to critically evaluate the problems facing their beach environments and develop sustainable management solutions. <http://www.sandwatch.ca/>

ANNEX VII Sequencing of CCE (and DRR) K-3

Group 1 - Sequencing of CCE (and DRR) in the curriculum of K-3

Years	Causes of CC	Changes in Phenomena	Impacts of CC	Mitigation	Adaptation
K	Pollution Changes in weather (cold/hot) (rain/sund)	Rain – Flood Sunny – Drought	Food Shortage Bad road condition	Seperation of rubbish (non biodegradable, biodegradable) Gardening	Traditional food preservation Gardening
Year 1	Weather Clouds Pollution	Plant need water and sunlight to grow	Disturbance of food chain Not enough food	Gardening Planting of trees Keep clean environment Encouraging walking	Relocation Indigenous knowledge
Year 2	Pollution (water and air) CO2 (Gas)	Changes of temperature (hot/cold) Changes of soil texture Sea level / tides (low/high)	Air pollution Water pollution Health and nutrition problems	Keep environment clean Don't burn trees and tires and plastics Don't throw rubbish in rivers and sea Don't cut trees	Replant trees, corals Conservation of natural resources e.g. sea, forest, ...
Year 3	CO2 and H2O	Changes of temperature H2O Weather changes	Disturbance of Eco-system (study of mangrove ecosystem) Sun/rain – shortage of food Disturbance of water cycle	Fallow-land/bush Don't burn trees Don't cut trees Replant mangrove	Traditional preservation of food Relocation Water preservation (some traditional ways)

(Comment CCCPIR: Regarding adaptation also modern technologies should be considered)

Group 2 - Sequencing of CCE (and DRR) in the curriculum of K-3

Year	Causes	Phenomena	Impacts	Mitigation and Adaptation
K & 1	Natural Night and Day (role of sun) Seasons (role of sun) Human Burning of plastic, tyres	What is weather? Elements of weather: wind, sun, cloud, rain Weather calendar Cyclones Signs of cyclones (traditional knowledge)	Effect of drought on plants and animals (observe) Effect of heavy rain on environment (observe) Draw and talk about environmental changes	Respect for/ care of environment Protection and management of water (and energy) resources Reuse, reduce, recycle (RRR) Separating waste Composting No litter

	Cutting down and killing trees Leaving waste in the open	Tides Knowledge about growing plants	How drought and heavy rain affect water supplies and health Disturbance of	Planting trees and flowers (How things grow) Identify clean water sources Use local shopping bags (no plastic)
2 & 3	Natural Rotation Revolution Orbit of moon Seasons – why? (traditional calendar) Volcanoes Human Gases in Atmosphere (animals, plants, CO2 and O2) Burning of wood, plastic, tyres	Temperature (thermometer, measurement, by effect on objects) Wind speed and direction Rainfall measurement Cloud cover Drought and Flooding Sea level change	Observations of changes on sea shore Evidence of: Coastal erosion Changes in plants and animals Loss of biodiversity (evidence from stories) Comparison of environment (now and 30 years ago) Impact on land use Disturbance of water cycle	Recycle/Reuse/Reduce Careful management of resources and respect of natural resources (water, soil, forests, reefs) Traditional methods of agriculture and fishing and animal husbandry Care of plants and animals (urban gardens) Multiple water sources Relocation of houses Advantages of smaller families