

# Destructive Fishing Practices: Assessment of Awareness Materials Effectiveness

A Baseline Study of Destructive Fishing Practices  
Throughout Upper Primary and Secondary  
Schools in the Selected Provinces of Papua New  
Guinea: Manus, West New Britain, New Ireland  
& National Capital District



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**The opinions expressed herein are those of the authors and do not necessarily reflect the views of The Nature Conservancy**

## TABLE OF CONTENTS

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Table of Contents .....	ii
Introduction .....	1
Defining the baseline – Its context and Content.....	1
Baseline Information from the Current Curriculum at Upper Primary level .....	2
Culture and Community .....	2
Language.....	2
Personal development .....	2
Upper primary syllabus as baseline.....	3
Making a living .....	3
Social science syllabus as baseline.....	4
Sustainability.....	5
Grade 11 and 12 Baseline.....	5
Field work in NCD, West New Britain, New Ireland and Manus.....	6
Background .....	6
Field work methodology .....	6
School profiles .....	6
Province: NCD.....	6
Coronation Primary school .....	6
Port Moresby Grammar school.....	6
Province: West New Britain .....	7
Lukas Waka Primary school .....	7
Patanga Primary school.....	7
Province: Manus .....	7
Lorengau East Primary School .....	7
Pere Primary school .....	7
Province: New Ireland .....	7
Cateret Primary school.....	7
Our Lady of the Sacred Heart International (OLSH).....	8
Nusalava Community School .....	8
Baseline data in terms of resource material availability.....	8
Implementing of reform system in the schools .....	8
Syllabuses.....	8
Integration between subjects .....	9
Teachers’ training and In service .....	9
Packages in the new curriculum.....	9
Support for resource materials .....	10
Advantages.....	10
Disadvantages .....	10
Methods of teaching .....	11
Does the syllabus address marine diversity.....	11
World Environment Day .....	12
Teachers perception of student knowledge of Nature and Conservancy.....	13
Civil society engagement in Conservation.....	13
Mahonia Na Dari.....	13
Ruango Village .....	14
Pasiloke Village .....	15
Student perception baseline survey .....	16
Student’s knowledge in terms of marine diversity.....	16
Social science.....	16
Making a Living.....	17
Science .....	18
Methods of teaching.....	18

Analysis of the baseline information from the schools .....	19
National curriculum framework and local action.....	19
Old syllabus Vs the New Syllabus .....	19
Lack of teacher’s creativity .....	19
Content of materials to students .....	20
Culture and community – This is an elementary syllabus taught in elementary 1 and 2 with 3 strands of:.....	20
Making a living .....	20
Social science .....	20
Grade 11 Biology syllabus.....	21
Way forward for the dissemination of Information.....	21
References .....	22
Appendix .....	23
Terms of Reference for Anthrosearch (PNG) Ltd.....	23

## INTRODUCTION

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This report comprises the baseline survey on live reef food fish trade in Upper Primary, secondary schools and Communities in the provinces of National Capital District, Manus, West New Britain and New Ireland Province. By way of background, the Live Reef fish trade (LRFFT) presents Pacific Island Countries with both potential and problems. This baseline study is part of the TNC project on protecting coral reefs from destructive fishing practices which has three objectives which are:

1. To develop and facilitate the application of cost effective management controls on the exploitation of aggregating reef fish resources.
2. To strengthen the capacity to assess, monitor, and manage aggregating reef fish resources and
3. To raise awareness and appreciation among the stakeholders of the vulnerability of aggregating reef fish populations and associated ecosystems, the nature and significance of spawning aggregations, and options for improving management.

Under the first phase of this project, a range of education and awareness materials were produced. These materials were anticipated to be provided to a range of local partner organizations within PNG and the Solomon Islands. The second phase was to undertake an assessment of the effectiveness of the effectiveness of the current materials and use the feed back to guide the development of the next set of materials. However prior to the distribution of the materials throughout the selected schools, partners and communities a baseline assessment was undertaken. This was then to be used as a bench mark to be able to measure impact.

## DEFINING THE BASELINE – ITS CONTEXT AND CONTENT

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Given the fact that the baseline survey was going to target schools in the above listed provinces. The focus in terms of the baseline would also divert to look at the content of materials being used in upper primary and secondary schools. This therefore enabled a review of the current educational curriculum taught in upper primary and secondary level. The other aspects of the baseline survey focused on collecting information from schools and teachers throughout the above provinces. This was to have a baseline data on how the students, teachers react to the current curriculum content in both the upper primary schools and secondary schools.

To set the basis of discussion on the baseline. This report also begins with a review of the National Curriculum statement which commenced in 1992. This was significant with a number of structural reforms such as the top up system and the secondary school system. Curriculum reform was part of the process that intends to provide a relevant basic education for Papua New Guineans.

The National Curriculum statement is a policy framework that provides for a national framework for curriculum development in Papua New Guinea from elementary prep to Grade 12.

The foundation of the education reform is the promotion of culture, values, attitudes, knowledge and a range of skills appropriate for Papua New Guinean societies. Prior to the reforms in Papua New Guinea, it was a case whereby the Papua New Guinean curriculum was based on foreign western beliefs that was geared purely for academic success, but not meant to meet the real needs of the citizens of Papua New Guinea.

By way of baseline data and in consistency with the National Curriculum policy, Papua New Guinea needed an education curriculum that:

- Provided a consistency and stability in education
- Culturally sensitive and reflects the cultures, values and has strong regard for traditions and customs.

- Relevant to national and local needs and is community oriented
- Builds on traditional knowledge, values and attitudes in order to support the development of relevant knowledge, skills and attitudes.
- Learning outcomes for all subjects at all levels of schooling that is essential for girls and boys.
- Assessment and reporting requirements based on learning outcomes.
- Strong reflection and building on national identity
- Ensures national unity, nation building and a healthy nation and
- Promotes and encourages the sustainable use of natural resources.

The curriculum reform anticipated to promote greater socialization, participation, liberation and equality. This is to enable the students to develop mentally, socially, emotionally and spiritually. Students are anticipated to become creative thinkers and also learn to respect the thoughts of others and at the same time develop as individual members of the community.

## **BASELINE INFORMATION FROM THE CURRENT CURRICULUM AT UPPER PRIMARY LEVEL**

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The following areas are identified as learning areas and this also contributes to this baseline information, though not only restricted to the Marine environment only, but rather is inter-connected to other areas as well. These learning areas are as follows:

### **CULTURE AND COMMUNITY**

This learning area is associated with Community life, traditions and cultural practices of Papua New Guinea. It includes subjects with a technological bias such as making a living, agriculture, Home economics, Design and Technology. Sociology focused subjects such as Social sciences, Arts, Economics and Business studies are also part of the Culture and Community Learning area.

### **LANGUAGE**

Language as a learning area is fundamental to thinking, learning and communication in all cultures. The diversity of cultures in Papua New Guinea enables the fact that many cultures are sustained through communications with different languages. Language is the most universal means of communication, sharing, developing and maintaining our culture. It is therefore anticipated that effective use of language enables students to access and create knowledge and play a more active part in society.

### **PERSONAL DEVELOPMENT**

Personal development as a learning area contains subjects of health, physical education and personal development and aspects of Guidance, religious education and civics. This learning area enables students to make informed decisions about their lifestyles, including the values of the family, culture and religion to which they belong. Personal development as a learning area assist students to understand how and why it is important to be physically, socially, emotionally, mentally, spiritually, morally and culturally healthy.

## UPPER PRIMARY SYLLABUS AS BASELINE

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The current upper primary syllabus has certain subject areas for which can be a continuation of the above learning areas as per the National Curriculum. The focus in this context is therefore on the syllabus itself and its relevance to the theme of Environmental conservation and the Live Reef fish food trade. This to an extent depends also on the geographical location of focus.

### MAKING A LIVING

Making a living is as syllabus anticipates to provide practical learning experiences for students to be able to acquire practical knowledge, skills, attitudes and values. In doing so it is anticipated that students become self-reliant, innovative and use local resources sustainably to improve their quality of life and contribute meaningfully to their local community and society. From a baseline perspective, the syllabus provides an opportunity for students to:

- Develop an appreciation of Papua New Guinea's unique environmental diversity.
- Participate in activities to protect, conserve and manage resources in a sustainable way.
- Develop relevant skills, knowledge and attitudes to identify and address ecological and economic problems and issues.
- Take action to improve and sustain environments, food production and economic activities in Papua New Guinea.

The three strands covered under 'making a living' includes –

#### 1. Managing Resources

This strand enables students to learn that people depend on the environment for food, water, shelter and clean air. It is anticipated that students understand and value natural resources and also learn ways of managing land and water resources in a sustainable way which is beneficial to people and the environment. A possible linkage process would later be explored in the context of this report. The focus under this strand is also on students learning principles and techniques of managing land and getting quality and quantity of yield from production. Sub-strands of managing resources include the following:

- Land and water management

The emphasis is on the importance of land and water resources to meet basic human needs. Students develop understanding and appreciation of the importance of land and water in supporting all forms of life, consider threats to the resources and consequences of mismanagement of land and water.

- Environment

The focus is on terrestrial, marine, wetlands and built environment. This component enables students to observe consequences when an element of local environment is affected through the loss of habitats. Students also participate in activities to reduce, reuse and recycle waste to improve the environment and also understand ecological systems of an environment and how to conserve and protect these systems, apply environmentally friendly actions to care for environment.

#### 2. Better living

This strand enables the students to develop essential skills and knowledge for effective management of time, money, labor and resources to achieve a safe, healthy and productive lifestyle. The focus under strand of better living focuses on food preparation to meet nutritional requirements, money management and promote creativity and innovation. The strand anticipates for students to develop

problem solving, decision making skills and applying these in practical and real life situations to improve their standard of living. The following are substrands under better living:

- Healthy living – focuses on best safe practices for maintaining and promoting a healthy way of living
- Care management – students investigate areas within the school and home that need improvement and carry out appropriate actions to create a safe and pleasant place in which to live.
- Wise consumer – skills development of effective money management and for students to make informed decisions about goods and services available to them to access.
- Making things – use of range of appropriate materials, techniques, tools and equipment to create and produce an item or product that benefits the individual or community

### 3. Community Development

The focus is on students to learn about how to contribute to, live and work within the community. In this strand students create awareness to the community about services available to them and assist in democratic decision making processes most appropriate for the community. Substrands included in the community development strand includes the following:

- Knowing communities - Helps students to become aware of the social and physical aspects of the community.
- Communication – students effectively communicate culturally and contextually the appropriate information and skills they have accessed and analyzed from the community. This are a means to promote public relationships and create awareness to the community on issues or concerns.
- Community projects – helps students investigate needs and opportunities for improvement in their community. It is therefore anticipated that the students will take appropriate actions that will encourage the school and community to participate actively.

## **SOCIAL SCIENCE SYLLABUS AS BASELINE**

Social science is an active course which enables students to do activities that is anticipated to achieve the following:

- Protection of the environment
- Improvement of their communities and lives
- Be effective members of society
- Celebrate their own cultures
- Appreciate the culture of others

The focus of the social science syllabus is about how people relate to other people's environment and how they organize themselves and exploit their resources. The syllabus from a baseline perspective anticipates equipping students with skills, knowledge and attitude to enable them to undertake the following:

- Sustainably use and protect their environment
- Contribute to building their communities and the broader society
- Develop an appreciation and tolerance by active and meaningful participation in their own local community, other communities and the nation,
- Participate in their own local and national cultures and where appropriate participate and appreciate others cultures.

## **SUSTAINABILITY**

Sustainability is one of the core themes of the social science syllabus in which students must learn practices that use their environment in a sustainable way so that they can apply these when they leave school. The learning outcomes and content for Grade 6 to 8 are organized in four strands namely:

### 1. Environment and Resources

Students learn about the physical and human environments, how physical features have been formed and how it affects the people, and the inter-relationship between the physical environment, resources, sustainability and natural hazardous events. Three sub-strands include:

- People and Environment : local and Papua New Guinea
- People and Environment: Papua New Guinea and region
- People and Environment: The World and Papua New Guinea

### 2. Organization

Students learn about different groups that contribute to social and economic development, features, roles and responsibilities of some of these groups, traditional and contemporary forms of government, their structure and functions, trade and communication and transport and also consumer awareness.

### 3. Culture

Students learn elements of culture, and describe different cultures: local, national and other cultures and identify changes and discuss reasons for changes to culture. It is anticipated that students should develop attitudes of understanding and tolerance towards people and their cultures, appreciation of and pride in their own local and national and other cultures, appreciation of the diversity of Papua New Guinea's cultures and pride and promote Papua New Guinea's national identity.

### 4. Integrating projects

The strand support and promote learning that enables the acquiring of integrated sets of skills, knowledge and attitudes in meaningful contexts. In real life, students need to integrate all the skills, knowledge and attitudes they develop at school.

## **GRADE 11 AND 12 BASELINE**

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Grade 11 and 12 students use Introduction to Biology text written by D.G. Mackean as the text, which was first published in 1986 by John Murray publishers limited. The book is divided into the following sections

Section 1: Some principles of Biology – The main topics of discussions include cells and tissues, chemicals of living cells, Energy from respiration, how substances get in and out of cells, photosynthesis and nutrition in plants.

Section 2 dealing with flowering plants deals with plant structure and function, transport in plants, sexual reproduction in flowering plants, seed germination, vegetative reproduction, plant sensitivity.

Section 3 deals with human physiology which deals with topics such as food and diet, digestion, absorption and use of food, the blood circulation system, breathing, excretion and the kidneys and the skin and temperature control.

Section 4 deals with Genetics and heredity which focuses on cell division and chromosomes, heredity, variation and selection.

Section 5 of this text has reference for the Life reef fish food trade, as it deals with organisms and their environment, while section 6 focuses on classification of bacteria and viruses. Section 5 of the text materials deals with organism and their environment. The focus under this section is on

1. Interdependence of living organism
2. The Human impact on the environment
3. Conservation and reduction of pollution and
4. Ecology

Interdependence of living organism deals with the interdependence between different living organisms. The section on human impact on the environment has some relevance for this study and baseline, however it falls on focusing specifically on the marine environment, though there is some discussion on rivers and streams.

## **FIELD WORK IN NCD, WEST NEW BRITAIN, NEW IRELAND AND MANUS**

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### **BACKGROUND**

As part of collecting baseline information, field work was undertaken in the provinces of the National Capital District, West New Britain, New Ireland and Manus.

### **FIELD WORK METHODOLOGY**

Field work methodology included pre-coded questionnaires that was administered to the schools and also check list interviews with the teachers in the schools. The baseline information in the context of the field work focused on information relating to marine resources and its diversity as addressed from the perspective of the old and the new curriculum and the teaching syllabus for primary schools. Some communities were also visited for the purpose of collecting baseline information, as they can have an impact on marine conservation and coral reefs.

Pre-coded questionnaires were distributed to the selected schools in the provinces identified for this study. The teachers in the schools were interviewed using check list methodology and interactive discussions. Due to the fact that the survey was undertaken in November when most teachers were busy.

### **SCHOOL PROFILES**

#### **Province: NCD**

##### ***Coronation Primary school***

Coronation Primary school was once an International school but later got changed to it being a community school. In 1994, when the reform system was introduced, it became a primary school. At the present time the school has a total population of over 1500 and a teaching staff of 50 teachers. There are 6 classes each of Prep, Elementary 1, and Elementary 2 with 5 classes each for lower primary to upper primary.

##### ***Port Moresby Grammar school***

Port Moresby Grammar school commenced about 1992, in down town Port Moresby, it moved to the present location in 2003. The school has grades 1 to grade 12, and in 2005 prep and elementary classes

will be introduced. The school has 80 staff members in which there are 55 registered teachers, 14 assistant teachers and 12 support staff.

**Province: West New Britain**

In West New Britain, two primary schools and two villages were involved in the survey as well as an addition of an NGO Mahon Na Dari. Two villages included in the baseline survey included Pasiloke and Ruango. Mahonia Na Dari was included in the baseline study as their educational program offered to students from schools in Kimbe and other parts of Papua New Guinea. The organization has also been proactive in undertaking awareness in villages on how to preserve and conserve their natural resources both on land, water and sea.

***Lukas Waka Primary school***

Lukas Waka primary school is a rural school located along the coast of the Talasean Peninsula about 40 minutes drive from the main center of Kimbe town. The school was established in 1989 and at present time has an estimated population of about 9 teachers and 142 students. The school has two classes of grade 8 and one class each of grades 1 to 7. The reform system of education is being implemented for the first time in 2005. In the previous year, this was not so due to the absence of student population to be able to have an elementary class and prep.

***Patanga Primary school***

Patanga primary school is a rural school located on the Talasean peninsula. The school was established in 1975 and has a total teaching staff of 10 and a student population of over 200. The reform system has not been implemented due to no presence of prep and elementary.

**Province: Manus**

Two schools were visited in Manus namely Lorengau East Primary school and Pere Primary school.

***Lorengau East Primary School***

Lorengau East Primary school is an urban school established in 1988 and situated within the township of Manus. The school has a student population of about 433 and a total of sixteen (16) teachers. The school has a prep, but during the period of undertaking the fieldwork, it was not in the position to implement the National Education reforms.

***Pere Primary school***

Pere primary school is a rural school located in Pere village which is about one and half hour by speed boat from Lorengau.

**Province: New Ireland**

Three schools were visited in the New Ireland Province, namely Cateret Primary school, Our Lady of the Sacred Heart International (Both schools in town) and Nusulava Community School in the Tigak Islands.

***Cateret Primary school***

Carteret primary school is situated in the center of Kavieng town established in 1950. It has a total student population of 500 students and a total of 20 teachers. The school has two classes each grade from prep elementary to grade 8. The school has implemented the new curriculum however most teachers are still using the old syllabus or even both syllabuses.

### ***Our Lady of the Sacred Heart International (OLSH)***

OLSH International is an urban school run by the Catholic Church and is located in the center of Kavieng's town. It is the only international school in town. The school has each class ranging from Grade 1 to grade 8.

### ***Nusalava Community School***

Nusalava community school is located within the Tigak group of Islands and is about one hour and thirty minutes boat ride from Kavieng's main harbor. The school was established in 1960 and to date has four teachers with a total student population of 88. In 2005, the school does not have grades 8 and 5 due to the lack of students availability to form these classes. The school has access to the new curriculum but have not used that very much.

## **BASELINE DATA IN TERMS OF RESOURCE MATERIAL AVAILABILITY**

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The first section of this report has been able to spell out which materials are already available through the curriculum that is thought in schools. This section of the report tries to spell out and highlight the baseline information in relation to what is previously discussed under the section literature review.

### **IMPLEMENTING OF REFORM SYSTEM IN THE SCHOOLS**

The new reform was implemented in 1992, but the field work undertaken as part of this study has shown that most of the schools surveyed have not been implementing the new system in their schools. Few schools have established prep elementary as a sign of gradually adapting the new reform. However teachers are still using the old syllabus to teach students. It thus imply that the older generation of teachers are more used to the old syllabus and therefore would continue with the same. The new syllabus focuses or emphasizes a lot on teacher's creativity, while the old syllabus was one which was fixed and teachers do not have to spend much time planning and delivering lessons. The new syllabus for the old teachers would require some level of in service training, to enable them to utilize the new curriculum. This in itself is positive for the TNC initiative of which could easily be included in any of the refresher training. This would be further discussed under the recommendations section of this report.

Teachers interviewed in the context of this baseline data gathering exercise expressed that teaching is not a problem to them, however they need further skills and knowledge that would prepare them to carry out the objectives required by them by the new curriculum.

### **SYLLABUSES**

There is a great difference between the old syllabus and the new curriculum syllabus. The old syllabus enables teachers to be more comfortable in that it provides additional resource materials such as teacher's guide and pupils books. Teachers do not have to look for information, as everything is available. All that was then required then was for the teachers to prepare the lessons based on the available resources. The situation then in the past was such that teachers were not creative and were teaching students as based on the materials even though the content was not relevant for the area. This is an issue that the new reform syllabus has been able to address. Teachers under the old syllabus were enjoying the benefits and privileges of being teachers with very poor performance. Creativity in terms of planning and decision making was very much not much of the old syllabus but rather is of the new syllabus in the upper primary school. However the burden that schools are faced with is that the older generation of teachers need refresher training to implement the curriculum and get a paradigm shift in terms of creativity and using local resources to enhance teaching and learning.

Establishment of the new curriculum emphasizes effectiveness and creativity. It therefore does not provide additional resource materials, but rather the onus is on the teachers to be creative with whatever local resources that are available in the area, including the immediate environmental settings. The current syllabus provides teacher's guide that outlines certain possible outcomes in which the teachers have to do research based on proposed outcomes in order to plan and organize their lessons. In the context of the present syllabus, teachers have to be active in order to meet the expectations required of them in the teachers' guide syllabus.

## **INTEGRATION BETWEEN SUBJECTS**

The new curriculum focuses on integration between subjects and in this way there is continuity in learning by the students involved. This implies that a particular topic covered under one subject is also covered under another subject but in a different approach or under a different topic.

The impact of subjects' integration is that it is very helpful to the students to enhance and improve learning from different perspectives. In the old curriculum, topics were usually grouped into different subject areas and are strictly covered under the particular subject area. In this context, it is not helpful to student learning because it does not broaden students' capacity of learning meaning that students would not be able to link a topic from one subject to another.

The problem faced by the old teachers was how to link the subjects up based on the possible outcome given. For many teachers, they have not been using the new teacher guide syllabus but by having looked through the syllabuses, they found the syllabus to be complicated in terms of subject linkages. The processes of linking up between different subjects is one area of difficulty. Teachers spoken to during the period of collecting this baseline feel that the new curriculum has caused an overload on their work. They therefore feel that they attend special courses in order for them to become familiar on how to go about programming their lessons based on different outcomes given in the new curriculum syllabuses. This therefore provides a point of entry for the TNC materials and resources on the live reef fish food trade.

## **TEACHERS' TRAINING AND IN SERVICE**

Teachers spoken to during the course of the field work highlighted that they have to attend some form of in service training to be equipped with skills and knowledge on how to implement the new curriculum syllabus in schools. Most of the teachers are certificate holders who have not been trained on how to utilize the syllabuses even though they have attended very short courses on the new curriculum. They stated that these short courses are still not very much helpful and would prefer to attend more courses in the near future. This therefore implies that it would take time for them to adapt to the new style of teaching. An area that needs strengthening should TNC intervene with each material is on going mentoring and monitoring of the usage of materials, and possibly other support areas such as coaching for the teachers in the usage of materials provided by TNC.

For the Diploma teachers who have been trained to teach the new curriculum as in the likes of Miss Ogi of Lorengau East Primary school, who indicated that she cannot teach the new syllabus due to the fact that almost all the teachers in the schools are old staff who are still teaching the old curriculum. She therefore was forced to fall back in line with the other teachers. In discussions with her in the course of the fieldwork, she stated that she has been teaching the new curriculum, but also uses the old syllabus for revision with her students to prepare them for final examination. It's also of contradiction, given the fact that there is uncertainty on which syllabus the final examination is to be based on, as most rural schools are still using the old curriculum.

## **PACKAGES IN THE NEW CURRICULUM**

The new reform system also tries to assess teacher's performance and the sense of creativity in teaching the new curriculum. This is achieved through the merit based system of rewards through

financial incentives. This is something that TNC through the program can explore further as means to motivate the teachers and the personnel involved.

For other private and international schools like OLSH international school in New Ireland province, teachers usually sign a contract of employment for a period of three years. Teacher's either renew their contract or transfer elsewhere.

## **SUPPORT FOR RESOURCE MATERIALS**

Introduction of the new curriculum requires teachers to participate more effectively in the community of which they live within. The environment of which the teachers live within is an additional resource that can be tapped on in terms of enhancing learning within schools. A classical example is a coastal village can be a learning place for marine conservation program. This could also be a research base as well. The new curriculum requires teachers to do a lot of research to prepare their lessons and activities for students. Undertaking research is one of the important aspects of the new curriculum. Additional support in this area is required for the curriculum to make an impact in people's lives. Research from the perspective of knowledge base to prepare students lessons assist the teacher's capacity of learning in terms of collecting information relating to a possible outcome or topic outlined in the teachers syllabus. In the event of collecting information, teachers are also able learn a lot of new things. In this context it also encourages teachers to be involved and be exposed to other sectors and stakeholders like the communities, government departments and Non-governmental organizations.

In the course of undertaking this field work, certain advantages and disadvantages were also identified from the context of the baseline as reference to the new curriculum.

### **Advantages**

- Encourages teachers to be more active and to be more assertive and articulate.
- Enables teachers to be more creative
- Enhanced teachers with skills and knowledge on research
- Enables teachers to acquire new information and learn new things
- Enables teachers to get involved with the local community and other sectors and stakeholders of the society.

### **Disadvantages**

- No resource or support materials to support their teaching
- Teachers lack research skills
- Research involves money which teachers are able to meet the cost themselves.

The situation is such that the schools are still use the old curriculum and therefore still rely on using the old support/ resource materials. In the course of the fieldwork from the context of discussing with teachers of Port Moresby schools, in comparison with teachers from the other provinces namely West New Britain, New Ireland and Manus that old curriculum materials was still relevant while the Port Moresby teachers do not think so. Teachers from Port Moresby schools namely Coronation and Port Moresby Grammar school think that the social science text books for students are really out of date and therefore needs amendment. Teachers from the other coastal provinces have pointed out that the resource materials are still useful except that more information addressing marine resources and its diversity should be included in the new curriculum.

One also begins to wonder if schools such as Coronation primary school are implemented the new curriculum in a structural sense but not in the context of the knowledge base through the new syllabus. It is therefore a situation in which old resource materials are still be used, and therefore implies a combination of both curriculum. Field work in Cateret primary school in Kavieng has indicated that even though the new curriculum has been implemented, teachers have been using both syllabuses to teach their children.

## **METHODS OF TEACHING**

Methods or style of teaching is very important factor associated with imparting useful information to students. Different methods of teaching also contributes a lot in communicating or illustrating an idea to students in such a way that an idea could be easily grasped and understood by the students.

Different methods of teaching available are spelled out clearly in the teachers' guide syllabus such as research, field trips or excursions, and focus group discussions. The conventional method commonly used is teacher to student interaction or teaching. In most schools it is always the teacher talking to the students, while students listen and write. Mrs. Ame, a Social science teacher from Coronation Primary school in the National Capital District stated that it very much depends on the teacher and how he/ she plans to teach his/ her class. The situation is such that if the teacher talks a lot and does not give students room to explore through research at libraries, it makes the class boring. The unavailability of text books in schools makes the classes boring. Most students find their class interesting if they have their own text books that could be utilized any time for homework and research at home. When students do not do their homework it become boring.

A teacher from Lorengau East Primary school, Miss Ogi mentioned that there is a saying that states that, *"You tell them and they will forget, you show them and they will only remember for a short period of time, you show them and let them touch, feel and experience it themselves, they will remember it always"*. This relates very much to the issue of students going on excursions or field trips to be able to learn new things and ideas. The only impediment to this has been the cost involved in undertaking the exercise.

## **DOES THE SYLLABUS ADDRESS MARINE DIVERSITY**

All teachers interviewed during the course of undertaking field work mentioned that there is information available on conservation of natural resources in the old syllabus but the main focus is always on the land. In terms of marine resources and its diversity there is nothing at all, if there is any, then it is vague or very little. The teachers from the coastal provinces stressed the need to have more information addressing coral reefs and its ecosystem to be included in the new curriculum. The old teaching materials and syllabus are still useful, however they still lack information relating to the coral reefs and its ecosystems.

There exist some information about sustainability and conservation, however it is too broad and teachers are not too certain that such information base would be of assistance, should issues be raised in this area. There is existence of little information. In areas of conservation, the information that exist is too little or very broad. Take conservation for example, in the social science curriculum, it mainly focuses on forest and plants and stresses the point that clearing of forest requires planting of trees. There is little information on soil erosion however and the linkage to the clearing of forest and effect on the coral reefs. In the area of marine resources and conservation, there is nothing mentioned in the old syllabus in this area.

Most of the teachers teaching in the coastal provincial school are quite old and are therefore not too comfortable with teaching the new syllabus which requires certain level of creativity. There is very good information on marine resources available in the new curriculum and the teaching syllabus, but there is no support or resource materials. By glancing through the sample materials published by TNC,

the teachers were very grateful that such materials are published and can be used as resource or support materials. The teachers strongly suggested that if TNC could produce more books regarding conservation and sustainable use of marine resources and its diversity, it would be useful to teachers as such would form the basis of resource materials that goes with the syllabus.

The teacher's also stressed the point that conservation is a very broad term that requires special attention from every individual and person in this country. It needs to be clearly defined and explained in the new curriculum or it could be published as a separate syllabus of its own. The justification behind such a thought is that the majority of Papua New Guineans are not aware of the importance of our natural resources, both on the land and on the sea or water. Many are not managing their natural resources in a sustainable way. The rise in the cost of living has enable people to exploit their resources in an unsustainable way such as the use of marine resources.

The teachers in the course of undertaking the field work have advocated for detail information about conservation and sustainable management of our natural environment and its ecosystem. This issues or concerns be included in the new curriculum or be a separate syllabus on its own. Fishing in Papua New Guinea is a very important commercial activity and therefore more information relating to the diversity of the marine resource should be made known to every citizen of the country.

Information on traditional methods of harvesting our natural resources from the sea was passed on to the younger generation through oral history. Patrick Pomat of Pere primary school mentioned the fact that there is no information regarding conservation of marine resources, but children are taught traditional ways of harvesting their marine resources. There are some good and bad methods of doing this. He stressed that at the moment children are taught traditional methods through word of mouth but as years go by, it is very important that this be documented and where possible also used in schools.

The teachers concern has been that if we don't educate the youth now, we could loose all our natural resources in the near future leaving our future generations with nothing to survive on. A teacher from Nusalava Community School in Kavieng pointed out that it is very important that for students leaving near the sea, the marine environment in itself provides a subsistence base, therefore through educating these students, it ought to be managed properly.

In the coarse of undertaking field work in OLSH International school, the materials present at this school was focused on conservation of natural resources but was Australian focused, with the focus also being more land oriented.

## **WORLD ENVIRONMENT DAY**

All the teachers spoken to during the course of the fieldwork stated that during the World environment day, the main activity organized by the schools has been the replanting of flowers and trees. For the coastal schools cleaning of the beach is also one of the main activities. Few schools have organized dramas and plays on that day, however the main focus is always on the land with most information relating to conservation of plants or trees. Focus is very much centered on the land, rather than the sea for which also is affected by activities on the land.

The baseline data gathering exercise also revealed that there is usually no awareness materials except posters and charts made by the students themselves. An area that needs potential support is provision of awareness materials such as Videos, pictures of distinct animals.

## TEACHERS PERCEPTION OF STUDENT KNOWLEDGE OF NATURE AND CONSERVANCY

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The teachers' comments with regard to the student knowledge in terms of nature and conservancy was that they wouldn't know much about how to use a natural resource in a sustainable way. The teachers stated that with the little information available on the conservation of our resources, they hoped that this information would help the students to be aware of the importance of their natural resources. They hoped that this information would be able to enable students to be made aware of the importance of their natural resources and be able to make wise decisions when dealing with any activities associated with their natural resources.

### CIVIL SOCIETY ENGAGEMENT IN CONSERVATION

The notion of civil society engagement in the context of this report focuses on NGOs and Village communities involved in marine conservation in the provinces visited particularly West New Britain.

#### **Mahonia Na Dari**

Mahonia Na Dari is a local research and conservation organization located next to Walindi Plantation Resort in West New Britain. It is located about 20 minutes drive from the main town of Kimbe. Buildings at the center are semi-permanent with traditional sago roofs, while walls are of banded bamboo. Mahonia Na Dari implies "Guardian of the sea" in the Talasea language of West New Britain. The organization was established with a focus on protecting the Kimbe Bay. The initiative of starting this organization came from the owners of Walindi Plantation resort. Mahonia Na Dari is funded by The Nature Conservancy to implement conservation awareness. This undertaken through the eco-tourism officers who concentrate on the tourism aspect of the place. This includes:

1. Conservation – this area covers conservation of natural resources focusing mainly on coral reefs and its ecosystem.
2. Education program – this area mainly targets students. Special education is organized for students in Kimbe and other parts of the country to take part. The program enables students to learn more about marine resources and its diversity and equips them with skills and knowledge on how to protect and preserve their marine diversity.
3. Live and learn – this area mainly focuses on conservation of rivers and waters on the mainland. Any harm caused to the rivers or creeks also affects the sea and its resources in one way or another.

The organization Mahonia Na Dari has its own teaching syllabus that focuses mainly on the marine resources. It contains information that creates link to the marine resources. This includes:

- Diving
- Snorkeling
- Coral polyps
- Pollution
- Different species of coral reefs
- Different species of fish
- Food chain

Students from schools around Kimbe town and along the Talasean Peninsula attend classes at Mahonia Na Dari every Saturday. For schools in remote parts of West New Britain, Mahonia organizes at puppet show at these schools. The aim of the puppet show is to create awareness on the importance of coral reefs and ecosystem and that people should take extra precaution about their marine diversity

and to help them protect and preserve their environment by managing it in a sustainable way. The Mahonia Na Dari team have also traveled to Kavieng and Manus to perform in this area.

Schools from outside West New Britain have also shown keen interest in Mahonia Na Dari in terms of its activities. This has therefore included visits to the center by Tabubil and Korobosea International School and Port Moresby Grammar school. Students from these schools have gone through the program run by Mahonia Na Dari. Some of the reaction by students from Kimbe schools stated that the courses enable them to learn new and important things about marine diversity which they have never learnt in previous classes. Mahonia Na Dari has its own plans in relation to educational programs. This includes running of workshops and trainings for key personnel from the community

### **Ruango Village**

Ruango village is an urban village located few meters from the town of Kimbe. 2002 census figures reveal that the village has a total population of 466 people. There is also a settlement located just on the fringes of the village. The village mainly collected their food from the nearby gardens as well as the sea. Most of their marine areas have been protected by Mahonia Na Dari, they have not been affected in any way.

Ruango village has been included in Mahonia Na Dari's program which has enabled the village community to achieve the following:

- People are only allowed to fish in the protected waters
- There are some fishing areas that are marked by the village leaders as taboo and people are not allowed to fish there until such a time when the taboos are removed. This enhances breeding.
- People are allowed to fish in certain areas close to the shore that are not marked taboo and are out of the protected sites.
- Fishing methods including diving using the traditional fishing guns, fishing rods and bait. Nets are not used often as they destroy coral reefs and cause them to die.
- 'Poison rope' a very dangerous method used by the villages to catch fish is now being strictly forbidden in most of the villages. Other destructive fishing practices such as use of cyanide and dynamites are forbidden.
- Settlers are strictly forbidden to fish in their waters.

Special training courses have been given by Mahonia Na Dari to some of the village people on how to observe and keep a record of the different species of animals and coral reefs in their waters. With these new training courses, the village people were equipped with the skills and knowledge in observing and protecting their marine resources. The impact of the courses can be seen from the perspective of people being more conservation sensitive and a sense of environmentally friendly. People have seen fish swimming around already dead coral, implying that some of the dead coral is coming back to life, as people change their attitude towards the sea and the marine environment.

The course of undertaking this baseline fieldwork, village elders stressed that they have been very careful about the way they are using their marine resources. However the continuous dying of coral reefs in some areas still pose a challenge to the villages. According to the villages, this may be the result of the following:

- There are many creeks and rivers flowing through the oil palm plantation. Chemicals used in the oil palm plantation gets to the sea through such means which results in the dead of the coral reef.

- Inland people use ‘poison rope’ to kill fish along rivers which also contributes to the destruction of coral reefs.
- Inland people using pesticides and fertilizers on food garden and the effluent discharge to the sea causes such

This matter has been brought to the attention of The Nature Conservancy and a meeting was held in 2004 between the New Britain Palm Oil Managing Director and TNC. The villagers are still waiting for the outcome of the meeting.

The Village elders mentioned that although protective measures have been taken to save their marine environments. There are two outstanding things which is a concern to them. This are,

1. The government owns what is in the sea, and it has all the prerogative to grant fishing licenses to any company.
2. Urban settlers are using their sea for fishing and might also include them trespassing into protected reef.

This issue has been brought up to the Local level government to empower the people to protect their marine environment.

### **Pasiloke Village**

Pasiloke village is located about 30 minutes drive from town of Kimbe. 2002 Census figures reveal that it has a total population off 271. The village is located along the Talasea Peninsula with beautiful islands and coral reefs.

Mahonia Na Dari has undertaken a lot in areas of education, awareness and training for people to be environmentally sensitive. People are aware of the importance of their coral reefs and are very cooperative in ensuring that their coral reef and its ecosystem is carefully managed and taken care of.

Similar to Ruango village, certain areas of the marine environment are protected through a partnership arrangement between Mahonia Na Dari and village people. Villagers are allowed to fish outside this area using traditional fishing methods namely fishing guns, traditional spears, and fishing rods. ‘Poison rope’ and other modern fishing practices such as cyanide and dynamites are strictly forbidden. The village also has personnel trained by Mahonia Na Dari to observe and keep records of the different species of coral reefs and fish in their waters.

Unlike Ruango, they have not encountered any decrease in the diversity of their marine resources. This is attributed to the fact that the village people own most of the oil palm blocks along the area and therefore sensitive in what they use in those blocks. There are also no settlements around this area and therefore it is easy to observe and control the management of their natural resources. The protection of the marine environment has not affected them, as they also have other subsistence base in the gardens and also the forest. They have not sighted any fishing boat in the area, however the dilemma of government issuing fishing license to anyone to fish in their waters still concerns them.

## STUDENT PERCEPTION BASELINE SURVEY

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As part of collecting baseline data associated with this project, one of the focus areas was on student's perception to what is currently available in the syllabus and the curriculum. Students interviewed came from the following schools of Luka Waka Primary school and Patanga Community School (West New Britain) and Carteret, OLSH and Nusalava Primary School (New Ireland Province).

### STUDENT'S KNOWLEDGE IN TERMS OF MARINE DIVERSITY

For the five schools visited, the total number of students interviewed were 115. The questions were divided into three subject areas namely:

- Social science
- Making a living and
- Science

#### Social science

In the new syllabus, social science was defined as:

- It is about how people relate to other people and their environments and
- It is about how they organize themselves and exploit their resources.

In social science, students were asked what they know about the subject itself and both answers were given as multiple choices. Instead of choosing both answers for their answer, most students (about 60%) choose between the two with majority in favor of "It is about how people related to other people and their environments."

When asked what they understood of the word 'environment' again majority (58 %) seem to be in favor of "everything that is around us", from the choices given:

- (a) All living and non living things
- (b) Everything that is around us
- (c) Plants and animals
- (d) Forest and wildlife
- (e) Sea and marine resources
- (f) Environment is made up of all the above

Only a few chose "f"

Most of the students have indicated that topics such as 'Environment, sustainable development, conservation, forest and wildlife, pollution and coral reefs are covered under the social science (as the most favored subject) and science. The students in the survey indicated that social science as the major subject to cover any of the above topics. The teachers have indicated that there is little information available on these areas. Where there is information available, it focuses on land and not much on the marine environment. From the student perspective and perception, there are broad themes in the syllabus, however there is no material to supplement those themes, for it to practically work with the students. This is the gap that has to be filled in. Efforts by organizations such as The Nature

Conservancy feels this gap. A process of filling the gaps has to be discussed with the National Curriculum development Unit.

One of the questions raised in relation to the natural resource being under threat from rapid population expansion and overuse of resources. Majority of the students were aware of the threat to the environment, however they were not sure on what can be done locally to protect those environments. This is an area whereby if there was adequate support materials, teachers would have asked the students to come up with creative ideas to protect the environment. Creativity on the part of the teachers is another issue.

The question of our people and awareness of our natural environment and its diverse habitats including coral reefs and ecosystem being exploited at faster rates. Student response to this seems, that there is not much awareness in this area, even the school level. This demonstrates also the lack of information, or where information exist it is very broad and not very specific in a particular area.

The student perception on what they think is currently being used for fishing, reveal the following answers:

- Fishing nets
- Diving
- Dynamite and Cyanide
- Fishing guns
- Strings and fishing rods

The above are in order of use as raised by the students in the baseline survey.

### **Making a Living**

Making a living is one of the syllabuses used in the upper primary school teaching. Some of the important topics covered include;

- Managing resources
- Better living and
- Community development

Student response to some of the questions such as one trying to gauge the perception of the students on whether the subject 'managing resources' discusses topic such as sustainability, conservation and protection of natural resources. 60 % out of the total of 115 students from the two provinces agree, while the remaining 40% percent were not sure.

One of the other perception question relates to information about sustainability, conservation and protection of natural resources of which the 80% of the student population chose between not much to very little and not sure. Information gap both at the school level and also at the village is the missing link in terms of assistance with the management of their natural resources including the marine resources.

One of the other perception questions that was raised was the student's understanding of the word 'conservation'. Two or more answers were given as options for the students. This included the following:

- (a) sustainable use of the natural resources
- (b) Managing of land and water resources in ways that help protect and reserve our resources.

- (c) Participate in activities to reduce, reuse and recycle waste to improve the environment
- (d) Apply environmentally friendly actions to care for the environment and
- (e) All of the above.

Almost equal number of students selected 'b' and 'f' as their main answers while the rest (about 40%) chose between the others.

The baseline data gathering exercise showed that some of the schools have implemented the new reform system, but have not used the syllabus due to the fact that the older generation of the teachers are not comfortable with using it. This generation of teachers need in service training to assist with further implementation of the new reform and syllabus system. This is also an opportunity of which TNC can tap into particularly for the sensitization of teachers to be able then to take up this opportunity to use materials developed by the organizations.

The teachers have indicated that they have gone through the new syllabus and have discovered important information relating to marine diversity. In this area, there is also still a lack of skills and knowledge on how to go about implementing the new syllabus. Research skills for teachers is also an area that needs strengthening which would later enable to teachers to research first before disseminating information to the students.

### **Science**

Questions were asked to find out about student's knowledge on pollution affecting seas and waterways and if they have also been taught ways on how to minimize such activities from happening in the future. Students have indicated that they have taught on how to use dangerous chemicals and waste, affects food webs including those with humans including insecticides, pesticides, chemicals for mining and factories, sewerage into seas and water ways, smoke in the air. Student's response has been that they have been taught on how to reduce some of these problems.

The question on practical research program was posed to the students in which the students would carry out a practical research program. The students were interested in carry out a research project on a certain species of animals that was in danger of becoming rare in the local area. The common answer was "land and forest animals." Only a few students indicated that they would work on projects to do with the sea and marine animals including 'coral reefs and different species of fish'.

### **METHODS OF TEACHING**

The most common method of teaching was teacher directly instructing or delivering lessons to the students. This method saw the teacher as superior knowing everything, while the students knew nothing. Most students in this study would favor practical exercises including field trips and excursions. The teacher syllabus in the new reform curriculum, clearly spells out the different teaching methods which includes tools like survey, excursions and field trips, projects, role play, research, group work, discussions and debates. These are only few of the many examples described in the teaching syllabus and if they can be used often, the class sessions can be more interesting and participatory for the students. This itself would empower the students in the long term.

## **ANALYSIS OF THE BASELINE INFORMATION FROM THE SCHOOLS**

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This section of the report attempts to provide certain level of analysis based on the baseline information that was reviewed as part of this study and to a certain extent during the phase of the fieldwork in Manus, New Ireland and West New Britain. Some of the key areas of focus are as follows.

### **NATIONAL CURRICULUM FRAMEWORK AND LOCAL ACTION**

The National curriculum policy and framework is broad in scope and the puts the challenge to the schools to tailor their own program based on the National Curriculum. The National curriculum is prescriptive in terms of baseline information. This information is well detailed in the section on the literature review of this report. The National curriculum statement has a long term vision of where to go in terms of educational development in Papua New Guinea. This is also in alignment with the other government policy documents, however the challenge to make it work in particular localities rest solely on the inhabitants of that particular area utilizing existing state institutions such as local level government utilizing provisions of the organic law on provincial and local level governments. The National educational curriculum sets out some anticipated outcomes of the syllabus that are being taught in schools.

The policy from the context of the Department of Education is quite clear, however the scenario is quite different while in the field. It falls short of reaching anticipated outcomes as per the policy directive. This is attributed to a range of factors both internal and external. However to non-governmental organizations such as The Nature Conservancy, it provides an opportunity of international NGOs to build the capacity of the educational institutions in the provinces of focus and at the same time provide some resource support to the National Department of education. The situation in the field is also that not many schools are in alignment of the reform system, and not many schools are using the current reform syllabus.

### **OLD SYLLABUS VS THE NEW SYLLABUS**

In the old syllabus, everything was provided, while in the new syllabus there is a lot of flexibility for the teachers to do what they think is the best teaching method. This is an issue that a lot of the older generation of teacher are confronted with. In the new syllabus teachers have to explore creative ways to deliver their classes. The new syllabus also emphasizes a lot of creatively and effectiveness, however a lot of the schools in the remote areas are still faced with problems of resource constraints.

The new syllabus does not provide support materials along with the syllabus. This puts the teachers in a difficult position especially if they are to research topics. Communications is still a problem to a lot of the remote schools.

Having sufficient resource materials for classes is vital however this is limited. These resource materials can easily be used by teachers to draw up their lessons plans. Ideally the approach by TNC to provide these materials would go along way towards supporting the teachers.

### **LACK OF TEACHER'S CREATIVITY**

The current level of teachers teaching at the schools are older generation of teachers who have got used to teaching the old syllabus and are not comfortable with the new syllabus. The old syllabus was one in which everything was contained in the teachers guide. The new syllabus enhances flexibility in student learning. The older generation of leaders are not too comfortable teaching the new syllabus. In the new syllabus, teachers have to do practical exercises, research projects, excursions and pen days.

When there was a shift to the new curriculum and the contents, there was a failure to take the older generation of teachers through some form of orientation or in service training on the new reform curriculum. The situation that currently exist in some of the schools visited is such that these teachers are not interested in teaching the new curriculum, but would rather stick to the old curriculum materials. This exercise also provide an opportunity for 'The Nature Conservancy' to tap into re-orienting the teachers through some of the materials that TNC anticipates to use in the awareness.

## **CONTENT OF MATERIALS TO STUDENTS**

The syllabus that has been used is relevant to marine education and environment. This can be observed also from different context and perspectives such as the following syllabus:

### **Culture and community – This is an elementary syllabus taught in elementary 1 and 2 with 3 strands of:**

1. Me and my environment – relevant to addressing issues raised in the LRFFT. The strand focuses on land but not much on marine environment. This is an area that needs focus in the coastal villages.
2. Me and my community – Strand focuses on helping students play an active role in helping students play an active role in helping build their communities, this is entrenched through ideas like social development which develops the student's understanding and sense of responsibility. In this context, it is about empowering students to be responsible for their environment. This has to be brought on at the elementary stages and gradually should continue to be reinforced at the upper primary level.
3. Community living – Community living is a subject taught to Grades 3, 4 and 5. The syllabus builds upon what is taught at the elementary level. The focus is on enabling students to contribute to integral human development by helping students to understand and respect their cultures, societies and environments. The issue of environment is very broad, and ideally in the context of coastal community one could only focus on the marine environment in the context of which Papua New Guineans have had a special relationship with the land. The issue of sea and marine environment is also important in this regard. There has been a lot of focus in the past on land, and the sea and marine environment has been neglected. The syllabus has had a lot of good aims however it fails to indicate how those are to be achieved.

The strand is clearly in line with what is covered under the LRFFT such as under the context of geography of the community. For the coastal community/ coastal village or school it would be ideal to come up with its own geography based on some key concepts.

### **Making a living**

This is one of the key syllabuses in terms of baseline information relating to this project on LRFFT. The three strand areas covered under this subject area

1. Managing resources – one of the key sub-strand area is environment
2. Community development

### **Social science**

Social science is one of the active courses that is about how people relate to other people's environment and how they organize themselves and exploit their resources. The learning outcome under the environment and resources is one of the key focus areas of the LRFFT. The baseline survey conducted throughout 4 schools namely 2 in West New Britain and 2 in New Ireland, clearly showed

that schools have an interest in this particular area. The students in these schools are focused on areas that is of interest to them namely the marine environment. The students in these schools also had knowledge or perception between possible overlaps between social science and science subjects in relation to the environment. This also demonstrates the fact that integration between subjects is already working in this areas and that students are thinking ahead.

### **Grade 11 Biology syllabus**

As part review into Grade 11 and 12 materials at the secondary school level, there was a lot of focus into exercises based on experiments. In experimenting, it enables students to observe and discover new things that are naturally taking place in the surroundings which can only be explained and proved using scientific experiments. The book currently being used as a text by Grade 11 and 12, has only one section devoted to organism and their environment. The type of information in the text materials focuses just on land and animal species living on the land. There is nothing on the sea and its inhabitants.

## **WAY FORWARD FOR THE DISSEMINATION OF INFORMATION**

Based on the literature review of the baseline information available from the school syllabus and field work in the provinces, following are some recommendations that need taking up after the launching of the educational materials for the schools.

1. In service training for teachers in selected schools needs to be organized, prior to handling or distribution of such materials. The justification behind such an approach is that the teachers namely those teaching social science related subjects need to be sensitized on how to utilize these materials in the schools in conjunction with the curriculum and syllabus. This recommendation also stems from the fact that some of the teachers currently teaching these subjects are older generation of teachers, and therefore they are quite reluctant to change.
2. The National Curriculum division be involved from the beginning on the information dissemination aspect. They can also take a lead role in organizing in service training for teachers from these schools. They were kept out of the field visit during the baseline data gathering phase, due to their possible influence on the responses from the schools.
3. That there be approach to build the capacity of TNC personnel in the provinces especially in the context of which they can play a lead role in terms of information dissemination. The TNC personnel in the provinces of West New Britain, New Ireland, and Manus be involved in the in-service training of teachers from this province.
4. That Mahon Na Dari be the play the lead role in partnership with the Curriculum division on any in service training for teachers. This is due to the fact that Mahon Na Dari is already doing a lot of good things in terms of environment and education. The National Department of Education through the curriculum Unit needs to tap into that and build up to address the issues raised in this baseline study. This is from the context of the lack of Marine environmental materials in the current curriculum and syllabus. This is also to activate provisions of section 44 of the organic law on provincial and local level government in relation to integration of marine environmental conservation messages into the tokples skuls.

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## APPENDIX

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### TERMS OF REFERENCE FOR ANTHROSEARCH (PNG) LTD

#### **Protecting Coral Reefs from Destructive Fishing Practices – Protecting and Managing Reef Fish Spawning Aggregations in the Pacific**

##### **Assessment of Awareness Materials Effectiveness**

##### **Background**

The Nature Conservancy's (TNC) mission is "...to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the land and the waters they need to survive." To achieve this we work in collaboration with public and private partners, and especially communities, to help them conserve their lands and waters to ensure a healthy, diverse natural world for future generations.

Towards this goal the Conservancy is working to significantly reduce the degradation of coral reef ecosystems in the Pacific region from destructive fishing practices, and to conserve coral reef biodiversity by reducing the depletion of aggregating reef fish in Pacific Island countries. The Nature Conservancy (TNC) has received funding from the East Asia and Pacific Environmental Initiative (EAPEI) and the Oak Foundation to conserve coral reef biodiversity by reducing destructive fishing and the depletion of reef fish spawning aggregations in key Pacific Island countries.

Destructive fishing practices that target key species and degrade fragile coral habitats are among the major threats to the viability of coral reef ecosystems. Many reef fishes form aggregations at predictable places and times, frequently for the purpose of spawning. The nature of spawning aggregations makes them extremely vulnerable to elimination by over-fishing. It can take as few as two to three years of intensive fishing on spawning aggregations to eliminate breeding populations of fishes. There is presently little awareness of, or capacity to address, this threat to the marine resources and biodiversity in the Pacific. The spawning aggregation phenomenon has not been reflected in fishery management plans or the design of marine protected areas (MPAs).

The Live Reef Food Fish Trade (LRFFT) presents Pacific island countries with both potential and problems. As relatively small-volume, high-value fisheries in which income can potentially accrue directly to fishing communities, LRF fisheries have the potential to make a contribution to sustainable economic development in many Pacific island countries. However, experience with the trade in Southeast Asia, and with its past forays into the Pacific, have shown the trade to be prone to a "boom-and-bust" syndrome, with one area after another being over-fished for the highest-valued species. Of particular concern in the Pacific is the unsustainable targeting of grouper spawning aggregation sites by LRF operators for the live reef food fish trade.

The goals of this project are to improve resource management and spawning aggregation site protection, increase awareness of these resources' vulnerability to over-exploitation, and enhance capacity to manage reef fish spawning aggregations and MPAs that incorporate these sites. The project has three objectives: (1) to develop and facilitate the application of cost-effective management controls on the exploitation of aggregating reef fish resources; (2) to strengthen the capacity to assess, monitor, and manage aggregating reef fish resources; and (3) to raise the awareness and appreciation among stakeholders of the vulnerability of aggregating reef fish populations and associated ecosystems, the nature and significance of spawning aggregations, and options for improving management.

### **Awareness Materials**

Under the first phase of the ‘Protecting Coral Reefs from Destructive Fishing Practices’ project, a range of education and awareness materials were produced. One package was prepared for regional distribution in the Pacific and focused on the raising the awareness of decision-makers about the LRFFT. These packages are available through the Secretariat of the Pacific Community. These materials included:

1. A six-minute video outlining the main issues associated with the LRFFT.
2. Plastic fish identification cards for the top 16 LRFFT species.
3. A presentation folder containing:
  - An 8-page overview of the LRFT in the Pacific
  - Four 2-page fact sheets on:
    - Managing Our Fishery: Why is Management Critical?
    - Managing Our Fishery: Why Assess and Monitor?
    - Managing Our Fishery: What Do We Need to Know to Manage?
    - Your Community and the Live Reef Food Fish Trade.
  - A poster with the 16 most valuable fish species on one side, and a diagram of the “chain of custody” from the fishers to restaurants and a map on the reverse side.
  - The SPC Information Bulletin on Live Reef Fish issues.

In addition, in-country awareness materials for Papua New Guinea and Solomon Islands are being produced. The focus is on developing awareness materials that can be used now and into the future, and that also have a greater relevancy. While the LRFFT is an issue in a number of areas within PNG and the Solomon Islands, the issue of destructive fishing practices—including many of the activities promoted under the LRFFT—are more widespread in Melanesia.

The strategy for this has been to devise awareness materials that can be used as a resource in the schools targeting students, but that can also be used in communities by local NGOs and community-based groups. The main rationale for this is the need to promote a younger generation that is conscious of the environment and plays a more active role in ensuring that natural resources are used sustainably. These young people will become future leaders and business people, and with the right environmental education, they will be better placed to make decisions that are compatible with the sustainable use of natural resources. These young people can also influence their parent’s actions.

A description of the awareness and resources materials developed to date include:

- Storybook “A Fishy Business”

A storybook entitled “A Fishy Business” is targeted for schools in PNG and the Solomon Islands. The story is based on the use of destructive fishing practices in the live reef food fish industry in Melanesia, but with a romantic twist. The aim is for the schools to adopt the storybook as a regular resource material for use in the school curriculums. Preliminary discussions with the schools indicated a willingness to use the books. The former USA Ambassador to PNG and the Solomon Islands, Ambassador Susan Jacobs, provided a review forward for the book.

- Teachers and Students Activity Manual for “A Fishy Business”

A Teacher and Students Manual has been completed that will accompany the storybook “A Fishy Business”. The Manual covers English Activities and Science Activities. The English Activities include comprehension exercises, dictionary practice, working with verbs, etc. Science Activities include research, biodiversity and presentation activities.

- **Puppet and Drama Story**

English and PNG pidgin versions of drama scripts of the “A Fishy Business” storybook have been prepared. The dramatized version of the storybook concentrates on the key messages in the storybook that includes the lessons to be learnt concerning destructive fishing practices and the unsustainable use of marine resources. The puppet and drama versions storybook version also contains instructions on how to construct the puppets.

- **Match the Sketch Teaching Materials**

Five different lessons have been printed on synthetic paper (water proof paper) and packaged in one unit. Color pictures that are needed to deliver each of the lessons are to be cut out by the students and the lessons are delivered by adding, removing and matching pictures from a screen/board in an interactive manner. The five lessons covered in the match the sketches are:

- Destructive fishing techniques presentation
- Lifecycle of the LRF fish species presentation
- Biodiversity presentation
- Movement of money in the LRFF trade presentation
- Coral biology presentation

- **Match the Sketch Student and Teachers Manual**

This is a manual that accompanies the Match the Sketch Teaching materials described above. The manual provides full instructions on how to use and deliver the five lessons.

### **Posters**

A total of three different poster designs have been printed and distributed to government institutions at the national, provincial and local levels, schools and communities throughout PNG and the Solomon Islands. Each of the posters was modified for the use in the Solomon Islands and PNG. The three different designs were entitled:

- “Our Fish Our Future”
- “What is the live reef food fish?”
- “We are protecting our fish from destructive fishing practices”

- **What you need to know about Live Reef Food Fish Trade**

This booklet provides a simple format with pictures that describes what the LRFFT is and suggests steps to take and questions to ask, should a community want to get involved with the LRFFT. This booklet is still in production and will be added to the materials package as soon as it is available.

### **Evaluation**

The in-country awareness materials will be provided to a range of local partner organizations within PNG and the Solomon Islands. While the original design of these materials was based on requests from partners for destructive fishing and LRFFT awareness materials, they were not developed within an overall structured awareness campaign framework. Under the ‘Protecting and Managing Reef Fish Spawning Aggregations in the Pacific’ phase of this project, additional spawning aggregation related awareness materials will be developed that build on the current materials.

To help guide this second phase of the destructive fishing awareness component, we will need to undertake an assessment of the effectiveness of the current materials, and use the feedback to guide the development of the next set of materials. To do this The Nature Conservancy will contract an independent company, Anthrosearch PNG, to design and undertake the assessment.

## **Scope of Work**

The contractor (Anthrosearch PNG) will:

1. Work with The Nature Conservancy's Melanesia Program staff (in particular: Paul Lokani, Melanesia Program Director; and Barbara Masike-Liri, Partnership Coordinator) to design a study to assess the effectiveness of the in-country awareness materials described above.
2. Work with TNC to identify a range of targeted partners within PNG that will be invited to participate in the assessment. These may include, local NGOs, community-based groups, local level or provincial level fisheries or environment officers, schools, or individuals. Geographically partners may include groups in Manus, Kavieng, Kimbe, Milne Bay and Pt. Moresby. Partners can be divided into two groups, those using the materials and those that are the recipients of the awareness activities. It is *not* the intention of this study to evaluate the partners and their methods, but to focus on the effectiveness and usefulness of the materials.
3. Undertake a baseline survey of the selected partners to be provided the awareness materials. This should be completed prior to the distribution and launch of the awareness materials packages by TNC. The launch is currently scheduled for mid-August 2004, therefore the fieldwork for the baseline study needs to be completed prior to mid-August.
4. Complete a follow-up survey of the partners surveyed in 3. above after an agreed to time after the delivery and launch of the awareness materials. The time between the launch and the post-survey should be agreed to under 1. above, but should not be less than two months (it is currently envisaged that the follow-up survey would be completed in October 2004).

TNC will provide the contractor with copies of all the materials. The Conservancy will also be responsible for contacting and inviting the partners to participate in the assessment, advising them of the review schedule and methods, and for providing the contractor with introductions to the involved partners.

## **Reporting**

The contractor will provide the following written reports (in both hard and electronic form)

1. Progress report after the baseline study that includes:
  - A description of the study objectives and the baseline methodology
  - The results of the baseline survey
  - Issues arising from the baseline survey
  - Work plan for the follow-up survey
2. Final report after the follow-up survey that includes:
  - A description of the study objectives and methodology
  - The results of the evaluation, including but not limited to: an overall assessment; what materials were more effective and in what circumstances; what materials were not effective and suggestions why; the effectiveness of the media used; did the materials help raise the awareness of a) the delivery partners and b) the recipient partners.
  - Contextual issues which may have affected the effectiveness of the materials.
  - Recommendations on how to modify or redesign the materials and/or use of media.
  - Recommendations and/or guidelines on how to assess the effectiveness of awareness materials in future.
  - Attachments of all survey forms, questionnaires, data sheets, etc.