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PEOPLE, RULES, AND ORGANIZATIONS SUPPORTING THE PROTECTION OF ECOSYSTEM RESOURCES (PROSPER)

Report summarizing findings of review of formal primary school curriculum, adult literacy curriculum, and non-formal education materials, and identifying opportunities to integrate environmental themes (Deliverable 23)

SEPTEMBER 2015

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Principal contacts:

Paul Meadows, Chief of Party, Tetra Tech ARD, Monrovia, Liberia,
Paul.Meadows@tetratech.com
Vaneska Litz, Project Manager, Tetra Tech ARD, Burlington, Vermont,
Vaneska.Litz@tetratech.com

Implemented by:

Tetra Tech ARD
People, Rules and Organizations Supporting the Protection of Ecosystem Resources (PROSPER)
19th Street and Payne Avenue, Sinkor
Monrovia, Liberia

Tetra Tech ARD
P.O. Box 1397
Burlington, VT 05402
Tel: 802-495-0282

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ACRONYMS

ACC	Agriculture Coordination Committee
AML	Arcelor Mittal Liberia
ASNAPP	Agribusiness in Sustainable African Plant Products
AYP	Advancing Youth Program
BCC	Behavior Change and Communications
BOTPAL	Botanical Products Association of Liberia
CA	Community Assembly
CDWG	Curriculum Development Working Group
CFDC	Community Forestry Development Committee
CFMA	Community Forest Management Agreement
CFO	County Forestry Officer
CI	Conservation International
CJPS	Center for Justice and Peace Studies
CM	Community Mobilizers
COA	Communications Outreach Advisor
CRL	Community Rights Law
CSO	Civil Society Organizations
dTS	Development and Training Services
EMMP	Environmental Management and Mitigation Plan
ENNR	East Nimba Nature Reserve
ETD	Environmental Threshold Decision
EPA	Environmental Protection Agency
FDA	Forestry Development Authority
FED	Food and Enterprise Development Project
FEWG	Forestry Education Working Group
FFI	Fauna and Flora International
FTI	Forestry Training Institute
GIO	Gender Integration Officer
GoL	Government of Liberia
IEE	Initial Environmental Examination
IRD	International Relief and Development
LA	Livelihoods Advisor
L/LEDA	Leader, Livelihoods and Enterprise Development Activities
L/EDOA	Leader, Educational Development and Outreach Activities
LFSP	Liberia Forest Support Program
L-MEP	Liberia Monitoring and Evaluation Program
LRCFP	Land Rights and Community Forestry Program
LTTP	Liberia Teacher Training Program

MES	Monitoring and Evaluation Specialist
MoE	Ministry of Education
NAEAL	National Adult Education Association of Liberia
NBST	National Benefit Sharing Trust
NNBSG	Northern Nimba Biodiversity Stakeholders Group
NTFP	Non Timber Forest Product
ODA	Organizational Development Specialist
PES	Payment for Environmental Services
PROSPER	People, Rules and Organizations Supporting the Protection of Ecosystem Resources
TMF	Tailings Management Facility
UOF	Universal Outreach Foundation
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Review of formal primary school curriculum, adult literacy curriculum, and non-formal education materials, identifying opportunities to integrate environmental themes

This report is in fulfillment of Deliverable 23 (formerly Deliverable 26); “Report summarizing findings of review of formal primary school curriculum, adult literacy curriculum, and non-formal education materials, and identifying opportunities to integrate environmental themes.”

The report covers findings and analyses from the formal primary school curriculum, including opportunities identified to integrate environmental themes. Unfortunately, there were very limited adult literacy and non-formal education resources found with opportunities for integration of environmental themes. The Ministry of Education (MoE) and other education stakeholders had coinciding opinions about what should be considered the “target” for integration of environmental themes. These priorities for integration are discussed in further details below.

Following consultations with MoE officials, a consensus was reached that PROSPER will take the lead to work with partners to identify and prioritize environmental themes, while the MoE will lead the identification of opportunities within the national curriculum for the integration of those themes.

The PROSPER Project offers opportunities for non-formal education within the project target areas through its established objectives.

PROSPER PROJECT OBJECTIVES

The PROSPER Project has three objectives:

Objective 1: Expanded Educational and Institutional Capacity to Improve Environmental Awareness, Natural Resource Management (NRM), Biodiversity Conservation and Environmental Compliance;

Objective 2: Improved Community-Based Forest Management Leading to More Sustainable Practices and Reduced Threats to Biodiversity in Target Areas; and

Objective 3: Enhanced Community-Based Livelihoods Derived from Sustainable Forest-Based and Agriculture-Based Enterprises in Target Areas.

The PROSPER Objective 1 is meant to support and complement activities conducted under Objectives 2 and 3 of the project. This review is required within the first activity under Objective 1 as described below:

Activity 1.1: “To collaboratively support the development and/or modification of primary formal and non-formal school curricula to increase knowledge and understanding related to natural resources, their management, and the related rights and responsibilities of government and citizens.”

Together with the other four activities of Objective 1 (1.2-1.5), Activity 1.1 shares the common goal of enhancing public acceptance and practice of community forestry. Activity 1.1 does this

by supporting curricula aimed at increasing children's awareness and adoption of better natural resource management (NRM) practice.

The PROSPER education and communications team enlisted the support of the National Adult Education Association of Liberia (NAEAL) to support the development of adult and non-formal education curricula. Rutgers University also contributed curriculum development expertise to Activity 1.1, for primary formal, adult and non-formal curriculum development.

FIRST STEPS AND THE FORMATION OF THE CDWG

The evolution of the Activity 1.1 began in early June 2012, with the arrival of the PROSPER team and the positioning of the NAEAL-provided Education Advisor. In August 2012, the Curriculum Development Working Group (CDWG) was created with the support of PROSPER, with a goal of selecting appropriate environmental themes for "integration" into the existing MoE primary 1-6 curricula, as well as into existing adult and non-formal education curricula. The potential CDWG membership was to include MoE, USAID/Liberia projects supporting the MoE, and private sector partners, such as Buchanan Renewables (BR), Golden Veroleum, and AML (Arcelor Mittal Liberia), through PPPs (Public Private Partnerships) or PPAs (public-private agreements). Numerous USAID project partners eventually agreed to participate as did Arcelor Mittal, but Buchanan Renewables and Golden Veroleum did not contribute members, nor were there any members forthcoming through public-private partnerships. PROSPER promoted the idea that it was appropriate that the MoE chairs the group as it would be the MoE which would be in charge of the end product. It was in early September 2012, that the following organizations agreed to participate as members of the CDWG: MoE (2), NAEAL (1), EPA (1), FDA (2), UNICEF (1), IRD (1), CI (1), FFI (1), and AML (1) – the numbers in parentheses represent the number of members from each organization. There were a total of eleven members, plus the non-voting Component 1 team of PROSPER.

Many of the problems involved in the formation of the CDWG arose from the fact that contacting potential partners was very difficult. Individuals who were initially targeted to be on the CDWG ended up not being available. Additionally, there were delays with the MoE designating representatives to serve. It was not until just before the inaugural meeting of the group in September 2012 that the MoE approved B. Dio Harris and J. Emmanuel Milton to work with the CDWG.

CURRICULUM REVIEW PROCESS: MOE AND NON-MOE CURRICULA

Desk Reviews and Partner Consultations

The review process on the primary, adult and non-formal education curricula and materials was designed and implemented by PROSPER in collaboration with the MoE. Contact was initiated through the Ministry of Education, requesting information on how to locate the National Primary Curriculum, and other possible Liberian source curricula. Until early August 2012, the project was not able to obtain a copy of the National Primary Curriculum directly form the MoE, but managed to obtain a copy from USAID. During that same period, the Director of the Curriculum Development Center of the MoE provided PROSPER with a CD containing the National Primary Curriculum. Both copies were confirmed to be identical after initially being warned that there were various versions of the curriculum in circulation. Unfortunately, it was discovered that some schools were using non-finalized versions of the curriculum.

In June 2012, PROSPER began the search for non-MoE Liberia-based environmental primary curricula. As a PROSPER partner, the National Adult Education Association of Liberia (NAEAL) was contacted. NAEAL informed PROSPER that they had developed a curriculum for adult and non-formal education. Unfortunately, that document was never produced. The adult and non-formal section of the MoE informed the team that the 'official' adult and non-formal curriculum had been prepared by the USAID-Advancing Youth Project (AYP) in collaboration with MoE. The review team then met with AYP and obtained copies of the USAID-AYP supported adult and non-formal curricula.

Through an internet search, the PROSPER team also identified two additional sources of environmental curricula materials for primary schools – UNEP and GreenCOM. Other curricula materials located through internet searches were middle or senior high-school levels. Although the AYP curriculum was meant for use outside of the school classroom, PROSPER believed that its environmental sections could be useful to identify environmental themes and opportunities for integration in the National Primary School Curriculum. It was envisaged that the AYP curriculum could provide a basis for integrating environmental themes into adult and non-formal curriculum materials. The AYP curriculum served as the only curriculum officially sanctioned by the MoE for use for both adult and non-formal education. From the analysis carried out, the national primary curriculum offered more opportunities for integrating environmental themes than that of the AYP adult and non-formal curriculum.

Approach to Identifying Environmental Themes

The three curriculum sources, AYP, UNEP and GreenCOM, formed the basis for selection of environmental themes to be identified for integration to the MoE curricula. There were several options explored as to how to carry out the task of identifying environmental themes for integration in the MoE curricula. These options included: Have the PROSPER education team conduct the identification of themes in-house; Form a Curriculum Development Working Group; or Hire consultants to carry out the tasks. It was clear that PROSPER could guide the process, but would not have sufficient human resources to accomplish the labor-intensive work required for the curriculum development. Having the CDWG shoulder the task was also ruled out as it was feared that demanding too much work of a largely volunteer group would result in the curriculum development process being delayed. The team decided that engaging external consultants would be the best option, as their time could be dedicated solely to this task.

The PROSPER team and the MoE decided that the logical process for this work would be to develop a list of themes organized by priorities, so that the CDWG, which had to approve the selection, could easily identify clusters of issues, as opposed to dealing with a wider disorganized array. This approach proved to work very well during the process.

Once the curricula materials had been identified, the next task was to identify the environmental elements found within each of the core subject areas, i.e., Science, Social Studies, Mathematics and Language Arts curricula. The team then researched additional relevant environmental themes not found in the current MoE curriculum to present a broader view and body of knowledge for the student.

Several other sources were identified during the process, including: Jane Goodall's Roots and Shoots; Project Wild and a text from Sierra Leone, Our Environment; Taking Care of Our Future, Environmental Foundation for Africa, SV/UNHCR, 2004. This assortment of materials proved sufficient for an initial compilation of environmental themes. After a certain point in the

selection process, it was decided that a continued search would be redundant as most themes had already been identified.

Two Liberian-based consultants were engaged for this task: Paul Clarke, an ecologist working at the Forestry Training Institute of Liberia, and Martha Lukens, a curriculum specialist. PROSPER tasked the two consultants to identify and evaluate the environmental themes in the existing MoE national primary curricula, and assist in the identification of national and international environmental curricula which could be used to enhance the MoE curricula. They would further support the CDWG to vet and adjust priority environmental themes for eventual integration within the MoE national primary curriculum.

Following the prioritization of the environmental themes by the CDWG, a third consultant from Rutgers University supported the team to organize the priorities even further. Based on the process set out, the next step was to categorize and organize the themes identified by the CDWG by grade level so as to ensure age-appropriateness.

Potential Beneficiaries of the Curriculum with Enhanced Environmental Themes

The principal beneficiaries of this activity are the Liberian primary school pupils, their teachers, and the MoE. National and international organizations working in primary-level education can also benefit. This curriculum can support the development of curricula elsewhere but more importantly, makes a major contribution toward greater stewardship of natural resources nationwide.

Analysis of the MoE National Primary School curriculum

The analysis consisted of several steps:

1. Identify “environmental” elements in the current MoE National Primary School (NPS) curricula in science, social studies, mathematics and language arts;

2. Evaluate the elements in terms of objectives, activities and sequencing; and

3. Propose “preferred” curriculum elements, based on an analysis of external source curricula.

The identification of environmental elements in the primary curriculum was not a complicated task. There were some environmental themes that were considered important, such as sand mining, but which were not included in the MoE primary curriculum. The more complicated task was the analysis of the MoE curriculum.

A cursory review of several sample curriculum topics was sufficient to see that there were many gaps in the official MoE curriculum, making the task of retrofitting environmental elements very difficult.

The scope and sequence of the MoE NPS curriculum lacks efficiency in that it is unclear as to how much of a subject is going to be taught or the order in which the subject will be taught. This would make it difficult to integrate a given environmental curriculum element at a specific point in the MoE curriculum. It is not just the scope and sequence of the environmental elements in the current MoE curriculum, but all of the other elements in any one subject of the curriculum. These deficiencies would require the PROSPER team to identify environmental elements by

grade level, leaving the exact placement to the MoE. PROSPER's goal was to suggest items which could enhance the delivery of existing elements and not to change the order of curriculum elements.

Inconsistencies Identified within the MoE NPS Curriculum

The national primary curriculum for Grades 1-6, in the core subject areas – science, social studies, mathematics and language arts – is very general. It is more of a list of topics to be covered by subject, marking periods and year. It does not provide lesson plans, nor does it always have clear objectives for specific lessons with accompanying learning activities to provide support to the teacher in the classroom. It provides no guidance to teachers for week-to-week nor day-to-day lesson presentations. The curriculum sometimes suggests lesson teaching aids. For example, Science, Grade 3, Marking Period I refers to "an aquarium life" under materials, but there is no mention of where to acquire such an aid or how to use it. In general, there is no consistency of style or presentation across the subject areas, with some subject areas treating general objectives as learner outcomes and others not.

Objectives for each marking period vary in their clarity and usefulness. In the following examples we observed various kinds of inconsistencies:

- Social Studies, Grade 3, Unit V – In this example, Social Studies uses Units, while Science does not
- Marking Period V – There is inconsistency in numbering, varying from the use of numbers spelled out, Roman numerals or Arabic numerals

The "general objectives" are listed as follows:

At the end of this unit pupils should be able to:

- *Identify good health habits*
- *Explain health in relation to the environment*
- *Identify communicable diseases prevalent in our society, along with their prevention*

These are actually learner outcomes. The "Specific Objectives" are also learner outcomes:

Upon completion of this topic, pupils should be able to:

- *Explain ways of taking care of his/her body*
- *Explain that children are happy when they play*
- *Explain that physical exercise is good for the body*
- *Identify some common communicable diseases and*
- *List the prevention and cure of the some common diseases.*

The objectives mention "environment," but in the Outcome and Content sections of the detailed chart below the initial listing of the objectives, there is no explanation about what the "rules" about the "environment" are. Is the teacher meant to present a lesson on this with no explanation as to how? Students are also expected to explain how a community might keep their environment clean. "Pollution" is mentioned in the Content section, with no explanation of what it is or how it relates to this unit in general. This section represents a perfect opportunity to expand on and explain the significance of pollution, but this is not done.

As well, to address physical properties of water, in Science Grade 2, Marking Period II, the "general objectives" are:

1. *Demonstrate that science involves observation and exploration*
2. *Explore plants (sic!) and animals (sic!) behavior in the environment*

Also, the “general objectives” in social studies are really learner outcomes. The “specific objectives” are that:

At the end of this topic, pupils should be able to:

1. *Name and identify sources of water*
2. *Explain the process of evaporation and condensation*
3. *Identify soluble and insoluble substances in water*
4. *State the properties of air*
5. *Explain how sound travel (sic!)*
6. *List the medium through which sound travel (sic)*
7. *Identify primary colors*

However, while the Content section in the chart for the topic lists “forms of water,” the activities only include experimentation to show evaporation, with no comparison of the solid, liquid or gaseous states of water (H_2O).

Some marking period objectives for some subject areas are more detailed and could assist teachers in developing lesson plans by week and by day, guiding a teacher to cover the topics and to present environmental themes across a marking period. For example, the objectives to address deforestation, Science Grade 6, Marking Period III state:

Specific Objectives:

Upon completion of this topic, students should be able to:

1. *State the importance of the Liberian forest*
2. *List some plants and animals in the Liberian forest*
3. *Discuss the activities of the society for the conservation of nature*
4. *List some laws for the conservation of the Liberian forest*
5. *Describe global warming and its effects on Liberia*
6. *State local causes of atmosphere pollutions and the solutions*
7. *Explain the relationship between man and his environment*
8. *State local causes of water pollution*
9. *State the local causes of pollution in the soil and*
10. *State the effects of the improper care of the environment.*

The entire marking period treats environmental issues, specifically deforestation, pollution and environmental responsibility, and provides teachers with a relatively clear idea about what of the lessons to be presented.

When it comes to the range of learning activities listed in charts of the national primary curriculum, they range from no objective at all to those that have clear and detailed enough objectives to allow a teacher to develop lesson plans.

For example, to address weather, Social Studies, Grade 1, Marking Period III, lists the following as specific objectives:

At the end of the topic, pupils should be able to:

- *Define environment*
- *Describes*(sic!) *man's specific activities carried on in the environment*
- *Define weather and climate*
- *Distinguish natural resources for energy and those for generating revenue for the country*

The activities are limited, do not address these "specific objectives," and seem to be merely class discussions of the effects of weather on man and farming. The teacher is told to "Use diagram and drawings to explain and discuss the influence of weather." However, it is not clear from the suggested activities and materials, how the teacher is expected to do this, nor is it explained how the teacher is expected to distinguish weather from climate, although students are expected to differentiate between the two by the end of the marking period.

In contrast, addressing weather again, Science, Grade 5, Marking Period VI lists the following objectives:

Specific Objectives:

Upon completion of this topic, pupils should be able to:

1. *Explain the meaning of weather*
2. *Describe the effects of precipitation, air pressure, humidity, and seasons on the weather*
3. *Describe the solar system*
4. *State the characteristic of the sun and the moon*
5. *Explain what eclipses are and how they occur*
6. *Identify the stars and their positions*
7. *Identify the four groups of stars*

And in the chart, lists the following activities for learning about the weather including:

1. *Stating how wind, storm (sic!) and cloud (sic!) are formed*
2. *Stating the causes of land and sea breeze (sic!)*
3. *Explanation of temperature, air pressure and wind direction*
4. *Stating the effects of precipitation*
5. *Discussion on the causes of humidity*
6. *Discussion on seasons of Liberia, West Africa and other continents*
7. *Demonstration of how air rises by using a pin wheel*
8. *Discussion on the causes of lightning and thunder*

These are specific enough for a teacher to be able to prepare solid lesson plans that will provide exposure to students on various aspects of weather and how it affects the environment.

Unfortunately the materials listed: wind vine (sic), barometer, paper leaf, pin, stick, telescope, globe, flash light, etc. are not items readily available to a majority of Liberian grade schools, and so may affect the teacher's ability to follow the activities as listed.

Overall, the national primary curriculum, while including many of the environmental themes determined important by the CDWG, could benefit from use of ideas from the non-MoE

curriculum sources reviewed as well as environmental themes which these non-MoE sources identify and which are not included in the MoE curriculum.

Gaps in Environmental Themes Identified within the MoE NPS Curriculum

Table 1 (Annex) illustrates the environmental themes identified in the MoE curriculum and in the non-MoE source curricula. The column, “Current MoE Curriculum Sites” in Table 1, shows references to whether or not the environmental theme is treated in the MoE curriculum. If it is treated in the MoE curriculum, specific subject area and marking period references are given. If the theme is treated at more than one site in the MoE curriculum, this is so indicated. If the theme is NOT treated in the MOE curriculum, the column is left blank. Of the 51 themes identified by the CDWG, 27 were in the MoE curriculum, while the remaining 24 were recommended for integration. Therefore, almost half of the environmental themes considered as highly important or of high priority by the CDWG were NOT in the MoE NPS curriculum.

NEXT STEPS

Following the identification of environmental themes and opportunities for integration, the process continued. The CDWG used the identified themes as input to further develop the curriculum. A consultant from Rutgers took these priorities and arranged them by grade level for retrofitting into the MoE curriculum and will then develop six lesson plans, one for each grade level, for submission to the Deputy Minister for Instruction of the MoE for approval. Once approved, the MoE will delegate personnel to integrate the environmental themes into the MoE curriculum. Once the draft curriculum is accepted by the MoE, PROSPER will vet the curriculum with teachers in Nimba and Grand Bassa Counties for appropriateness. At the same time, PROSPER will identify teacher training specialists to develop training materials for teacher trainers and training materials for teachers. Teachers identified in PROSPER-area schools will then be trained using the teacher training materials.

ANNEX - METHODOLOGY USED IN THE ANALYSIS

The first consultant, Paul Clarke, developed “general areas,” such as air and more specific environmental themes, such as *air pressure*. The “general areas,” shown below in the results’ chart, are broader categories than the themes, which tend to be subcategories of the general areas. Each category was then assigned a value from 0 to 5, with 5 as the highest number assigned to each category: biological resources, threats to sustainability, global climate change, and agencies’ management of natural resources, public natural resource management rights/responsibilities, foundational science knowledge required, and compatibility for Liberia. This consultant then ranked each theme according to the above scheme.

The curriculum specialist, Martha Lukens, followed the same scheme and completed the task of compilation of the environmental themes. Their scores were essentially the same, but were not shown to the members of the CDWG, so that CDWG members’ judgment would not be affected or influenced by the specialists. CDWG members were asked to assign their own priorities to the identified themes, using the same rating system of 0 to 5 for each category, with a total range of 0 – 30. They were also told that their selections would determine the eventual prioritization of the themes. In the final analysis, it was only the ratings of the CDWG members that were considered. There was considerable overlap between the consultants’ ratings and those of the CDWG. The following chart shows the ratings and therefore the priorities arrived at by CDWG members. The chart which was used to rate each theme is NOT included here as themes were listed at random. Below they are listed in order of priority.

In addition to the ‘General Areas’, the ‘Themes’ and the ‘Priority Rating Total’, there are two other columns; ‘Source’ indicates where a theme is treated in non-MoE curricula, ‘Details’ refers to where the theme is located in the Source, and ‘Current MoE Curriculum Sites’ refers to where a Theme is treated in one of the four MoE curriculum subjects: science, social science, mathematics or language arts. An example of this is 1. *Slash and burn farming;* treated in Life Skills L1S2, Lesson 99, and in the MoE curriculum in SS1MP3. If the cells on the table, Source and Detail are empty, this means that the Theme is not treated in non-MoE curricula. If the cell Current MoE Curriculum Sites is empty, this means that the Theme is not treated in the MoE curricula. An example of this is no. 2, Biodegradable vs. non-biodegradable. In this case, the Theme was not mentioned in the non-MoE curricula or in the MoE curricula. This theme was suggested by members of the CDWG.

TABLE 1 - CDWG PRIORITIZED ENVIRONMENTAL THEMES

Key:

SS – Social Studies;
Sc – Science;
MP – Marking Period
SS1MP3 – Social Studies, Grade-1, Marking Period 3
GreenCOM – Lessons from School-Based Environmental Education Programs in Three African Countries, June 2000; GreenCOM; Environmental Education and Communication Project, USAID, Bureau for Africa, Office of Sustainable Development, Huma Resource and Democracy.
UNESCO-UNEP – International Environmental Education Program; Environmental Education Series 21; Title – ENVIRONMENTAL EDUCATION ACTIVITIES FOR PRIMARY SCHOOLS, Suggestions for making and using low-cost equipment; produced by the International Center for Conservation Education.

General Area	Theme	Priority Rating Total average of all	Source	Detail	Current MoE Curriculum Sites
Farming	1. Shifting cultivation	30.0	Alternative Basic Education Curriculum; Life Skills; Level 1, Semester 2	Lesson 99	SS1MP3
Landscapes	2. Biodegradable vs. non- biodegradable matter life cycles - positive and negative effects on the environment	30.0			
Energy	3. Capturing Liberia's solar and water potential	30.0			
Landscapes	4. Harmattan – the path to Liberia's past and future	30.0			

General Area	Theme	Priority Rating Total average of all	Source	Detail	Current MoE Curriculum Sites
	5. Emphasis on field practical	30.0			
	6. Energy transfer : food chain	30.0			
	7. Ecosystems	30.0			
Wildlife	8. Interaction	28.5	UNESCO-UNEP	5.6 p.74	Sc 3MP1, Sc5MP3, Sc6MP1
Environmental Problems	9. Deforestation	28.3	Alternative Basic Education Curriculum; Life Skills; Level 2, Semester 2	Lesson 57, p. 22	Science 3MP4 , Sc6MP3
Water	10. Pollution	28.3	UNESCO-UNEP	4.5 p.55	Science 4MP5, Sc6MP3, SS 3-5
Positive Action	11. Tree planting	28.3	UNESCO-UNEP	6.6 p.92	
Forestry	12. Community forestry	27.8	GreenCOM	Annex 1, #4, p.43	
Environmental Problems	13. Farming	27.8	Alternative Basic Education Curriculum; Life Skills; Level 2, Semester 2	Lesson 61, p. 34	
Environmental Awareness	14. Environmental responsibility	27.7	GreenCOM	Annex 1 #3, p.42	Science 3MP1, SS 1-3
Industry	15. Sand mining	27.6	Alternative Basic Education Curriculum; Life Skills; Level 1, Semester 2	Lesson 100	

General Area	Theme	Priority Rating Total average of all	Source	Detail	Current MoE Curriculum Sites
Environmental Problems	16. Farming	27.5	Alternative Basic Education Curriculum; Life Skills; Level 2, Semester 2	Lesson 59, p. 28	Science 6 gen, SS 1-3
Environmental Problems	17. Water conservation	27.5	Alternative Basic Education Curriculum; Life Skills; Level 2, Semester 2	Lesson 62, p. 37	
Environmental Problems	18. Environmental awareness	27.3	Alternative Basic Education Curriculum; Life Skills; Level 2, Semester 2	Lesson 56, p. 19	Science 3MP4, Science 6MP1,2,3, SS 1MP3
Wildlife	19. Biodiversity	27.0	UNESCO-UNEP	5.2 p.69	Science 2MP5, Sc3MP4
Wildlife	20. Ecosystems	27.0	UNESCO-UNEP	5.5 p.73	Sc 3MP1, Sc6MP2
Pollution	21. Pollution awareness/action	27.0	Alternative Basic Education Curriculum; Life Skills; Level 1, Semester 2	Lesson 98, p.184	Science 6, SS 3-5
Positive Action	22. Recycling	26.8	UNESCO-UNEP	6.1 p.86	SS 3-5
Wildlife	23. Communities	26.3	UNESCO-UNEP	5.3 p.70	Science 6
Landscapes	24. Change (over time)	25.8	UNESCO-UNEP	2.4 p.24	Sc6MP1
Water	25. Freshwater ecosystems	25.7	UNESCO-UNEP	4.3 p.53	

General Area	Theme	Priority Rating Total average of all	Source	Detail	Current MoE Curriculum Sites
Water	26. Marine ecosystems	25.7	UNESCO-UNEP	4.4 p.54	
Water	27. The water cycle	25.5	UNESCO-UNEP	4.1 p. 52	
Energy	28. Greenhouse effect	25.0	UNESCO-UNEP	1.3 p.11	Sc 6MP3
Wildlife	29. Habitats	25.0	UNESCO-UNEP	5.4 p.72	Science 6MP2, SS 4MP2
Water	30. Irrigation and drainage	24.7	UNESCO-UNEP	4.7 p.58	
Landscapes	31. Soil fertility	24.5	UNESCO-UNEP	2.6 p.26	Science 4MP5
Wildlife	32. Adaptations	24.5	UNESCO-UNEP	5.7 p.75	
Ecology	33. Neighborhood ecology	24.3	GreenCOM	Annex 1, #7, p.46	Sc6MP2
Landscapes	34. Erosion	23.8	UNESCO-UNEP	2.9 p.29	Sc6MP1
Positive Action	35. Creating wildlife areas	23.5	UNESCO-UNEP	6.5 p.90	SS 4-2
Water	36. Physical properties	23.5	UNESCO-UNEP	4.1 p.51	Sc1MP4+5, Sc 2MP2
Energy	37. Photosynthesis	23.2	UNESCO-UNEP	1.2 p.10	Sc4MP1, Sc5MP3, Sc6MP2
Wildlife	38. Extinction	23.2	UNESCO-UNEP	5.10 p.79	
Ecology	39. World ecology	22.8	GreenCOM	Annex 1, #8, p. 47	
Ecology	40. Watersheds	22.5	GreenCOM	Annex I, #1, p.41	
Air	41. Ozone hole	21.8	UNESCO-UNEP	3.0 p.47	
Landscapes	42. Soil texture and profile	21.7	UNESCO-UNEP	2.5 p. 25	Science 1MP4
Air	43. Weather	18.5	UNESCO-UNEP	3.7 p.42	Sc 1MP5, Sc3MP6,

General Area	Theme	Priority Rating Total average of all	Source	Detail	Current MoE Curriculum Sites
					Science 5MP6, SS 1-3, SS 3-4
Positive Action	44. Environmental audits	17.2	UNESCO-UNEP	6.4 p.89	
Air	45. Wind	14.8	UNESCO-UNEP	3.33 p.36	Sc1MP5
Air	46. Temperature	14.2	UNESCO-UNEP	3.5 p.39	Science 1-6
Air	47. Acid rain	13.3	UNESCO-UNEP	3.8 p.44	
Energy	48. Evaporation	12.3	UNESCO-UNEP	1.5 p.13	SS1MP4,Sc 2MP2, Science 4, Sc5MP1+2
Air	49. Air pressure	7.8	UNESCO-UNEP	3.1 p.32	Science 1, Sc5MP6
Landscapes	50. Plate tectonics	7.7	UNESCO-UNEP	2.1 p.21	
Energy	51. Convection	5.7	UNESCO-UNEP	1.4 p.12	

TABLE 2 - THEMES ARRANGED ACCORDING TO THE RATINGS ACCORDED EACH THEME BY THE CDWG

Numbers 1 (slash and burn farming), already in the MoE curriculum and 2-7 (biodegradable-non-biodegradable, solar/water potential, Harmattan, field practice, food chain and energy transfer), not in the MoE curriculum, were the themes which had a rating of 30, the highest possible. The lowest ranking theme was Number 51 (convection) which had a rating of 5.7.

Number (MoE/not MoE)	Theme	Rating	Total	Cumulative total
1 (MoE), 2-7 (not MoE)	Slash and burn farming, biodegradable-non-biodegradable, solar/water potential, Harmattan, field practice, food chain and energy transfer	30	7	7
8 (MoE)	Interaction among wildlife forms	28.5	1	8
9-10 (MoE), 11 (not MoE)	Deforestation, pollution, tree planting	28.3	3	11
12-13 (not MoE)	Community forestry, farming	27.8	2	13
14 (MoE)	Environmental responsibility	27.7	1	14
15 (not MoE)	Sand mining	27.6	1	15
16 (MoE), 17 (not MoE)	Farming, water conservation	27.5	2	17
18 (MoE)	Environmental awareness	27.3	1	18
19-21 (MoE)	Biodiversity, ecosystems, pollution awareness/action	27	3	21
22 (MoE)	Recycling	26.8	1	22
23 (MoE)	Communities and wildlife	26.3	1	23
24 (MoE)	Change over time	25.8	1	24
25-26 (not MoE)	Freshwater ecosystems, marine ecosystems	25.7	2	26
27 (not MoE)	Water cycle	25.5	1	27
28-29 (MoE)	Greenhouse effect, habitats	25	2	29
30 (not MoE)	Irrigation and drainage	24.7	1	30
31 (MoE), 32 (not MoE)	Soil fertility, adaptations	24.5	2	32
33 (not MoE)	Neighborhood ecology	24.3	1	33
34 (MoE)	Erosion	23.8	1	34
35-36 (MoE)	Creating wildlife areas, physical properties	23.5	2	36
37 (MoE), 38 (not MoE)	Photosynthesis, extinction	23.2	2	38
39 (not MoE)	World ecology	22.8	1	39
40 (not MoE)	Watersheds	22.5	1	40
41 (not MoE)	Ozone hole	21.8	1	41
42 (MoE)	Soil texture and profile	21.7	1	42
43 (MoE)	Weather	18.5	1	43
44 (not MoE)	Environmental audits	17.2	1	44
45 (MoE)	Wind	14.8	1	45
46 (MoE)	Temperature	14.2	1	46
47 (not MoE)	Acid rain	13.3	1	47
48 (MoE)	Evaporation	12.3	1	48
49 (MoE)	Air pressure	7.8	1	49
50 (not MoE)	Plate tectonics	7.7	1	50

51 (not MoE)	Convection	5.7	1	51

It is clear from the ranking by the CDWG that most themes are given high priorities, especially among those NOT treated in the MoE curriculum. It will be up to the CDWG, working with the Rutgers consultant, to devise a set of themes, starting with the highest ranked, which can reasonably be retrofitted to the existing MoE curriculum. As of the time this exercise was being concluded, there was no defined cutoff point at which themes should be integrated into the MoE curriculum or not.

U.S. Agency for International Development
Liberia Mission
502 Benson Street
Monrovia, Liberia