Environmental Education Needs Assessment Survey

Primary School Teachers and Administrators

by

Jack A. Reed
Environmental Education Specialist

November, 1991

Sponsored by

Natural Resource Management Project
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ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY

PRIMARY SCHOOL TEACHERS AND ADMINISTRATORS

INTRODUCTION

This needs assessment report is a continuation of a study begun in May, 1991 to determine something of the environmental knowledge, interests and priorities held by practicing educators at several educational levels. One component, a survey of Peace Corps volunteer teachers and their counterparts, was completed earlier. A study of teacher educators is in progress and will be completed shortly. Data and recommendation from a recent national environmental education planning conference will provide further information.

This report centres on the responses of primary school teachers and primary school administrators to a questionnaire distributed to a select number of primary schools in Botswana. However, because no appreciable or statistically significant differences was detected between the responses of the teachers and those of the administrators and because the teacher population (170) predominated over other sample segments (54) the responses were treated as being derived from a single sample of teachers.

RATIONALE

Primary school teachers were chosen as one component of the Needs Assessment because it is through the primary schools that the fundamental concepts regarding the environment, its maintenance and the individual's responsibility for environmental stability are communicated to a future citizenry and the wider community. The effectiveness of an environmental education programme will be increased by selecting learnings that are perceived by teachers as being important and relevant. Similarly, learning efficiency is enhanced when those communicating the learning materials believe that the approach is appropriate to the readiness of the learner. For the curriculum developer, knowing where to begin in the preparation of learning materials and what ideas are most appropriate to the child are essential.

PURPOSE OF THE SURVEY

1. To determine if the respondents integrate any environmental education in their own teaching strategies
2. To determine whether the syllabuses being used by the respondents contain environmental education topics.
3. To determine which of the environmental topics selected as priorities in the National Conservation Strategy are being dealt with in existing syllabuses.
4. To obtain suggestions for environmental education for teachers which will enable them to help students protect or improve their environment.
5. To obtain suggestions for environmental education for teachers which will enable them to help students benefit from sustainable use of their environment.
6. To find out which environmental issues are considered important by teachers to include in the teacher training curriculum.
7. To obtain suggestions of preferred teaching methods and techniques for environmental education.

   (From the paper Allen, I. A. "*Environmental Education Needs Assessment Survey Peace Corps Volunteers and Counterparts*" May 1991)

THE QUESTIONNAIRE AND THE PROCESS OF SCORING IT

In consultation with designers at the Curriculum Development Centre, a short questionnaire was designed (Annex I) to collect the desired information. It was decided to use open-ended questions to solicit environmental education ideas in order to allow for as wide a variety of answers as possible. The questionnaire was reviewed by a group of curriculum designers, and tested with a small sample of teachers.

The questionnaire was distributed to a sample of primary school teachers by their headteachers. The headteachers responded to the questionnaire as well. The questionnaire was filled out individually with no special instruction other than those in the questionnaire. The primary school headteachers collected the completed questionnaires and returned them to the Curriculum Development and Evaluation Centre, Ministry of Education.

After examining a sample of the returned questionnaires, it was decided that the environmental education categories identified in the earlier Peace Corps Volunteer study would be valid categories to use in the tabulation of the primary teacher responses. In this way, there would be greater opportunity to compare the responses and to identify similarities in response patterns across the two studies.

To assist in the identification of responses in the various categories, a category outline was compiled using the earlier study as a guide. The category outlines were examined across all questionnaire items and simplified by reducing the duplication of response categories and combining closely related response choices. From the final outline, tally sheets were designed that were essentially identical for each of the questionnaire items. In this way, persons tallying responses could more easily memorise the categories and use the categories to classify the responses.(Annex II)

A brief training session was held for the persons who tallyed the questionnaire responses. The markers were encouraged to ask questions about any step of the process and about the categories and sub-categories of the tally sheets at the end of the session.

RESULTS

There were 224 questionnaires returned by the primary teachers. For the 9 environmental categories, a total of 2224 responses were identified across the four questions asked.

Ethnographic Data

TABLE 1. SEX OF RESPONDENTS

Sex	Frequency	Percentage
Male	119	53.1
Female	72	32.1
No Response	33	14.7
Total	224	99.9

TABLE 2. OCCUPATION OF RESPONDENTS

Occupation	Frequency	Percentage
Teacher	170	75.9
Parent	1	0.4
Education Officer	3	1.3
Headteacher	29	12.9
No Response	21	9.4
Total	224	99.9

TABLE 3. AGE OF RESPONDENTS

Age	Frequency	Percentage
Under 20	6	2.7
21 - 35	126	56.3
36 - 50	54	24.1
Over 50	13	5.8
No Response	25	11.2
Total	224	100.1

TABLE 4. FARMING BY RESPONDENTS

Farming Category	Frequency	Percentage
Subsistence	26	11.6
Commercial	2	0.9
Not a Farmer	131	58.5
No Response	65	29.0
Total	224	100.0

TABLE 5. TYPE OF FARMER

Type of Farmer	Frequency	Percentage
Cattle	24	77.4
Plough	7	22.6
Total	31	100.0

RESPONSES TO QUESTIONS

Tables 6 - 15 display the distribution of responses to the following questions:

1a If you wanted to teach school children something that will help them protect and improve their environment, what would you teach?

1b. Suggest 5 issues that you feel are priority issues in the environment and give reasons for your selection.

2a. If you wanted to teach children something about how they could use their environment for their benefit (eg. obtain food) without destroying the environment , what would you teach?

2b. Suggest 5 things that you feel are important and give reasons for your selection.

TABLE 6. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO MAJOR ENVIRONMENT CATEGORIES

Major Environ.	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
A.Agriculture	82	13.9	72	10.1	121	27.9	83	17.2	358	16.1
B.Wildlife	67	11.3	102	14.2	39	9.0	57	11.8	265	11.9
C.Energy	9	1.5	14	2.0	9	2.1	6	1.2	38	1.7
D.Plant & Tree	100	16.9	123	17.2	88	20.3	79	16.4	390	17.5
E.Cattle	26	4.4	42	5.9	30	6.9	30	6.2	128	5.8
F.Soil & Min.	101	17.1	112	15.6	81	18.7	93	19.3	387	17.4
G.Wtr. & Sani.	60	10.1	79	11.0	15	3.5	44	9.1	198	8.9
H.Pollution	73	12.3	107	14.9	17	3.9	42	8.7	239	10.7
I.Oth. Env. Iss.	74	12.5	65	9.1	34	7.8	48	10.0	221	9.9
Total	592	26.6	716	32.2	434	19.5	482	21.7	2224	99.9

TABLE 7. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO AGRICULTURE SUB-CATEGORIES

Agriculture	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	17	20.7	8	11.1	28	23.1	8	9.6	61	17.1
Sustain. Crop.	5	6.1	4	5.6	21	17.4	16	19.3	46	12.8
Reforestation	51	62.2	47	65.3	39	32.2	32	38.6	169	47.2
Fruit Tree Gro.	2	2.4	4	5.6	25	20.7	11	13.3	42	11.7
Horticulture	1	1.2	3	4.2	6	5.0	4	4.8	14	3.9
Anim.Husband.	5	6.1	6	8.3	2	1.7	9	10.8	22	6.1
Other	1	1.2	0	0.0	0	0.0	3	3.6	4	1.1
Total	82	99.9	72	100.1	121	100.1	83	100.0	358	99.9

TABLE 8. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO WILDLIFE SUB-CATEGORIES

Wildlife	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	27	40.3	23	22.5	8	20.5	11	19.3	69	26.0
Attitudes	1	1.5	4	3.9	2	5.1	6	10.5	13	4.9
Conservation	32	47.8	39	38.2	20	51.3	20	35.1	111	41.9
Poaching	5	7.5	11	10.8	2	5.1	5	8.8	23	8.7
Wld. Ani. Use	0	0.0	8	7.8	4	10.3	4	7.0	16	6.0
Loc. Ind. Prod.	0	0.0	7	6.9	2	5.1	8	14.0	17	6.4
Extinction	1	1.5	4	3.9	0	0.0	0	0.0	5	1.9
Fence & Migr.	1	1.5	5	4.9	1	2.6	3	5.3	10	3.8
Other	0	0.0	1	1.0	0	0.0	0	0.0	1	0.4
Total	67	100.1	102	99.9	39	100.0	57	100.0	265	100.0

TABLE 9. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO ENERGY SUB-CATEGORIES

Energy	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	0	0.0	1	7.1	1	11.1	3	50.0	5	13.2
Conservation	3	33.3	1	7.1	1	11.1	1	16.7	6	15.8
Fos. Fuel Con.	4	44.4	3	21.4	3	33.3	1	16.7	11	28.9
Altern. Sources	1	11.1	7	50.0	3	33.3	0	0.0	11	28.9
Energy Cycles	0	0.0	0	0.0	1	11.1	0	0.0	1	2.6
Other	1	11.1	2	14.3	0	0.0	1	16.7	4	10.5
Total	9	99.9	14	99.9	9	99.9	6	100.1	38	99.9

TABLE 10. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO PLANTS AND TREES SUB-CATEGORIES

Plants & Trees	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	43	43.0	45	36.6	16	18.2	31	39.2	135	34.6
Firewood.	4	4.0	2	1.6	7	8.0	6	7.6	19	4.9
Defor.& Hab.	51	51.0	69	56.1	43	48.9	28	35.4	191	49.0
Use Wld. Fruit	1	1.0	6	4.9	22	25.0	13	16.5	42	10.8
Other	1	1.0	1	0.8	0	0.0	1	1.3	3	0.8
Total	100	100.0	123	100.0	88	100.1	79	100.0	390	100.1

It will be noted that the responses to the questions which referred to cattle were an extreme minority of less than 6 percent of the total responses(Table 11, page 8). This apparent discrepancy coming from respondents in a cattle-rich nation may be explained by noting that from the ethnographic data only 28 persons from a total of 159 (17.6 %) declared themselves to be farmers.

Within the category, "Cattle", there were 25 percent of the responses that were classified as *Other*. Upon examination of specific comments, it was observed that the vast majority of them dealt with the concept of overstocking. In a sense, these comments were also concerned with overgrazing and could have been classified as such.

TABLE 11. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO CATTLE SUB-CATEGORIES

Cattle	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Overgrazing	19	73.1	36	85.7	22	73.3	19	63.3	96	75.0
Other	7	26.9	6	14.3	8	26.7	11	36.7	32	25.0
Total	26	100.0	42	100.0	30	100.0	30	100.0	128	100.0

TABLE 12. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO SOIL AND MINERALS SUB-CATEGORIES

Soil & Minerals	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	19	18.8	28	25.0	6	7.4	22	23.7	75	19.4
Soil Conserv.	69	68.3	66	58.9	30	37.0	35	37.6	210	54.3
Fertilizer Use	5	5.0	7	6.3	15	18.5	8	8.6	35	9.0
Plough Method	7	6.9	7	6.3	27	33.3	19	20.4	60	15.5
Mineral Conser.	1	1.0	4	3.6	3	3.7	8	8.6	16	1.6
Other	0	0.0	0	0.0	0	0.0	1	1.1	1	0.3
Total	101	100.0	112	100.1	81	99.9	93	100.0	387	100.1

Table 13 (page 9) displays the comment sub-categories dealing with "Water and Sanitation". It was noted that the majority of the specific comments fell into the *General* sub-category. In many instances the comments simply stated 'water' with no elaboration. Apparently, in a country newly-recovered from an extended drought period, the respondents this comment was self-explanatory.

An examination of Table 15 (page 10) dealing with the responses classified as "Other Environmental Issues" reveals that the most frequent classified response was *Other*. A review of the Questionnaires revealed that this category was used by the markers for tallying responses that were so unclear, or inappropriate, that they fit nowhere.in the classification outline. This sub-category became the 'rubbish bin' of the assessment.

TABLE 13. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO WATER AND SANITATION SUB-CATEGORIES

Water & Sanita.	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	33	55.0	56	70.9	10	66.7	30	68.2	129	65.2
Water Treat.	5	8.3	8	10.1	2	13.3	2	4.5	17	8.6
Water Conserv.	22	36.7	15	19.0	3	20.0	8	18.2	48	24.2
Water Cycles	0	0.0	0	0.0	0	0.0	4	9.1	4	2.0
Other	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	60	100.0	79	100.0	15	100.0	44	100.0	198	100.0

TABLE 14. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO POLLUTION SUB-CATEGORIES

Pollution	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	30	41.1	29	27.1	3	17.6	10	23.8	72	30.1
Disposal, Waste	5	6.8	14	13.1	3	17.6	6	14.3	28	11.7
Tox. Waste Haz	1	1.4	8	7.5	1	5.9	1	2.4	11	4.6
Littering	20	27.4	28	26.2	4	23.5	7	16.7	59	24.7
Recycling	6	8.2	1	0.9	1	5.9	5	11.9	13	5.4
Water	4	5.5	9	8.4	3	17.6	3	7.1	19	7.9
Air	4	5.5	18	16.8	2	11.8	8	19.0	32	13.4
Other	3	4.1	0	0.0	0	0.0	2	4.8	5	2.1
Total	73	100.0	107	100.0	17	99.9	42	100.0	239	99.9

TABLE 15. DISTRIBUTION OF RESPONSES TO THE QUESTIONS ACCORDING TO OTHER ENVIRONMENT ISSUES SUB-CATEGORIES

Other Env. Iss.	Question 1a.		Question 1b.		Question 2a.		Question 2b.		Total	
Sub-category	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
General	16	21.6	7	10.8	8	23.5	7	14.6	38	17.2
Attitude Devel.	5	6.8	7	10.8	1	2.9	4	8.3	17	7.7
Envir. Manage.	21	28.4	4	6.2	11	32.4	6	12.5	42	19.0
Ref., Park Dev.	1	1.4	2	3.1	2	5.9	2	4.2	7	3.2
Consu.Res.Use	0	0.0	4	6.2	1	2.9	3	6.3	8	3.6
Dredging	0	0.0	1	1.5	0	0.0	0	0.0	1	0.5
Sustainable Dev	2	2.7	9	13.8	2	5.9	9	18.8	22	10.0
Popula. Control	4	5.4	9	13.8	1	2.9	4	8.3	18	8.1
Global Warm.	2	2.7	6	9.2	0	0.0	0	0.0	8	3.6
Other	23	31.1	16	24.6	8	23.5	13	27.1	60	27.1
Total	74	100.1	65	100.0	34	99.9	48	100.1	221	100.0

ANALYSIS

Characteristics of the Respondents

Of the 224 questionnaires that were returned, it was surprising to note in Table 1 that the majority of the questionnaires were identified as completed by males(53.1 percent). Approximately 15 percent of the questionnaires had failed to identify the sex of the respondent, but it appeared that less than 40 percent of the respondents were women. The male /female ratio in the primary schools has been more nearly 25 : 75 and this reversal in ratio created the suspicion that other factors may have played a role in the return of responses. Further study of this phenomena may be warranted.

Of the 203 persons who identified their occupation, 170 were classroom teachers(75.9 percent) with the remaining 24.1.percent being distributed among the ranks of headteachers(29), education officers(3) or parents(1) (Table 2). The teachers were young with more than 63 percent classifying themselves as between the ages of 21 and 35 (Table 3). Only about 12 percent of them identified themselves as farmers(Table 4). These farmers were cattle owners for the most part (77.4 percent)(Table 5).

Environment Categories Identified in the Study

There were nine major areas identified as being associated with the environment and its quality. These areas were listed in Table 6 (page 5)with the selection frequencies. In Tables 7 - 15(Pages 6-10) each category was elaborated by listing the sub-categories associated with the main environmental category. In these tables, the response frequencies for each of the sub-cate-

gories is reported. The list is repeated below in outline form with the respective sub-categories that respondents identified with each major category.

A. Agriculture
   (1) General
   (2) Sustainable Cropping
   (3) Reforestation
   (4) Fruit Tree Growing
   (5) Horticulture
   (6) Animal Husbandry
   (7) Other

B. Wildlife
   (1) General
   (2) Attitudes
   (3) Conservation
   (4) Poaching
   (5) Wild Animal Use
   (6) Local Industry Products
   (7) Extinction
   (8) Fencing and Migration
   (9) Other

C. Energy
   (1) General
   (2) Conservation
   (3) Fossil Fuel Conservation
   (4) Alternate Sources
   (5) Energy Cycles
   (6) Other

D. Plants and Trees
   (1) General
   (2) Firewood
   (3) Deforestation and Habitat Destruction
   (4) Use of Wild Fruit and Vegetables
   (5) Other

E. Cattle
   (1) Overgrazing
   (2) Other

F. Soil and Minerals
   (1) General
   (2) Soil Conservation (Erosion)
   (3) Fertilizer Use
   (4) Ploughing Methods
   (5) Mineral Conservation
   (6) Other

G. Water and Sanitation
   (1) General
   (2) Water Treatment
   (3) Water Conservation
   (4) Water Cycles
   (5) Other

H. Pollution
   (1) General
   (2) Disposal, Waste
   (3) Toxic Waste Hazard
   (4) Littering
   (5) Recycling
   (6) Water
   (7) Air
   (8) Other

I. Other Environmental Issues
   (1) General
   (2) attitude Development
   (3) Environmental Management
   (4) Refuge and Park Development
   (5) Consumer Resource Use
   (6) Dredging
   (7) Sustainable Development
   (8) Population Control
   (9) Global Warming
   (10) Other

In some instances, it may appear that a number of sub-categories are redundant or repetitious. It was felt , however, that these responses were encountered in different contexts and needed to be treated as separate items.

Analysis of Responses to Questions

Question 1a If you wanted to teach school children something that will help them protect and improve their environment, what would you teach?

The teachers contributed 592 suggestions across the 9 major categories. Table 16 shows the rank order of the major categories for this question. The three most often mentioned categories were "Soils and Minerals"(101), "Plants and Trees"(100) and "Agriculture"(82) which made up almost 48 percent of the responses to Question 1a. The three least mentioned categories were "Energy"(9), "Cattle"(26) and "Water and Sanitation"(60) which accounted for 16 percent of the responses to this question.

Of the sub-categories in the "Soils and Minerals" category, *Soil Conservation (Erosion)* was of top rank (68.3%, Tables 12 and 22). *Deforestation and Habitat Destruction* was the most popular comment in the category "Plants and Trees" (51%, Tables 10 and 20). Within the "Agriculture" category, the topic *Reforestation* was ranked number one (Tables 7 and 17) with more than 62 percent of the responses.

Discussion continues on Page 17.

TABLE 16. RANK ORDER OF MAJOR CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
A. Agriculture	3	6	1	2	3
B. Wildlife	6	4	4	4	4
C. Energy	9	9	9	9	9
D. Plants and Trees	2	1	2	3	1
E. Cattle	8	8	6	8	8
F. Soils and Minerals	1	2	3	1	2
G. Water and Sanitation	7	5	8	6	7
H. Pollution	5	3	7	7	5
I. Other Environ. Issues	4	7	5	5	6

TABLE 17. RANK ORDER OF AGRICULTURE SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Agriculture Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	2	2	2	5	2
2. Sustainable Cropping	3.5	4.5	4	2	3
3. Reforestation	1	1	1	1	1
4. Fruit Tree Growing	5	4.5	3	3	4
5. Horticulture	6.5	6	5	6	6
6. Animal Husbandry	3.5	3	6	4	5
7. Other	6.5	7	7	7	7

TABLE 18. RANK ORDER OF WILDLIFE SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Wildlife Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	2	2	2	2	2
2. Attitudes	5	7.5	5	4	6
3. Conservation	1	1	1	1	1
4. Poaching	3	3	5	5	3
5. Wild Animal Use	8	4	3	6	5
6. Local Industry Products	8	5	5	3	4
7. Extinction	5	7.5	8.5	8.5	8
8. Fences and Migration	5	6	7	7	7
9. Other	8	9	8.5	8.5	9

TABLE 19. RANK ORDER OF ENERGY SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Energy Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	5.5	4.5	4	1	3
2. Conservation	2	4.5	4	3	5
3. Fossil Fuel Conserva.	1	2	1.5	3	1.5
4. Alternate Sources	3.5	1	1.5	5.5	1.5
5. Energy Cycles	5.5	6	4	5.5	6
6. Other	3.5	3	6	3	4

TABLE 20. RANK ORDER OF PLANTS AND TREES SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Plants and Trees Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	2	2	3	1	2
2. Firewood	3	4	4	4	4
3. Deforest. & Habit. Dest.	1	1	1	2	1
4. Use Wild Fruit & Veg.	4.5	3	2	3	3
5. Other	4.5	5	5	5	5

TABLE 21. RANK ORDER OF CATTLE SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Cattle Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. Overgrazing	1	1	1	1	1
2. Other	2	2	2	2	2

TABLE 22. RANK ORDER OF SOIL AND MINERALS SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Soil and Minerals Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	2	2	4	2	2
2. Soil Conservation (Ero.)	1	1	1	1	1
3. Fertilizer Use	4	3.5	3	4.5	4
4. Ploughing Methods	3	3.5	2	3	3
5. Mineral Conservation	5	5	5	4.5	5
6. Other	6	6	6	6	6

TABLE 23. RANK ORDER OF WATER AND SANITATION SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Water and Sanitation Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	2	1	1	1	1
2. Water Treatment	3	3	3	4	3
3. Water Conservation	1	2	2	2	2
4. Water Cycles	4.5	4.5	4.5	3	4
5. Other	4.5	4.5	4.5	5	5

TABLE 24. RANK ORDER OF POLLUTION SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Pollution Sub-categories	Rank Order				
	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	1	1	3	1	1
2. Disposal, Waste	4	4	3	4	4
3. Toxic Waste Hazard	8	6	6.5	8	7
4. Littering	2	2	1	3	2
5. Recycling	3	7	6.5	5	6
6. Water	5.5	5	3	6	5
7. Air	5.5	3	5	2	3
8. Other	7	8	8	7	8

TABLE 25. RANK ORDER OF OTHER ENVIRONMENTAL ISSUES SUB-CATEGORIES ACCORDING TO THE FOUR QUESTIONNAIRE ITEMS

Other Environmental Issues	Rank Order				
Sub-categories	Question 1a	Question 1b	Question 2a	Question 2b	Overall
1. General	3	4.5	2.5	3	3
2. Attitude Development	4	4.5	7	5.5	6
3. Environ. Management	2	7.5	1	4	2
4. Refuge & Park Develop.	8	9	4.5	8	9
5. Consumer Resource Use	9.5	7.5	7	7	7.5
6. Dredging	9.5	10	9.5	9.5	10
7. Sustainable Develop.	6.5	2.5	7	5.5	5
8. Population Control	5	2.5	7	5.5	5
9. Global Warming	6.5	6	9.5	9.5	7.5
10. Other	1	1	2.5	1	1

Analysis of Responses to Questions (Continued from Page 12)

Question 1b Suggest 5 issues that you feel are priority issues in the environment and give reasons for your selection.

The respondents named 716 issues which were classified across the 9 categories. In Table 16, it will be seen that the three most frequently named issues were the categories "Plants and Trees" (123), "Soils and Minerals" (112) and "Pollution" (107). These three categories accounted for 47.7 percent of the issue frequency. The three least mentioned issue categories were "Energy" (14), "Cattle" (42) and "Other Environmental Issues" (65).This represents a total of 17 percent of the responses to this question.

Within the category "Plants and Trees", *Deforestation and Habitat Destruction* (56.1%, Tables 10 and 20)was the most often cited issue category. *Soils Conservation (Erosion)* (58.9%, Tables 12 and 22) was found to be the most frequent response within the "Soil and Minerals" category. The "Pollution" sub-category that was most frequently cited as an issue was the *General* statement Pollution (27.1%, Tables 14 and 24). *Littering* was named almost as often(26.2 %, Tables 14 and 24).

Question 2a. If you wanted to teach children something about how they could use their environment for their benefit (eg. obtain food) without destroying the environment, what would you teach?

The topics named by the respondents were the same as those identified in Question 1a. The order in rank changed slightly with "Agriculture" (121) now occupying first place out of the 434 suggestion made. "Plants and Trees" (88) remained in second rank and "Soils and Minerals" (81) was third(Tables 6 and 16). These three categories commanded 66.9 percent of

the responses(Table 6). The three topics considered least likely to be taught were "Energy" (9), "Water and Sanitation" (15) and "Pollution" (17). These three categories were identified less than 10 percent of the total for this question. It is interesting to note that, though "Pollution" was considered a major issue(Question 1b.), it was not selected as a topic that should be taught to children for their benefit.

As with Questions 1a. and 1b., the most popular sub-category identified by the respondents was *Reforestation* (38.6%, Tables 7 and 17) in the "Agriculture" category. In the "Plants and Trees" category, the first rank sub-category was *Deforestation and Habitat Destruction* (48.9%, Tables 10 and 20). *Soil Conservation (Erosion)* (37.0%, Tables 12 and 22)was the leading sub-category in the major category of "Soils and Minerals". The lower percentages indicate that there was apparently more diversity in the suggestions made for each of the three highest ranked major categories.

Question 2b. Suggest 5 things that you feel are important and give reasons for your selection.

The assessment of the 482 responses to Question 2b. provided the same three major categories as had been found in the assessment of Questions 1a and 2a. but in a different rank order. These were: "Soils and Minerals" (93), "Agriculture" (83) and "Plants and Trees" (79) (Tables 6 and 16). The three categories accounted for 52.9 percent of the total responses to the item A similar consistency was observed in examining the frequency of the major categories with the lowest rank. "Energy" (6), the lowest ranked category in all of the previous questions, remained the lowest rank in this question as well. "Cattle" (30) was the second lowest category of response for the question and had been ranked in the same position for two of the three previous questions. The "Pollution" category (42) was the third lowest ranked category and had only been ranked this low for one previous question. These three low ranked categories accounted for 16.1 percent of the responses to Question 2b..

A similar consistency was found when the highest ranked sub-categories were identified for each of the major categories. In "Soils and Minerals", *Soil Conservation(Erosion)* (37.6%, Tables 12 and 22) and in "Agriculture". *Reforestation* (38.6%, Tables 7 and 17) the top ranked topics remained the same. In "Plants and Trees", the *General* sub-category was ranked first (39.2%, Tables 10 and 20)with *Deforestation* (35.4%, Tables 10 and 20) being a close second.

It can again be seen that the top-ranked sub-categories have less command of the frequencies and probably indicates a greater diversity in opinion for the latter questions. It may also be possible that the respondents, in answering the Questionnaire and thinking about the possibilities, became increasingly aware of alternatives.

CONCLUSION

From the analysis, it can be seen that the teaching force is aware of environmental issues. Responses were made that indicated that the teachers were able to identify nearly 60 issues at some level of understanding. On the average, the teachers made 3.3 responses to each of the questions.

A Spearman Rank Correlation Coefficient was computed to test the hypothesis that the similarities in the ranks of the nine environment categories across the four items of the questionnaire was a chance association. In this test, if the value of r_s is .600, or greater, it would be an indication that there is a probability of less than .05 that the samples have no association. Table 26 displays a correlation matrix of the 4 questionnaire items and the overall ranking of the 9 categories.

TABLE 26 A CORRELATION MATRIX OF QUESTIONNAIRE ITEMS 1A, 1B, 2A AND 2B

Questionnaire	Question 1a.	Question 1b.	Question 2a.	Question 2b.	Overall
Question 1a.	1				
Question 1b.	.733	1			
Question 2a.	.817	.500	1		
Question 2b.	.900	.650	.883	1	
Overall	.917	.85	.867	.900	1

Note : Based on Spearman Rank Correlation Coefficient Sig. $r_s = .600$ for $p < .05$

It will be seen from Table 26, that there is a significant association between the ranks of each of the four questions and the overall ranking based on the frequency of the responses with one exception. A comparison of the rank order of Question 1b categories and the rank order of the Question 2a categories suggests that the association between them is due to little more than chance. However, the correlations of the other pairs of rankings suggest that similar frames of reference were used by the respondents and that the respondents were consistent in applying their opinions across the items of the Questionnaire. The calculated measure of association strengthens the credibility of the rankings and thereby the relative importance of the categories selected. Therefore, on the basis of the calculated rho values for each of the paired questions, the hypothesis of no association among the questionnaire items must be rejected.

On the basis of these findings and tests, it can be assumed that the opinions of teachers within the confines of the categories and sub-categories of the analysis could serve as a guide to environmental education personnel in the areas of curriculum development, teacher preparation and, the less formal, in-service training of teachers.

Annex I

ENVIRONMENTAL EDUCATION QUESTIONNAIRE

Dear Collegues,

We are in the process of developing curriculum which will help our people use fully and at the same time preserve our environment for future generations. We need your help so that the curriculum could be practical and be based on real life needs of our society. We will like you to answer the few short questions below to help us identify the needs in our communities.

1.If you wanted to teach school children something that will help them protect and improve their environment what would you teach?

_____

_____

_____

_____

_____

_____

Suggest 5 issues that you feel are priority issues in the environment and give reasons for your selection.

_____

_____

_____

_____

_____

_____

_____

_____

2. If you wanted to teach children something about how they could use their environment for their benefit (e.g. obtain food) without destroying the environment what would you teach?

_____

_____

_____

_____

Suggest 5 things that you feel are important and give reasons for your selection.

_____

_____

_____

_____

_____

PLEASE INDICATE BY AN X IF YOU ARE :-

1. Male OR Female
2. A Teacher A parent An Education Officer A Headmaster
3. Under 20 years 21 to 35 years 36 to 50 years Over 50years
4. A subsistent farmer OR Commercial Farmer OR Not a farmer
5. A farmer what type of farming do you do:- Cattle rearing OR Ploughing

COMPLETED QUESTIONNAIRES TO BE SENT TO:

Principal Curriculum Development Officer
Curriculum Development Unit
P.O.Box 221,
Gaborone,

ATT: Environmental Education Survey.

Annex II

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Final Section - Ethnographic Data

Response Categories	Identification Number														Total
A. Ethnographic Data															
1. SEX															
A. MALE															
B. FEMALE															
2. OCCUPATION															
A. TEACHER															
B. PARENT															
C. EDUCATION OFFICER															
D. HEADTEACHER															
3. AGE															
A. UNDER 20															
B. 21 - 35															
C. 36 - 50															
D. OVER 50															
4. FARMER															
A. SUBSISTENCE															
B. COMMERCIAL															
C. NO															
5. FARMER TYPE															
A. CATTLE															
B. PLOUGH															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.1a Teaching Emphasis Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
1. TOPICS															
A. AGRICULTURAL															
(1) GENERAL															
(2) SUSTAIN.CROPPING															
(3) REFORESTATION															
(4) FRUIT TREE GROWING															
(5) HORTICULTURE															
(6) ANIMAL HUSBANDRY															
(7) OTHER															
B. WILDLIFE															
(1) GENERAL															
(2) ATTITUDES															
(3) CONSERVATION															
(4) POACHING															
(5) WILD ANIMALS USE															
(6) LOC. INDUSTRY PROD.															
(7) EXTINCTION															
(8) FENCE AND MIGRA.															
(9) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.1a. (Cont.)Teaching Emphasis Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
C. ENERGY															
(1) GENERAL															
(2) CONSERVATION															
(3) FOSSIL FUEL CONSER															
(4) ALTERN. SOURCES															
(5) ENERGY CYCLES															
(6) OTHER															
D. PLANTS AND TREES															
(1) GENERAL															
(2) FIREWOOD															
(3) DEFOREST. AND HABITAT DESTRUCTION															
(4) USE OF WILD FRUIT AND VEGETABLES															
(5) OTHER															
E. CATTLE															
(1) OVERGRAZING															
(2) OTHER															
F. SOIL AND MINERALS															
(1) GENERAL															
(2) SOIL CONS. (EROSION)															
(3) FERTILIZER USE															
(4) PLOUGH METHODS															
(5) MINERAL CONSERV.															
(6) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.1a. (Cont.)Teaching Emphasis Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
G. WATER AND SANITATION															
(1) GENERAL															
(2) WATER TREATMENT															
(3) WATER CONSERV.															
(4) WATER CYCLES															
(5) OTHER															
H. POLLUTION															
(1) GENERAL															
(2) DISPOSAL, WASTE															
(3) TOX.WASTE HAZARD															
(4) LITTERING															
(5) RECYCLING															
(6) WATER															
(7) AIR															
(8) OTHER															
I. OTHER ENVIRON ISSUES															
(1) GENERAL															
(2) ATITIUDE DEVELOP.															
(3) ENVIRON. MANAGE.															
(4) REFUGE , PARK DEV.															
(5) CONSUMER RES. USE															
(6) DREDGING															
(7) SUSTAINABLE DEV.															
(8) POPULA. CONTROL															
(9) GLOBAL WARMING															
(10) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.1b Teaching Issues Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
1. TOPICS															
A. AGRICULTURAL															
(1) GENERAL															
(2) SUSTAIN.CROPPING															
(3) REFORESTATION															
(4) FRUIT TREE GROWING															
(5) HORTICULTURE															
(6) ANIMAL HUSBANDRY															
(7) OTHER															
B. WILDLIFE															
(1) GENERAL															
(2) ATTITUDES															
(3) CONSERVATION															
(4) POACHING															
(5) WILD ANIMALS USE															
(6) LOC. INDUSTRY PROD.															
(7) EXTINCTION															
(8) FENCE AND MIGRA.															
(9) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.1b (Cont.)Teaching Issues Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
C. ENERGY															
(1) GENERAL															
(2) CONSERVATION															
(3) FOSSIL FUEL CONSER															
(4) ALTERN. SOURCES															
(5) ENERGY CYCLES															
(6) OTHER															
D. PLANTS AND TREES															
(1) GENERAL															
(2) FIREWOOD															
(3) DEFOREST. AND HABITAT DESTRUCTION															
(4) USE OF WILD FRUIT AND VEGETABLES															
(5) OTHER															
E. CATTLE															
(1) OVERGRAZING															
(2) OTHER															
F. SOIL AND MINERALS															
(1) GENERAL															
(2) SOIL CONS. (EROSION)															
(3) FERTILIZER USE															
(4) PLOUGH METHODS															
(5) MINERAL CONSERV.															
(6) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.1b (Cont.)Teaching Issues Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
G. WATER AND SANITATION															
(1) GENERAL															
(2) WATER TREATMENT															
(3) WATER CONSERV.															
(4) WATER CYCLES															
(5) OTHER															
H. POLLUTION															
(1) GENERAL															
(2) DISPOSAL, WASTE															
(3) TOX.WASTE HAZARD															
(4) LITTERING															
(5) RECYCLING															
(6) WATER															
(7) AIR															
(8) OTHER															
I. OTHER ENVIRON ISSUES															
(1) GENERAL															
(2) ATTITUDE DEVELOP.															
(3) ENVIRON. MANAGE.															
(4) REFUGE , PARK DEV.															
(5) CONSUMER RES. USE															
(6) DREDGING															
(7) SUSTAINABLE DEV.															
(8) POPULA. CONTROL															
(9) GLOBAL WARMING															
(10) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.2a Teaching Activity Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
1. TOPICS															
A. AGRICULTURAL															
(1) GENERAL															
(2) SUSTAIN. CROPPING															
(3) REFORESTATION															
(4) FRUIT TREE GROWING															
(5) HORTICULTURE															
(6) ANIMAL HUSBANDRY															
(7) OTHER															
B. WILDLIFE															
(1) GENERAL															
(2) ATTITUDES															
(3) CONSERVATION															
(4) POACHING															
(5) WILD ANIMALS USE															
(6) LOC. INDUSTRY PROD.															
(7) EXTINCTION															
(8) FENCE AND MIGRA.															
(9) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.2a Teaching Activity Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
C. ENERGY															
(1) GENERAL															
(2) CONSERVATION															
(3) FOSSIL FUEL CONSER															
(4) ALTERN. SOURCES															
(5) ENERGY CYCLES															
(6) OTHER															
D. PLANTS AND TREES															
(1) GENERAL															
(2) FIREWOOD															
(3) DEFOREST. AND HABITAT DESTRUCTION															
(4) USE OF WILD FRUIT AND VEGETABLES															
(5) OTHER															
E. CATTLE															
(1) OVERGRAZING															
(2) OTHER															
F. SOIL AND MINERALS															
(1) GENERAL															
(2) SOIL CONS. (EROSION)															
(3) FERTILIZER USE															
(4) PLOUGH METHODS															
(5) MINERAL CONSERV.															
(6) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.2a Teaching Activity Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
G. WATER AND SANITATION															
(1) GENERAL															
(2) WATER TREATMENT															
(3) WATER CONSERV.															
(4) WATER CYCLES															
(5) OTHER															
H. POLLUTION															
(1) GENERAL															
(2) DISPOSAL, WASTE															
(3) TOX.WASTE HAZARD															
(4) LITTERING															
(5) RECYCLING															
(6) WATER															
(7) AIR															
(8) OTHER															
I. OTHER ENVIRON ISSUES															
(1) GENERAL															
(2) ATTITUDE DEVELOP.															
(3) ENVIRON. MANAGE.															
(4) REFUGE , PARK DEV.															
(5) CONSUMER RES. USE															
(6) DREDGING															
(7) SUSTAINABLE DEV.															
(8) POPULA. CONTROL															
(9) GLOBAL WARMING															
(10) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.2b Teaching Activity Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
1. TOPICS															
A. AGRICULTURAL															
(1) GENERAL															
(2) SUSTAINABLE CROPPING															
(3) REFORESTATION															
(4) FRUIT TREE GROWING															
(5) HORTICULTURE															
(6) ANIMAL HUSBANDRY															
(7) OTHER															
B. WILDLIFE															
(1) GENERAL															
(2) ATTITUDES															
(3) CONSERVATION															
(4) POACHING															
(5) WILD ANIMALS USE															
(6) LOC. INDUSTRY PROD.															
(7) EXTINCTION															
(8) FENCE AND MIGRA.															
(9) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.2b (Cont.)Teaching Activity Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
C. ENERGY															
(1) GENERAL															
(2) CONSERVATION															
(3) FOSSIL FUEL CONSER															
(4) ALTERN. SOURCES															
(5) ENERGY CYCLES															
(6) OTHER															
D. PLANTS AND TREES															
(1) GENERAL															
(2) FIREWOOD															
(3) DEFOREST. AND HABITAT DESTRUCTION															
(4) USE OF WILD FRUIT AND VEGETABLES															
(5) OTHER															
E. CATTLE															
(1) OVERGRAZING															
(2) OTHER															
F. SOIL AND MINERALS															
(1) GENERAL															
(2) SOIL CONS. (EROSION)															
(3) FERTILIZER USE															
(4) PLOUGH METHODS															
(5) MINERAL CONSERV.															
(6) OTHER															

ENVIRONMENTAL EDUCATION NEEDS ASSESSMENT SURVEY
Question No.2b (Cont.)Teaching Activity Responses

Response Categories	Identification Number														Total
B. ENVI. EDUCATION CATEGORIES															
G. WATER AND SANITATION															
(1) GENERAL															
(2) WATER TREATMENT															
(3) WATER CONSERV.															
(4) WATER CYCLES															
(5) OTHER															
H. POLLUTION															
(1) GENERAL															
(2) DISPOSAL, WASTE															
(3) TOX.WASTE HAZARD															
(4) LITTERING															
(5) RECYCLING															
(6) WATER															
(7) AIR															
(8) OTHER															
I. OTHER ENVIRON ISSUES															
(1) GENERAL															
(2) ATTITUDE DEVELOP.															
(3) ENVIRON. MANAGE.															
(4) REFUGE , PARK DEV.															
(5) CONSUMER RES. USE															
(6) DREDGING															
(7) SUSTAINABLE DEV.															
(8) POPULA. CONTROL															
(9) GLOBAL WARMING															
(10) OTHER															