No.

REPORT ON THE RESEARCH ANALYSIS PROJECT FOR THE ACTIVITIES OF VOLUNTEERS IN AFRICAN EDUCATION (SCIENCE SUBJECTS)

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Japan International Cooperation Agency (JICA)
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Foreword

Since its establishment in 1965, the Japan Overseas Cooperation Volunteers (JOCV) scheme has posted a total in excess of 10,000 volunteers to developing countries in Asia, Africa, the Middle East, Central and South America, and Oceania. In particular, 3,776 volunteers had already been posted to the African region as of the end of March 1991. Of these, 495 or 13% were instructors in science subjects, making this a notable form of cooperation within the areas of education and culture.

Excluding institutions such as universities and research institutes, this posting of teachers of science subjects is a rare example of cooperation in basic education within our country's international cooperation efforts. Perhaps we could see this sort of cooperation as being an area which will become increasingly vital from now on.

The JOCV set up a Committee for Research Analysis of the Activities of Volunteers in the Education of Science Subjects in the African Region, with Toshio Toyoda, a Professor at Tokyo International University, as its Chairman, and with Hitoshi Nakamura, a Professor at Asia University, and Hiroshi Otani, Deputy Manager of the Planning Department of Nikki Co., Ltd, as its members. This committee has been researching into the current situation and problems of education in sciences in Africa from the point of view of the activities of the volunteer teachers in these subjects, as well as into the achievements and problems of cooperation in education in sciences by the JOCV.

This committee has held gatherings on nine occasions, chiefly to hear about these activities from returning volunteers, as well as carrying out field surveys in Kenya, Zambia, and Ghana. The findings of these have now been compiled in the form of this report.

In the report we have of course included vital analyses and proposals for the future directions of cooperation in education in sciences, as well as how educational cooperation mainly in these subjects in Africa should proceed from now on. We are sure that the report will give valuable suggestions not only to the JOCV but also to other relevant national and

international organizations in various overseas countries. In order to make it useful as reference to these various organizations, we have now decided to prepare an abridged English translation of the report.

While expressing my deepest gratitude to the Chairman Mr.Toyoda and the gentlemen of the Committee for compiling this report, I would also like at the same time to thank the volunteers who have given us their cooperation in activity reports and other forms, and all relevant persons who have cooperated in the field surveys.

March 1992

Morihisa Aoki
Managing Director, Japan Overseas Cooperation Volunteers
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Table of Contents

Preface	Outline and Proposals	5
Chapter I	The State of Education and Educational Cooperation in African Countries	13
Chapter II	Request for Educational Aid from African Countries	37
Chapter III	Directions for Education Development Aid to the Third World from Communication Theory Perspectives	51
Chapter IV	Problems with Cooperation in Mathematics and Science Education	79

Preface

Outline and Proposals

Introduction

Our research group was commissioned by the JOCV to examine activities involving the overseas posting of science teachers, and to draw up proposals for measures in cases where the findings of our research proved that improvements were needed. So far, more than 3,500 JOCV volunteers have been posted to Africa. 13.4% of these were volunteer teachers in science subjects. 13.4% is a rather large proportion. There have been 474 teachers of science subjects, not including more than 30 teachers of Science and Mathematics. We feel this to be a unique form of cooperative activity. While there have been cases of cooperation from our country in higher education such as the Jomo Kenyatta College of Agriculture and Technology in Kenya or the Monkut Institute of Technology in Thailand, there have hardly been any examples of cooperation in basic education such as primary or secondary schools. In fact, there are no other examples of cooperation in formal education. Thus we can justifiably use the word 'unique'.

In 1990, which was coincidentally International Literacy Year, a major convention on educational development was held in Jomtien, Thailand. This was an unprecedentedly large convention, attracting 1,500 participants from 152 countries, among them three state presidents such Kenya's President Moy. The theme of this world convention was "Education For All". This was based on a global awareness that, while until now education has been aimed only at an elite minority, from now on it should be available to everybody, and that education for the ordinary people is just as important. Thanks to the existence of conventions like this, this principle is gaining recognition, and concern for basic education has suddenly started to increase of late.

In our country, a study group on educational aid was set up to enable the present authors to undertake research with experts on this problem in the Foreign Ministry, the Education Ministry, and others. A history of 20 years of activities in sciences - educational cooperation in science and mathematics at the secondary level. This was also the chief concern of the authors in the study group on educational aid.

Now, if there are shortcomings in present cooperative activities in sciences, they need to be improved. We need to make some sort of proposals to the JOCV on the subject of future activities. The first topic of our study was to define the significance of educational cooperation in forms such as teachers of science subjects, and, further, the significance of cooperation in the fields of science and mathematics as far as Japan is concerned, in comparison to that in French language from France, or recently the English language education appearing recently in aid from the United Kingdom. Thus we examine the significance of cooperation from our country in sciences within education in African countries. (Chapter 1)

Our second point looks at the problems of the host countries, and the background and circumstances which lie behind the requests from the various governments. We approach our research from the angle of elucidating whether the best choice has been made in view of that country's human-oriented policies for the future. (Chapter 2)

Chapter 3 deals with the English language abilities of science subject teachers. We study this through questionnaires aimed at discovering the teachers' self-assessment of their teaching medium (English), and the opinions of pupils, respectively. We also heard the voices of school principals and teachers on this important point.

In Chapter 4 we examine problem points in the education of mathematics and science – which we could see as the central core of cooperation in science education. We survey the current situation of education in science and mathematics in Africa, and study the directions that science education should take for the future development of that continent.

In the process of our research we invited returning science volunteers to tell us their experiences of these activities, as well as reading their reports and endeavouring to identify the

problem points. In addition, by carrying out field surveys, we had opportunities to gain first-hand knowledge of the local situation regarding cooperative activities in sciences, as well as problem points.

We will be more than happy if the following report can be of some use to the positive development of science volunteer activities from now on.

(Toshio Toyoda)

1. Outline of the Research Analysis
– Main issues in analyzing activities in science subjects

A. Activities in Science Subjects as Educational Cooperation

1. Although our country has become the biggest source of aid, in the field of education we are still at a low level. Japan's share of educational cooperation within our bilateral ODA is 5.8%, well below the DAC average of 11.5% (see Table Pre-1).
2. Japan's educational cooperation, mainly through JICA, concentrates on higher (science & engineering) and secondary technical education, while there is hardly any activity in fields of education proper such as primary & secondary education, social education, or teacher training (see Table Pre-2).
3. JOCV is producing unique results midway between these two. Almost 30% of its work is in education. In particular, posting volunteer teachers in science subjects is a form of cooperation in proper secondary education under the jurisdiction of the educational ministries and organs of the host countries, and as such it is a field of cooperation that deserves attention.
4. Basic education at the primary and secondary levels has taken shape originally through the autonomy and self-sufficiency of various third-world countries. As such, one difficulty in providing cooperation lies in matters relating to the fundamental sets of values of each country.

   JOCV's science subject activities are a form of educational cooperation that makes little intrusion into fundamental values in science and mathematics education, but responds to a demand expressed by third world countries.
5. Science subject activities, a rare young sapling in terms of Japan's educational cooperation, must be nurtured to full growth from now on in order to intensify our educational aid, which is lagging behind that of other DAC countries.

As a major economic power, our country is occasionally subjected to close scrutiny from the outside world. In order to gain a well-balanced international acceptance from now on, we need to replace our concentration on commodity exports with one on intensive cultural exchanges. Educational cooperation through science subject volunteers represents an advance guard, a bridgehead to this ideal.

6. Of science teachers, about three-quarters are posted to Africa. The cumulative total over the last ten years or so has reached a major scale in excess of 500 participants (see Table Pre-3).

7. In Africa, a region which was colonized for centuries by western European countries, the systems and details of education in the various countries retain strong influences from their erstwhile rulers. If we take the example of the use of English or French as a teaching medium, this fact becomes obvious.

   Emotionally, too, African people retain a sense of respect and esteem for the western culture which they have cultivated for so long, and they enjoy western European sets of values. This sort of cultural environment provides the stage for the activities of our science subject volunteers.

8. Bringing with them the educational traditions and Confucian culture of the orient, these science teachers enter deep into African culture, virgin territory to them. Viewing African culture in different terms, we could see it as a testing ground for assessing the internationalization of Japanese culture, and it could even become the site for a confrontation between eastern and western cultures.

9. The tools of the science teachers are the subjects of science and mathematics, and with these as teaching aids they will play a part in the modernization and industrialization of African countries. And the volunteers embody the Japanese tradition of respect for education. (The importance of this seems to be proved by the rapid growth of NIES and ASEAN, taking shape with their roots in a policy of emphasis on education.) The secondary school pupils of Africa, while learning the subjects of science and mathematics,

will surely absorb the earnest educational attitude of the Japanese volunteers at the same time.

10. On the other hand, the science teachers will have a lot to learn in their daily lives, alongside their teaching activities. For example, the relationship between people and time. In Africa, people control time. African people, revering their ancestors and seeing themselves bound up in an infinite continuation from them, have a sense of harmony and oneness between themselves and time. The realization of what we have lost as a result of civilization will be a great treasure for the science volunteers to bring back to Japan. Here lies one of the important roles which the volunteers have to fulfil in "development education".

Table Pre-1 The Share of Educational Aid within the Bilateral ODA of leading DAC Countries (%)

Country	Belgium	France	Germany	Canada	U.K
Share of Educational Aid	25.1	24.6	16.4	13.3	12.6
Country	Switzerland	Netherlands	U.S.A	Japan	All DAC
Share of Educational Aid	10.4	7.8	5.8	5.8	11.5

Source: DAC Chairman's Report 1990
(Figures based on amounts pledged in 1989)

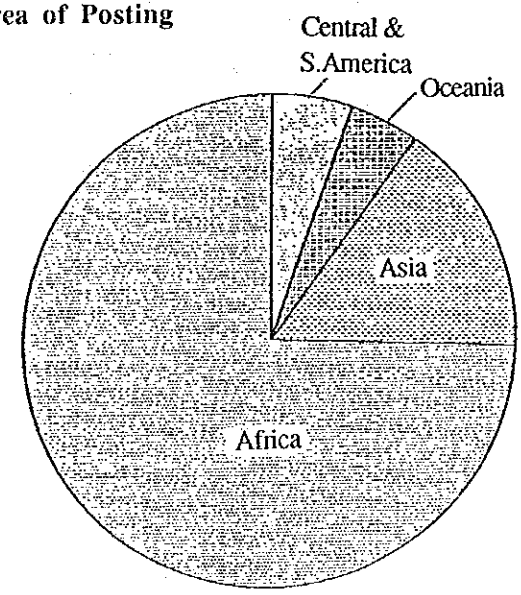
Table Pre-2 The Emphasis of Education-Related Aid from International Organizations and Leading DAC Countries

	Education & Training				Study Abroad, etc.		Private
	Policy Planning	Basic Education	Higher Education	Vocational Training	Study Abroad	Non-formal	NGO etc
World Bank	√√	√√	√	√	√	√	√
UN (Unicef, UNDP etc)	√	√√	–	√√	√	√	√
USA (USAID)	√	√√	–	–	√√	√	√
U.K. Germany	√	–	√√	√	√√	√	√
France Belgium	√	√√	–	–	√√	√	√
Sweden	–	√√	–	√	√√	√	√√
Japan	–	–	√√	√√	√	–	–

Source: Included in *Research on Methods of Human-Oriented Cooperation in the Countries of Asia and Oceania*, National Research Institute, JICA 1989
√√ = considerably active; √ = somewhat active; – = not active

Table Pre-3 Cumulative Totals of JOCV Science Teachers according to Area of Posting

Region	Cumulative Total
Central & S.America	35
Oceania	31
Asia	102
Africa	491



Cumulative totals are from the start of posting until October 1st, 1990.
(The start of posting differs from country to country.)

Chapter I

The State of Education and Educational Cooperation in African Countries

Introduction

Viewing educational systems in the shape of a pyramid, we can say that those in Asia and Africa have been formed from the top down, i.e. with emphasis on higher education. This is the reverse of the systems in Europe, the Soviet Union, the USA, and other industrially developed countries. Japan shares this latter type of system, with the greatest emphasis placed on forming the base of the pyramid (basic education), along with a single university.

Higher education in Asia and Africa can now be said to have reached a good level of adequacy. There are 51 universities in sub-Saharan Africa. This is probably because the university is seen as a symbol of the prestige of an independent country, while also being in the interests of the ruling classes. But the problem is that the basic education corresponding to this higher education is still as meagre as ever. The primary and secondary educational systems in Africa are still in the same state of under-development as in South East Asia and the Middle East. Circumstances of need in those countries, whether in terms of nation-building or seeking aid from developed countries, are thought to be bound up in some shape or fashion with these shortcomings in 'basic education'.

1. Progress and Educational Development in African Countries

1) Progress and Education

Education is a powerful tool that is indispensable for the progress of developing countries. This kind of awareness started to become prominent in around 1960.

A succession of notable studies were made on the interrelationship between 'economic progress' and 'education', while above all else there was explosive growth in the spread of school education.

If we take 'reading and writing ability' (adult literacy) as a means of measuring one country's educational standards, there will normally be a close interrelationship between 'progress' and these 'educational standards'. However, there are countries in the world today which do not conform to this theory. To be specific, there are some countries, firstly, which have low economic standards but an abnormally high reading and writing ability. In Africa, we can cite Tanzania. The high adult literacy rate in Tanzania results from state policies on literacy.

Secondly, there is the low 'reading and writing ability' in the Islamic sphere. In Africa, one person in three is a Moslem (Moslems place greater emphasis on rote learning).

Thirdly, although African people have no way of writing their own languages, even children are quite skilled at 'listening' and 'talking' (neither of these latter two points are mentioned in UN statistics; the only figures available deal with 'literacy', and not rote learning or reproductive abilities).

Fourthly, the trend of careers based on academic background – whereby attending a prestigious school becomes a passport for worldly advancement – has now reached Africa as well.

If we now look at African education in terms of literacy and school attendance, we see that the illiteracy rate in sub-Saharan countries is 52.7%. In other words, on average more than one in two adults is unable to read or write. Though, considering that in around 1960 (dubbed the year of African independence) the illiteracy rate was 81%, we have to admit that remarkable progress has been made in education over the last 30 years (see Table I-1).

Meanwhile, the improvement in school attendance rates has been even greater than that in literacy. In 1980 the attendance rates for children of primary school age was about 70% for boys and about 55% for girls. Although the rate for boys is not as high as in the Middle East, there is a strong motivation for school attendance by girls in Africa. The fact that the school attendance gap between boys and girls is, if anything, smaller than in Asia or the Middle East

is a point worthy of attention. On the other hand, the attendance rate for secondary education (12-17 years old) can be said to be actually higher than in Asia or the Middle East.

Table I-1 World Illiteracy Rates (Numbers of Illiterate Persons)

(Unit: %; in parentheses: million people)

	1960	1970	1980	1990 (est.)
World	39.3 (735)	34.2 (783)	32.2 (932)	26.9 (963)
Developed countries	4.9 (33.9)	3.5 (27.3)	2.3	4.4
Developing countries	59.2 (701.1)	50.2 (756)	43.6	35.1
Africa	81.0 (124)	73.7 (153)	64.6 (169)	52.7 * (139)
Asia	55.2 (542)	46.8 (579)	43.3 (695)	24.0 ** 53.8 ***
Latin America	32.5 (40)	23.6 (38.6)	21.0	15.2

* Sub-Saharan; ** East Asia; *** South Asia

(Source: *Education in the Third World*, Toshio Toyoda, revised 1992)

2) Traditions versus European-Style Education

We often find that European values are in collision with African traditional values. If we look back in history, the Pan-Africanism which started in the 19th century and the Negritude movement of the 1930's could be seen as the forerunners of this collision. The Pan-African movement, which reveres collective and spiritual values, as against modern European values based on individualism and materialism; the Negritude movement, which asserted that black people share a unique internal world, a cosmic awareness, aesthetic sensitivity, and artistic creativity. Both of these took up postures in opposition to modern European values.

As African countries gained independence in the years around 1960, they vied with each other to introduce European-style education systems. Modern schools were founded as the first step towards making up lost ground and approaching European levels. Thus, Africa's modern education has a history of a mere 30 years. In the era of colonialism leading up to

independence, European-style education was available in Christian mission schools, but this was only on a limited scale. In the west of Africa, the first mission school in Nigeria was founded in the middle of the 19th century, while in Kenya, to the east, the first such school wasn't created until the start of this century. But this movement gradually expanded from the coastal region bordering on the Indian Ocean into the inland areas of Kenya, until in 1920 there were 105 mission schools.

There is a far longer history of Islamic Koran schools. In fact, in tribal society educational functions of a sort have existed since ancient times. The solidarity of the tribe used to be maintained by an education that covered the whole spectrum of tribal life, starting from nursery rhymes for babies, and following through to growing boys and girls.

The state of education in the colonial era was described quite bluntly, for example, in the Beecher Report of 1949. "An illiterate who doesn't mind physical labour is more useful than a school-leaver who begrudges it", to quote one example. Indeed, a glance at public spending on education reveals just how much discrimination there was in education in the colonial era. The per capita expenditure on education for Africans was a mere one-fortieth of that for Europeans, and only one-fifth of that for Indians (1925). Even up to the verge of independence in 1959, the respective proportions were still only one-twentieth and one-quarter.

Jomo Kenyatta, the first President of Kenya, saw the difference between European and African education in terms of human relationships. That is to say, while the focus of European education is based on respect for individuality, its African counterpart places emphasis on human relations. Kenyatta saw the core of education as depending on how well human relationships could be maintained within society.

Julius Nyerere, the former President of Tanzania, asserted that a European-style education was not appropriate as it taught the values of the colonial era, raising the following four characteristics. First, education creates only an elite minority. Second, if the peasants are educated they will reject agriculture. Third, only the written word and knowledge gleaned

from others is seen as beneficial, while past experience receives minimal appraisal. And fourth, while people are being educated, the work force is reduced. This straight forwardness of Nyerere is highly interesting.

3) The Dilemmas of Developing Education

Though there are many dilemmas facing the evolution of education in developing countries, in the case of Africa this is particularly conspicuous. According to Ronald.P.Dore, we may raise the following points.

(1) Policies to guarantee opportunities for basic education do not evolve as expected.

(2) The principles of basic education as 'a qualification for citizenship' or 'fundamental preparation for productivity' have not emerged.

(3) The expansion of education for career advancement and increased unemployment among the highly educated (social pressure for expansion of higher education facilities)

(4) Pressure of educational budgets on national finance.

(5) Disillusionment with vocational schooling systems.

(Ronald P.Dore 'Diploma Disease' 1976)

To summarize these points in different terms: national finances for education in African countries are exceeding their limits. The main reason for this is that higher education has expanded and increased regardless of the occurrence of unemployment. And, as against this, basic education (primary & secondary education) has been left in an underdeveloped state. (Moreover, even when systems are actually installed, they suffer from marked inefficiencies such as a high drop-out rate.)

If our summary is correct, then our country's cooperation in education will have to take account of the plight of public finances in African nations, and will have to concentrate above all on developing basic education. Until now Japan's educational cooperation, as stated

above, has been of an 'aid for higher education' type, but from now on the emphasis will have to shift to an 'aid for basic education' type.

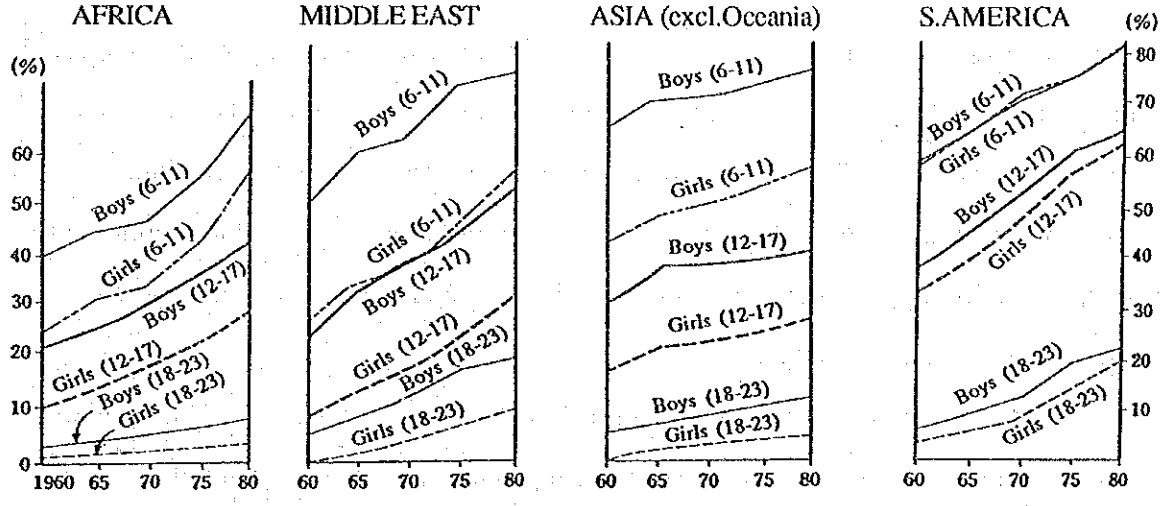
Conventionally, various domestic circumstances have led African nations to give priority to higher education. More than anything else, there has been a need to produce quality manpower to fill the gap left by the departure of the colonials following independence. However, a university degree eventually came to signify an 'express ticket' which offered special privileges in social status and salaries.

Before going on to the next point, we shall here record the state of education (school attendance and literacy rates, and expenditure on education) in four African countries (see Table I-2).

Table I-2 Education in 4 African Countries - School Attendance Rate; Literacy Rate; Expenditure on Education

	School Attendance (%)		Adult Literacy Rate (%)	Education Spending Ratios (%)	
	Primary School	Secondary School		Ratio to GNP	Ratio to gov't spending
Kenya	95	* 20	50	6.7	14.8
Zambia	94	* 19	54	5.4	16.3
Ghana	79	* 35	30	3.4	21.5
Tanzania	87	* 3	85	5.8	15.3
Japan	100	99	99	5.1	17.9
USA	–	100	99	6.7	17.7
U.K.	–	85	99	5.2	11.3
France	–	95	99	6.1	18.5

(Source: Toshio Toyoda, *Development & Basic Education*, 1991)



Notes: 1. The School Attendance Rate is shown in three educational stages, i.e. primary (6~11 years old), secondary (12~17), and higher (18~23).
2. Although, of the four regions, Asia has 57% of the world's population and there are big differences between east and west Asia, they are shown as one group.
3. The discrepancy between male and female school attendance is most pronounced in Asia and the Middle East.

Source: Toshio Toyoda, *Education in the Third World*, 1992

Fig. I-1 Trends in School Attendance Rates in Developing Regions

2. Basic Education (Primary/Secondary) in African Nations, and its relation to Educational Cooperation

1) Educational Problems raised by Instructors from 8 Countries

In order to cooperate in education, we have to understand the actual circumstances of education in African nations. Statistics issued by international organizations, by their very nature, only cover basic topics such as school attendance rates and literacy rates. This is not enough. In order to gain information above and beyond this, we have to carry out field surveys; however, there are limitations to this. Thus, the authors decided first to undertake two questionnaires. The first was directed at instructors in African countries, while the other was designed to gather data via Japanese offices overseas (JICA offices).

We have had 34 cases of responses from instructors in eight African countries, as shown in Table I-3. These are broken down into 10 cases relating to shortcomings in school

facilities, and 9 cases of complaints about shortages of textbooks or teaching materials, these two together making up more than half of all responses. Specific points were classrooms crammed with upwards of 70 pupils, lack of electricity, drinking water, or toilet facilities, and shortages of desks or chairs. Also, shortages of teaching materials, school supplies, or teaching aids. Although the number of cases is limited, some representative concerns of African teachers are manifested here.

Apart from these, in the questionnaire mention is also made of the low level of instructors' salaries (and thus the need for outside work to supplement income) and long distances to schools. The main cause of these problems is found in the educational budgets of the various countries and the economies in which these are rooted. Moreover, expenditure on education in all African countries occupies a major part of total government spending.

Table I-3 Educational Problems Raised by Instructors* in African Countries

(Questionnaire Results)

1	Too many pupils to a class, hard to teach slow learners	Ethiopia
2	Headmasters or government making errors in management	"
3	Pupils forgetting to bring books or stationery	"
4	When my level is not high enough to give guidance to pupils	"
5	Too far to travel to work, get tired, lessons don't go well	Ghana
6	Shortage of textbooks	"
7	Parents can't pay school fees, so pupils go absent	"
8	Cases of children in bad educational circumstances	Kenya
9	Cases of pupils lacking discipline	"
10	Shortage of teaching materials	"
11	Deficiency of learning environment, eg. water, electricity etc.	"
12	Lessons can't be held under trees in the monsoon season	Malawi
13	Shortage of stationery such as books, exercise books etc.	"
14	Shortage of textbooks	"
15	Shortage of classrooms	"
16	Shortage of teacher accommodation	"
17	Talking during lessons	Senegal
18	Shortage of books, tape recorders, audio-visual aids	"
19	Too many pupils to a class, too noisy	Sudan
20	Not enough desks or chairs	"
21	Shortage of teachers for reasons of low salaries, no promotion, compulsory work in the provinces etc.	"
22	Far from pupils homes, often late, have to go home early	"
23	Lunches are often unhygienic	"
24	Teachers are not paid enough	"
25	70 to a class	"
26	Shortage of teaching materials	"
27	Shortage of classrooms and staff accommodation	Tanzania
28	Too many pupils to one class	"
29	Shortage of desks, chairs, books	"
30	Shortage of teachers	"
31	Shortage of teaching materials	Zambia
32	Classrooms filled beyond capacity	"
33	Shortage of desks, pupils have to cram up to each other	"
34	Some pupils can't follow English or Social History lessons etc	"

Taken from the Aug.1990 issue of JICA's journal, *International Cooperation*.

* Teachers involved in educating sixth-grade primary school children in the various countries.

The teachers were asked the question "What problems trouble you most as a teacher?"

Though this is limited research based on the results of a questionnaire, it reveals aspects that are common to all African countries.

2) Cooperation in Basic Education

Financial resources for education have reached their limit. Seen from this angle, higher education and particularly universities are quite substantially developed. In other words, from the point of view of financial capabilities, universities have grown out of all proportion. This has become a source of pressure on educational finances. On the other hand, basic education such as primary and secondary education remains as underdeveloped as ever. We feel that for the time being the right course will be to direct aid at this underdeveloped basic education.

If we look at the sorts of educational aid that developed countries are providing to African nations at the moment, we see that they are divided into three types. The United Kingdom and Germany concentrate on aid for higher education, and France and Belgium on secondary education. Sweden, the IDA, and Unicef put emphasis on primary education. These are the divisions that emerge from past performance. As for Japan, we have adopted the UK/German type, concentrating on aid for higher education.

Whatever the country, basic education goes to form the root essence of that country, and should be constructed within these limitations in accordance with the degree of self-reliance. Yet, with educational finances in the various countries now having reached their limits, it is inevitable that a fairly large part of aid for basic education will take the form of aid towards financial resources.

The pressure for basic education is above else caused by population increases, and the explosive increase in the population of children entering primary school. An annual population increase of almost 3.5%~4% leads to phenomena of overcrowded classrooms and even of 'armies' of children who cannot enter school. Teachers' salaries, which occupy an average of about 70% of total costs, must be guaranteed within limited financial resources. That alone takes up all energies, and there is no room to hope for extensions to school buildings or classrooms.

Here lies the biggest problem when considering African education, and particularly basic education. This being so, we must next exert our efforts to nullifying wastage and inefficiencies such as early drop-outs within the current situation.

To express education in different terms, as well as having the function of transmitting knowledge and skills to the next generation, on a more fundamental level it also has the function of forming values and patterns of behaviour. The most vital issues of a country's autonomy and the formation of its self-respect lie in the hands of the country's basic education. Moral education and the development of human resources, to say nothing of the transmission of knowledge and skills, form the very nucleus for the will for autonomous progress to come of age.

On this point, the educational experience of our country during the period of modernization is deserving of respect as a model example. The nation as a whole unified its efforts to elevate educational levels for the sake of independence, out of concern that the country may otherwise be colonized.

3) Cooperation in Developing School Infrastructure – According to school facilities research –

Until now, we have been looking at the significance of cooperation in basic education. And we have mentioned how, in terms of types of educational cooperation, the type with emphasis on basic education, as provided by Sweden, IDA, and Unicef, offers a new direction. Moreover, points which touch on the ideologies of the respective countries have to be handled with caution (indeed, English and French-based textbooks are still commonly used in African countries which used to be in the British and French Empires).

If we look at the situation of school facilities today, we see a notable lack of facilities such as desks and chairs, as well as drinking water facilities (provision of hygienic drinking water), electricity, and toilets in the 8 African countries, particularly in villages (the shortage of classrooms extends across the whole region, and there are also hardly any sick rooms or

science labs). There is a particular need for paths and bridges which allow access to schools in the rainy season.

Giving help to the development of such school infrastructure does not have a direct bearing on the content of the education, which are requirements which are being urged by teachers in every countries. Needless to say, the development of infrastructure cannot be carried out overnight. Perhaps a cooperation by model school should first be created, then with this method we should cooperate in the development of infrastructure of a large number of schools over a period of ten or twenty years. In the process of this, I feel, help could be given to education itself in such forms as preparing textbooks should the request arise.

3. Japan's Educational Cooperation and Science Teacher Posting Activities

1) New Directions for Educational Cooperation

We have already stated that cooperation in education should ideally be directed at basic education (primary & secondary education). This is particularly true in Africa. The World Bank and international organizations such as UNDP and Unicef are shifting their weight towards placing greater priority on basic education, in line with the principle of last year's Jomtien Convention ('Education For All').

In addition, one earlier report from the Japanese government stated the same view (*Japan's Role from the Viewpoint of Overall National Strengths*, EPA, 1989). Namely, it points out that "From the aspect of economic cooperation, efforts should be exerted towards the development of human resources, the software of economic progress, such as in the hitherto weak area of aid for primary and secondary education". It goes on to state that "While in human areas until now there has been a tendency to lean towards training of specialists, aid for primary & secondary education offers great effects in itself".

In either case, these could be seen as new attitudes resulting from reflections on aid to developing countries over a period of 30 years. Primary & secondary education is linked to

the foundations of cultural formation in the country concerned. In as far as it relates to fostering 'knowledge, skills, and values', education is deeply bound up with a country's culture. Schools are not only places for teaching the three R's. Along with this learning, schools teach the following generation patterns of behaviour which are rooted in shared values. In developing countries which are poor in modern superstructures, the school is an indispensable organization, i.e. a location for collective training. Japan's international efforts will only reach the core of cooperation when they start to engage in cooperation in basic education.

The majority of our country's educational cooperation is under the aegis of JICA and the Ministry of Education. JICA is in charge of higher (science & engineering) education and technical training, while the Ministry of Education takes care of acceptances for overseas students. Both of these entail cooperation at a high level, but in areas of education proper such as primary and secondary education, there is hardly any activity. In this light, the posting of science teachers is a unique form of educational cooperation.

Though our country has become the one of biggest provider of aid, in the field of education this only amounts to a 5.8% share of our bilateral ODA, which falls far short of the DAC average of 10.7% (thus, cooperation in basic education is actually less than 1% of the total). The JOCV activities in posting volunteers in science subjects, seen against this background, are a truly unique activity and can be recognized as the results of a rare cooperation in basic education.

According to estimates by the British Institute for Development Studies, the Third World needs to spend US$58 billion by the end of this century in order to fulfil the principle of "Education For All". Even assuming that measures to improve educational systems are carried out, the minimum limit of this expenditure would be US$43 billion, and the countries of the Third World would have to finance the great majority of this cost on their own. Seen from the point of view of the projected economic growth of the African nations (even if military spending is brought down) this would represent an impossibly huge

financial outlay. The IDS calculates that, in order to achieve the objective of the principle, DAC countries would have to provide additional aid of US$1-1.3 billion annually until the year 2000, on top of their present amounts of educational aid. Moreover, it says that 70% of this would have to be invested in sub-Saharan Africa, where aid is urgently needed.

This is first and foremost the premise which developed countries will have to consider when planning cooperation in education.

2) Considerations of the Cultural Landscape of Africa – Towards Development Education –

Africa is a major continent with about 80 times the size of Japan. It occupies 22% of all the world's land area. On this continent there are 2,000 tribes, 800 languages, and 52 countries.

For centuries Africa was colonized by Europe. But in spite of being exploited in this way, there is a pronounced inclination towards the European culture which has been cultivated for so many years.

People used to view Africa as the 'dark continent'. This is a superiority complex which has not disappeared to this day. In this way of thinking, civilized and primitive societies are viewed in terms of good and bad. It wasn't until the latter half of the 20th century that people realized that the problems between civilized and primitive societies are formed by differences of expression and are hard to assess in a judgmental way. In considering the future of world civilization, the significance of African culture is great. At the very least, there is a pressing need for us to view culture in relative terms (culture as the social customs within which people live; Caucasians used to ridicule the African-style way of life and to try to get black people to reject their various systems and customs).

The people of Africa value person-to-person relations above all else. In addition, unlike 'civilized' people, they are not controlled by time. African people have a sense of oneness between themselves and time, caught up in an infinite succession of reverence for ancestors.

For some reason, Japanese people have a dislike for southern countries. The cause of this could be that the intense heat would appear too taxing for hard-working Japanese peasants, and/or that the state policy of breaking away from Asia and entering the European fold made southern countries unwelcome. Europeans, on the other hand, are fond of the scorching heat of the sun. They welcome postings to southern countries. This may be because of the attraction of nature and wildlife there. When the attraction of the wild is lost, can people enjoy a more peaceful future as a result?

For the JOCV volunteers, these southern countries provide the stage for their activities. In particular, we hope that the science teachers will discovering what mankind has lost in the process of civilization, and thus make a contribution to the spiritual resuscitation of the Japanese people. Our country's aid until now has mainly involved large-scale projects. Together with this, people who care are realizing that our aid to Africa must be modest and sustained. Vitalizing economies through technical guidance and financial aid - surely the foundation to both of these lies in basic education.

We hope the volunteer teachers will cull a great many lessons from the cultural landscape of Africa while they carry out their educational activities. With these, they will surely have an immense contribution to make to our country's 'development education' in community and school environments when they return home.

Some Proposals

1) A Dramatic Expansion of Science Teacher Posting Activities

Though our country has become the largest provider of aid, there is still little cooperation in the field of education, in which we are considerably below the DAC average. Expansion is urgently required.

Our cooperation in education is undertaken mainly by JICA and the Ministry of Education, but there is hardly any activity in areas of education proper such as primary or secondary

education. In this respect, the 20-year history of posting of science volunteers by the JOCV is a unique case of cooperation in basic education.

Although Japan is often criticized as being an economy-oriented nation, from now on we need to undertake intensive exchanges in education and culture in order to gain a balanced international acceptance. The educational activities of the science volunteers are truly an advance guard, a bridgehead to achieving this. There is a strong demand for dramatic expansion.

2) Radical Improvement in Ability in the Teaching Medium Language (English)

In the field surveys carried out for this report, cases of insufficient ability in English were revealed, despite the volunteers' high level of knowledge and experience in the subjects of science and mathematics. As an activity for cooperation in education, this is a problem which cannot be allowed to remain.

3) Suitability Training of Science Volunteers and Improvement of Educational Effects

African education in science and mathematics is rooted in an educational environment which is completely different to that in Japan. This fact must be understood sufficiently in advance. Mathematical, arithmetic, or scientific knowledge is not often needed in the living environment, while the basic scholastic level that should be cultivated in primary schools is weak, mathematics and science are seen as subjects for rote memory, and approach methods are passive.

The objective of this education is to familiarize pupils with science subjects and to help them to like them as subjects. Before taking up their posts volunteers should make every possible effort to study this educational environment and the actual situation in Africa, and should acquire suitability through local training.

(1) Training in African science education before taking up posts (can include participation of returning volunteers)

(2) Lesson support through textbooks and teaching materials (provision of textbooks and teaching materials)

4) Setting up Bases and Model Schools

The effects of education take a long time to manifest themselves. Education, if implemented over a long period in a specific region, can become deeply rooted within the local society. Therefore, we feel that for activities in science subjects, too, a model education ought to be implemented, by creating base schools in specific regions, distributing volunteers in science and mathematics, sometimes adding health instruction, physical education, Japanese language, and primary school teachers, and completely furnishing all teaching materials and aids. Through the joint efforts of local offices and headmasters it should be possible to create a fine monument to cooperative activity in education.

5) Distribution of Area Guidance Advisers

In order to carry out lessons which have broad effects, use must be made of the know-how accumulated so far by previous volunteers. But it would also be ideal to have specialists who can give advice on education patrolling duty areas and offering counsel to volunteers on teaching skills (such as planning lessons, progress, lesson levels, experiments, and evaluation). These duties should ideally be fulfilled by specialists who have been involved in teaching methods in Japan for a number of years ('Silver Volunteers').

6) Implementing Diagnosis and Evaluation of Educational Cooperation

These science volunteer posting activities, standing at the forefront of cooperation in education, must always be watched with great attention from a broad perspective.

A diagnostic research team should be sent once every two or three years for evaluations, to endeavour to discover problems and to report back to JOCV.

APPENDICES

POSTINGS OF MATHEMATICS AND SCIENCE TEACHERS

	Country	1985	1986	1987	1988	1989	1990	CT
Central South America	Peru		2 (MS)					35 (Bolivia 1)
	Paraguay		2 (MS) 3 (E)	2 (MS)		1 (MS) 1 (E)	2 (S)	
	Honduras	4 (MS) 1 (E)	3 (MS)	1 (S) 2 (E)	1 (MS)	1 (M) 1 (MS) 2 (E)	1 (M)	
	Columbia				1 (MS)		2 (MS)	
Oceania	Tonga	1 (MS)	4 (MS)	1 (MS) 1 (M)	2 (MS)	2 (MS) 1 (S)	2 (MS)	31
	West Samoa	1 (MS)	3 (MS)					
	Solomon Is.						1 (MS)	
Asia	Phillippines	2 (MS)	3 (MS)	1 (MS)	1 (MS)	1 (MS)		102 (Malaysia 5) (Sri Lanka 1)
	Nepal	5 (MS)	11 (MS)	3 (MS) 3 (M)	3 (MS)	4 (MS)	7 (MS)	
Africa	Nigeria		1 (MS)	1 (MS) 1 (M)				491 (Malaysia 96) (Tanzania 26)
	Liberia		1 (MS)	5 (MS) 1 (M)	5 (MS) 1 (M) 2 (S)			
	Ghana	8 (MS)	7 (MS)	6 (MS)	3 (MS) 2 (M) 7 (S)	1 (MS) 1 (M) 3 (S)	8 (MS) 2 (M) 6 (S)	
	Kenya	33 (MS)	13 (MS)	19 (MS)	15 (MS)	10 (MS)		
	Zambia	5 (MS)	5 (MS)	5 (MS)	1 (M) 2 (S)	6 (S) 2 (M) 1 (X)	3 (MS)	
	Total	1) 4 (MS) 2) 2 (MS) 3) 7 (MS) 4) 46 (MS)	1) 4 (MS) 3 (E) 2) 7 (MS) 3) 14 (MS) 4) 27 (MS)	1) 2 (MS) 1 (S) 2 (E) 2) 1 (MS) 1 (M) 3) 4 (MS) 3(M) 4) 36 (MS) 2 (M)	1) 2 (MS) 2) 2 (MS) 3) 3 (MS) 1 (X) 4) 23 (MS) 9 (S) 3 (M)	1) 1 (MS) 2 (S) 3 (E) 2) 2 (MS) 1 (M) 3) 5 (MS) 4) 17 (MS) 4 (S) 3 (M)	1) 1 (M) 2 (S) 2 (MS) 2) 2 (MS) 1 (S) 3) 7 (MS) 4) 11 (MS) 6 (S) 2 (M)	659

Note: 1) = Central South America, 2) = Oceania, 3) = Asia, 4) = Africa
MS = Mathematics & Science
M = Mathematics
S = Science
E = Primary School
CT = Cumulative total number of postings from start of program to Oct. 1, 1990
At the start of postings differs from country to country.

SUBJECTS TAUGHT AND NUMBER OF SUBJECTS TAUGHT

Subjects Taught

	Kenya	Zambia	Ghana
Mathematics	*90%	29%	54%
Physics	63%	24%	35%
Chemistry	49%	33%	25%
Biology	22%	29%	9%
Agriculture	6%	5%	0%
Physical Education	36%	0%	0%
Science	2%	24%	6%
Other	3%	0%	3%

Note: This table shows the proportion of different subjects taught by mathematics/science teachers in these countries. For instance, * shows that in Kenya, 90% of mathematics/science teachers taught mathematics.

Number of Subjects Taught

	1st	2nd	3rd	4th	5th
Kenya	8%	36%	36%	18%	2%
Zambia	57%	33%	10%	0%	0%
Ghana	64%	36%	0%	0%	0%

(Data collected from volunteers' reports over the last 10 years)

EXTRACURRICULAR ACTIVITIES

Kenya

Fine Arts	Sports	Cultural Exchange	Others
Music club	Volleyball	Art Club	Cashew Nut Project
Chorus club	Badminton	(Origami)	IQ Test
Fine Art club	Soccer		Health Club
	Netball		Science Club
	Basketball		Book Committee
	Table Tennis		Agricultural Club
	Track and Field		
	Karate		

Zambia

Fine Arts	Sports	Cultural Exchange	Others
	JOCV Cup	Japan Day	Poultry Project
	Volleyball	Penfriends Introduction	
	Karate	Japan Club	

Ghana

Fine Arts	Sports	Cultural Exchange	Others
Guitar Club	Volleyball	Origami	
Concert	Soccer		
Wall News Sheet	Table Tennis		
	Ball Games		
	Swimming		
	Track and Field		
	Judo		
	Aikido		
	Kendo		

(Data collected from volunteers' reports over the last 10 years)

DISTRIBUTION OF ODA EDUCATION AID

Form	Technological Cooperation	Donation Cooperation	Free Loans Total	Government Loans	Bilateral ODA Total and Total Share
Education	345.33	63.03	408.36	50.35	* 458.71 (5.8%)

Source: *Japanese Government Development Aid*, 1990
('Form' determined according to DAC classification. Figures based on pledged amounts)

SYSTEM OF TEXTBOOK DISTRIBUTION IN VARIOUS COUNTRIES (25 COUNTRIES SURVEYED)

Free 21 Countries	Free supply	Korea, Denmark, Italy, Australia (4)
	Free loan distribution	Sri Lanka, Philippines, Australia, U.S., Canada, Finland, Norway, U.K., Belgium, Holland, France, Spain, U.S.S.R., East Germany (14)
	Countries both systems available	Sweden, West Germany, Switzerland (3)
Paid 4 Countries	Free supply distribution to needy households	India, Ireland, Brazil (3)
	Paid supply	China (1)

1985, Japanese Education Ministry Investigation

Kenya	Loan System
Zambia	Distribution System
Ghana	Distribution System

Chapter II

Request for Educational Aid from African Countries

1. General Background

When a developing country intends to attain economic growth, it has to provide people with good-quality education. Meanwhile, only those countries which have successfully developed their economies can afford to provide their people with good education. Today, many African countries, which have been in trouble with their explosive population increases as well as for their long term economic stagnation, could not rectify their poor educational environment, such as a decisive shortage of teachers, pathetic educational facilities, scarce teaching materials, etc., due to their deteriorated financial situation.

This is the reason why African countries like Kenya, Zambia and Ghana, which have been annoyed by the above mentioned dilemma and have been struggling to overcome those difficulties, request the Japanese Government to send the Japanese science and mathematics teachers to their countries.

The following are brief descriptions of educational environment of Kenya, Zambia and Ghana on which we conducted field survey and obtained relevant data and information.

1) Kenya

Since its independence in 1960, in recognition of importance of education as a means to achieve national unity and economic self-reliance, Kenya has been endeavoring enthusiastically to expand its education. This posture of Kenya remains basically unchanged to this date. A report prepared by the Presidential Working Party on Education and Manpower Training for the Next Decade and Beyond, published in 1988, concedes that education has contributed to the growth of Kenyan economy through development of its indigenous

manpower resources. Nevertheless, it goes on to stress that in the next decade and beyond towards 21st century Kenya should place more importance on promotion of its educational programs which would enable it to develop its industry by reaping the benefits of science and technology. In other words, the report implies that the most important role education must fulfill is to nurture those people who are conversant with science and technology in order to develop the nation through industrialization.

In 1986, there were a total of 2,485 secondary schools in Kenya, of which 2,132 were state schools and 353 were private ones. State schools are divided into government-run schools and Harambee schools, numbers of which were 635 and 1,497 respectively. Government schools are further divided into 18 national schools which accept pupils all over the country and 617 regional schools which accept only local pupils. Harambee schools are, in principle, funded by donations of local benefactors, though state government shares financial burden by paying salaries of some government sponsored teachers. Spirit of self-reliance of local people along the line of Jomo Kenyatta's "Harambee spirit" was a basic discipline of running original Harambee schools. In recent years, however, Harambee schools have been increasingly provided with financial assistance of the state government. The introduction of 8-4-4 school system in 1985 reduced the number of Harambee schools by either merger or by closure of those schools which had few pupils and meager school facilities; thus Harambee schools were said to have become more or less standardized than before in terms of number of pupils and status of school facilities, though there still remain many small Harambee schools and many unsolved problems.

As was mentioned above, Kenya changed its school education system in 1985 from previous 7-4-2-3 system to present 8-4-4 system along with modification of school curriculum and school graduate certification system. While these reforms have a variety of aims, one important objective was to provide school leavers with skills needed to the professions in which they would be engaged. Thus, the new curriculum can be said that it is characterized by putting additional emphasis on vocational and skill training by introducing

such subjects into the secondary school education. There appears, however, to have some problems. As can be seen in Table II-1, the new curriculum reduces the time for sciences and mathematics subjects.

Table II-1 Timetable of School Subjects (for 3rd-4th Formers)

	Number of Hours	Before Reform
	8-4-4 System	
English	6	8
Mathematics	6	7
Swahili	5	5
Physics/Chemistry	3	6
Biology	3	4
Religious Study	3	3
Geography	3	3
History	3	3
Agriculture	3	0
Practical Subjects	3	0
Cultural Subjects	3	0
Social Education/Ethics	2	0
Physical Education	2	1
Total	45	40

Source: Literature of the Kenyan Ministry of Higher Education

Regarding school graduate certification system, 8-4-4 school system works in the following way. Primary school education is compulsory. But, not every pupil can go to secondary school. Admission depends on the result of KCPE (Kenyan Certificate of Primary Education) examinations which are to be held at the end of primary school education. Only those who made good scores are permitted to enter the government maintained national school, while the most of remainders have no other choice than going to Harambee school. It is said that there are many Harambee students who lack basic learning abilities. Meanwhile,

for university entrance, KCSE (Kenya Certificate of Secondary Education) examinations are held at the end of secondary education. Only those who clears a certain criteria are qualified to go on to university.

The KCSE includes examinations on 11 subjects, of which there are three subjects related to sciences and mathematics, namely physics or chemistry, biology and mathematics. Moreover, examination on physics, chemistry and biology includes questions which require knowledge and skill of laboratory experiment. Accordingly, all schools are needed to have sufficient facilities for scientific experiments. Many Harambee schools, which are under-equipped and under-staffed, cannot provide their students with curriculum-demanded education very effectively. Such educational circumstances subsequently affect the poor records of Harambee school students in their KCSE examination.

In view of the general background as described above, we can conclude that the major reasons for the Kenyan government requesting sciences and mathematics teachers from Japan are based on the following necessity of the nation.

As is already mentioned, it is a definite belief of Kenyan government that science and technical education is very important to the development of the nation because it can contribute to nurturing people who are conversant with science and technology. This belief seems to be a consensus among the people who are concerned about education in Kenya, and most of opinions we heard in our field survey did not differ from this very much. This, however, does not mean that Kenya is providing people with the education along with this line. Contrary, there are many schools which are in trouble, specifically in teaching students on sciences and/or mathematics subjects. The Presidential Working Party on Education and Manpower Training for the Next Decade and Beyond depicts the problems of science education in secondary school of Kenya as; (1) insufficient time allocated to science and mathematics subjects for 3rd and 4th grade students (2) lack of materials and facilities for teaching science and technical subjects (3) inability to secure well qualified teaching staffs. Solution to these problems may not be easy, since all problems have very profound roots in

the socio-economic situation of the country. Regarding the problem (1), for example, it is associated with the reform of education system implemented in 1985. Namely, the new curriculum brought in after the reform called for increase on total number of hours for teaching secondary school subjects. However, due to addition of newly introduced subjects such as vocational and technical training subjects, numbers of hours allocated to sciences and mathematics subjects were subsequently reduced.

On the other hand, the problems of (2) and (3) are somewhat related to the financial difficulties of the country. Since Kenya has been already allocating substantial portion of its national budget to education sector, it may be quite difficult to find room to increase the educational expenditure further specifically under current economic situation.

Regarding the shortage of teaching staffs, a shortage does not mean that teachers are required in every teaching subjects. It is specifically in science and mathematics subjects whose teachers are crucially needed. The reasons for a shortage for sciences and mathematics teachers are two-holds. There exists an absolute shortage of students who major education course to become science and mathematics teacher. But another important fact to be taken seriously is that even though they majored education discipline they very often refuse to become teachers because of their low salary.

Incidentally, the most of science and mathematics teachers dispatched from Japan to Kenya by the request of the Kenyan government tend to go to Harambee schools. The reason for this is that there are many Harambee schools which have serious a shortage of science and mathematics teachers in terms of both number of teachers and their qualification. The problems of Harambee schools are very often cited as inappropriately small number of students, inadequacy of teaching staffs, lack of teaching materials and lack of basic learning skills of students. But besides these, very frequent turnover of teaching staffs, poor school management and low motivation for students to learn are also very serious problems with which many Japanese volunteer teachers would encounter.

2) Zambia

In Zambia, basic recognition of education as an instrument to development of the nation is not different from that of Kenya. Zambia's Ministry of General Education and Youth Sports describes education as "a fundamental human right of every citizens" and depicts the characteristics of education as "a crucial force to cultivate individual ability." It also states that education is a basis of growth of the nation and it guarantees a growth of social capability through advancement of sciences and technology.

In Zambia, education spread very rapidly in 1960's. At the time of independence of 1964, it is said that there were mere 100 university graduates and 1000 Cambridge Overseas School Graduation Certificate holders among Zambian 3.6 million population. In those year only one every thirty Zambian was said to have completed primary education. However, an ambitious education expansion program initiated by the Ministry of Education in 1964 changed the situation. The number of pupils enrolled in primary schools has jumped from mere 370,000 in 1964 to 1.43 million in 1988. For secondary school enrollment, the figure showed even more dramatic improvement from only 14,000 in 1964 to 161,000 in 1988. It is also to be noted that the number of secondary schools in Zambia has increased very rapidly since1985 and as is seen in Table II-2 it reached 480 in 1989.

Table II-2 Secondary School Education in Zambia

	Number of Secondary Schools	Number of Secondary School Teachers	Number of Secondary School Students
1985	225	5,856	131,397
1986	268	5,898	146,979
1987	306	5,758	150,639
1988	379	5,786	161,000
1989	480	N.A.	N.A.

Source: Zambian Government

The school education system of Zambia was modified in 1989 from previous 7-3-2-4 system to present 7-2-3-4 system for the sake of alleviation of financial burden of the nation in the midst of afflicted economy. Namely, Zambian secondary education is divided into 2 years at middle school and 3 years at high school. Both primary and secondary education system are free. But this does not mean everyone can go to secondary school. Because of a limited number of class rooms available to eighth grade (first year for secondary school) students, seventh grade pupils of primary school have to clear a screening test. The ratio of enrollment to middle school declined somewhat from early 70's to mid 80's. Middle school enrollment ratio in 1985 was 21.4%.

Middle school graduates have to have standardized national examinations and only half of them are allowed to continue education at high school. At the end of the 12th grade (3rd year of high school) GCO (General Certificate of Education) examinations are conducted. Those who successfully pass the GCO examination are given a Cambridge Overseas School Graduation Certificate and regarded eligible to enter college and university.

The Zambian government is currently trying to ameliorate its education system by pursuing the following objectives.

(1) To expand and improve education system so that every Zambian is provided with good education opportunity.
(2) To reform education system so that every Zambian can receive 9 years education. (7 years of primary education + 2 years of secondary education)
(3) To promote science and mathematics education by securing teachers, teaching materials and facilities.
(4) To foster the mind of self-reliance, patriotism and international collaboration among Zambian people through education.

The Zambian government regards, among others, promotion of education on science and technology as the most important objective for the development of the country, though they have to solve two fundamental problems.

Firstly, sufficient educational facilities are largely required. Today, even computers are introduced into class rooms in some advanced countries. There need advanced model of NC lath for students who wish to learn latest metal processing techniques. Likewise, well equipped science laboratories are definitely needed for science education. However, despite the Zambian government's desire to upgrade the level of science and technology education, the current financial stringency of the country does not allow the government to increase its spending on education for either renovating or modernizing their obsolescent education facilities. Accordingly, the Zambian government sees what it has to do under current circumstances is just doing their best within the available budget.

The second problem which the Zambian government has to tackle with is an absolute shortage of teachers on science and mathematics subjects. With a dramatic increase of secondary students in recent years, graduates from university and teacher training college are not sufficient enough to fulfill the requirement for science and mathematics teachers. In particular, a shortage of science and mathematics teachers who have either B.A. degree or Post-Graduate degree are strongly felt in secondary schools. Some of primary school teachers are assigned to teach secondary school students. Table II-3 and Table II-4 show the number of secondary teachers for science and mathematics subjects and the status of the shortage by the statistics of Zambian government. In general, only university graduates are eligible to teach science and mathematics subjects at Zambian high school. However, due to acute shortage of eligible teachers those with diploma holders have to play the part for middle school teachers. Also as can be seen from these Tables, Zambia has to depend as high as 60% of high school teachers for science and mathematics on foreign teachers. Moreover, even with this heavy dependence on foreign teachers as well as diploma holders, there still exists a large shortage of science and mathematics teachers for both middle and high school.

Table II-3 Present Numbers of Zambian and Foreign Middle & High School Science Teachers (1988)

	Teachers with B.A.		Teachers with Diploma		Primary Teachers
	Zambians	Foreign	Zambians	Foreign	
Mathematics	69	115	549	8	N.A.
Science	129	170	520	9	N.A.
Subtotal	198	285	1,069	17	609
Total	483		1,086		2,178

Source: Zambian Government

Table II-4 Shortages of Science and Mathematics Teachers in Secondary School in Zambia (1988)

	Teachers with B.A.	Teachers with Diploma
Mathematics	157	422
Science	167	412
Total	324	834

Source: Zambian Government

As is the case with Kenya, a serious shortage of science and mathematics teachers in Zambia is caused by two main reasons; short supply of graduates from university or college and drainage of teacher candidates either to industry or to neighboring countries.

These are the major reasons why Zambian government has been very ardently requesting Japan to send science and mathematics teachers.

3) Ghana

Ghana is an African country which has made efforts from very early years to expand its secondary and tertiary education with great enthusiasm. This is very clearly illustrated by the fact that the secondary school enrollment ratio of Ghana in 1960 had already reached as high as 19% point, whereas the figures of that ratio of Kenya and Zambia in the same year lingered

around mere 2%. Since then, secondary school education has been dramatically expanded both in Kenya and Zambia. Nevertheless, Ghana's secondary education enrollment ratio of 40% in 1987 was far ahead of those of Kenya and Zambia, which were 23% and 17% respectively in 1987. Of course, this does not mean that Ghana is ahead of Kenya and Zambia in every aspect of education. For example, with respect to primary school enrollment ratio in 1960, all these three countries were vying with each other at around 50%. Since the 60's, Kenya and Zambia have expanded their primary education with enormous speed. By mid 80's primary enrollment ratio of both countries have reached a level of nearly 100%. Meanwhile, Ghana's primary enrollment in 1987 was still sluggish at just over 70%. Although Ghana, in recognition of importance of education, has initiated its innovative education expansion program, it could not have successfully raised its primary enrollment ratio to such extent as had been done by Kenya or Zambia. It is also to be noted that there were people who criticized Ghana's education because it had tendency of putting too much emphasis on academic work. Critics regards this tendency as a result of subjection to British education system and British education philosophy.

In order to remedy the situation, a proposal was submitted in 1973 to reform its education system so that Ghana could gain the forces for the growth of nation through renovation of education. Some preparatory work to implement the ambitious reform plan started in 1975. The plan, however, was stalled in the mid-course because then the government did not have strong will and the financial situation of the nation was unfavorable for its implementation. It was only in 1986 when implementation of the reform plan was finally announced. Thus, in September 1987, the old 6-(4)-5-2-4 system, which in extreme case requires up to 17 years before going to university, was changed to new 6-3-3-4 system whereby students can go to university after 12 years of primary and secondary education. Today, it is still under a transient period when both old and new systems co-exist. This means that the current education executed at secondary school is very confusing because higher grade students are

being taught based on the old curriculum, while lower grade students in the same campus have to be taught in a different system based on a different curriculum.

Two major objectives which the government of Ghana intended to attain under the new education system were:

(1) To have Ghanian people access easier to education

(2) To increase the effectiveness of education so that the real world needs could be reflected well into their curricula

Regarding the access of the Ghanian to education, new system calls for the first 9-year education, comprising 6 years for primary school and 3 years for junior high school, as free and compulsory. This is a quite big improvement compared to the old system in which only 6 years of primary education was compulsory and those who want to continue their education at secondary school have to take CEE (Common Entrance Examination for Secondary School) at the end of primary school education. Namely, under the new system Ghanian can enter junior high school without examination and compulsory education was extended from 6 years to 9 years. In addition, it is a long range plan of the government to have 50% of junior high school graduates continue studying at senior high school and 25% of senior high school graduates go on to receive tertiary education. Furthermore, the government is trying to devise a way for adult who did not complete the school to be able to go back to school again for study.

Meanwhile, with respect to increase in effectiveness of education great attention was paid to reform of curriculum so that education could respond to the requirements of economic society by changing the traditional characters of Ghanian's education which tended to place too much emphasis on academic work.

Under the new education system, secondary education of Ghana is required to fulfill the following objectives.

(1) To reinforce knowledge and skills acquired through 9 years of education

(2) To develop different talents and skills of different students

(3) To respond to highly trained manpower requirements of society

(4) To develop a positive attitude of students for further self-improvement

(5) To provide students with qualities of responsible leadership

Anyway, the new education system of Ghana is still in a transition process. Whether the new education system can really answer the expectation of Ghanian society is still to be seen. But one extremely important element which affects the successful implementation of new education systems is to secure the member of the teachers who are required by the new education system. In recognition of this, Ghanian government thinks it necessary for them to have Japanese volunteer teachers be sent to their country to fill the shortage of their own teachers.

As is the case with elsewhere in Africa, Ghana also have a serious shortage of secondary school science and mathematics teachers. Though there are apparently some uncertainties in terms of accuracy and reliability of information, especially with the fact that a shortage of teachers in Ashanti region is abnormally high, Table II-5 evidently demonstrates existence of crucial shortage of science and mathematics teachers in Ghana. Our field observation as well as our field survey also confirmed this fact.

Then, the question will be why Ghana could not secure sufficient number of teachers required for their secondary education. There are apparently three major reasons. Firstly, the most important one is so called "barain-drain." In a stagnant economy, college or university graduates do not want to teach at school because of their low salary. Secondly, Ghana needs much more secondary school teachers than Kenya or Zambia does, since Ghana is more advanced in secondary education and more secondary schools than in other two countries. As a matter of fact, there are approximately 5000 secondary schools in Ghana, which are supposed to be almost twice as many schools in Kenya. Thus, Ghana requires more teachers.

Table II-5 Shortage of Science Teachers in Secondary School in Ghana by Regions

	Great Accra	East-em	Volta	Cent-ral	Ash-anti	Upper West	Brong Ahafo	North -ern	Total
General Science	7	6				1	7	4	25
Physics	7	16	10	17	50	3	12		115
Chemistry	6	9	7	11	45	3	7		88
Biology	4	7	8	9	42	3	7	1	81
Agricultural Science	1				30		6	8	45
Mathematics	7	21	11	18	85	5	22	12	181
Basic Electricity					20				22
Applied Electricity	1			1					
Engineering Science	2								2
Total	35	59	36	56	272	15	61	25	559

Source: Ghanian Government

Thirdly, it is now under a transient period from old education system to new one and both old and new curricula are being used for secondary education. This inevitably makes teacher's burden heavy and consequently makes situation worse. It is also to be noted that since more emphasis is to be placed on science and technology education under the new education system rather than conventional academic subjects, requirement for science and mathematics teachers is expected to grow more in the future.

(Hiroshi Otani)

Chapter III

Directions for Education Development Aid to the Third World from Communication Theory Perspectives

– Problems of Language Learning and Cross-Cultural Contact for the Japanese –

1. Lessons and Communication in English

1) The Language Environment in the Duty Area

In the space of over a quarter of a century since JOCV was set up in April 1965, about 10,000 volunteers in 150 fields have already been sent out to developing countries. 500 of these have been teachers of science subjects. Seen from the perspective of language ability as a tool for communication, fluent and precise language ability is required more of science teachers than in any other field.

The reason for this is that in lessons on sciences such as mathematics, physics, and chemistry, abstract concepts and theories are frequently taught. In addition to this, explanations of minus temperatures in a hot region such as Africa or of such things as semi-conductors in places where there is no electricity, not only require an adequate knowledge of scientific terms, but also the foreign language ability with which to express these, as well as outstanding powers of explanation through the use of metaphors.

In the three countries which we selected as targets for this research, namely Kenya, Zambia, and Ghana, English is the official language, since during the colonial era all of these countries were in the British Empire. In Kenya and elsewhere there are places where a standard tribal language such as Swahili (an official language in Kenya) forms part of the lessons, but these only comprise one subject of the curriculum. For this reason, even if people speak in tribal languages or standard tribal language in the home or local community,

as soon as they enter primary school and start their education they must study in English; The ability to speak, listen, read, and write in English is required of children and pupils as a matter of course.

Volunteer science teachers direct their lessons at pupils such as these.

Incidentally, reports so far from volunteers (field reports or reports made after returning) and the results of field surveys made up until this time indicate a low level of English ability on the part of people in the duty area. Assessments include "Their ability in English is extremely low"; "Pronunciation is poor"; "Grammar is awful"; "They commonly use phrases like 'How is you?' or 'I can be able to...'"; "Because they use both English and tribal language, they end up speaking neither well", and so on.

In this respect, certainly there are problems with English ability (pronunciation, grammar, etc) in comparison to native speakers who have been brought up with English as their mother tongue. However, when we consider that there are many foreign teachers from the US Peace Corps, from Britain and elsewhere in secondary schools (middle and high schools), we can only think that the pupils must be in contact with a high level of English on a daily basis.

Whether or not the English language ability of the pupils is as low as the Japanese volunteers say, viewed from in broad national terms, of course it is undoubtedly low. But, judging from the responses to questionnaire surveys that we conducted with pupils in this research, we cannot help thinking that they have a reasonably high ability to express themselves. From the time that they enter primary school, at least while they are at school they are immersed in English. Thus our view was that they should not have too much difficulty expressing themselves in English.

2) Conducting Questionnaires

While our research team talked directly to volunteers, schools, and pupils, we also undertook some analytical research via questionnaires. Of these, the authors were in charge of (1) Survey questionnaires on volunteer activities, (2) Survey questionnaires for pupils, on

school-related issues such as lessons, (3) Survey questionnaires on pupils' general awareness of Japan, (4) Survey questionnaires on the degree of pupils' interest in news. In particular, survey questionnaires were (1) conducted with the volunteers with survey questionnaires (2) conducted to find out how the pupils themselves relating to the Japanese volunteers turned out to have extremely interesting results.

Of these, the following were the three most important survey questionnaires for the pupils.

(1) Survey questionnaire for pupils on school-related issues such as lessons

Q1 What do you think about the Japanese teachers?

Q2 What is special about the Japanese teachers compared to the teachers from other countries?

Q3 What benefits have you received from the Japanese teachers?

Q4 Is your study of science subjects improving?

Q5 Do you think the study of science subjects is useful?

Q6 Can you communicate well with the Japanese teachers?

Q7 Please tell us what you like and dislike about the Japanese teachers.

Q8 What do you expect from the school?

Q9 Are there any problems in the school? If so, please write them down.

Q10 What makes you most happy and most unhappy about school life?

(2) Survey questionnaire on pupils' general awareness of Japan

Q1 What do you think in general about Japan and Japanese people?

Q2 What is your assessment of the industrial and technological strengths of Japan?

Q3 Do you think Japanese people are creative?

Q4 What animal would you liken Japanese people to?

Q6 Please name some world-famous Japanese products.

Q7 Please tell us the names of Japanese products you have in your home.

Q8 If you know the names of any famous Japanese people please write them down.

Q9 Are Japan and the Japanese people going to be your friends (allies) in the future?

Q10 What do you expect from Japan and the Japanese people?

Incidentally, survey questionnaires with exactly the same questions were conducted between summer and autumn 1989, in industrial cities in England and South Korea (England: Sunderland and the outskirts of Derby, in English; South Korea: Ulsan, Masan, and the outskirts of Changwon, in Korea). Later we shall refer briefly to the results of these for comparison.

(3) Survey questionnaire on the degree of pupils' interest in news

Q1 What does 'news' mean to you?

Q2 Which of the following news items interests you most? (more than one answer possible)

A1)	World events	A2)	African events
A3)	Local events	A4)	School or work-place events
A5)	Domestic events	A6)	others

Q3 Which of the following items are you most concerned about? (more than one answer possible)

A1)	War	A2)	Crime	A3)	Money/Income
A4)	Promotion	A5)	Success/Failure	A6)	Health
A7)	Food	A8)	Entertainment	A9)	Leisure
A10)	Love	A11)	Sex	A12)	Friendship
A13)	Results	A14)	Electrical goods	A15)	Cars
A16)	Bicycles	A17)	Fashion	A18)	Sport
A19)	others				

Q4 Which of the following media do you usually come into contact with?

A1) Newspapers A2) TV A3) Radio

A4) Magazines A5) Films A6) Music

A7) others

Q5 What do you think about the Gulf War?

The above survey questionnaire was conducted in Kenya, Zambia, and Ghana during the period of this research (excluding the first and last travel days, from February 28th to March 13th 1991).

In consequence, we received a total of 39 responses to the questionnaire (1) aimed at Japanese volunteers, broken down into 28 from volunteer science teachers and 11 from volunteers in other fields.

In addition, with regards to questionnaires (2), (3), and (4) aimed at pupils in three African countries, they were conducted in a total of 12 schools (3 each in Kenya and Zambia, and 6 in Ghana), and we received 352 responses from pupils for questionnaire (2), 162 for questionnaire (3) and 186 for questionnaire (4), giving a total of 700 respondents.

Table III-1

(Unit: persons)

Japanese Volunteers Who Responded to the Survey Questionnaire				
	Kenya	Zambia	Ghana	Total
Volunteer science teachers	8	9	11	28
Volunteers in other fields	1	8	2	11
Total	9	17	13	39

Table III-2

(Unit: persons)

Pupils from 3 African Countries Who Responded to the Survey Questionnaire				
	Kenya	Zambia	Ghana	Total
School matters such as lessons	83	69	200	352
Awareness of Japan	51	54	57	162
Degree of interest in news	41	42	103	186
Total	175	165	360	700

The distribution of question sheets was carried out by three groups, namely Japanese volunteers, non-Japanese teachers, and the authors themselves. The method adopted was for the pupils to fill in the forms while in the classrooms. The atmosphere on these occasions was felt to differ slightly depending on those who distributed the sheets.

Also, while there were some students who answered all three questionnaires, there were others who only responded to one or two.

In terms of the special characteristics of the respective countries in which the survey questionnaires were conducted, in Kenya all the schools were Harambee schools located in mountain villages far distant from the capital Nairobi. The awareness of the pupils was not all that high. Learning abilities also were considerably lower than in the government-run state schools, and in terms of performance in standard national examinations they were ranked as low-grade schools. Against this, those in Zambia were not that far from the capital Lusaka, and were in convenient locations from the point of view of transport. In nationwide terms, all of them were ranked as middle-grade schools. In the case of Ghana, with the exception of Aboulu and Adidome the schools were either in cities or in the centre of the region developed from British colonial days. Overall, the pupils had a high awareness and were relatively strong in their learning ability. In terms of performance in standard nationwide examinations and the rate of university entrance, they were ranked as top-grade schools.

3) The Results of Questionnaire Surveys

Special priority objectives in the questionnaires were to discover whether the Japanese volunteers were making use of their English ability and succeeding in their lessons, and whether communication with the pupils was going smoothly. Also, they were interested in how the pupils themselves regarded the Japanese teachers, and what sort of benefits they felt the Japanese teachers brought. This was the first time that such an extensive survey had been carried out with local pupils.

First, we will look at the evaluation of lessons and communication according to the Japanese volunteers.

Essentially, lesson conditions and the degree of communication are inseparable from each other. The condition of a lesson that goes well, as well as daily communication, are evidence that the relationship between the provider and the receiver is a favorable one. Moreover, English, the medium which will form this link, has a vital role to fulfil in both cases.

However, reports so far from the volunteers stated "Although everyday conversation and simple communication may be all right, the lessons are a problem". There were many such statements which distinguished between these two elements.

Thus, while it is doubtful whether the two can be differentiated strictly, language is not the only form of everyday communication. There are also methods of manner, attitude, expression, and indeed the approach of relating to people with the whole personality. Therfore, even if the lessons in the classroom are not going well, there should be no problem in making contacts through sport or recreation.

Thus, we divided the questionnaires for volunteers into questions for evaluating lessons and those for evaluating everyday communication.

The results, as shown below, revealed responses from volunteers stating that both lessons and communication were going rather well.

Table III-3

Questionnaire for Volunteers: Are lessons going well ?					
	Very badly	Quite badly	Average	Quite well	Very well
Kenya	0 (0)	0 (0)	6 (75.0)	1 (12.5)	1 (12.5)
Zambia	0 (0)	0 (0)	8 (88.8)	1 (11.1)	0 (0)
Ghana	0 (0)	1 (9.0)	5 (45.4)	5 (45.4)	0 (0)
Total	0 (0)	1 (3.5)	19 (67.8)	7 (25.0)	1 (3.5)

Feb-March 1991, Researcher: Hitoshi Nakamura (in parentheses: %) – same below

Table III-4

Questionnaire for Volunteers: Is Communication going well ?					
	Very badly	Quite badly	Average	Quite well	Very well
Kenya	0 (0)	0 (0)	3 (37.5)	3 (37.5)	2 (25.0)
Zambia	0 (0)	0 (0)	3 (33.3)	5 (55.5)	1 (11.1)
Ghana	0 (0)	0 (0)	5 (45.4)	4 (36.3)	2 (18.1)
Total	0 (0)	0 (0)	11 (39.2)	12 (42.8)	5 (17.8)

In other words, the majority felt that lessons were 'average', while over one-quarter responded with 'quite well' or 'very well'. Indeed, regarding communication, more responded with 'quite well' than 'average', and if the figures for 'very well' are added to this, the responses indicating a favorable relationship take up more than 60%.

As far as can be seen from these responses, we may judge that lessons and communication using English language ability are going reasonably well.

Of course, there will be large discrepancies between the English language abilities of individual volunteers. There are also differences in the various methods of self-evaluation used. However, when analyzing these as a whole, a certain single condition ought to emerge. Here, if we could assume that most of the responses of 'average' in self-evaluation to be

rather a self-induced inhibition of a more favorable response, perhaps we could see anything from 'average' upwards as indicating favorable conditions.

Meanwhile, the volunteer in Ghana who responded that lessons were going 'quite badly' had only taken up the post six months previously, and moreover since the school was in an urban area, the English language ability of the pupils would be expected to be comparatively high. Incidentally, as this volunteer responded that communication was going 'quite well', we can deduce from these responses that the situation will be corrected if the lessons just go slightly better.

On the other hand, how do the pupils feel about the Japanese teachers?

While there will of course be slight differences in the pupils' view of Japanese people as revealed in the questionnaires (depending on the country and the individual school), on the whole opinions pointing out a lack of English language ability of the Japanese were universal, along with others which praised them as 'kind', 'very friendly', 'excellent', 'hard-working', 'earnest', 'punctual', or 'co-operative'.

Nevertheless, behind these favorable feelings there were many voices which lamented the lack of English-language ability of the Japanese teachers. Moreover, although their ways of expressing this, using words or phrases such as 'but', 'though', 'despite', or 'the only problem', show a willingness to give as much praise as possible, they reveal a sense of hopelessness solely on account of this lack of English language ability on the part of the Japanese teachers.

> "The teachers are very good, earnest, and work very hard, but the problem is that they aren't good at English." (Kenya, female, 15 years old, and others)
>
> "They're all good teachers. But there is a constant breakdown in communication. They just can't express themselves in English." (Zambia, male, 19)
>
> "Despite the fact that they can't use English, they are trying their best." (Ghana, male, 20)

Amongst these, there are some rather frank opinions. For example:

"The first thing I would say is that I don't understand what they are talking about." (Kenya, male, 19)

"Their English is beyond my comprehension." (Kenya, male, 16)

"Since they can't express themselves in English, before coming here they should study English for two years." (Zambia, male, 18)

"Their inability to use the official language is a big problem." (Zambia, male, 19)

"Because English isn't their native language, they can't speak English during the lessons." (Ghana, female, 16)

Though we have previously mentioned that there will be discrepancies in the individual English language abilities of the Japanese teachers, the view of the African pupils is that Japanese people as a whole cannot speak English. This is deduced because there were pupils in every country and every school who pointed this out as a problem.

Indeed, when we see responses such as "When a pupil asks a question, the Japanese teacher can't answer and the class is immediately thrown into confusion" (Ghana, female, age not given), or "Simply because the teacher can't speak English, one day the lesson just collapsed" (Ghana, male, 15), we become painfully aware of the pressing need to improve the English language abilities of the Japanese volunteers.

In response to questions 1 to 10, the number of cases in which African pupils indicated a lack of English language ability on the part of the Japanese (even if only once) are shown below, along with their proportion to the questionnaire responses as a whole.

Table III-5

Problems of English Language Abilities of Japanese Teachers as Revealed in Questionnaire for Pupils				
	Number of responses (A)	Number of responses indicating lack of English ability by Japanese teachers (B)	Proportion of (B) to (A) (%)	Number of schools polled
Kenya	83	13	15.6	3
Zambia	69	48	69.5	3
Ghana	200	121	60.5	6
Total	352	182	51.7	12

*1 In general, male pupils tend to be more outspoken than female pupils in pointing out the problem points of Japanese teachers. Also, the higher the age group of the pupils, the greater the dissatisfaction with the Japanese teachers' English ability tends to be.

*2 The comparative lack of problems in the case of Kenya could be explained in part by the relatively strong English ability of the volunteers there. Nevertheless, the low level of dissatisfaction is thought rather to be due to the facts that, compared to Zambia and Ghana, the schools were located in extremely remote places, and also that the type of schools polled were not government-run public schools but Harambee schools, with their large volume of low-level pupils.

In fact, viewed as a whole, more than half of the pupils polled pointed out deficiencies in the English ability of the Japanese, while particularly in Zambia and Ghana, with their comparatively high levels of learning ability, over 60% of pupils expressed dissatisfaction with the lack of English ability of the Japanese teachers.

To be sure, we can feel nothing but admiration for the continued professional application of the Japanese volunteer science teachers, considering the environment in which they have been placed, with its hard climatic, cultural, and gastronomic conditions, the state of hygiene, meagre school equipment, pupils' low learning ability, and indeed the inadequate supply of textbooks, exercise books, and writing utensils. Nevertheless, we must not ignore the pupils' cries of distress.

4) Results of Informal Talks with Japanese Volunteers

Our survey group visited groups in Kenya, Zambia and Ghana, and held discussions with individual mathematics and science teachers. We also had meetings set up in each capital city, with the assistance of the JICA in each country, where we met with volunteers, including those in remote areas. These discussions proved extremely valuable. We shall now examine a number of the issues raised.

Kenya

Need for training in English and Swahili after arriving in Kenya: It would be a definite plus to receive training in Swahili as well as English, in order to be able to develop friendships with pupils' families and other residents of the region. Many felt that in addition to concentrated training in English, they would like to receive on-going training in tribal languages, or standard tribal language.

Views of mathematics and science volunteers in Ghana on the merits and demerits of introducing on-site training during the summer vacation in Kenya, similar to the Akosombo International School long-term program (24 days in 1990): Over the summer holidays, teachers often take the opportunity to travel outside their appointed country, so many volunteers questioned the significance of undertaking training over this period when attendance would be low. In the end, it seems that such training would be difficult to implement without considerable demand from volunteers themselves. Further, volunteers desire more active negotiations with the Kenya Government Education Department over continuing with mathematics and science education in the research centres in each region.

Good communication and harmony with school principals: In these three former British colonies, school management is still strongly influenced by British tradition. A principal's authority is much stronger than in Japan. Because of this, volunteers have caused minor incidents through mistakes in communication. One complaint from a principal said "Absent from school without leave; went to Nairobi". However the teacher concerned claimed to have

already sought permission from the previous principal to take the day off in order to attend a research meeting. In general, when pressed, volunteers told us that Kenyan principals tended to confuse official and private matters, and often used school personnel such as secretaries and accountants for their own personal affairs. Such behaviour, normally embarrassing to a Japanese, is not so in the context of Kenyan morals. Volunteers expressed the desire for more normal, active communication with school principals.

Teaching success or lack of it: This appears to depend largely on the principal of the assigned school. On their own, volunteers do not have enough influence in this area. Expulsion is not an option available to them. Examples were given of pupils quite incapable in either English or Swahili which, if true, points to a serious deficiency at the secondary education level. Generally speaking, in spite of the bad points of Kenya's Harambee school as compared to government schools – for instance schools management, facilities, and students' ability, as outlined above – volunteers are managing to carry out their appointed tasks. Many also said that the linguistic problem need not be pursued too thoroughly. This may well be the case.

Difficulty in measuring 'success' in education: The general opinion is that success is not readily apparent, and may take up to 10 years to manifest itself. This seems indeed to be the case, so given the lack of concrete information in this area, there is little else that volunteers can do other than to persevere slowly and steadily with their work. The problem is that there is no system for collecting and collating the required measurement information over a two-year (or with extension three-year) teaching period. Many volunteers would like to see this situation improved, but first require knowledge about how to construct such a system. In this respect the 1985 *JOCV Mathematics and Science Handbook* is a useful collection of volunteers' thoughts and opinions.

Indications that language ability drops dramatically over the summer vacation: There are many problems with long vacations such as the summer break for those living alone while at Harambee schools. Female volunteers are particularly at risk, and therefore only go to Nairobi

to meet with fellow Japanese. This is one of the main reasons why English ability falls. It seems that this problem can only be solved by the individuals themselves.

English training at the Hiroo office: The 77-day training course at Hiroo produces good results. In particular, the C-course using technical terms is useful in schools. However, it was pointed out that even this is not taught in front of actual children (pupils).

Zambia

Zambian people have low English ability: Opinions such as the following were common: "Even at the lower levels in secondary school, they have no English ability. At first, having little English myself, I only suspected that might be the case, but when I asked a Zambian teacher it turned out to be true. It's not only the Japanese whose English is poor". However, compared to higher levels, expressive ability at lower levels is far better than in Japan, even though some pupils are clearly deficient. Pronunciation is also good, provided one can get used to the accent.

In connection with this were comments such as the following: "If we become completely used to this style of pronunciation, our own English will suffer"; "Since coming here I've done badly in the TOEFL (Certified English Examination) – why is it that my score has dropped about 50 points?"; "The Zambian people I'm living with correct my English for me, but even after a year my English hasn't improved". It seems that the correct English needed for exams such as TOEFL cannot be gained from experiences in these countries. In the end, there is little else that volunteers can do other than use the limited opportunities to further their own personal learning. Some volunteers said that they listened to BBC broadcasts to improve their listening comprehension, but more than anything personal study was necessary for real improvement.

Training at Hiroo: The following are examples of opinions typically expressed by volunteers, and warrant close attention: "For me, the only really useful thing was the opportunity to speak with a foreign teacher, thus reducing my uneasiness in speaking English to foreigners. More than learning lots of grammar rules, I would have preferred more practical

training"; "Even now, I find appearing in front of school staff meetings difficult. At Hiroo, they should think of all sorts of things like that too"; "There's too little time in the C-course. The classes should be further differentiated according to occupation and ability".

How hard to work pupils in English classes: One member said "I openly accept their lack of English ability. The problem is, how simply to explain things. As far as possible I use simple, easy words, and gestures too". The key to success in communication is that the meaning gets through, so this is the best solution in this respect. On the other hand, vocabulary will never increase this way.

Facilities for teacher training and re-training courses: The standard of education across the country is sufficient for such a program to be useful. We would very much like to implement such training. We need a final decision from Japanese government sources.

Ghana

Results of Akosombo on-site training: All volunteers felt that there was a great deal to be gained from class training at the international school, while the pupils are on summer vacation. The 'mock lesson' is particularly useful in introducing new volunteers to a number of different teaching situations. Also, the after-class evaluations help to bring to light one's own weaknesses, and serve as a useful goal for self-improvement. This has evolved largely at the requests of volunteers and, with the assistance of local JICA offices and the JOCV in Tokyo, enjoys an excellent reputation.

Requests in regard to training at Hiroo: Improvement in English ability was seen by volunteers as the most important aspect of their training. They also suggested a special class structure aimed specifically at mathematics /science teachers. Given the importance of English in the schools where they are posted, this is worth investigation.

Two-year appointments are not long enough: One comment was: "Just when you finally become accustomed to it, you have to go back home. More than just extending the terms of appointment, do away with the age restriction and maybe create a 'specialist' mathematics

/science teacher category". Skilled technical subject specialists are indeed in demand at schools. It would probably enhance the quality of education if, in addition to younger volunteers, older teachers, even over 50 years, with a wealth of teaching experience and English ability, were able to play an active role. In this case the problem is one of adjustment to the local climate and food, but this could be alleviated to some extent by restricting placements to schools in large cities and surrounding areas.

Establishing a 'model' school as a base: Different conditions apply in different schools, whether they be schools where the volunteer program is continuing, just starting, or finishing. In order to provide a basis for measuring progress in all areas (not just Ghana), volunteers have suggested the formation of a 'model' school in each area, or in specific areas. Rather than distributing restricted numbers of personnel and limited budgets (eg small, non-reimbursable grants) ad hoc, better results would be achieved by concentrating on those areas most in need.

Such a school might also be able to serve as an 'experimental' school for use in retraining, and is definitely worth further investigation.

The above comments and suggestions were obtained from informal talks with volunteers and discussions with JICA offices. We have gained much valuable information about a variety of situations experienced by volunteers, including what appear to have been some rather difficult experiences.

5) How Volunteers Can Improve Their English

For volunteers to improve their English they must undertake training both before and after taking up their positions, and pursue this vigourously. However there is a limit to the extent to which training is possible after selection, so we need to make the English selection examination relatively difficult, and select for mathematics and science teachers only those who perform above a certain level of consistency. If we do not it will only cause difficulties at schools, not only for volunteers who are not confident of their speaking ability, but also for the pupils themselves.

Many volunteers joined because they wanted to travel overseas, or work in third world countries, or come into contact with African people and experience nature. Many others expected that working in an English-speaking environment would have a positive effect on their English language ability.

The reality, however, seems to be slightly different. The Kenyan Government specifies (1) a science-related university degree, (2) a teacher's certificate, and (3) a mastery of English, as prerequisites for mathematics and science teachers. This study revealed that in practice English ability is regarded as the most important attribute. Comparing the relative importance allotted to English ability and mathematics/science ability in the selection process, the former accounts for about 70% and the latter only 30%. In some cases, graduates in arts related fields with no more than an interest in mathematics and science and a limited degree of teaching ability are considered acceptable if they have a sound command of English. The latter is considered extremely important, as opposed to Japanese language teachers and some science teachers.

The pre-posting English training A and B courses are considered good, but volunteers requested that the C course be further segmented according to occupation and ability, and that more time be devoted to it.

If possible, we should investigate the possibility of conducting some training in front of English-speaking children (for instance from the American School).

2. Problems Arising from Contact between the Cultures

1) Coping with Differences in Customs and Lifestyles

Africa is a considerable distance from Japan, and consequently there are many differences in culture.

Volunteers generally seem to have absorbed and assimilated new customs and etiquette without too much difficulty, through a combination of natural curiosity and their own efforts. In Zambia, one member even attended the coming-of-age ceremony held for a young woman named Ncorola, and was deeply moved. On the day of the ceremony, the girl's father and

mother each provided a bull, which was slaughtered by the young people of the village and dismembered with great skill using axes. This became the meal at a lively banquet. Although for a Japanese it would be difficult to stomach the meat of an animal one witnessed the slaughter of, in this case, the experience of taking part in such an event was well worth it.

One teacher proudly reported that sleeping on the ground, in accommodation without electricity or running water, was a "wonderful lifestyle, at one with nature". Another who lived alone in the teachers' quarters described enjoyable evenings spent at the village's only drinking establishment, drinking the local liquor together with other villagers. Still another teacher, a Buddhist, went to church on Sundays and joined in singing hymns. Due to their youth, these volunteers were able to overcome difficulties with a 'never give up' attitude.

The staple food in Kenya and Zambia consists of things made from maize powder, called nshima and ugali. Other foods include vegetables fried in oil and seasoned with salt and, depending on the region, fish dried and then boiled. In Ghana, potatoes are the staple food, which is eaten with soup made from ground peanuts. Meat, fish and eggs are reserved for banquets and so are rarely seen.

One cannot but admire these Japanese who, being used to their own foods and lifestyle, go and live with the locals and eat local foods. JICA Kenya office's vice-chairman, Mr. Takahata, said, "Even if a civil war were to occur, I hope the villagers would naturally want to protect our volunteers." In the event of a sudden change for the worse. We could evacuate our volunteers, but more important than this is the development of close cooperative relationships between the villages and volunteers.

The point is that we must not always be thinking of our own culture, but of the similarities between cultures. However the reality for some is that a new and completely different culture can be difficult to understand and appreciate. Even with a flexible and tolerant attitude, we will sometimes accept and change, and other times reject differences. But sincerity will always be understood by another person; humans are the same, whether Africans or Japanese.

In the questionnaire administered as part of this study, we asked volunteers to name the three most important qualities required to be a teacher in the JICA program. The results have been arranged into a "Best 10" as shown in the following table.

Table III-6

Best 10 Qualities Required for Teaching	
1. Health/Strength	13
2. Kindness/Consideration	9
3. Stamina	9
4. Specialist knowledge	8
5. Language (English) ability	7
6. Personality/Humaneness	6
7. Enthusiasm	5
7. Talent at performing	5
9. Flexibility	4
9. Positive attitude	4
9. Discipline/Strictness	4

(Total includes multiple answers)

The above table shows that since their new lifestyles are completely different, in order to live in more difficult conditions, the most important factors are health and strength. Also, kindness, consideration, and endurance are essential. It is interesting to note that these three factors were ahead of such considerations as specialist knowledge and language ability.

2) Punishment

Punishment is something which has been practised in Anglo-Saxon education. In Africa, still influenced by the British education system and British educational thinking, corporal punishment is still officially approved in schools. At some schools, corporal punishment can legally be carried out only by principals and specified others, as in Kenya, while at other

schools this responsibility is given to senior pupils. Different schools set different limits on who can administer corporal punishment - from principal, head teacher and dormitory dean, to all teachers (but generally male teachers), through to senior pupils as well. Corporal punishment usually consists of caning the bottom (for boys) and hitting the palm of the hand (for girls).

More general forms of punishment, such as cutting grass or drawing water, either during or after class, are used at nearly all schools. We saw many instances of grass-cutting at the school we visited. Leaving corporal punishment aside, grass-cutting does not appear to be terribly onerous. One pupil we saw was laughing while cutting grass with a scythe and was obviously quite happy to be outside the classroom. At first sight it actually looked quite enjoyable. It is thus hard to establish what sort of effect this type of punishment really achieves.

There are many reasons pupils get punished, such as causing disruption, making trouble by being noisy, or failing to answer a question. Of some concern is the fact that failure to bring tuition fees to school can also be a reason for punishment, even corporal punishment.

Volunteers' opinions on punishment can be summarized as follows:

Table III-7

Views on Punishment	
Punishment itself is not a good thing	4
Corporal punishment is not a good thing	4
It is necessary in some situations	3
I sometimes use simple punishments	2
Punishments which disrupt the class are of questionable significance	2
I accept it because it's part of the way things are here	1
It's OK if you use it effectively	1
No response	11

These figures show that eight people disagree with punishment including corporal punishment, while seven approved of it under certain conditions. Another way to view these results is that seven people use punishment to a certain extent, while one fears that it disrupts classes.

The general opposition to punishment also surfaced in the discussions, although there were also comments such as, "Soon after arriving it comes as a bit of a shock, but in the course of time you get used to it, your opposition fades, and you even find it necessary at times."

Pupils overwhelmingly nominated punishment as one of the most unpleasant aspects of school life. They also said that Japanese teachers on the whole did not use it much.

On the other hand, some pupils complained about this. Two comments were: "Punishment is necessary in order for us to be able to study properly" (Ghana, 16-year-old girl), and "Japanese teachers don't take any notice even when everybody is being too lively, so the classroom becomes really noisy" (Ghana, 11-year-old boy).

In Japan, these forms of punishment (especially corporal punishment) are illegal. It is prudent that Japanese teachers in Africa generally observe the punishment standards outlined in Table III-7.

3) The Santa Claus Role

Africa seeks to employ mathematics and science teachers for a number of reasons. Firstly, it needs to secure personnel in order to fill the void in secondary education created by the dire shortage of teachers in this area. Secondly, it wishes to raise the overall standard of mathematics and science by employing high-quality teachers. At the same time, many schools are expecting to receive other things, ranging from equipment for science experiments, stationery, pens, etc. which are all in short supply, through funds for repairs to school buildings, water facilities, etc. In other words, many schools are expecting not only people, but materials and money also.

Some volunteers have voiced their concern over this 'Santa Claus' role, while others simply accept it by saying there is nothing that can be done about it. In actual fact, material aid is available within the limits of the support provided by JICA offices and the small non-remunerable loans administered by the embassies in Africa.

Perhaps the size of loans, etc. should be increased, but the method of distribution is quite appropriate as is: with the purchasing and supply controlled by JICA offices – in Tokyo and through the embassies – according to the requests of volunteers.

However, other problems exist. There have been cases where a member has requested materials or aid, but by the time they arrive at the school, he or she has already returned home and no Japanese volunteers are present. Aid should be timed to coincide with the teachers' period of posting. If the teacher has already left, the school may be unclear as to the purpose for which the aid was requested.

We now present some comments from the questionnaire and from direct discussion with volunteers.

"Certainly, there is a need for material aid for schools, but the schools themselves also need to plan properly. For instance, there was one instance of purchases not arriving because the school forgot to include transportation fees in its calculations. They worked it out in the end, but it was a long time before we actually saw the goods." (Male, Ghana)

"I wonder whether our aid really is helpful to these developing countries which are on their own. More than just giving, I think we should be trying to help them." (Female, Ghana)

"They are desperate for teaching materials and aid, but I think it's dangerous to concentrate only on the immediate future. Fundamental areas such as manufacturing and public health also deserve attention. These needn't be enormous projects, just the setting up of a small-scale infrastructure in each region." (Male, Ghana)

"I would like to see a more long-term outlook aimed at human development." (Male, Zambia)

"Just giving things is no good. There needs to be a change in thinking." (Male, Zambia)

"I would like to see 'aftercare' included in the assistance. In some cases it's a waste of our efforts." (Male, Zambia)

"The preliminary investigation and post-evaluation are too lenient." (Male, Zambia)

"Communication comes first. It's no good thinking of people and things only." (Male, Zambia)

"Just giving things to these countries will only ruin them." (Male, Zambia)

"There's no limit to the things that seem essential to a school. We should restrict ourselves to giving the most useful things only." (Male, Zambia)

"African people don't know their own potential, and if they keep receiving donations they'll never realize this fact." (Male, Zambia)

"Originally schools were often refused, but there is now a growing tendency for them to ask for anything and everything. When it's unreasonable, we have to say 'no' clearly. I think we should give only the most necessary things." (Female, Zambia)

"I came here to assist in human development, and I hate this 'Santa Claus' role." (Male, Zambia)

3. Lifestyle and Opinions of African Pupils

1) Pupils' View of Japan

We interviewed pupils from 12 schools - three in Kenya, three in Zambia, and six in Ghana – where Japanese mathematics and science teachers are stationed. Pupils overwhelmingly praised the diligence and excellence of the Japanese teachers, their kind and friendly character, and their progressive nature.

This is thought to be due to the fact that African pupils' interest in Japan has grown from having been in constant contact with Japanese people. Despite the enormous physical distance between the countries, the psychological gap has narrowed.

Proof of this is the fact that 90% were able to give the name of a Japanese product.

We asked pupils to liken the Japanese national character to an animal.

Table III-8

Pupils Questionnaire: What animal would you liken Japanese people to?								
	Kenya		Zambia		Ghana		Total	
Animal name	Hare	7	Sheep	16	Ant	7	Sheep	18
	Cat	5	Domestic Pet	5	Cat	7	Cat	13
	Rabbit	4	Monkey	5	Fox	3	Ant	11
	Ant	4	Elephant	3	Elephant	3	Rabbit	8
	Pig	3	Rabbit	3	Pig	3	Monkey	8
	Chimp	3					Hare	7
	Lion	3					Elephant	7
							Pig	6
							Dom. Pet	5
							Lion	5

Likewise we asked them to compare fellow Africans to animals. The results were as shown below:

Table III-9

Pupils Questionnaire: What animal would you liken fellow Africans to?						
	Kenya		Zambia		Ghana	
Animal name	Monkey	11	Monkey	5	Monkey	10
	Elephant	5	Sheep	5	Cat	9
	Lion	5	Cow	4	Pigeon	2
	Hare	4	Dog	2	Lion	2
	Orang-utang	4	Hyena	2	Sheep	2
			Lion	2		
			Domestic Pet	2		

As mentioned before, a study was carried out between summer and autumn 1989 in industrial cities in England (Sunderland and Derby) and Korea (Changwon, Ulsan, Masan) on the level of awareness of Japan. In England, friendliness was rated highly, but awareness of famous Japanese, including the Emperor's name, was a low 6%. On the other hand, in Korea, despite strong anti-Japanese sentiment, up to 80% of respondents were able to write down the names of famous Japanese (not counting 5% who refused to take part).

When English people were asked to liken Japanese people to animals, the most popular answer was ants (55% of the total), followed by worker bees (12%), and then chimpanzees (7%). Koreans saw Japanese as foxes (69%), and snakes and cats (8% each).

Comparing these with the African results, the three African countries are similar to Korea in their level of interest and knowledge of Japan, but more like England in their perception of the friendliness of the Japanese. Teachers also reported that the pupils' level of friendliness was increasing.

In conclusion, the pupils appear to be developing a broader perspective of Japan through constant contact with their Japanese teachers. A 'window' to Japan has opened, which can only continue to open up further in the future.

2) Pupils' Degree of Interest in News

Although African pupils are living in a developing region, they are nevertheless part of the world at large. What kind of things interest them, and how do they obtain information those things?

Table III-10

Pupils Questionnaire: How do you obtain news? (more than one answer)				
	Kenya	Zambia	Ghana	Total
	Radio 29 (70.7) Parents and neighbours 6 (14.6) Newspapers 5 (12.1) Teachers and friends 4 (9.7) Govt, PR 2 (4.8) TV 1 (2.4) Others 1 (2.4)	Radio 29 (69.0) Newspapers 8 (19.0) Teachers and friends 8 (19.0) Parents and neighbours 7 (16.6) TV 5 (11.9) Others 2 (4.7)	Radio 56 (54.3) TV 38 (36.8) Newspapers 32 (31.0) Parents and neighbours 15 (14.5) Teachers and friends 4 (3.8) Others 4 (3.8)	Radio 114 (61.2) Newspapers 45 (24.1) TV 44 (23.6) Parents and neighbours 28 (15.0) Teachers and friends 16 (8.6) Others 7 (3.7) Govt. PR 2 (1.0)
Total	48	59	149	256
Number of respon-dents	41	42	103	186

(Brackets indicate percentage of respondents, %)

The above table shows that overall the most important source of news is the radio (44.5%). This is particularly so in Kenya where many places do not have electric lights, and more than half of these (20.7%) receive the news on battery-powered radios. In Ghana, newspaper (24.1%) and television (23.6%) are greater.

Most radio and television broadcasts, newspapers and other mass media are in English. Thus the pupils become used to English from an early age. Many pupils added that they listen to the BBC.

The final question was about the kinds of things that concern the younger generation in Africa. The issues which stood out the most are shown in Table III-11.

Table III-11

Pupil Questionnaire: What are your everyday concerns? (more than one answer)				
	Kenya	Zambia	Ghana	Total
	Health 26 (63.4) Money/Income 23 (56.0) Results 20 (48.7) Sport 17 (41.4) Friendship 17(41.4) Food 16 (39.0) Entertainment 16 (39.0) Love 13 (31.7) Cars 13 (31.7) Leisure 10 (24.3) Promotion 10 (24.3)	Health 36 (85.7) Sport 25 (59.5) Friendship 24 (57.1) Love 21 (50.0) Results 17 (40.4) Food 15 (35.7) Entertainment 13 (30.9) Money/Income 12 (28.5) Cars 9 (21.4) Promotion 8 (19.0) Success/Failure 8 (19.0)	Health 68 (66.0) Love 38 (36.8) Entertainment 34 (33.0) Money/Income 30 (29.1) Friendship 30 (29.1) Results 29 (28.1) Promotion 29 (28.1) Sport 26 (25.2) Results 26 (25.2) Fashion 25 (24.2) Food 25 (24.2)	Health 130 (69.8) Love 72 (38.7) Friendship 71 (38.1) Sport 68 (36.5) Money/Income 65 (34.9) Entertainment 63 (33.8) Results 63 (33.8) Food 56 (30.1) Promotion 47 (25.2) Cars 42 (22.5)
Total	208	212	451	871
Number of respond-ents	41	42	103	186

(Brackets indicate percentage of respondents, %)

A most surprising result was that, despite their youth, respondents placed health at the top of their list of everyday concerns. Young people between 14 and 20 are usually full of energy, and one would therefore not expect health to be a major issue. Yet in all three countries it rated over 60%.

This is probably due to the fact that in Africa, disease, the 'enemy of the people', is prevalent on a scale probably unimaginable in Japan.

If this is the case, then Japanese volunteers working in such conditions should be warned to take great care regarding their health, just as the African people have been doing for thousands of years, and their young people do even today.

Other concerns of pupils included the changes going on in their country. In Kenya (which consists largely of mountain villages) money & income, school results, sport, friendship, and food were common concerns, while in Zambia (in an area which is flat and close to the capital) sport, friendship, love, and school results respectively were the greatest concerns. At schools in Ghana, which is more open, after health came love, friendship, sport, and money & income. Love' does not necessarily indicate love between man and woman, but also includes the love of God. Many Ghanaian girls in Christian schools nominated 'love'.

3) Relations between Japanese Teachers and African Pupils

African pupils have very positive feelings toward Japan. Their level of interest is also high. If they are guided along the right path, the results will be very beneficial.

There is however a problem with the lack of language ability on the part of the Japanese participants, and in some cases we found that the pupils lacked language skills as well. It is reasonable to assume ,however, that the pupils' level of understanding English will be higher than that of their Japanese teachers, if they listen to English broadcasts on the radio every day. Even so, when the students reach a level where they can speak, their pronunciation tends to be a little odd.

The written answers to the questionnaire showed that the pupils have an excellent grasp of sentence structure.

When pupils have a better grasp of English than their teachers, it can be difficult to explain concepts clearly to them, just as water cannot flow upward. At this stage, our main problem is how to improve the English ability of Japanese volunteers.

English is the No.1 priority in the selection of volunteers. Further language training after being assigned is also essential.

Our survey of schools found that pupil-teacher relationships are very harmonious, and much more relaxed than in Japanese schools. Even though there are some English communication problems, the intellectual level of the teaching staff is generally superior, and by their enthusiasm and efforts they have improved the overall standard of education considerably.

Firstly, I think we should commend the way teachers have made an effort to blend in with African society. Often under difficult conditions, with no electricity or water, they remain bright and cheerful in their relations with the local people, they eat the local food, and they lead a full and interesting life. The feeling throughout the survey was that Japanese people are friendlier towards, and feel closer to, African people than are Caucasians.

In each of the countries, pupils were eager for the posting of Japanese teachers to continue. It seems that they have come to know and appreciate Japan much more through their teachers.

It would appear that although they are aware of language problems associated with having Japanese teachers, pupils nevertheless respect and feel close to them.

The only way to develop and strengthen this bond between Japanese teachers and African pupils is to further expand the volunteer program. Africa, as it pursues modernization, also has a pressing need for expansion of the program.

(Hitoshi Nakamura)