

W. P. Palmer (1994). 'Training the Teachers in Western Samoa: Some Wider Implications', **Educating all the Family** (Editors Mike Read and Roger R. Wook), *Proceedings of the Twenty-second Annual Conference of the Australian and New Zealand Comparative and International Education Society*, 4-7 December, St Hilda's College, University of Melbourne, Australia, pp.1-11.

TRAINING THE TEACHERS IN WESTERN SAMOA: SOME WIDER IMPLICATIONS

**Bill Palmer, Faculty of Education,
Northern Territory University.**

ABSTRACT

I have been a part of a program in Western Samoa that involves inservicing Western Samoan secondary teachers in all subjects. My part in the program has been to inservice the science teachers in the delivery of the environmental science curriculum to students in the junior secondary schools. Quite a number of the secondary teachers are upgraded primary school teachers and have comparatively little background in their subject areas. The paper will explain the setting of the project broadly, will give some examples of the difficulties that our team encountered in carrying out the task and will raise some general issues of being involved in an Australian Aid Program.

INTRODUCTION

Having spent a career in science teaching in a number of different countries, I must confess that the idea of being a consultant very definitely appealed to me. Like many events in my life, becoming a part-time consultant seems to have been a remarkably unplanned event. As in many Australian states, the Northern Territory Department of Education started a business arm, called the International Project Management Unit (IPMU), though this has now been transferred to the Department of Industries and Development. One of its functions is to bid for contracts that are offered by AIDAB (or other organisations). Some of these contracts are educational, but a variety of other areas are covered including health, planning and agriculture. The planning process for these contracts often takes a long while in gestation. The bids for the contract from the various competing agencies are considered by AIDAB, mainly on the basis of cost and the suitability and experience of their teams. I had submitted my curriculum vitae to IPMU prior to knowing about any specific project but in mid 1991 I found myself in a meeting with ten to twelve others from the Faculty of Education (Northern Territory University) and the Northern Territory Department of Education, discussing this project to inservice secondary teachers in Western Samoa. There were many unknowns and I would say that the lack of information about the project initially and the major changes of plan during the project have been features of this project (and I suspect of most others).

THE WESTERN SAMOAN EDUCATIONAL SYSTEM

The Samoan archipelago contains three main islands and numerous smaller islands. A rather complex colonial history, involving Britain, Germany, USA and New Zealand has left one of the islands as part of the American Commonwealth and the other two islands as the independent nation of Western Samoa. There is not a lot in the literature comparing the two Samoas, apart from one thesis that compares the teacher's role in Western and American Samoa (Lowe, 1981). From my limited observations, I feel that, although being a colonial dependency of the USA has had advantages in the past for American Samoa in

terms of the amounts of money spent on aid and social security, it is in fact now Western Samoa that looks in better shape to face the future.

Western Samoa has a population of about 160,000 with slightly more males than females and about half the population under 20, though there is a steady decline in the younger age groups. Most of the statistics that follow come from an unpublished paper by our deputy team leader (Cameron, 1991).

Faa Samoa (The Samoan Way) emphasises tradition rather than change, so changes to the system tend to happen slowly. In 1986 the number of years that children spent at primary school was reduced from nine to eight years. Primary schooling is now followed by three years of junior secondary schooling (Years 9-11), which are rounded off by up to two years of senior secondary schooling (Years 12 & 13) for the most able students. There are examinations at each change of level and in Year 12 and Year 13.

At the Year 8 level the examination results allow a change of path, in some ways like the old "11 Plus" in the UK. The students, who do best in the Year 8 examinations, go on to elite schools, such as Samoa College, Avele College or Vaipolu College - the rest go to the junior secondary schools. The resources allotted to the colleges are greater than those allotted to the junior secondary schools and the teachers are more experienced. Some primary schools are very successful in getting places for their students in the colleges. Others, particularly the rural schools, seldom, if ever, have students who pass the examinations. The children of the rich, the successful and the "Matais" (the traditional chiefs) tend to go to the colleges. The fact that different Christian churches also have colleges for Year 12 & 13 students, enables a number of students to go through those systems and this to some extent alleviates the inequalities of the government system.

The major problem with the junior secondary schools is that, although in theory, students doing very well at the Year 11 examination can go on to college for Year 12, in practice this does not work very well. This is because these students are already behind the students who have been at a college for three years and have covered the year 9-11 content and more besides. This makes the junior secondary schools terminal institutions for most students and I believe this has a stultifying effect on both staff and students. The alternative view is that the economy of Samoa depends on skilled people, that is those who have been through the elite system, who leave Samoa to obtain jobs in developed countries and who remit money to relatives in Samoa. These remittances are a major factor in the country's economic health.

School attendance is not compulsory. There are a total of about 50,000 students in schools in Western Samoa, of whom 38,000 are in primary schools. About 80% of year 8 students enter Year 9 and about 65% of the Year 1 starting school will expect to finish Year 11. Only about 33% of the Year 1 students eventually sit for Year 12 examinations. Less than 8% of the original intake successfully complete Year 12 or university entrance. About 20% of children attend mission rather than government schools, with about 14% of these being at primary level, 41% at junior secondary level and the remainder at the senior secondary level. Staff/student ratios are about 25 to 1 overall, but the figure is not very meaningful as large variations occur. There are about 500 teachers employed in secondary schools altogether. About 25 new secondary teachers are produced locally each year. In addition, there are a few overseas teachers, mainly volunteers such as Peace Corps. A roughly equal number of teachers drop out of the system through attrition or emigration. In addition some primary teachers are employed as secondary teachers because there seems to be a slight

overall shortage of secondary teachers. In total, teachers are the largest group of government workers, absorbing 40% of the government's salary allocation of WS\$T 25 million.

HISTORICAL BACKGROUND.

A thumb-nail sketch of the history of primary and secondary education (Tamati, 1981) is available through the papers presented in the "Aims of Secondary Education Workshops" organised in 1979/80 by Macquarie University.

In this same group of papers Baumgart asks eight questions, which in my view, the Western Samoan system is still in the process of answering. They are:

- 1) *Who should receive secondary education?*
- 2) *Should there be a choice in the curriculum? If so, how much choice?*
- 3) *Where choices exist, should there be integration or separation?*
- 4) *Should the emphasis be on vocational or general education?*
- 5) *How should the school relate to the broader culture?*
- 6) *What emphasis should be given to technological development?*
- 7) *What is the role of examinations?*
- 8) *What should be the language of instruction?*

(Baumgart, 1981, pp. 27-8)

As an external curriculum consultant one sometimes feels that these more cultural issues are not for outsiders, yet each of the above issues has profound significance for teaching and learning in all curriculum areas. I certainly feel that the "jury" of the Samoan people is still considering the issues above and that the system must change. When there are major changes in the system, then curriculum in all subjects will have to change too.

It is interesting to note that a recent planning project emanating from within the Western Samoan Department of Education does indicate a recognition of the problems that beset the education system. Certainly if the aims of quality, equity, relevance and efficiency, which the Department sees as its major aims, are ever to be approached in practice, resources well beyond what is currently available would be essential. In other words, the sort of action that is needed to improve education in Western Samoa could be readily agreed by educationalists, but I would personally doubt if sufficient resources or will-power are available to make it happen in reality.

There has been a long history of 'Aid' projects. I will use the science curriculum as an example, as I am familiar with it, though there will be similar evidence in other curriculum areas. Baumgarner, (1982) gave some historical background to curriculum development in science up to 1980 and he dates progress in science education in Western Samoa to the re-establishment of a science committee in 1972 (p.114) though there was an earlier program in 1967 (p.113). On the aid question Baumgarner believed that when aid projects were completed continuing costs would be borne by the host country and I quote:

Although costs are initially borne by the development agency involved, eventually the costs must be absorbed by the individual country . . . Finance must also be found for personnel, equipment, teacher development and general support of a curriculum program. This was a lesson learned by the Western Samoan Science Program after 1970.

That any lessons were learned from 1970 would appear as a pious hope unlikely to be fulfilled. Rather the view appears to have been that aid programs can be used to patch up current problems, so long term planning and self-sufficiency are not necessary.

In the early 1980s there was a new emphasis on secondary education for a larger percentage of the population. The provision of a project to produce a secondary curriculum eventually became a part of Australian aid in the 1985-88 period. A document that gives the curriculum outlines (CDU undated) in all secondary school subjects was compiled and this includes the environmental science curriculum. I have not been able to find much in the literature about this project, which was the precursor of our project, but the original project co-ordinator of the Australian team gives some information (Fox, 1988; 1990).

In the earlier paper (Fox, 1988), the author expresses dissatisfaction with some aspects of the project, and warns generally about the problems of neo-colonialism. Indeed this is a familiar criticism which is, for example, implicit in a much earlier paper by Baba in which he castigates Australians for being the "educational buccaneers" of the Pacific (Baba, 1986). Dr Baba's suggestion was that generally the projects in the Pacific area should be funded by Australia and implemented by the University of the South Pacific. I do remember reflecting at the time that the suggestion might not be entirely devoid of self interest. In fact, and this is a major problem with aid, there is within it both a desire to help others and an element of self-interest and I suspect that these two motives remain inseparable.

From the limited information on the earlier project, it seems that AIDAB is now much more tightly in control of its projects than in earlier years. Fox (1990, p.158) felt that the project had moved from a "process orientated" approach to a "product-orientated" approach. The major task of the 1985-88 project was to produce a secondary curriculum for Western Samoa in a range of standard secondary school subjects. The apparent trouble with the "process orientated" approach was that it took time and the project was in danger of overrunning its timelines. The problem with a "product orientated" approach was that to make the curriculum relevant to the country one needs considerable Samoan input and it is not always easy to get written Samoan input in practice. All Australian aid teams tend to try to navigate between the "Scylla" of process and the "Charybdis" of product. However the 1985-1988 project did produce a curriculum in the form of a number of student books in each subject.

In science, these units are what junior secondary school students see and use in their science lessons. Units in other curriculum areas appear very similar. Generally each science curriculum booklet covers one area in science, is of A4 size with light card covers and is printed locally in ordinary type in monochrome and with only a limited number of illustrations. The overall pattern is similar to booklets produced in a number of other science curricula that I have seen in different Pacific Island nations. They are dull and old fashioned with experiments plagiarised from other science curricula worldwide. They also contain a number of minor errors, but they are cheap and easy to produce and, best of all, they are actually available in schools. The two major problems in the case of the environmental science curriculum are that it is not particularly environmental in its approach and that it does not use enough local Samoan examples or materials.

However as curricula go, it is quite a good curriculum and about 70 percent of it is based on simple experiments - so it is a practical curriculum. Its suitability to the Samoan situation, where few schools have science equipment or laboratories, or any budget to provide either, is dubious. This was the curriculum provided and being critical is easy, but I would find it hard to devise a curriculum in science that was significantly better within the time allowed for the project. The reality is that this task is really one for Samoan nationals.

The units were in Samoan schools by mid 1988 (Fox, 1990, p.158). So from mid 1988 to the time that our project of inservicing the teachers in the understanding of the curriculum started in September 1991, the Samoan teachers were on their own. Fox also correctly warned that the inservicing of teachers was an essential feature of such a project. Her own observations were that:

In some classes, the teachers were doing a very thorough job. In others, not even the language was comprehensible to the teachers, let alone the teaching aims

(Fox, 1990)

To help the teachers in environmental science, a number of teacher's guides were prepared by the previous team to parallel the student units, but it appears that they were not used much. At the same time planning went on for our project and details of what was required were written up so that the process of tendering could start. I suppose that the major point of criticism would be the lengthy delay between the provision of the curriculum by the 1985-1988 team and the start of our project in 1991 to teach teachers how to use the curriculum. After observing a few lessons and listening to our own participants I would agree with the comments by Fox (1990) that the quality of the teaching was very variable.

What sort of curricula are most nearly suited to current Samoan styles of teaching and learning? I have seen very limited amounts of teaching in Samoan secondary schools. In one of the lessons that I observed there were eighty-four children sitting cross-legged on the floor leaving only a very small area in which the teacher could move in order to write on the board. There are difficulties in teachers employing anything other than a lecturing style in such a situation. In terms of Beeby's educational stages (Beeby, 1966, p.72) I believe that Stage II moving to Stage III would be an appropriate description of most Samoan teaching that I observed or that I learnt about when teachers explained what they would do.

Explaining this new curriculum to Western Samoan secondary teachers was to be the bulk of our own project (1991-1994), even though those that we were to teach had already been using the curriculum for three years.

THE PROJECT (1991-1994)

The project started with our first visit in September 1991 which was a short time after a devastating cyclone had hit Samoa. The team consisted of a consultant for each of the main subject areas {English, Mathematics, Social Science, Environmental Science and Commercial Studies (core subjects) and Home Economics and Industrial Arts (non-core subjects)} plus a consultant for assessment and one for computer science and the team leader, Dr Tony Austin. There was a Samoan national for the teaching of Samoan (a non-core subject) from the Curriculum Development Unit, who ran an inservice in Samoan Language. The effective difference between core and non-core subjects was that core

subjects were taught in two sets of four inservice sessions, one set on the island of Upolu and one set on the island of Savaii, whereas non-core subjects had a single set of four inservices entirely on Upolu.

The Curriculum Development Unit (CDU) was the part of the Ministry of Education responsible for the curriculum. Physically it was an rambling old building, which when we arrived was in a very poor state of repair. It has been redecorated and refurbished during the three year program and both the physical conditions and the morale of the staff there have improved over that period. In each subject area the CDU had two subject 'organisers', one for primary and one for secondary, accountable for the progress of that subject. The building was in a small area that also contained a teachers' college, a primary school, a secondary school, and the university. Staff from the teachers college also became involved with the project.

The project was initially to supply computing skills to the Samoan organisers, but for a variety of reasons this part of the project was delayed. In the end some computers and printers were supplied to the Curriculum Development Unit and two CDU personnel came to Darwin to receive tuition for about a month. There was a planning component to the program and this was I believe delivered successfully. The project also supplied a science van, so that science equipment could be demonstrated at different schools. However the usage of this vehicle was evidently insufficiently well controlled, so it was used more generally within the Ministry of Education.

Perhaps one of the more surprising omissions from the project which tried to cover all curriculum areas was agriculture and there does currently appear to be a move within the Ministry of Education to reinstate the role of agriculture in schools. Evidently it is still being taught in ten Junior Secondary Schools, (Fuata'i, 1993).

The first visit was planned to find out about the curriculum, to receive advice about the teaching of the curriculum from the subject advisory committee, to get to know our Samoan counterparts, and to plan and start writing the four inservices. In science, we thus started with meetings of an advisory committee made up of Samoan science teachers. The meetings were held from 24/9/91 to 27/9/91 starting at 8 am, taking a shortened lunch break and finishing at 3.30 pm. In general they were business-like and constructive, with members contributing well.

Here again, I will relate my experiences in science perhaps as being typical of other subject areas too. As a visitor I learned a lot about the situation in Junior Secondary Schools during these sessions. The team also visited two schools to see the curriculum in action and these visits were also useful in getting some idea of what sort of teaching situation to expect. As a result of this experience in discussion with my counterpart, I developed a plan of action for the writing of inservice materials and the organisation of the inservice.

The counterpart situation perhaps needs some explanation. As in most projects of this type, the training of a national counterpart is seen as a "sine qua non" for the sustainability of the project. Some subject areas had counterpart staff, usually CDU organisers, whilst in other subject areas there were no counterparts. This was complicated by the fact that over the three year project life, some consultants and organisers became unavailable for one reason or another. In the case of environmental science, there has not been a full-time permanent counterpart. The Chief Education Officer at the CDU has acted as science counterpart in

parallel with his other duties. He has written a lot of materials and has taught much of the inservice, but in the end, much of this is his own generosity and professionalism, rather than a continuing plan to organise the teaching of science in Samoan secondary schools. There was a science organiser appointed in the middle of the project but he quickly obtained a scholarship to undertake a first degree in Australia. His departure did not leave his position vacant, so no science counterpart was appointed during the project, which meant that in project terms environmental science was not considered sustainable. In most subjects there were also additional trainers. In science the primary science lecturer from the teachers college and a teacher from a local school were additional trainers.

THE INSERVICE MANUALS

A major task in each subject area was to write inservice manuals. The task of writing the manual was to have been a joint team task with the writing divided between the consultant, the organiser and the trainer. The reality varied from subject to subject. In science the chief education officer made a significant contribution to the task. Using the advice from the advisory committee I constructed an inservice program with the features below.

Practical Work: Practical session to be the first session daily to indicate its importance. Practical sessions in fun-in-science and in each of the individual sciences.

Theory Sessions: Science theory in each of the sciences to upgrade teacher's content knowledge relevant to the units.

Linkage Sessions: These are called overview, links or evaluation and attempt to familiarise all teachers with all units and the links between them.

Methodology Sessions: These look at a variety of methodologies including small group work. Also included is a series of talks on the scientific units used in the empirical and quantitative sciences.

Field Trips: It is our aim to have two field trips or visits from outside speakers per two week inservice unit. This may have financial implications. It should include ways of organising field trips.

Assessment Sessions: These are a minimum of two sessions per inservice block organised by the assessment consultant.

The appendix shows the titles of units and the links between units in the environmental science curriculum. The task for our team was to inservice Western Samoan secondary teachers in the curriculum as it was and not to alter it in any major way.

Using the criteria/headings I constructed all four inservice programs. Generally the first one and a half hour session was practical. The next one and a half hour session was theory relating to the practical or the unit from which the practical was taken. The two hour long sessions after the lunch break were a mixture of assessment, methods, linkage and field trips. However in practice there has been considerable variation from the timetable in the light of local circumstances. In writing the inservice booklet I did add a lot of extra information. This was deliberate as I feel that it is very difficult for Samoan teachers to get information about science. Usually there are no books in schools except free ones from

twenty years ago. Even for those living in Apia the supply of books and journals is very limited.

THE TEACHERS' INSERVICE

The first inservice was due to start in January 1992. However in December Cyclone Val struck to even more devastating effect than its predecessor Cyclone Ofa, which had eighteen months previously wreaked considerable havoc. The trip was to be cancelled, but instead of cancellation its purpose was changed to spending more time writing inservice materials. Whole schools had been ruined, so it is doubtful if any inservice could have been successful whilst people were clearing up the wreckage.

The first inservice was in May 1992, so I met the teachers for the first time then. The plan was to give the first inservice for Environmental Science and Commercial Studies, Home Economics and Industrial Arts plus Samoan in Apia on Upolu island. At the same time the first inservices for English, Mathematics and Social Science would be given on Savaii. In September 1992 the situation would be reversed for the core subjects and the inservices repeated for different groups.

In the first inservice I constructed and gave out a questionnaire that asked the participating teachers about their training, experience and particular areas of worry about the curriculum, both for themselves and their students, and I gave out a similar, but modified questionnaire during the last inservice for both groups. I can see from the answers given that teachers generally were far happier about teaching the science curriculum than they were at the start of the program. The numbers in the groups were small and there were significant numbers of dropouts, so I doubt if I will be able to claim statistical validity for the results.

The inservices have generally gone well in all subjects. In environmental science I can state that all participants who have attended the complete course of four inservices will have covered both theoretically and practically the full Western Samoan environmental science curriculum plus additional material in underlying theory, practical skills to allow them to make some low cost equipment, plus a variety of teaching methodologies.

EXAMINATIONS

My colleague, Peter Varghese, is Chief Examiner for science and usually sets and marks the papers. The papers, which he set over the three years I have visited Samoa seem approximately consistent in standard and also seem to cover, at an appropriate level, the curriculum material that students have been exposed to between Years 9 and 11. The students are given grades that represent how well they have done in comparison with other students and these grades appear unexceptionable. However, in order to help teachers understand the real performance of their students, the chief examiner for science published the actual results in terms of marks scored out of 100 in a local teachers' journal (Varghese, 1994). The results given are for the 1993 examination and in the examiner's opinion the results are not dissimilar to previous years. These indicate a very low understanding of science by Year 11 students. The top mark was 78%; 1% of students scored above 60%; a total of 4.26 % of students scored above 50%; there were a total of 2665 candidates; the average mark was just below 30%. One should also point out that part of the examination was multiple choice which tends to increase scores. How can this poor performance be explained?

Firstly I expect I will have a difficult task in convincing Australian comparative educationalists that examinations have any meaning or importance. Within Western Samoa, however, examinations have become entrenched in the system, and I believe that they have an important message for anyone studying the system, though the results are presented in a way that disguises the mismatches that are present.

The most obvious mismatch is with language. The national language is Samoan, but the examinations are in English. The language of instruction is officially English, but anecdotal evidence suggests that this is not the case in practice. The examiner's comment was "The English used by the candidates was mostly incomprehensible" (Varghese, 1994).

The second mismatch would be the scientific understanding of the teachers who are teaching science. That is the mismatch that our project was designed to address. Even though the project was small, the system is small too, so that there is a real opportunity to make a difference in the quality of teaching in one's subject area. Perhaps a third of all Samoan science teachers completed our course. About half our participants were former primary teachers and some of these learnt a lot, but a few did not really have sufficient background to improve significantly. Others were moved back to primary or have been given subjects other than science to teach. Over the three year project a few left teaching or moved. Nonetheless the project should make a difference to the Year 11 examination results, even if only a minor one, but no improvement is visible yet.

The third mismatch is having a practical curriculum in a country where many schools do not have laboratories and have very little science equipment. The course emphasised using locally purchased and discarded materials for experiments to lower costs, but this is only a partial solution. The earlier project provided some equipment, but in the schools I visited only part of this was still available. Our own project provided equipment for schools (A\$5000) per school to be used for all subjects. The equipment was being supplied to schools just as the project was finishing. In addition the Australian High Commission in Apia has taken two initiatives which I applaud. They have agreed to pay for internal gas fittings for each secondary school to any school room designated a laboratory, but the school will have to purchase the bottled gas. They have also agreed to help fund a Ministry of Education store of equipment, ready for local purchase by schools. The first of these projects is already under way.

From the point of view of the students, they are asked questions about experiments they probably have not seen, in a language in which their understanding is limited and these experiments may have been explained to them by teachers whose own understanding of science is limited. Poor results in these circumstances may not be entirely surprising, but the steps taken so far should improve results. However the question of language is one which the Samoan government has to decide.

WIDER ISSUES AND CONCLUSION

Aid projects are supposed to give benefits to the recipients of aid and with each and every aid project perhaps we should ask the question "To whose benefit is this project?". The old and simple answer was that it was entirely for the country receiving aid. Now the issues are more complex and there are a variety of beneficiaries.

In the Western Samoan Secondary Teacher Development Project, which is probably similar to other projects, the consultants were rewarded, but differentially between University and

Department of Education employees; the University took a percentage of this as did IPMU. Some projects involve consultants staying in-country whilst others like ours only involve short stays. Our project involved three journeys to Samoa each year, so that costs of travel agents, air-lines and hotels have to be added. However costs of permanent housing for consultants and families and perhaps school fees and insurance, needed for long stay in-country projects are eliminated. There are thus definite cost advantages and disadvantages for each type of project but each sort of project also carries its own sort of risk and limits on its effectiveness. Government agencies like AIDAB will try to ensure that as much aid money as possible is recycled to Australia. Agencies like IPMU have to make a profit to be in a position to bid for other contracts. And the recipients of the aid also want benefits. The project did try to provide the Samoan Ministry of Education, the government schools, the mission schools, CDU staff, trainers and the teachers with benefits. These were achieved to some extent though participants in the inservice were dissatisfied with the allowances paid and initially with the financial arrangements for morning tea. (It may seem strange to mention this, but I believe in our project this single question caused more debate than any other issue.)

Each of the parties in these arrangements do receive benefits. The overall beneficiaries should be the secondary students of Western Samoa as the project should improve the quality of their education. I am not sure that this will be a result for which evidence can be provided. The teachers have received certificates to signify the real knowledge gains made, yet it is doubtful if these will be recognised for greater pay. CDU staff, trainers and consultants will have received some financial reward. However I suspect that in the end that most of those involved will have made lasting friendships and will have had memorable experiences that will not appear on the accountants' balance sheet and yet be very worthwhile.

Overall I believe that the project, though not without faults achieved the major aim of explaining the Junior Secondary Environmental Science Curriculum to practising Western Samoan secondary teachers, many of whom had previously seemed to be unclear about large parts of the curriculum.

REFERENCES

- Baba, T 1986 Australian Academics in the South Seas , Mimeographed paper at 14th Annual ANZCIES Conference, Education as an International Commodity, Brisbane, Queensland (9 pages).
- Baumgarner, K. E.. (1982) *A case study of the development of science education in Western Samoa with specific reference to the development of the Western Samoa science programme Forms I & II*, Minor requirement for a Master of Arts Degree, School of Education, Macquarie University.
- Baumgart, N. (1981) Aims of Secondary Education, *Aims of Education for Western Samoa* (edited Julie Biles, Brian Low, & Mervyn Dunkley), Pacific Programs, Macquarie University, pp.27-8.
- Beeby, C. E. (1966) *The Quality of Education in Developing Countries*, Harvard University Press , Cambridge , Mass, USA.

- Cameron, J.M.R. 1991 Educational Characteristics of Western Samoa, Personal Communication, 27 April.
- CDU (Undated, 1988?) *Curriculum- Framework and scope and sequence*, Curriculum Development Unit, Education Department of Western Samoa, Apia.
- Fox, C. 1988 Conflict and Communication in Educational Development: a Case Study of a Pacific Island Country, *Higher Education: Planning and Implementation* (Editor Leonnie Cottrill), Proceedings of the 16th Annual Conference of the Australian and New Zealand Comparative and International Education Society, Canberra College of Advanced Education, 21-25 November, pp. 45-57.
- Fox, C. (1990) Approaches to Developing Creative Curriculum in the South Pacific Islands: A Cross-Cultural View, *WCCI Forum*, Vol IV, No 2, pp.154- 159.
- Fuata'i, L. (1993) An assessment of secondary education in a small island state: implications for agricultural education, *Directions*, Vol 15, No 2 (December), pp.17-27.
- Lowe, I. R. (1981) *Some Aspects of a Teacher's Role in Development-A Comparative Study of the Two Samoas*, (M. Ed Study) Centre for Comparative and International Studies in Education, La Trobe University, Melbourne.
- Tamati, P. (1981) Development of Education in Western Samoa, *Aims of Education for Western Samoa* (edited Julie Biles, Brian Low, & Mervyn Dunkley), Pacific Programs, Macquarie University, pp.1-5.
- Varghese, P. (1994) Year 11 National Examination 1993: Environmental Science: Chief Examiner's Report, *Faioga*, Vol 8 (March), pp.25-31.

**APPENDIX 1 FLOW CHART OF LINKAGES BETWEEN UNITS
WESTERN SAMOAN ENVIRONMENTAL SCIENCE CURRICULUM**

YEAR 9

YEAR 10

YEAR 11

