In the dying years of the 20th century, global change in its many facets profoundly affects people and countries worldwide. The dimensions of global change are examined broadly under four headings: socio-cultural change, technological change, economic change, and physical change.

Global change tends to be polarized between developed and developing countries. Within the Commonwealth, the inconsistencies in development goals among countries are ameliorated. The rich variety of empirical experience and analytical diversity of Commonwealth countries as presented in this volume do offer a challenge for humankind on how to aspire to a more sustainable future.







This book has stemmed from a symposium held in 1994 in Hong Kong associated with the silver jubilee celebration of the Commonwealth Geographical Bureau. The symposium was held in collaboration with The Chinese University of Hong Kong. It is a major contribution to our understanding of the powerful and pervasive forces that have recently reshaped and redirected the world and its people.

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Edited by
Yue-man Yeung

GLOBAL CHANGE AND THE COMMONWEALTH



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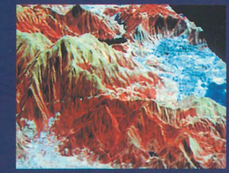
Edited by Yue-man Yeung











Yue-man Yeung is Professor of Geography and Director of the Hong Kong Institute of Asia-Pacific Studies, The Chinese University of Hong Kong. He is also currently Director of the Commonwealth Geographical Bureau. He received his Ph.D. from the University of Chicago and has published extensively, including *Pacific Asia in the 21st Century* (1993), *Guangdong* (1994) and *Emerging World Cities in Pacific Asia* (1995).

Hong Kong Institute of Asia-Pacific Studies
The Chinese University of Hong Kong

Global Change and the Commonwealth

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Edited by

Yue-man Yeung

Hong Kong Institute of Asia-Pacific Studies
The Chinese University of Hong Kong
1996

Research Monograph No. 26

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Preface

When I was elected Director of the Commonwealth Geographical Bureau (CGB) at the General Assembly of Commonwealth Geographers during the 27th International Geographical Congress held in Washington, DC in August 1992, one of the tasks expected of me was to organize a silver jubilee event to mark the 25th anniversary of the founding of the Bureau. It was with some reluctance that I decided to bring another CGB event to Hong Kong and to The Chinese University of Hong Kong after a similar workshop had been held there in December 1990. The choice of Hong Kong again as the venue for the landmark event was my confidence in raising local funding, a prospect which was fully justified by subsequent efforts.

A silver jubilee celebration is a memorable and significant milestone in any institution's history. For the CGB, its celebration would bring back personally to me long years of association with it almost from its establishment. I began my university teaching career in 1969 at the then University of Singapore, and it was Professor Robert Steel, our External Examiner in geography and then Director, who introduced me to the work of the Bureau. While working in Singapore, I took part in a CGB workshop held there in 1975, with a field excursion to Johore, Malaysia. The late Professor Charles Fisher, then the CGB Director, was a participant of the Singapore workshop. I kept in close touch with the work of the CGB as my former colleague in Singapore, Professor Ooi Jin Bee, was to become a Director, who was succeeded by Professor John Parry. I had the occasion to visit Professor Parry in Montreal as I was once a resident of Ottawa. Thus, I am personally acquainted with all the past Directors, and it would be personally meaningful to hold a special celebration in Hong Kong.

Indeed, a Silver Jubilee Symposium on the theme of Global Change and the Commonwealth was held at The Chinese University of Hong Kong on 5-7 December 1994. It was exceptionally well attended, with participants coming from all major regions of the Commonwealth. All but one member of the Committee of Management of the Bureau attended the symposium and presented papers. In fact, as Professor Steel's chapter will illuminate, many of the past officers of the Bureau as well as the present ones were present at the symposium and made important scholarly contributions.

All the papers included in this book originated from the symposium. The choice of the theme of global change is grounded on the fact that it is not only a subject which is highly significant from a policy and academic point of view, but it is one that deeply affects every part of the Commonwealth. As the papers will speak for themselves, they make original contributions to the current debate of how to grapple with what sometimes appears to be overwhelming and intractable changes in the contemporary world. The two introductory chapters are designed to construct a setting for later chapters to be better situated. In particular, Chapter 1 takes a retrospective view of the work of the Bureau and of Commonwealth geographers over the past 25 years.

The successful completion of this important project owes to the assistance, goodwill and support of many institutions and individuals. First and foremost, the generous local funding provided by the Sino Land Co., Ltd., the Lippo Group and Jardine Matheson Co., Ltd. is gratefully acknowledged. The funding raised locally in Hong Kong was generously and graciously matched by a grant from the Commonwealth Foundation, to which I wish to express again my personal gratitude. Members of the Committee of Management of the Bureau, especially Professors Denis Dwyer and John Overton, have been, as always, most supportive in every way, which has greatly helped me not just in the running of the symposium but in the discharge of my responsibilities as Director of the Bureau. I owe much to the Vice-Chancellor, Professor Charles Kao, for his dependable and unflagging support of the activities of the CGB on campus. He officiated at the opening of the symposium as well as the 1990 workshop. As a collaborative activity between the CGB and the Department of Geography and the Hong Kong Institute of Asia-Pacific Studies of The Chinese University of Hong Kong, I have enjoyed whole-hearted support from my colleagues. Preparation and

the actual running of the symposium depended heavily on an organizing committee, with members all drawn from the Department of Geography. The committee consisted of the following membership: Yue-man Yeung (Chairman), Kwan-yiu Wong (Vice-Chairman), Rupert Hodder (Secretary), Kwai-cheong Chau (Treasurer), and Wing-shing Tang (Activities Convenor). The support from colleagues in other universities in Hong Kong and the Hong Kong Institute of Planners in acting as chairmen and discussants of the papers presented is also deeply appreciated. At the Institute, secretariat, publicity and logistical support for the workshop was provided. Thanks are due especially to Janet Wong, Siu-yun Lui and Florence Hui for their contributions to the project. Janet Wong handled most of the correspondence with the authors, while Siu-yun and Florence provided most helpful assistance in research and proof-reading. Last but surely not least, I wish to register my sincere appreciation for all participants of the symposium who shared with us their expert knowledge in their contributions found in this book and joined us in our celebrations. Any remaining errors and shortcomings in presentation and representation, I should be primarily responsible.

Yue-man Yeung
September 1995

PART I

Introduction



Participants of CGB Silver Jubilee Symposium (5 December 1994)

4th row (left to right): D.A. Gilkes, I.J. Jackson, G.M. Robinson, M.J. Eden, P.E. Williams, K.C. Chau;
3rd row (left to right): R.B. Potter, A.J. Christopher, J. Leung, S. Tong, C.Y. Chang, P.J. Rimmer, Y. Leung, W.S. Tang, J. Overton, K.Y. Wong, K.C. Lam;
2nd row (left to right): R. Hodder, G.C.S. Lin, M.B.K. Darkoh, E. Steel, S.D. Cumming, B.W. Pandey, J.D. Porteous, M. Roche, J.T. Parry;
1st row (left to right): J. Ma, O. Ojo, E.A. Gyasi, Y.M. Yeung, C.K. Kao, J.P. Msangi, R.W. Steel, L. Oyebande, D.J. Dwyer, P. Pun, S.K. Lau, D.K. Y. Chu, N. Chiang.



Management Committee
Commonwealth Geographical Bureau, 1992-96

(From left) Edwin A. Gyasi (West Africa), John Overton (Secretary; Australasia and the Pacific), Y.M. Yeung (Director; East and South-East Asia), Josephine P. Msangi (East and Southern Africa), Denis J. Dwyer (Treasurer; Europe), Patrick E. Williams (The Americas).

Absent: R.B. Singh (South Asia).

CHAPTER ONE

Geography and the Commonwealth in a Changing World: A Silver Jubilee Overview

Robert W. Steel

I am honoured to be invited to give this overview at the beginning of our symposium, as the Chairman of the working party that recommended the establishment of the Bureau during the 21st Congress of the International Geographical Union held in New Delhi, India, in December 1968.

I want to begin by paying tribute to the Bureau's first Director, Professor K. Kularatnam of Sri Lanka, for to him is due the credit for the initial idea of an association of Commonwealth geographers. While studying at the Universities of Edinburgh and Sheffield in 1955, he discussed with the Geographical Association, whose headquarters are in Sheffield, the possibility of such an association. He was convinced that the interests of Commonwealth geographers could be best co-ordinated through such an association which (and here I quote his memorandum) "could publish geographical news and information and research regarding the regions within the Commonwealth."[1]

The Executive Committee of the Geographical Association took his proposals seriously and agreed to sponsor such an association and to allow their headquarters to be its office, at least in the initial stages. Within a few months, it was reported that it had already — and again I quote — "the assurance of the support of numerous distinguished geographers in various parts of the Commonwealth."[2]

There, with these pious thoughts, the matter might have rested had it not been for the persistence of Kularatnam, or K.K. as we all knew him, for his 16-letter forename most of us found very hard to pronounce — Karthigesapillai. There was also encouragement from individual ge-

ographers such as Michael Wise at the London School of Economics. A few years later, Wise secured the interest and financial support of the Commonwealth Foundation, founded in 1966 specifically to promote closer professional co-operation within the Commonwealth. The Director, John Chadwick, produced a considerable sum that made it possible for generous grants to be given to a number of geographers from different Commonwealth countries in the developing world so that there could be a much more representative group of Commonwealth geographers at the Congress in India in 1968 than at any previous Congress.

So in New Delhi in 1968, there was a fair spread of geographers, young as well as middle-aged, from many parts of the Commonwealth. Professor Wise, newly elected as a Vice-President of the International Geographical Union (he became its President from 1976 to 1980), was able to put on the agenda the possibility of an association of Commonwealth geographers; and much to my surprise, I was asked to chair a Working Party to explore the feasibility of this proposal which closely followed the lines initially suggested by Kularatnam more than ten years before.

Throughout the week of the Congress, the dozen or so geographers in the Working Party — some of you here in Hong Kong — worked very hard, despite the distractions of New Delhi and the excellent programme, both academic and social, arranged by our Indian hosts. At the end of the Congress, we produced a unanimous report recommending the formation of such an association. We were very disappointed, however, when the General Assembly, in accepting our report, asked us to come forward with specific proposals for the consideration of the next Assembly due to meet in Canada in 1972.

Why wait four years? Surely what was seen as sensible and good in 1968 did not need to wait until 1972 for implementation. Hadn't we already been definite enough in the proposals that we had made? There were arguments in the Assembly, for and against, but in the end our determination, and the conviction that we had indicated in our report, won the day — and the Commonwealth Geographical Bureau, as we came to be known, was born in New Delhi, one of the great cities of the Commonwealth, on 9 December 1968. As a consequence, we can now celebrate a 25th anniversary here in Hong Kong, another jewel in the Commonwealth crown, if I may so describe this exciting place where we are meeting this week.

In 1968, none of us could have envisaged the way in which this new baby would develop — certainly we could not have seen it being, twenty-five years on, the trusted, respected and firmly-established body that the Bureau is today. Here in Hong Kong, we have indeed something to celebrate: the coming-of-age of an institution of which all of us who have, in any way, been associated with, can be justly proud.

I was invited to be the director of the new association. However, having chaired the Working Party, I asked to be allowed to withdraw to the sidelines in view of the heavy university and other commitments that I already had. I was very pleased when Kularatnam agreed to become the first Director, with B.W. Hodder as Chairman, and J.T. Parry as Secretary-Treasurer. They, together with representatives of various Commonwealth groupings (two from Africa, two from Asia and one each from the Americas, Australasia and Europe) constituted the Committee of Management.

The first four years of the Bureau's existence, between the India Congress of 1968 and the Montreal Congress of 1972, were not easy though they were, in all the circumstances, remarkably productive. K.K. was indefatigable in his travels but many of the promises of help and co-operation from various parts of the Commonwealth made in New Delhi did not materialize. Nevertheless, within less than two years of its existence, the Bureau had successfully organized its first workshop which took place at the University of Ghana at Legon, just outside Accra, in September 1970. Some excellent papers were delivered and there were plans for their subsequent publication in a volume that I agreed to edit with the help of George Benneh. But, alas, printing costs were escalating at the time — it was before the introduction of many of the easier and cheaper printing techniques that the Bureau is now able to employ. The British publisher regretfully had to withdraw his offer, and the unpublished manuscripts still lie safely in a filing cabinet drawer in my study in Britain! The experience was somewhat typical of the many frustrations that the officers of the Bureau had to experience in those early years of the Bureau's life.

The Bureau also agreed to collaborate with the Council of the Institute of British Geographers in organizing the holding of an Indo-British seminar in India during 1971 (in fact it had to be postponed by a year to December 1972). The funds provided by the Bureau were to be used specifically to make it possible for young geographers from the Indian

sub-continent to attend the seminar, which was most successful, and has been followed in subsequent years by other seminars held alternately in India and in Britain.

For a brand new organization, this was not a bad record. It reflected very well on the enthusiasm and devotion of the officers who had achieved much despite the lack of any real financial support apart from that of the Commonwealth Foundation. But when Commonwealth geographers in general, and in considerable numbers, met during the International Geographical Congress in Montreal, Canada, in August 1972, many questions were asked. A lively meeting (which I missed because of another commitment) voiced some justifiable criticisms of the Bureau's activities and made some valuable suggestions for its future development. Some members asked for a fairer representation of the various groupings within the Commonwealth and a different, perhaps broader, type of programme. Less money, it was suggested, should be spent on meetings of the Committee of Management and more devoted to the encouragement of geographers in their travel and research, particularly the younger ones. After long discussion and debate, new officers were elected, a rather different group from those who had watched over the early years of the Bureau.

Charles Fisher, of the School of Oriental and African Studies at the University of London, agreed to be Chairman of the Bureau on the understanding that the important work of the Secretary-Treasurer would be done in his own department in London by his colleague Robert Bradnock. After the first meeting of the new Committee of Management, I was invited to become Director — a post that, after due thought and with considerable hesitation (because of the heavy university responsibilities that I had), I agreed to accept. Little did I think that for the next nine years I should remain Director!

Those years, 1972-1981, were not at all straightforward for a Bureau that was hardly off the ground as a new untried institution. We were conscious of the considerable misgivings expressed by geographers from different parts of the Commonwealth at the meeting in Montreal. Funding continued to be negligible apart from the grant so generously provided year by year by the Commonwealth Foundation. All the officers were heavily committed in their own jobs. I was a Pro-Vice-Chancellor of the University of Liverpool, as well as Professor of Geography and Head of the large and lively Department of Geography, when I first

became Director; and within less than two years, I had been appointed Principal of the University College of Swansea at the University of Wales. This full-time administrative post loosened my ties with geography and geographers — to my great regret — though it increased my knowledge of universities generally. In particular, it gave me access to universities throughout the Commonwealth (over and above those links that I already had in Africa through my long-term research interests in that continent) because I became increasingly involved with the work of the ACU, the Association of Commonwealth Universities.

My change of job and the undertaking of many new commitments and responsibilities would have mattered less had there been a solid base of administrative officers to take care of the day-to-day business of the Bureau. But in fact, it was I who continued in office while others seemed to come and go, all for very good and laudable reasons. I need not bother you with the details beyond saying that, at that time, while we had both a Director and a Chairman (the latter being Charles Fisher who was far from well and in fact, became very ill before he died in 1982), there was a single person who combined the key posts of the Secretary and the Treasurer. So when Bob Bradnock had sabbatical leave from his post in the School of Oriental and African Studies to undertake research in India, we had to find a willing person to take over his onerous tasks. We were very fortunate that Denis Dwyer was persuaded (very largely by me, and I take the credit for this idea) to accept nomination to serve for the period of Bob's absence as Secretary-Treasurer. Many years later, in 1994, we still have him as our Treasurer. With his experience of the Bureau, its problems as well as its potentialities, our finances could not be in better hands, bringing to the work of the Bureau his wide university experience based on two spells here in Hong Kong and his work in the relatively young British University of Keele.

In 1976, the posts of Director and Chairman were combined at Charles Fisher's request. Three years later, the Secretary's job was separated from that of Treasurer. That has remained the pattern ever since, and it seems to work. Michael Eden became Treasurer in 1979, and he remained in that office until 1990.

Interestingly, all of these officers had overseas research interest, mainly within the Commonwealth: Fisher in South-East Asia, myself in Africa, Bradnock in India, Dwyer in the Far East, and Eden in Latin America. They were, of course, all based in Britain. This meant that the

Bureau was being run, in large measure, by geographers in Britain — the very last thing that we wanted to happen in a newly-created Commonwealth institution. At the time, though, it seemed inevitable; and it had, of course, the effect of reducing our expenditure on administration very considerably. Meetings were normally held in London, usually when officers were going to be there for other reasons so that the cost of travel was negligible; and contact by telephone was relatively easy and cheap. But it made it more important than ever that there should be regular meetings of geographers generally in countries other than Britain. Considering the financial and other constraints under which the Bureau was operating at that time, we did, I suggest, reasonably well.

Plans for a symposium for Southeast Asia to be held in Kuala Lumpur, Malaysia, in December 1974 were scuppered by campus disturbances there, but we managed to re-arrange the meeting a few months later when we were able to meet, still in Southeast Asia, at the University of Singapore. Less than two years later, there was a meeting for East and Central Africa in Tanzania, at the University of Dar es Salaam. That workshop was indeed run on a shoe-string and some of our delegates' experiences in student accommodation in halls of residence were both trying and tiring. Yet once again, a good time was shared by all. Several of the papers presented appeared later in the *East African Geographical Review* which was published by Makerere University in Uganda and which received a grant from the Bureau. The Bureau's next regional conference, for Latin America including the Caribbean, was based in Guyana at the University of Guyana. On this occasion, we worked in close association with the Commonwealth Human Ecology Council (CHEC), on whose governing body I was serving at the time. In a small way, it was an early sign of what we are all being encouraged to do today, especially by the Commonwealth Foundation — to foster the development of inter-disciplinary investigations and the forging of links between the different Commonwealth associations supported by the Foundation and covering a very wide range of academic disciplines and professional interests.

But, despite the undoubted success of these regional conferences, which helped so much to widen an appreciation of what the Bureau was seeking to do and what it could achieve if given the necessary support, in terms of finance and personnel, the Management Committee felt that the time was ripe for the encouragement of a new type of activity. To

this end, a very wide topic, "National Resources of the Third World," was selected and a workshop planned. The new Secretary, Garth Cant of the University of Christchurch, New Zealand, who had succeeded Denis Dwyer in 1979, worked very purposively with Ooi Jin Bee of Singapore, who had agreed to play a co-ordinating role in the conference. The conference was held in my own College in Swansea in South Wales in April 1981. It was the venue that I had particularly wanted so that I could be both host and director before ceasing to be Director. In the event, however, I was ill at the time of the workshop, convalescing in my own home from pneumonia that had developed after a visit to Hong Kong, and then to China, with the Association of Commonwealth Universities. From all accounts, it was a very happy and successful conference, though all that I saw of it were some very short bedside visits by some of my special friends who took time off to come to see me. From the conference came the splendid volume that Ooi Jin Bee edited, *Natural Resources in Tropical Countries*, published in 1983 by the Singapore University Press with grants from the Commonwealth Foundation and the United Nations University.[3]

That volume was dedicated to me as Director of the Bureau from 1972 to 1981. I had thought that it represented my last direct link with the Bureau until I received, a few months ago, the warm invitation of the Officers to attend this Silver Jubilee celebration in Hong Kong and to present an overview of twenty-five years of highly successful and positive activities. I shall not dwell for too much on the recent years as time is limited, and I also need to try to assess the Bureau's role in Commonwealth affairs in 1994 and in the years ahead of us. During this Swansea workshop, Ooi Jin Bee succeeded me as Director, and occupied that office with distinction until 1984. Not only did he edit the conference's papers in a book that was very well received by geographers and others, but he also presided over the Bureau in a period when the scope of its work and the range of its activities widened very considerably. In a sense the Bureau, though only thirteen years old, had come of age. It was better known and more widely respected both for its actual achievements and its considerable potentialities.

Ooi Jin Bee was followed by a Director from Canada, John Parry of McGill University. John had been a keen supporter of the Bureau from the beginning, having served as Secretary-Treasurer between 1968 and 1972. Perhaps at this point I may be allowed to mention that Jin Bee had

been a doctoral student of mine in Oxford in the mid-1950s whereas John was the outstanding student of the last year when I was still teaching at Oxford, prior to going to Liverpool for the John Rankin Chair of Geography. So I have always felt particularly close to them and have taken special pride in their achievements — in the geographical world at large and in the Commonwealth Geographical Bureau in particular.

Under the leadership of these two Directors and our present Director, Yue-man Yeung, there was a tremendous increase in the Bureau's activities throughout the 1980s. I am deliberately not dwelling on the details — some of the essential information is consolidated in Table 1.1 showing who the officers were in different years. I was not directly involved in any of the workshops, seminars or other meetings since I was no longer an officer of the Bureau. Increasingly I was committed to university administration in Britain and overseas, as Vice-Chancellor of the University of Wales from 1979 to 1981. Then in 1982, I retired from the Principalship of the University College of Swansea. However, while I have seen little of the Bureau's activities at close quarters in recent years, many of you in my audience today have been directly involved and you know far more about them than I do.

The satisfying feature of the Bureau's activities during the last decade or more has been the diversity of topics discussed. Similarly, there has been an increasing variety of venues, although it is interesting to read in the report of the Bureau's Workshop on "Geography and Development in Pacific Asia in the 21st Century," held here at The Chinese University almost exactly four years ago, the first time the Bureau had chosen Hong Kong as a venue for a workshop! Clearly due note was taken of this which has ignored Hong Kong until 1990. In addition, in 1992, by our wisdom, Yue-man Yeung was chosen our new Director; and to the same University campus we came again for our current celebrations. Nevertheless, it is good to move around. The extent to which this has happened over twenty-five years will be apparent from the map of the distribution of our chosen venues (Figure 1.1). It is naturally what should be expected of a Commonwealth that ranges over all the continents.

Table 1.1 Commonwealth Geographical Bureau: Officers, 1968-1995

	Director	Chairman	Secretary-Treasurer	
1968	K. Kularatnam	B.W. Hodder	J.T. Parry	
1969	"	"	"	
1970	"	"	"	
1971	"	"	"	
1972	R.W. Steel	C.A. Fisher	R.W. Bradnock	
1973	"	"	"	
1974	"	"	"	
1975	"	"	"	
1976	"	"	"	
	Director			
1977	R.W. Steel		D.J. Dwyer (acting)	
1978	"		"	
			Secretary	**Treasurer**
1979	"		R.G. Cant	M.J. Eden
1980	"		"	"
1981	Ooi Jin Bee		"	"
1982	"		"	"
1983	"		"	"
1984	J.T. Parry		P.P. Courtenay	"
1985	"		"	"
1986	"		"	"
1987	"		"	"
1988	"		"	"
1989	"		"	"
1990	"		"	"
1991	"		"	D.J. Dwyer
1992	Yue-man Yeung		J. Overton	"
1993	"		"	"
1994	"		"	"
1995	"		"	"

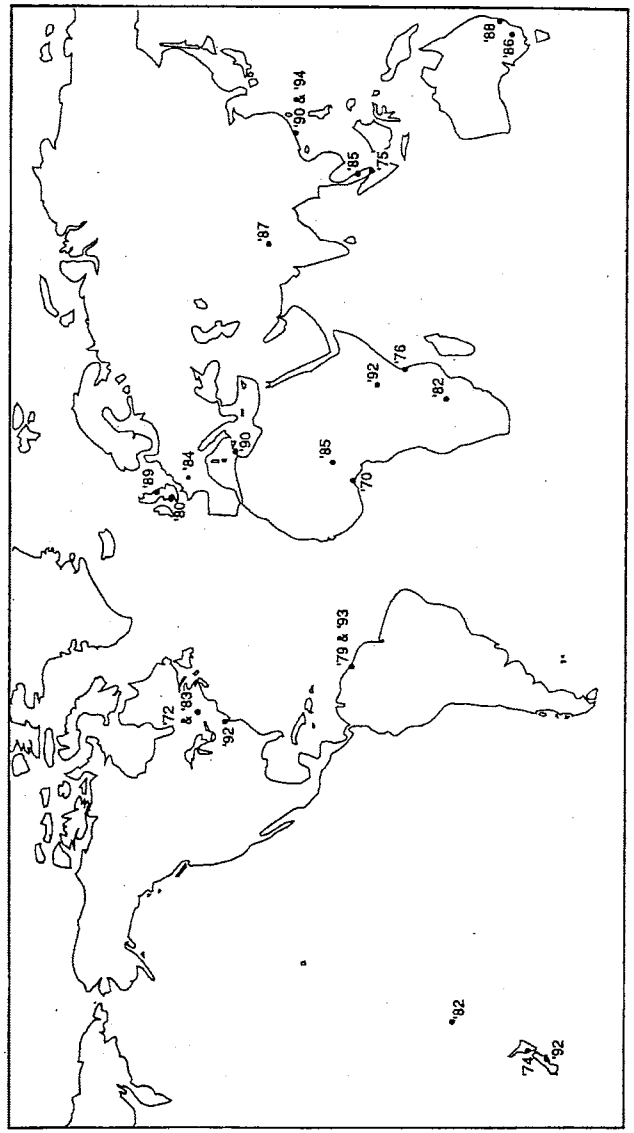


Figure 1.1 CGB Conference/Workshop Venues over Time

Another significant change to be noted is the decision taken in recent years and described by the then Director, John Parry: "Although our present series of Workshops has been very successful" (that, I may say, in parenthesis, is a very good and deserved summary of all our workshops), it has been decided (Professor Parry continues) "that tutorial type Workshops focusing on techniques and applications could be particularly valuable for younger Commonwealth geographers."[4]

Very understandably, the Bureau's constitution has been modified to take note of changed circumstances and emerging needs. The first Committee of Management drew up a set of rules in Ghana in September 1970 but these were later modified, particularly by the General Assembly of Commonwealth Geographers in Paris in 1984.[5] As already noted, the posts of Director and Chairman had been combined in 1976, while the post of Secretary-Treasurer was divided in 1979; and regional representation was assured by a clause that the committee should have a representative from each of the following:

East and southern Africa
West Africa
The Americas
South Asia
East and Southeast Asia
Australasia and the Pacific
Europe

At all times, efforts have been made to ensure not only a wide spread of geographical involvement but also that a maximum proportion of the available funding should be used to support activities and a minimum absorbed in administrative expenses.

There has also been a conscious effort to spread the officers throughout the Commonwealth. The Directors have come from Sri Lanka, Britain, Singapore, Canada and now Hong Kong (Table 1.1). The Secretaryship has been held in recent years in New Zealand by Garth Cant of Christchurch and in Australia by Philip Courtenay of the James Cook University of North Queensland (where he is now Rector of the Cairns Campus in that university); and our present Secretary, John Overton, is from Christchurch, New Zealand. The Treasurership has remained in Britain, where close contact with the Commonwealth Foun-

dation is so vital to the financial health of the Bureau. Michael Eden, who became Treasurer when the post of Secretary and Treasurer were separated (in 1979), held that office until 1990 when he was succeeded by Denis Dwyer who had been acting Secretary-Treasurer many years before and who has consistently been such a whole-hearted supporter of the Commonwealth ideals behind the Bureau.

During recent years, the Bureau has come to be increasingly recognized by other bodies as having a specific role to play in the development and extension of our subject. There has always been close understanding between the Bureau and the International Geographical Union (IGU) — hardly surprising in that its birth, if not its conception, took place during the International Geographical Congress in India in 1968; and the first meeting of the Bureau's potential membership — geographers from all parts of the Commonwealth — took place during the Congress of 1972 in Canada. For constitutional reasons — now happily resolved — it was not possible for the Committee of Management to convene Assemblies of Commonwealth Geographers in Moscow in 1976 and in Tokyo in 1980. But the General Assembly of Commonwealth Geographers, as it has come to be called, now forms an integral part of the IGU in all its quadrennial congresses. At one of these in Sydney, Australia, in 1988, the twentieth anniversary of the Commonwealth Geographical Bureau was noted. I was not present, but perhaps I may quote from a letter that I had written a few days before to the Director, John Parry, for in it I expressed many of the sentiments that I also feel at this 25th celebration. "What is so impressive about the Bureau today," I wrote, "is the tremendous range of its activities and the international and world-wide dimension of its work." "The officers," I continued, "have in recent years achieved wonders, all these in a time when finance has been far from easy to come by.... We can be very satisfied with the progress over the past twenty years... the first two decades of what I am sure is just the beginning of a long and distinguished history of a unique institution in the world of geography."[6]

I can say that same in 1994 as I wrote in 1988, and you would, I know, all agree, as you would with what the Director said, according to the Minutes of that meeting in Sydney. After commenting on the financial constraints under which the Bureau operated, and the consequent limited range of its activities, he went on to stress "the Bureau's important role in providing stimulating, interactive settings for communication between geographers from different parts of the Commonwealth and the interlayering of expertise and experience that its workshops permit." And The Chinese University of Hong Kong in December 1994 is yet another "stimulating and interactive setting" for our present symposium.

I have referred previously to the Bureau's co-operation with the Institute of British Geographers (IBG) in launching the first Indo-British seminar in 1972 which led on to a whole series of highly successful meetings between representatives of two of the largest groups of geographers in the Commonwealth. The Royal Geographical Society (RGS), also based in London, has also worked closely with the Bureau on occasions — notably in the implementation of the Commonwealth Geographical Bursaries' scheme in 1980 initiated by the Commonwealth Foundation to mark the 150th anniversary of the RGS. Much of the trawling to find suitable applicants was done by the Bureau through its regional representation, whilst the administrative work was undertaken by the RGS.[7]

The IBG and the RGS are just examples of the kind of collaboration that the Bureau has engaged in over the years. Wherever the Bureau has mounted a workshop or arranged a conference, it has always been in the closest possible co-operation with national or regional organizations. Arrangements have often been made subsequently for the publication of papers in the journals of the host country. Funds have also been forthcoming from organizations such as the United Nations University, centred in Japan, and grant-giving bodies such as the Canadian International Development Agency.

The Bureau's officers have from the beginning done all they could to support what the Commonwealth Foundation has always strongly urged — close collaboration between different Commonwealth professional associations. Hence, as already mentioned, that resulted in the co-operation with the Commonwealth Human Ecology Council when both it and the Bureau met, more or less simultaneously and not by chance but by design, in Guyana in 1979. Geographers have, after all, a long-standing awareness of multi-disciplinary activity, and we are sometimes surprised that other disciplines and professions have been so slow to appreciate the strength of geography both in research and in its contribution to the solution of many problems. Indeed, perhaps we have a special role to play in the breaking down of the compartmentalization

of knowledge commonly produced by traditional discipline-based departments, and the Bureau supports the Commonwealth Foundation whole-heartedly in its efforts to foster co-operation between professional bodies and associations.

You must have noted how often the Commonwealth Foundation has been cited in my overview, and it would indeed be impossible to overstress the significance of its support and encouragement given to the Bureau over a quarter of a century. Universities have helped the Bureau, directly and indirectly, whenever appropriate, though their funding has been very adversely affected by recession and the general economic situation in recent years. There are also many examples of sponsorship from the private sector, often for specific purposes, such as the organizational costs of a conference or the subsidizing of a publication. But the devoted work of our officers could never have achieved anything like what it has without the cushion provided, year after year, by the Commonwealth Foundation. This body, based in London, was established in 1966 following a decision of the Commonwealth Heads of Government at their meeting in London in 1965, "to promote closer professional co-operation within the Commonwealth." It has a special link with more than twenty professional associations (of which the Bureau is one) and a number of professional centres.

The Foundation has always listened sympathetically to our needs and responded as generously as it could to our requests, and has been most helpful in the giving of advice based very often on the experiences of kindred bodies among the host of Commonwealth bodies and associations that the Foundation helps. From my years as Director, I recall with much pleasure the welcome we invariably received in the splendid surroundings of Marlborough House, just off Piccadilly and not far from The Mall and St. James's Palace, when as officers of the Bureau we went, cap in hand, to see successive Directors of the Foundation to discuss our problems, review our objectives and revise our priorities. I know this has continued to be the experience of our officers, particularly the Treasurer, and it is no doubt a very wise decision that that particular post should normally, though not necessarily always, be occupied by someone living in Great Britain.

There is no doubt that the influence of the Commonwealth Foundation on the work of professional organizations throughout the Commonwealth will increase markedly in the future following on a

Conference of Commonwealth Professionals held in Sydney, Australia, in 1990. Nearly eight members of professional bodies were present, and much thought was given to the human resources of the Commonwealth, the importance of communication and networking, and the organization and structure of professional organizations. My comments on the report of their recommendations are given in full in our newsletter, No. 17.[8]

Our newsletters are an invaluable, indeed vital, means of maintaining contact between the very scattered community of Commonwealth geographers. I want to pay tribute here to all who have contributed over the years to the newsletters and, in particular, to successive Secretaries who have kept us informed of the Bureau's activities, year after year, by the regular publication of the newsletter. Beginning with No. 1, in 1972, they have been produced ever since more or less annually so that the latest, 1994, is No. 20. In preparing this overview, I must have read almost every word of every issue. What an impressive tale they tell, bearing in mind the small beginnings, the scattered nature of the membership, the world-wide distribution of the Board of Management — and the well-known fact that academics are not always particularly good correspondents or very prompt in their response to requests for information! The newsletters provide a remarkable record of activity and achievement, and their regular appearance and very considerable coverage reflects very well on the assiduity of our Secretary-Treasurers and Secretaries over the years. One can but hope that they have been as widely circulated and as carefully read as they deserve to be. It would, of course, be far too expensive to send a copy to every university geographer in every Commonwealth country. This indeed is why there has never been "membership" of the CGB in the ordinary sense of the term. Two copies are sent, I believe, to every identified department of geography, with one copy specifically endorsed, "Please circulate to all staff." The Bureau's Secretary has, on more than one occasion, urged readers to ensure that this is done. However, as Philip Courtenay wrote in the 1986 issue, "you would be surprised to learn how many geographers are still unaware of the existence of the Bureau!"[9]

So much for my overview of twenty-five years of the Commonwealth Geographical Bureau. Let me now try to see both the Bureau and the Commonwealth in this rapidly and constantly changing world in the

context of the theme chosen by the organizers of our conference, "Global Change and the Commonwealth."

Geography is changing, and changing very rapidly, as we all know. As one who graduated in the Honour School of Geography at the University of Oxford as long ago as 1937 — fifty-seven years ago — I am especially conscious of this. But the significance of geography today (however we understand it) is as great as it ever was, and our successive regional conferences and specific workshops have underlined this again and again during the twenty-five years of our existence. No-one today challenges the importance of geography in our understanding of the affairs of contemporary society, and in the coming sessions, you will be considering its role, its contribution and its potential under the four suggested sub-themes — physical change, technological change, economic change and socio-cultural change.

Then, how are global changes affecting the Commonwealth, and, thereby, the work of an association such as ours? Like everything else in the modern world, things are changing rapidly. Though often for good, this is by no means always the case. The Commonwealth in 1994 is very different from the British Empire of, say, sixty years ago, in 1934. That was the year in which I became an undergraduate and in the previous year the late Professor C.B. Fawcett had published his book, *A Political Geography of the British Empire* — a work that none of you consults today but a standard text during my student days.[10] Fawcett wrote "in all its magnitude, its distribution, and its internal variety, the present British Empire is the greatest experiment in human organization that this world has yet seen" (page 1). It had unparalleled variety that made the Empire (and again I quote) "a unique laboratory of political and social organizations" (page 9). Over sixty years, however, there have been tremendous changes. The British Empire no longer exists. The Commonwealth assuredly does. It has adapted itself to new political, economic and social circumstances and, by and large, shown a remarkable ability to be flexible. Whatever some of us may feel about the Commonwealth at times, the fact remains that membership of the Commonwealth does appear to be valued in many parts of the world. Witness, for example, the return of Pakistan — which had left the Commonwealth in 1972 — to the Commonwealth in 1989 and, more recently, the welcome given to the new South Africa when it was re-admitted to Commonwealth membership in 1994. The advantages of membership may be intangible and

not easily quantified. Nevertheless, to quote a former Secretary of the Bureau who wrote in the 1986 newsletter: "... What would be lost if this diverse group of nations were to lose its formal links?" It would be "generally agreed that any weakening of the links between geographers in the nations of the Commonwealth would be to the disadvantage of the more and of the less developed member countries alike."[11]

Concise official description of the Commonwealth is that it is "a free association of fifty sovereign independent states together with their associated states and dependencies." Her Majesty Queen Elizabeth II is recognized as the Head of the Commonwealth, though of the fifty member states, only sixteen have the Queen as head of state; twenty-nine are republics, and five are indigenous monarchies. Some cover huge areas, such as Australia and Canada, alongside much smaller territories, such as some of the Caribbean islands or Swaziland or Brunei. The number of "colonies" in the old sense of the term is very small, though they include, of course, Hong Kong (at least until 1997).

The Colonial Office in London, a hub of activity and a mine of information in the days when I began my research in tropical Africa many years ago, no longer exists. Many of its functions are now exercised by the Foreign and Commonwealth Office. The sources of information are, today, as often as not in the high commission offices and consulates scattered throughout London and other parts of Britain. Another significant change is the transformation of the Imperial Institute of my undergraduate years into the Commonwealth Institute with a much greater range of activities.

There have also been some brand-new developments to take account of changing circumstances and new opportunities. The most obvious from our point of view is undoubtedly the establishment of the Commonwealth Foundation, our great benefactor, in 1966. Then, of almost equal significance is the development of the Association of Commonwealth Universities. What is distinctive about universities in the Commonwealth? No-one seems to know, least of all when all their representatives gather together for their regular conferences. Yet, as I know from personal experience, there is so much to be gained from these periodical get-togethers. I think back to Edinburgh, Scotland, in 1973; Wellington, New Zealand, in 1976; London, Ontario, and Vancouver, British Columbia, in 1978; Hong Kong in 1981; Birmingham in 1983; and Swansea in 1993. I was privileged to be present at all these conferen-

ces, and I gained a great deal from my experiences in four different continents. In each, the several hundred representatives had very diverse backgrounds, widely differing university systems, very varied types of funding, and even contrasting administrative structures. Nevertheless, there always seemed the same focus of interest and concern, a conscious set of purposes and objectives. Something that is indefinable, intangible, and yet very real and living — and I do not believe that it was all because English was a common tongue for the majority of the delegates.

These conferences convinced me that the Commonwealth remains a very real and effective concept, changing yet still very dynamic and potentially a most effective influence in this changing world in the last decade of the twentieth century. It is vibrant and vital, and despite everything it still works. As recently as October 1991, the heads of government meeting in Zimbabwe set out new goals for the Commonwealth in what has come to be known as the Harare Declaration. The goals include the promotion of the Commonwealth's fundamental political values, such as democracy, the rule of law, good government and human rights; the promotion of equality for women; the provision of universal access to education; the promotion of sustainable development and the alleviation of poverty; actions against disease and illegal drugs; help for small Commonwealth states; and support of the United Nations in the quest for international consensus on key issues.

No-one surely dissents from these highly laudable goals as expressed in Harare. We may not go all the way with the quip that if the Commonwealth did not exist, it would have to be invented. But you would all approve of what a former Chairman of the Bureau, Charles Fisher, wrote in one of our first newsletter, in 1974. "... geographers in all Commonwealth countries can surely agree that, since the Commonwealth does exist, it is sound sense to make the most of the opportunities which it affords for the advancement of their subject."[12]

The Commonwealth continues to evolve, to change within itself, in order to meet new situations and challenges — rather as our own discipline has over the years responded to new insights, new methods and new demands. But what of the Committee's external contacts in this world of rapid change, political and technological?

I am not going to try to pronounce on these matters but mention them as they occur to me. I shall leave them with you, as unanswered

(and sometimes unanswerable) questions. Let me begin with a reference to the consequences of the break-up of the USSR and the collapse or dismantling of communism. The end of the so-called Cold War, and its consequences in terms of defence spending and trade links, has a major influence on all of us, wherever we live, and whether or not there is a so-called "peace dividend." In an ideal world, these events could have a tremendous effect on, for example, the availability of financial aid and technical assistance to many parts of the developing world. In terms of global change, the outcome could be enormous and its ramifications could be, literally, world-wide.

What about the consequences of the remarkable events in southern Africa in recent years, and particularly in 1994 in the Republic of South Africa? A few days before coming to Hong Kong, I gave a memorial lecture to the Workers' Educational Association in Swansea under the title "The New South Africa — the miracle and its aftermath." That perhaps sums up what has happened in a very few months. Within a decade and a half, we have seen the emergence of a new African-dominated government in what was Southern Rhodesia, and later Rhodesia, as the independent and well-organized Zimbabwe. This showed that what has happened over one-third of a century in most countries or tropical Africa could be repeated, albeit in a different guise, in those parts of the continent where there was a significant white minority, seemingly very well entrenched, socially, economically and politically. However, even with the example of Zimbabwe before us, who could have envisaged the speed of change in the Republic of South Africa, with its much larger white population and a history of violence and inter-racial conflict? Forty years of Nationalist rule that in the eyes of many of us was barely distinguishable from the Fascism that the Second World War was supposed to obliterate, disappeared almost overnight. Unfortunately, the consequences of the inhuman policy of apartheid — in education, health, housing, employment and social relationships generally — cannot be as quickly obliterated. The aftermath of the miracle (to use again the title of my Swansea lecture) poses a daunting series of problems that the Mandela Government has to address quickly and resolutely. We wish them well in their efforts. Happily they tackle these problems in the framework of the Commonwealth, to which South Africa returned, to the satisfaction of everyone, in 1994. Let us ensure that her return is matched by the sympathy, understanding and practi-

cal help of all of us who value the Commonwealth connection. That surely includes all of us who have gathered here to celebrate the 25th anniversary of the Commonwealth Geographical Bureau.

There is a major debate ranging throughout the world — the issue of human rights. The Commonwealth is, according to the Harare Declaration of 1991, committed to the promotion of, among several other things, good government and human rights. Human rights have for many years been the burning concern of Amnesty International, and we in Britain at least have not forgotten the events of Tiananmen Square in 1989. One speaks with some hesitation on this subject and risks causing embarrassment, and even resentment. Let me say at once that we in Britain, with our present Government, are not wholly blameless in this respect. What about Malawi and, on occasions, Kenya, and at the moment the spotlight is very much up on The Gambia and Nigeria. Some commentators with long and wide experience of Commonwealth affairs have even asked whether some of these countries should be allowed to remain full members of the Commonwealth when questions of human rights are discussed at the Commonwealth summit held in November 1995. It is a reminder to us that the political situation in a world of change is very effervescent, as much in the Commonwealth as elsewhere.

This brings me to another sensitive issue on which I do not propose to dwell — the situation now and in the near future in eastern Asia. Pakistan and South Africa have rejoined the Commonwealth. Hong Kong — what of its Commonwealth connections after 1997? This must exercise greatly the minds of many of you in my audience, and none of us can afford to ignore what is likely to happen. I suggest that I am less well equipped than almost anyone else here today to analyse either the current situation or the future prospects of Hong Kong, so I shall not attempt to do so. But I naturally ask myself, how does your Governor see the future? And how do the different elements in your society view the likely developments of the next few years? And how does the Committee of Management of the Bureau envisage its future arrangements?

Perhaps, this illustrates better than anything else the influence of Global Change and the Commonwealth — the theme of our Silver Jubilee Symposium. Do we let political circumstances beyond our control lead us to the exclusion from the Commonwealth Geographical Bureau of the very important group of geographers living in this part of the world; more particularly the very people who have done so much

for us and the Bureau in making possible our symposium here in The Chinese University of Hong Kong, including in particular our remarkably active and successful Director? There is, I trust, a way out of this dilemma, though it is not for me to make suggestions. They will come, in due course, from the Committee of Management, who can look to the flexibility that has always characterized the Commonwealth to deal with tricky situations such as the one I have described.

We have gathered to celebrate the 25th anniversary of the Commonwealth Geographical Bureau at this Silver Jubilee Symposium. We are thinking of Global Change and the Commonwealth, and a range of speakers will look at our four sub-themes to underline the strengths and to highlight the complexities of our widely scattered and highly diverse Commonwealth. At the same time, they will not overlook the problems facing us, and they will point the way to solving at least some of these in the years to come. We are moving rapidly not only towards 1997 but to the beginning of a new century, the 21st — as yet unknown but potentially very exciting. We believe the Commonwealth Geographical Bureau has made a substantial contribution to the closing years of the present century. May I, on your behalf, wish the Bureau, and especially its Officers and the other members of the Committee of Management, wisdom and courage — and the best of luck — as they plan the future activities, and decide, among many other things, upon the composition of the membership of the Bureau, that has, I firmly believe, proved over the past twenty-five years, its value and its special significance within the Commonwealth.

NOTES

1. Reported in the news section, *Geography*, 40(1958), p. 287.
2. Reported in the news section, *Geography*, 41(1959), p. 67.
3. Ooi, Jin Bee (ed.) (1983). *Natural Resources in Tropical Countries*. Singapore: Singapore University Press.
4. Commonwealth Geographical Bureau (CGB), *Newsletter*, 17(1991), p. 4.
5. CGB *Newsletter*, 10(1984).
6. CGB *Newsletter*, 14(1988).
7. Reported in the Presidential Address by Lord Hunt and the record section, *Geographical Journal*, 146(1980), pp. 335, 351, 472.

8. CGB *Newsletter*, 17(1991), pp. 14-18.
9. CGB *Newsletter*, 12(1986), p. 3.
10. Fawcett, C.B. (1933). *A Political Geography of the British Empire*. London: University of London Press.
11. Courtenay, P.P., CGB *Newsletter*, 12(1986), p. 3.
12. Fisher, C.A., CGB *Newsletter*, 2(1974), p. 8.

CHAPTER TWO

Global Change: Challenges for the Commonwealth

Yue-man Yeung

Introduction

The year 1995 marked the 50th anniversary of the end of World War II and of the founding of the United Nations. During this half-century, the world has witnessed an unprecedented economic growth, a vast expansion of trade and a rapid extension of technological frontiers. For some peoples and countries, economic prosperity has dramatically raised the quality of life and allowed them freedom to pursue scientific, cultural and intellectual ventures beyond their mundane needs. Yet, some other peoples and countries have experienced a population explosion, persistent unemployment, mounting national debts and a degraded environment. The lines of division between the poor and the opulent, the hungry and the overfed, the powerful and the powerless are sharper than ever before. In fact, the World Bank's *World Development Report 1992* reported that per capita GNP had fallen in 49 countries during the 1980s. Almost all these countries were low-income, largely agrarian economies experiencing rapid population growth and extensive degradation of their forests, grasslands and croplands (Brown et al., 1993:5).

As the 20th century is rapidly drawing to a close, there has never been such a time when peoples and countries are more aware of their being part of Planet Earth. Daily the life people lead is closely intertwined with globalization processes; the air they breathe, the land they live on and the water they drink are very much subject to environmental processes that envelop the world. "Globalization" and "global change"

have become catchwords of today, as indeed they touch deeply into almost every aspect of our lives. Taylor and Taylor (1992:65) have summed up the recent changes well:

> The 20th century is witnessing yet another major societal quantum shift, one that is global in scope and transformational in intensity. A globalization of all segments... is taking place: in the discoveries of science and the invention and dissemination of new technologies; in economic markets and intercontinental exchanges of goods and services; in information networks; in population growth and demographic pressures, especially in regions of the South;... in environmental pressures and ecological degradations; in societal interdependence and cultural interactions; and everywhere in the transformation of traditional value systems and goals.

Since the 1980s, planners, decision-makers and academics have voiced their concern over the deteriorating environment. Various green non-governmental organizations (NGOs) have sprung up, and the work of organizations, such as the Worldwatch Institute, has been very useful and educational. In June 1992, 106 heads of states and governments and 35,000 people participated in the United Nations Conference on Environment and Development (UNCED) or the Earth Summit in Rio de Janeiro. Among the outcomes of this meeting was a complex action plan involving many countries called Agenda 21, but they lacked solid targets, timetables and funding which would be required to translate principles and objectives into reality. Meanwhile,

> ... the environment worldwide is in crisis. At local, regional, and global levels, key features and processes of the natural world are being damaged or obliterated. Even though human societies have, since their earliest origins, affected many kinds of environmental transformation in the course of development, nothing compares to the changes that have been wrought in recent years. Consequent awareness of critical environmental issues — atmospheric change, water pollution, unsustainable exploitation of renewable resources, deforestation, erosion, degraded carrying capacity, loss of biological diversity — has now extended well beyond academic circles into the central arena of public debate. (IDRC, 1992:16)

Although the environmental crisis is worldwide, the perception of the environment and the attendant issues are sharply divided between developed and developing countries. This diversity came to a head at the Earth Summit. Whereas industrialized nations tend to be preoccupied with issues of environmental protection, such as global warming and ozone depletion, tropical deforestation, etc., developing countries have their focus on more pressing economic concerns (Hall and Hanson, 1992:13). Indeed, "global warming and the loss of biological diversity have little meaning for people suffering daily from starvation, malnutrition, or lack of basic health care. Southern priorities, such as resource degradation, pollution and natural disasters, are immediate issues of life and death. They are issues often tied to international politics and economics. They are global problems demanding global resolution" (IDRC, 1992:jacket).

The British Commonwealth

The cleavage between developed and developing countries in their stance on development and the environment is mirrored in a group of countries loosely tied together in a network that has come to be known as the British Commonwealth. However, polarized positions are often averted in this group of nations because, among them, there is a special kind of bond.

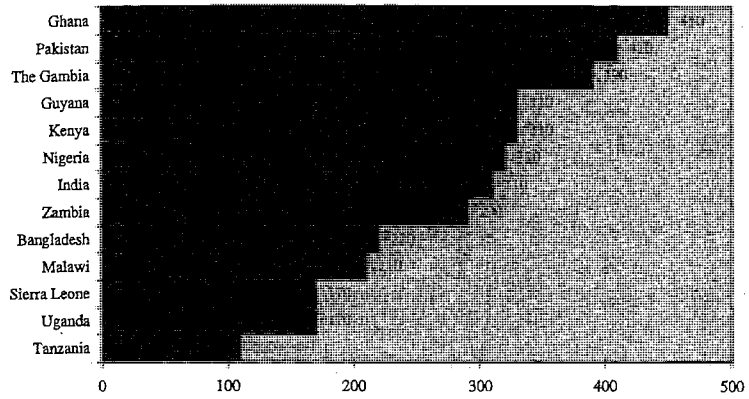
The Commonwealth is a voluntary association of independent sovereign states working together as equal partners for their common interests with no formal constitutional structure and no statutory obligations on members. Joining the organization confers upon a member certain benefits such as access to research and analysis that some members cannot afford on their own as well as a reservoir of goodwill (Bartholomew, 1989). The formation of the Commonwealth was a natural evolution triggered by the decline of the British Empire since the early 20th century; some historians have likened the death of Queen Victoria in 1901 as the beginning of the end of the British Empire. In the following period of decolonization, the Dominion and later independence status were granted one by one to the previous members of the British Empire who then received independence and bound together to form the British Commonwealth. Since then, membership has expanded

to the present 51 countries, after South Africa was readmitted in June 1994, when it repudiated its apartheid past and was reborn as a multi-racial democracy. Thus the British Empire, which once spanned the globe, has now become a voluntary and mutually beneficial association with the shared use of English, linking the countries of the richest and the poorest, the powerful and the powerless, the largest and the smallest under the name of the British Commonwealth (Meldrem, 1992).

At present, the Commonwealth constitutes almost one-third of the world's countries and accounts for approximately one-quarter of its people. One-and-a-half billion people live in Commonwealth countries which range in population size from a few thousands to several hundred million. Consequently, it is the most representative cross-section of the world community second only to the United Nations. It embraces countries and peoples widely different in size, wealth, levels of development, race, origin, culture, tradition and institutions. Figures 2.1, 2.2 and 2.3 attempt to depict the difference in economic development of Commonwealth countries in terms of their per capita GNP. At the risk of oversimplification, countries with per capita GNP over $1,000[1] are classified as more developed nations. The Commonwealth hence consists of developed and developing countries in almost equal proportion. Of concern is a group of 13 low-income countries with a per capita GNP of less than $500. They are found predominantly in Africa and South Asia.

At first sight, the diversity in income levels of Commonwealth countries appears to hinder the consolidation and operation of the association. In reality, however, "the special strength of the Commonwealth lies in the combination of the diversity of its members with their shared inheritance in language, culture and the rule of law" (Harare Commonwealth Declaration, s. 3). Despite this shared foundation, the relationship between member countries has occasionally shown strains. For instance, Malaysia's relations with Britain were at an ebb in the mid-1980s, after London raised tuition fees for all overseas students. Malaysia responded by launching a "Buy British Last" policy. Yet, it is still fair to say that the solidarity of the association has remained largely untested except in trade when, with the British entry into the European Community in 1973, the Commonwealth preference system for trade was abandoned (Aznam, 1989). Nonetheless, the Commonwealth has always continued its evolution into the present, withstanding the test of time.

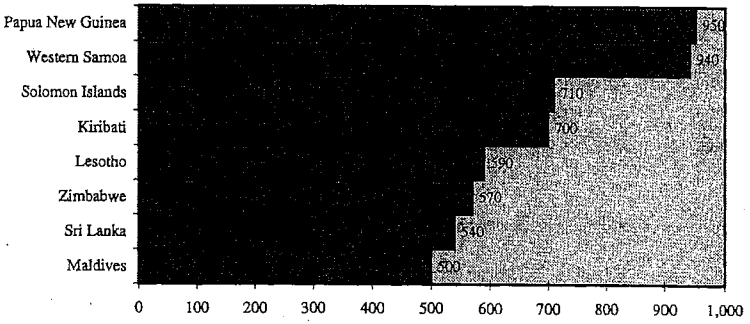
Figure 2.1 GNP Per Capita of Low-income Commonwealth Countries, 1992



Note: Low income = GNP per capita under $500 (25.5 per cent of Commonwealth countries).

Source: *The Commonwealth Yearbook 1993-94.*

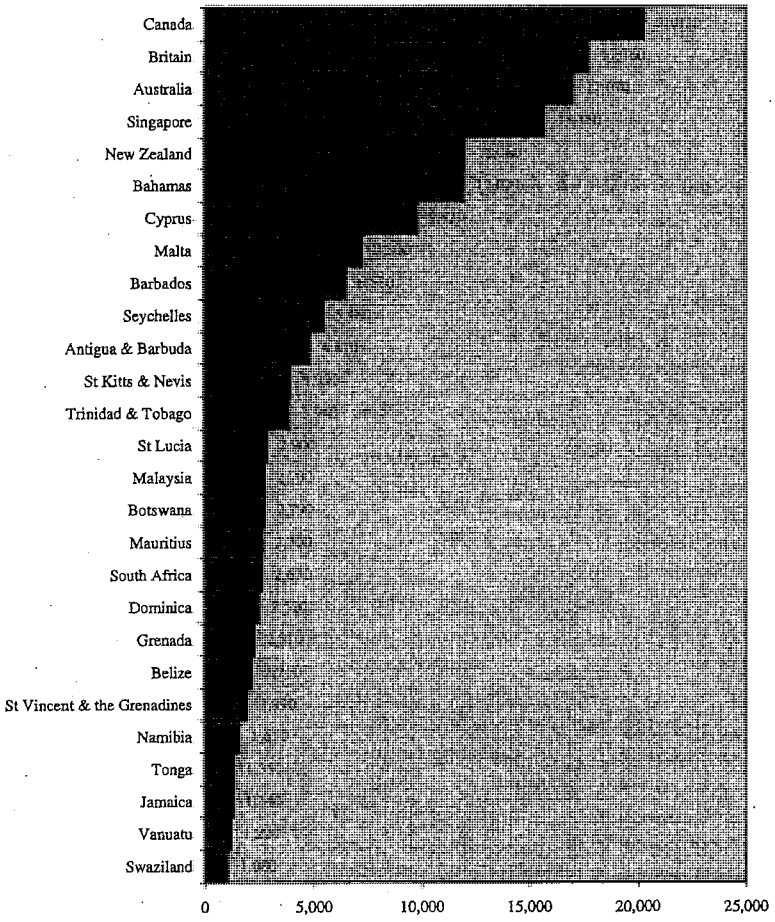
Figure 2.2 GNP Per Capita of Middle-income Commonwealth Countries, 1992



Note: Middle income = GNP per capita between $500 and $1,000 (15.7 per cent of Commonwealth countries).

Source: *The Commonwealth Yearbook 1993-94.*

Figure 2.3 GNP Per Capita of Higher-income Commonwealth Countries, 1992



Notes: Higher income = GNP per capita over $1,000 (52.9 per cent of Commonwealth countries).
Brunei Darussalam, Nauru and Tuvalu not included as GNP per capita figures unavailable.

Source: *The Commonwealth Yearbook 1993-94.*

As an aggregate of countries, can the Commonwealth meet the challenges of global change better than other groupings? This question will be tackled in the last section of this chapter. Meanwhile, it is apposite to review how and in what manner the processes of global change are affecting as well as being affected by the Commonwealth in a variety of ways.

Dimensions of Global Change

Global change has been occurring rapidly and has come with many facets. As the Commonwealth countries constitute a sizeable proportion of the family of nations, their policies and strategies of development obviously figure prominently in the pace and character of global change. For convenience of organization, the different contributions in the volume from every region of the Commonwealth have been grouped under four broad headings: physical change, technological change, economic change, and socio-cultural change. These groupings are not exhaustive and are not mutually exclusive, as change in one group imperceptibly merges into another. What is attempted below is an overview of some of the major dimensions of global change, with deliberate and constant reference to the pieces in this volume so that the patterns and processes of change can be readily perceived.

Physical Change in Climates

Of all the attention recently focused on global change, nothing perhaps looms larger in people's mind than climate change reminding them of their vulnerability. Although long-term climate change is short on scientific certainty, the signs are becoming increasingly obvious that the world is in the midst of some momentous transition. The average global temperature rose by 0.3°C from 1970 to 1980, but the five warmest years of the past century all fell in the 1980s. During that period, weather abnormalities were experienced in many Asian countries and elsewhere (Brown et al., 1989:3). This pattern of abnormally high temperatures has persisted into the 1990s. In the summer of 1995, record-breaking heat waves caused loss of lives in the United States, Spain and India. In July 1995, three weeks of temperature up to 50°C resulted in a casualty of 500 persons. The consensus opinion on climate change, as embodied in the

1990 working group report of the Intergovernmental Panel on Climate Change (IPCC), is that a doubling of the carbon dioxide (CO_2) level is likely to occur within the next 50 years if nothing is done to reduce CO_2 emissions. It was also concluded that it would be likely that by the middle of the 21st century, the earth will be warmer than at any time in the past 150 years. These estimates are based on their "business as usual" scenario, in which little is done to halt increases in greenhouse emissions (Hall and Hanson, 1992:74; Berkerman and Malkin, 1994).

Global warming resulting from climate change will lead to a rise in sea level. O. Ojo (Chapter 18) has shown how devastating such physical change will be as its socio-economic impacts have been felt by the people and countries in West and Central Africa, with special reference to the Niger Delta area. Extensive delta and estuarine areas, including cities with large capital investment, are prone to disasters that accompany substantial sea-level rise. Certain low-lying Commonwealth countries like Bangladesh are particularly vulnerable should a sea-level rise of import occurs.

The earth's warming weather will accelerate the melting of glaciers, the water from which will then lead to a sea-level rise and the submergence of low-lying areas. Thus, the case study of the snow melting and regional environmental change in the Himalayas is enlightening, with global warming as an important parameter causing variation in snow melting. A serious problem being faced in the region is the shrinking of glaciers, coupled by the recession of the tree line, as a result of changing regional and global climates (Chapter 19).

Climate change also impacts on hydrology and water resources management. Lekan Oyebande (Chapter 17) has brought into focus the need for improved water management because of water shortage. The persistence of the recent Sahelian drought is noted, as well as the Nile flow being below normal since 1965. Indeed, six of the seven lowest flows of the Nile since 1912 have occurred within this dry period. Six of the seven East and Northeast African countries are in a period of "water stress." In short, hydrological change is a magnification of climate change. Future climate change is beyond anyone's fathoming, but some observers have advanced the notion of even more chaos as a probable climate scenario (Milbrath, 1994). Consequently, Oyebande stresses the importance of non-climate factors, such as population and land use as

critical in maintaining Africa's economic, environmental and ecological sustainability.

In a similar vein but with a different orientation, J.P. Msangi (Chapter 11) has highlighted the importance of new water harvesting technology in dryland countries in Africa. The role of a country's social and cultural practices in the adoption or otherwise of new water harvesting technologies is crucial. Over-exploitation in transit ecosystems, such as that in the semi-arid zones of Africa, must be avoided. Age-old practices which are environmentally sustainable in these pastoral and semi-pastoral communities have not been sufficiently utilized after the introduction of new external factors of development.

Technological Paradigm Shifts

A prominent facet in facilitating the recent rapid global change from almost any angle is technology. Students of technology have agreed on long waves of techno-economic paradigms which have taken approximately 50 years for each to run its course. From the first paradigm based on water in the later 18th century, we are now in the middle of the fifth techno-economic paradigm based on selective production (Kogane, 1994:248). It is an age of computers, microelectronics, robotics, information technology and new materials.

With the invention of the chain saw and the associated technology of effective exploitation of tropical rain forests, deforestation has occurred at an alarming rate, contributing in part to global warming (Ooi, 1993). Each year the world loses 17 million hectares of tropical rain forests through deforestation. Over a decade, the destruction of tropical forests clears an area the size of Malaysia, the Philippines, Ghana, the Congo, Ecuador, El Salvador and Nicaragua (Brown et al., 1993:5-6). Tropical deforestation is so pervasive and yet such an urgent problem that Michael Eden (Chapter 9) argues for cultivating forests — silviculture — to make them sustainable, using Guyana as a case study. That forest operations create both commercial opportunities and environmental risks is not unique to Guyana. In fact, there is much shared experience among Commonwealth tropical countries in this respect. For example, the Malayan Uniform System (MUS) was adopted at one time in Guyana. Guyana is at its early stages of developing its forestry resources, but it needs political will, sound institutions, and an effective

monitoring system if forestry exploitation is to be ecologically sustainable. Forest management includes protecting forests that would otherwise be destroyed or degraded, reclaiming previously forested lands, improving forestry management and tree-harvesting practices, optimizing the beneficial effects of trees in urban areas and substituting biomass fuels for fossil fuels (Kinsman and Trexler, 1995).

Next, Patrick Williams (Chapter 16) provides a detailed case study of how two expatriate companies — Omai gold mine and Barama forestry and mining — have been viewed from both the indigenous and transnational companies' perspectives. Both firms came into Guyana during its stage of privatizing state-owned entities consequent to its request for assistance from the International Monetary Fund (IMF) and the World Bank to rebuild Guyana in 1985. The study reveals controversies about the nature of agreements under which the firms were allowed to operate. The arguments centre on who benefits more and at what costs to the environment.

Apart from deforestation, land degradation is another dimension taking a heavy economic toll on the earth's environment. This is a problem especially in the drylands that account for 41 per cent of the earth's land area. In the early stages the costs show up as lower land productivity, but if the process continues unarrested, wasteland will be created, destroying the soil as well as vegetation. Degradation of the earth's dryland regions in 1990 is estimated to have cost $42 billion a year in lost crop and livestock output, a sum roughly equivalent to the US grain harvest (Brown et al., 1993:7). Edwin Gyasi (Chapter 10) has shown that, for Commonwealth West Africa, the use of organic methods in farming is one means of countering land degradation. The keys to success include technical research co-operation, information exchange and other forms of multilateral interactions. In the drylands of East Africa, land degradation has surfaced as a problem because of pressures that have been put on them by the people and the communities (Msangi, Chapter 11).

Land degradation and deforestation may be viewed as two components of the environmental deficit that the world is experiencing. In recent decades, the environmental deficit and debt the world has incurred are enormous and far exceed the economic debts of nations. Economic debts between nations can be settled by resources changing hands, but environmental debts can often be repaid only by the deprivation and ill health of future generations (Brown et al., 1993:10-11). Every year every nation chalks up environmental damage equivalent to some proportion of its GNP. While some countries, such as Mali, the Netherlands and the US experience environmental damage in some sectors equivalent to less than one per cent of their GNP, the extreme case of Nigeria in 1989 through environmental damage in soil degradation, deforestation, water pollution and other erosion amounted to 17.4 per cent of its GNP. A very heavy burden on that Commonwealth country indeed (Brown et al., 1995:12)!

Recent technological advances have enabled nations to improve global monitoring. John Parry (Chapter 8) has shown the use of radar satellite remote sensing as a new technology that can be effectively deployed for resource surveys, environmental monitoring and the implementation of management plans. The full potential of the use of radar systems in environmental studies is to be realized.

Socio-economic Development

So far, the discussion has largely revolved around the physical and environmental dimensions of global change. The socio-economic aspects of global change have, in fact, been no less pervasive and rapid, directly affecting people and nations around the world. In this respect, the internationalization of production, distribution and services, otherwise known as *globalization*, has been occurring rapidly since the early 1980s. Global factories, global firms, global cities and global markets have now become new ways of life in many parts of the world. Within the Commonwealth, the rapid socio-economic and political change has been manifested in a variety of ways.

Robert Potter and Graham Dann (Chapter 6) have shown that the growing trends of socio-economic globalization and postmodernity have been obvious in the Commonwealth Caribbean. Processes of late capitalism and cultural imperialism are in evidence. There is a rising tide of environmental consciousness in the Caribbean, but unfortunately this is unlikely to be translated into sustainable development. For a region with 35 million inhabitants and 3 per cent of the world's tourist trade, the pressure is to pursue development for short-term gains rather than long-term sustainability.

In the South Pacific and Oceania, globalization has affected the region in many ways. John Overton (Chapter 7) has demonstrated that the former dependent relationships between the United Kingdom and Australia/New Zealand, on the one hand, and between Australasia and Pacific Island nations, on the other, have been succeeded by new political realignments. New global processes have been transforming not just political relations, but economic links as well. For instance, the dominance of Australasia in the Pacific Island economies has decreased, and a less rosy prognosis for the island states has stemmed from a tendency of globalization to concentrate development and capital in metropolitan areas. There has also been a more pronounced orientation towards the Asia-Pacific region. In any event, because of the emerging role of remittance through migrant labour, a Pacific regional labour market is gradually taking shape. As a variant on the same theme, Guy Robinson (Chapter 14) has examined changing trading strategies in the South Pacific in the face of globalization. During the past two decades, there have been a greater penetration of local markets by transnational firms and the attendant capital inflows. Australia and New Zealand have been changing their roles as international trading economies, with more emphasis being placed on Asia, ASEAN in particular. Similarly, in Chapter 15, Michael Roche has traced the evolutionary change in New Zealand's food export industry. That country has progressed to what is known as the third food regime, characterized by the reconstitution of food through industrial and bio-industrial processes and the importance of transnational capital. While Australia is likely to become an even more important market in the future, the orientation towards the Asian market proceeds at the same time. A recurring theme in all these studies of the South Pacific and Oceania is that London's status as a centre of the Commonwealth has been progressively weakened from the standpoint of trade.

Malaysia, a Commonwealth Asian country, has benefited from processes of globalization as reflected in its recent rapid economic growth. Jill Eyre and Denis Dwyer (Chapter 13) have traced the recent development of Malaysia, with an emphasis on its New Economic Policy (NEP) promulgated in 1970, immediately after the disastrous race riots of 1969. By 1990, most of the statistical targets of NEP had been close to being reached. A major development platform for Malaysia to embark on the road to export-oriented manufacturing is the establishment of a free

trade zone in Penang, a focus of the present study. In 1991, the Malaysian government announced the New Development Policy, which had as one of its objectives to double the country's per capita GDP by the year 2000. Similar policy statements have been made by Japan and China in the past to rouse national efforts for greater attainment and have been effective for development mobilization. There is no reason to believe it will not work to the good of Malaysia.

Globalization and innovative technology have permitted speedy time and space collapse in recent decades. The world is getting smaller quickly, and the Commonwealth is not what it used to be. In Chapter 12, Peter Rimmer has marshalled carefully assembled statistics and maps to show how air transport has changed within the Commonwealth in 75 years from 1919 to 1994. In the 1980s, with the ascendancy of Japan in world economic growth, it is argued that the Commonwealth had become almost irrelevant when considering air transport. By the late 1980s, low profit margins had led many North American and European airlines to record massive losses; British Airways was no exception. However, in 1992, four major Commonwealth airlines, namely British Airways, Singapore Airways, Qantas and Cathay Pacific were ranked among the world's top 15 airlines. A conclusion from the study is that London should be displaced as the centre of the Commonwealth from the viewpoint of its decreased relevance as being the hub for international passenger networks, although Heathrow remains the world's most accessible airport.

Global change has been occurring rapidly, occasionally with surprising results. The recent dismantling of apartheid against all odds in South Africa after the white having enjoyed political supremacy for over 300 years really took the world unprepared. The first election under universal adult franchise in South Africa was held in April 1994. As a consequence, the drawing of a new political map had to be accomplished. This is the subject of a contribution by A.J. Christopher in Chapter 4. He highlights the exigent time frame within which the drawing of regional boundaries had to be completed. The resulting map has given precedence to the continuing significance of ethnicity in the political process. It is clear that the success of the South African experiment with federalism must be dependent upon the wider transition from oligarchy to democracy.

To conclude this survey of global change, one might note some of its negative facets. Douglas Porteous (Chapter 5) has noted that, despite the destruction of home and place which has happened throughout history and everywhere, domicide has now become a common phenomenon in the world and is probably increasing. The mechanisms for its prevention and mitigation involve the co-operation and concerted efforts of decision-makers, planners and citizen groups across a broad front.

As a regional expression of global change in a negative sense, the consensus has been Africa. M.B.K. Darkoh (Chapter 3) describes the continent under seige. The debt problem has wiped out whatever social gains that had been made, and people share a feeling of fear and rejection of the state. The international economic system, which has helped many countries elsewhere on their road to economic growth and social modernization, has increasingly marginalized African countries. Sadly, 13 African countries comprising one-third of the region's population are actually poorer in per capita GDP terms than they were at independence. Darkoh passionately calls for a Second Liberation, in which national sovereignty has to be redefined, regional co-operation effected, and the dependency syndrome overcome.

What Role for the Commonwealth?

The foregoing has laid bare the economic and environmental challenges that the world has to confront if it is to mitigate some of the deleterious consequences of global change that have been described. What the community of nations lacks is a meeting of minds to tackle their common problems as they have different development agendas. To echo a theme that has been mentioned before, Hall and Hanson (1992:298) highlight the split among nations:

> Yet what has emerged is a growing gulf between North and South. A North whose perspectives are dominated by global pollution and the erosion of biodiversity, especially in tropical rain forests. A South determined to grasp development opportunities and angered by overconsumption in the industrial countries and the injustices of the global economy.

Against this backdrop of a polarized community of nations, can the Commonwealth do something to instil a sense of togetherness and a

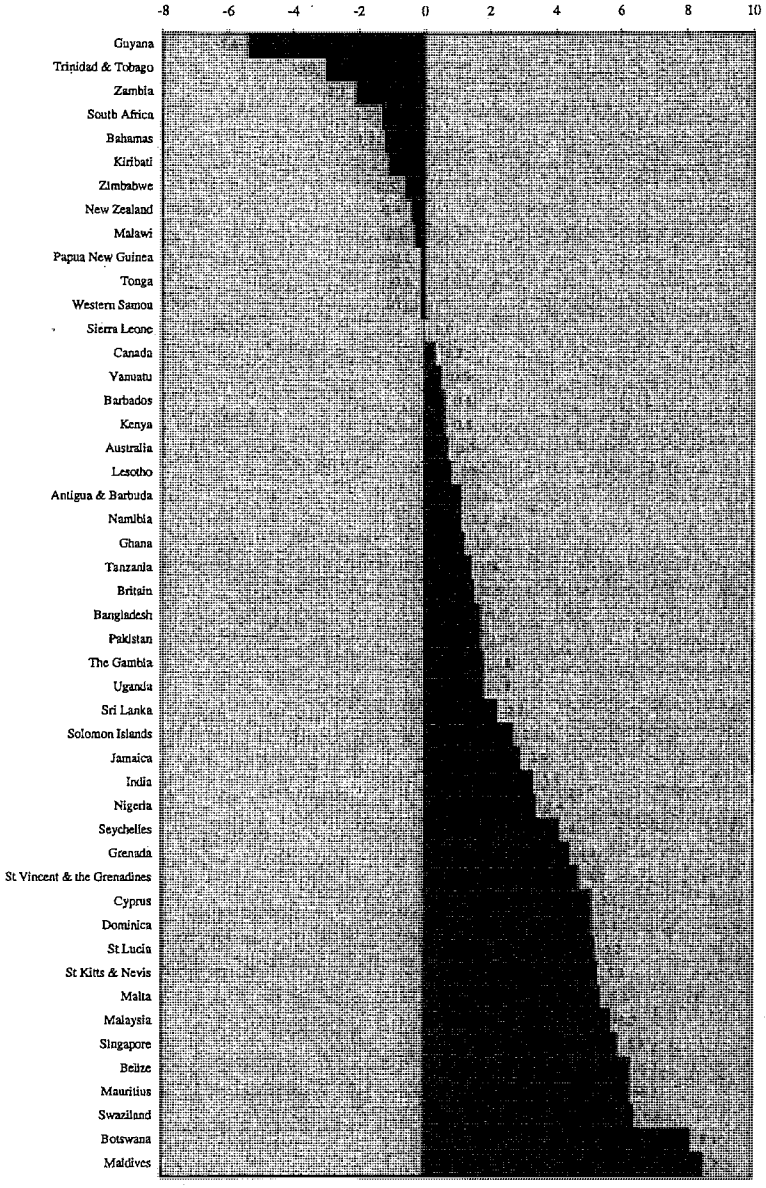
determination to improve the world? Within the Commonwealth, recent growth rates among countries markedly differed (Figure 2.4), but there is at least a special kind of bond loosely tying them together.

First, it has emerged from many of the pieces included in this volume that, at least implicitly, there is a need for a new kind of international and interdisciplinary scientific research that allows coordinated, collaborative projects, coordinated data-gathering in many parts of the world (Anon, 1994). Moreover, greater interaction should be promoted among researchers, with the assistance of governments, UN organizations and the industry, so that a better interface between science and its application can result to improve the global system (La Riviere, 1990). The increased globalization of organizations and their activities means that it is desirable to transcend organization boundaries and work as a network. The Commonwealth Network of Information Technology for Development (COMNET-IT) is accordingly one such project that consists of a number of networks based on interpersonal and institutional links (Qureshi, 1994). The network utilizes information technology (IT) to accelerate socio-economic development, a cost-effective way to enhance human and technical co-operation and to initiate activities and to facilitate the sharing of experience and knowledge among experts and researchers. Thus, despite scepticism from certain quarters of the Commonwealth being a political anachronism in this day and age, it still serves some useful purposes for its members.

In fact, global change is as much a political as a scientific problem. It is the ultimate decision-making in the face of uncertainty and as such, it may well dominate the international agenda during the next decade (Hall and Hanson, 1992:52). International co-operation in several major domains of global change is critical to resolve environmental crisis peacefully and in fundamental ways.

Such international co-operation may start within the Commonwealth. Nevertheless, for the overall harmonized development within the Commonwealth in the context of contemporary global change, the old modes of development management need re-evaluation in the light of present needs. The two main approaches to development management since the 1960s — development planning and structural adjustment — have not devoted their requisite attention to long-term perspectives of development problems. In a world that is now characterized by rapid technological, economic and political changes, there is an

Figure 2.4 Average Annual GNP Growth Rate of Commonwealth Countries, 1985-1992 (%)



Source: *The Commonwealth Yearbook 1993-94.*

urgent need to explore opportunities and the challenges of tomorrow in order to design more effective strategies for the future (Caiquo and Adesida, 1994). It follows from the above that a more holistic approach to development involves equal concern for economic growth as well as for the social, cultural and psychological needs of the people. The links between human lives and the environment and between economy and society need strengthening to realize environmentally sustainable economic development.

Another major global trend is towards more open economies and trading systems, more open political participation, more and better developed human resources, especially in developing countries, and more rapid and widespread communication and information flows (Sandstrom, 1994). Consequently, Commonwealth countries and individuals should play active roles and take part to "renew and enhance the value and importance of the Commonwealth as an institution which can and should strengthen and enrich the lives not only of its members and their peoples but also of the wider community of peoples of which they are a part" (Harare Commonwealth Declaration s. 13). This is a goal that should be set for every nation in the world, and as a group of countries and individuals the Commonwealth can make a head start to show how they can work collectively towards a more sustainable world and a brighter future, for themselves and their succeeding generations.

NOTE

1. Unless otherwise indicated, all references to dollars in this volume pertain to US dollars.

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PART II

Socio-cultural Change

CHAPTER THREE

Sub-Saharan Africa in Crisis and the Need for a New Domestic Order

M.B.K. Darkoh

Past Patterns and Trends

At independence there was optimism throughout Sub-Saharan Africa. Colonialism had ended and Sub-Saharan leaders believed that rapid progress would be made in raising incomes and improving the lives of their people. They were determined to catch up with the developed world. "We must run while they walk" was the popular slogan in those early days. The donor community at the time also shared this spirit and optimism. It was convinced that these less developed countries could be developed in a reasonably short time. After all, it believed, the less developed African countries merely lagged behind in their development and could catch up if they travelled the same road the advanced countries had travelled, that is, to modernize and to industrialize. Industrialization was believed to be the engine of economic growth and the key to transforming traditional economies. The rich countries were prepared to provide financial aid and send technicians to get the industrialization process underway. It was believed that Western technology and value systems could be transmitted ready made. An important reason for the willingness among the industrialized countries of the West to offer support to the newly emerging African countries was the conviction that, by enabling them to raise their standards of material well-being, they would help reduce the chance that leftist revolutions might occur.

At the global level and in geo-political terms, it was this well-intentioned faith and almost boundless optimism, as well as the East-West

rivalry and the fear of another Cuban revolution which inspired President Kennedy to launch the Peace Corps, call for the founding of the Alliance for Progress (for aiding Latin America), and declare the 1960s the First Development Decade. At the same time, the development of the poor countries was seen as economically beneficial to the developed countries. Apart from the possibility that investment might be profitable and that development would make scarce resources available to the industrialized states, the old doctrine of comparative advantage was by no means dead, so that an international division of labour or an "international harmony of interests" would be beneficial to all countries, both in the North and the South.

For the first generation of African leaders, an alliance with the West was seen as an opportunity for rapid industrialization which would pave the way for their countries to become developed. At the same time, industrialization was widely viewed as a measure of economic independence and respectability, so that it was advocated and promoted as an important, if not the most important, way to eliminate underdevelopment. The prospects for primary commodity exports were thought to be poor because of price fluctuations on the world market. There was also a desire to reduce dependence on manufactured imports. In those days, many economists and development specialists were convinced that once industry had reached an advanced stage of development, the agricultural sector would follow more or less automatically. This view exercised considerable influence on the first generation of African leaders, who saw a chance to relegate agriculture to the secondary role of supplying raw materials and provide tax revenues to finance other development and focus on import-substitution industrialization as the main means of reducing dependence on manufactured imports.

To implement these strategies, African leaders believed that government had to play the dominant role of entrepreneur. That view reflected their mistrust of foreign business, the perceived shortages of domestic private capital and entrepreneurship, and an underlying distrust of market mechanisms. As a result, and generally with full donor support, governments drew up comprehensive five-year plans; set up extensive infrastructure; invested in large state-run enterprises and enacted pervasive regulations to control prices, restrict trade, and allocate credit and foreign exchange.

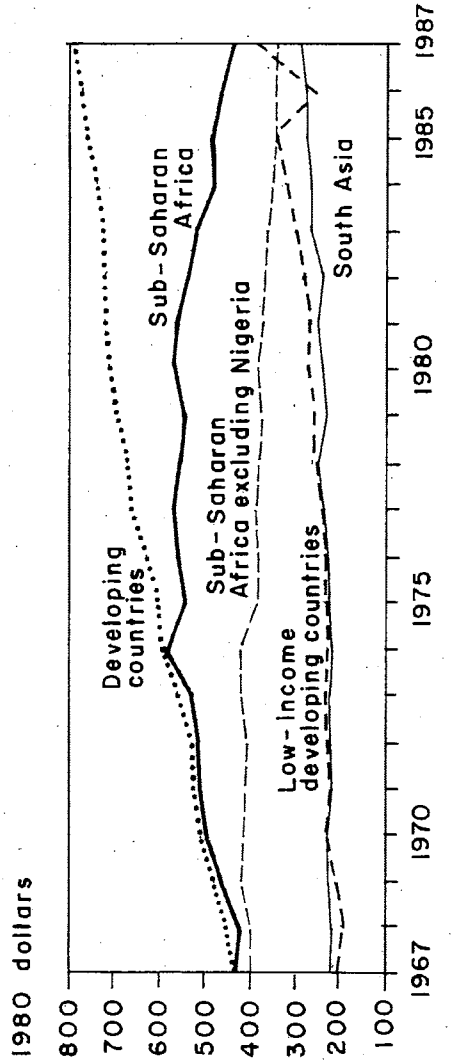
During the first decade and a half after independence, a great deal was achieved on the social, political and economic fronts. Starting from a low base, African countries significantly raised life expectancy and literacy and health care. There was enormous growth in the number of trained people, and major investments were made in Africa's infrastructure of roads, ports, telecommunications, and energy. The region saw important successes, as well as failures, politically. Countries born with arbitrary colonial boundaries struggled to establish nation states and to put on governmental structures in place.

The 1960s, and to some extent the 1970s, were a time of fairly steady progress in terms of economic growth, trade and liberalization. From an initially moderate economic growth, the pace quickened after 1967 (Figure 3.1). Record commodity prices and high investments financed from export earnings, commercial borrowing, and aid helped raise the growth rate. But then, as the 1970s advanced, countries began to stumble. By the middle of the decade, Africa's performance had fallen below that of other developing countries. By the 1980s, output had actually been declining.

Gross domestic product (GDP) grew at an average of 3.6 per cent a year between 1970 and 1980, but it has fallen every year since then (World Bank, 1984, 1989). With population rising at 3 per cent a year, income per capita in 1983 was estimated to be 4 per cent below the 1970 level. Agricultural output per capita has continued to decline, so food imports have increased, providing about a fifth of the region's cereal requirements. Much industrial capacity has become idle, the victim of falling domestic incomes, poor investment choices, a failure to develop export opportunities, and inadequate foreign exchange for materials and spare parts. After the impressive start the newly independent African nations made in building infrastructure, education and health services, progress has faltered, and cannot be reversed because of shortage of funds. Many institutions have deteriorated, both in physical capacity and in their technical and financial ability to perform efficiently.

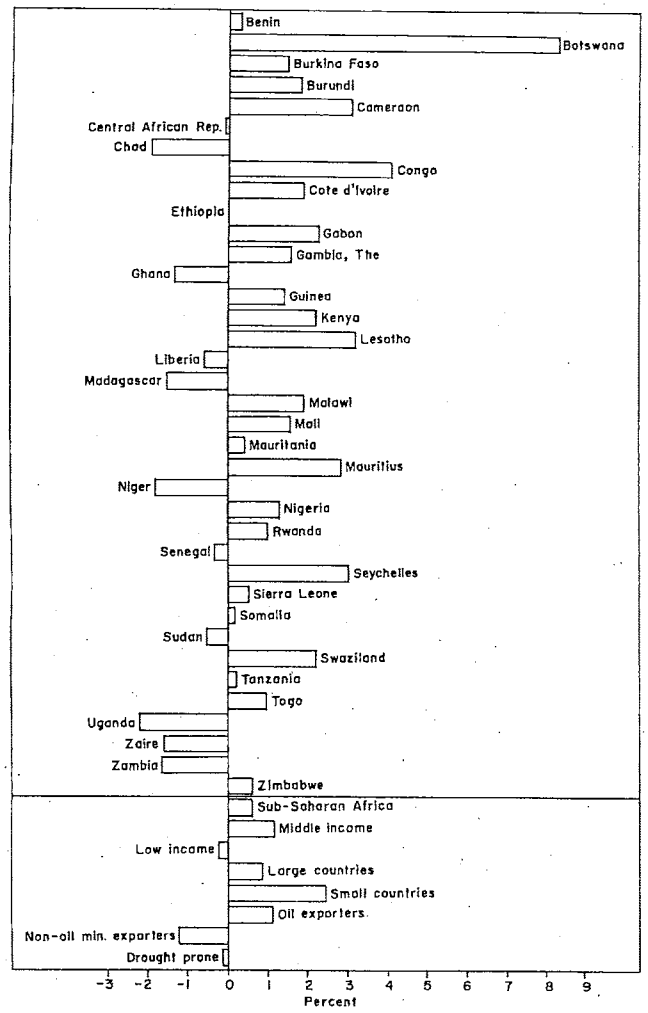
Behind the broad trends, experience has varied greatly from country to country (Figure 3.2). Overall economic growth in Sub-Saharan Africa has averaged 3.4 per cent a year since 1961, a fraction faster than the increase in population. By 1987, this region of 450 million people — more than double the number at independence — had a total gross domestic product (at market prices) of about $135 billion, about that of

Figure 3.1 Gross National Income Per Capita in Sub-Saharan and Other Developing Countries, 1967-1987



Source: World Bank data.

Figure 3.2 Diversity of Economic Performance in Sub-Saharan Africa: Per Capita GDP Growth Rate, 1961-1987



Source: World Bank data.

Belgium, which has only 10 million inhabitants (World Bank, 1989). Average annual GDP growth has ranged from 8.3 per cent (Botswana) to minus 2.2 per cent (Uganda). Oil accounts for much of the variation, with oil exporters doing well or badly according to fluctuations in oil price. Excluding the oil economies, aggregate annual growth has declined in the late 1970s and 1980s.

The Deepening Crisis

Sub-Saharan Africa has now witnessed more than a decade of declining per capita incomes and accelerating ecological degradation. Per capita food production first fell, then rose, but it remains lower than in 1980 (Darkoh, 1989). Annual per capita grain production in the 24 countries most seriously affected by drought has been falling on the average by 2 per cent a year. The continent remains the only major region of the world where food production per capita has been declining (Zeleza, 1986; Darkoh, 1989).

There is growing evidence of accelerating desertification (Darkoh, 1993, 1994). Nearly three-quarters of the total agriculturally used drylands in Africa have lost 25 per cent or more of their productivity in the last few decades, according to UNEP (1992). The Sahel and areas bordering the Kalahari face encroaching deserts and soil degradation, accelerated by drought. To compound these problems, some industrial countries are trying to dump their toxic wastes in Africa (UNEP's Governing Council, 1993).

Africa has lost a substantial part of its share in the world market for its exports. During the 1960s, the volume of exports grew on average by 6 per cent. Since 1973, however, export volumes have remained stagnant or declined significantly in most countries. Between 1970 and 1985, African exports in world trade fell from 2.4 to 1.7 per cent.

In the face of declining commodity prices, many African countries have resorted to heavy external borrowings. Sub-Saharan Africa's total debt increased from $6 billion in 1970 to $134 billion in 1988 (World Bank, 1989). By the end of that period, the region's debt was about equal to its gross national product (GNP) and three-and-a-half times its export earnings. Debt service obligations, the real measure of the debt burden,

rose in the 1980s to a point where they could not be met. They stood at 47 per cent of export revenues in 1988.

Consequently, many African countries have surrendered some of the gains they made earlier in human resource development — notably in school enrollments. Primary school enrollment rates have declined since 1980, and life expectancy is lagging well below South Asia's. The problems of environmental deterioration and food insecurity have become more daunting. Open urban unemployment is a rapidly growing problem in many countries.

The administrations, judiciaries and educational institutions of many African countries are now mere shadows of themselves. This widespread institutional decay is symbolized by the poor physical condition of once world-class institutions, such as the University of Ghana in Legon and Makerere in Uganda, by the breakdown of the judicial systems in a number of countries, by the poor state of once high-quality roads and by the dilapidation of once well-functioning railways.

Still, the most worrisome is the growing feeling of hopelessness among many people in and out of Sub-Saharan Africa. This crisis of confidence has been reinforced by the adverse external image of Africa in the global media which focuses mainly on Africa's economic, social and political woes — famines, desertification, refugees, human rights violations, *coups d'état*, internecine violence, malnutrition, disease and poor health.

The Causes

The causes of this crisis are both internal and external, the relative importance of which varies according to the circumstances of individual countries. Among the internal factors are: the absence of political stability due primarily to the intervention of the military or to bad leadership; civil strife; the lack of probity, equity, accountability and patriotism; illiteracy; a failure to work out national priorities; the overdependence on primary commodities; rapid increases in population and concomitant population pressures; the decline in food production; the lack of appropriate technology; financial mismanagement; corruption; and, growing poverty.

Some of these problems — for example, corruption, bad leadership, lack of probity and accountability — are hardly unique to Africa, but they may have been exacerbated by development strategies that concentrated power and resources in government bureaucracies, without countervailing measures to ensure public accountability and probity. Other internal problems are natural and man-made disasters such as drought, soil erosion, loss of flora and fauna, desertification, pollution, poor sanitation, disease, hunger, malnutrition and famine.

Among the external factors are the lack of new credit; mounting debt burdens; adverse terms of trade; falling commodity prices; high interest rates; International Monetary Fund's conditionalities and World Bank's structural adjustment policies. External factors have also been manifested in ex-colonial powers' tendency to continue to dominate their former colonies by manipulating internal differences and using economic levers — in particular, the depression of prices and the quota system of purchase of primary produce — in order to demand concessions and at worst to foment discontent and *coups d'état*. Direct military intervention is still an arrow in their quiver, even if less popular today than during the 1970s and 1980s. These forms of neo-colonialism have, in the last decade, been exacerbated by the very heavy burden of debt-servicing that threatens to wipe out any social gains made since independence and is the most blatant manifestation of the present unjust international economic order.

However, there is no denying the fact that the state[1] is central to all these as it finds itself in a dialectic relationship with civil society. Although the conditions vary from one part of the continent to another, the failure of the state to promote development is commonplace. The state in Africa is *besieged*. It is *set apart* in its relations to society; and as an executor of policy, it has become *overloaded* (Dag Hammarskjold Foundation, 1992).

The notion of "besieged" conveys the point that in its relation with other states and with international organizations, the African state is under pressure, left with few options of its own. The state "set apart" refers to the lack of legitimacy, partly because of the very process by which it was imposed and subsequently adopted, but mostly because of misrule which has created fear in the people and their wish to avoid its agents whenever possible. The people's fear and rejection of the state have arisen from the state's rejection of the people. The "overloaded"

state pertains to the discrepancy between expectation and performance and, in particular, to the fact that governments have accumulated tasks that they cannot effectively manage.

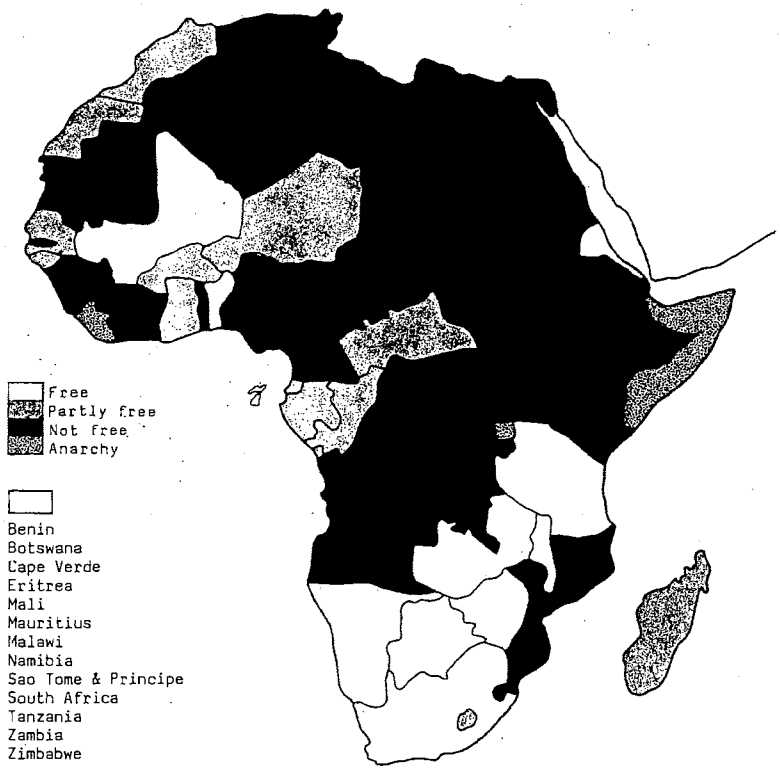
As a result of these conditions, African countries are increasingly marginalized in the international economic system; political leaders are finding it more difficult to acquire and retain legitimacy; governments are carrying on an operational burden that they can no longer afford; living standards are deteriorating; there is a breakdown in the relationship between people and environmental support systems, and Africans are no longer able to feed themselves.

To most observers, the essence of this crisis is the material deprivation that people in Africa suffer and the inability of the government to alleviate it effectively. While this perspective cannot be ignored, it is one-sided. Material deprivation must be seen as symptomatic of other malaises against which African people have been struggling. Ever since the 1960s, African peoples have been demanding the reform of post-independence structures and institutions, alongside the many calls for political reforms.

Recently, the political situation has shown some improvement. Since 1990, over 20 African countries have taken steps towards political liberalization and democratization. Figure 3.3 shows a four-way classification of African countries on the basis of their political liberalization. It counts countries as free, partly free, not free or in anarchy according to whether they have free and fair elections, multi-party legislatures, protection of civil liberties, an uncontrolled press and so forth.

Political opposition has been legalized in some countries, and multi-party elections have sometimes taken place. One-party systems have been forced to accept pluralism (as in Kenya and Tanzania). Occasionally, a founder-president is voted out as in the case of Kenneth Kaunda of Zambia and Hastings Banda of Malawi. Military regimes have been forced to go to the polls (as in the case of Jerry Rawlings of Ghana). And South Africa has at long last achieved majority rule and representative government. However, not all African countries have been liberalized. Some are still engulfed in war — as in the case of Angola, Mozambique, Sudan and Rwanda. Somalia and Rwanda have almost no political structures at all. And, Nigeria let down the whole of Africa when the elections of June 1993 were aborted.

Figure 3.3 Despots and Democrats: The Free and Not-so-free African Countries



Source: Adapted (with modification) from *The Economist*, 27 August 1994, p. 16.

On the whole, while one can say that on the political scene there has been some encouraging progress, one cannot say that much about the economic scene. With minor exceptions, African countries are poorer than they were 30 years ago. In the past decade, six countries — Equatorial Guinea, Ghana, Liberia, Nigeria, Sao Tome and Principe and Zambia have slipped from middle income to the low income group as classified in the World Bank's (1990) *World Development Report*. If overvalued exchange rates were taken into account, more African countries would have slipped. In the early 1960s, Sub-Saharan African countries had per capita incomes similar to those in other developing countries. Since the 1970s, African incomes have fallen behind, and if present trends continue, they will be on a par with those of the poorest countries of Asia by the turn of the century. Thirteen African countries — accounting for a third of the region's population — are actually poorer in per capita terms than they were at independence (World Bank, 1989).

The Way Out

In the last two decades, African states have given a great deal of thought to the economic problems facing the continent and have made recommendations for solving them. In 1980, the Organisation of African Unity (OAU) for the first time devoted a special session exclusively to economic matters and passed the *Lagos Plan of Action* which recommended national and collective self-reliance as a development path to be followed, leading eventually to an African common market. *Africa's Priority Programme for Economic Recovery (APPER) 1986-1990*, which was prepared for the UN Special Session on Africa, emphasized an integrated approach to development on the continent and the interdependence of sectoral economic activities. The *Abuja Statement* in 1989 emphasized that structural change should begin with the food and agricultural sector and went on to recommend that African states should gradually reduce the significance to their economies of primary commodities while increasing the role of domestic and intra-African relationships. The *Khartoum Declaration*, also in 1989, discussed the acute social and economic problems arising from the recent implementation of conventional structural adjustment programmes and emphasized the importance of the human dimensions of Africa's economic recovery and

development. The *African Charter for Popular Participation in Development and Transformation*, adopted in Arusha at the Conference on the same subject in February 1990, unanimously asserted that the absence of full democratic rights was the primary cause of Africa's unyielding decade-long crisis.

The main lesson learnt to date, however, is that the states, being just currently constituted in most countries of the continent, are incapable of bringing these initiatives to fruition. Those charged with responsibility for bringing about changes that will promote economic and social development have failed. The style of governance and institutional solutions adopted have only exacerbated the structural constraints under which Africa had operated historically. The state as constituted cannot bring about the necessary transformation and economic diversification that will allow it to move away from the inherited colonial structures.

The Second Liberation

The First Liberation, achieved at independence, gave African countries legal and political national sovereignty. It also kindled the continent's hope for democracy. But, those entrusted with responsibility for good governance have, in most cases, abused their power. They have used power arbitrarily to intimidate people and trample upon their freedom and civil liberties. Drawing on the coercive methods favoured by the colonial state, they have perverted democratic norms and replaced them with highly personalized authoritarian rule (Healey and Robinson, 1992). As a result, many Africans believe that it is only through a Second Liberation[2] that a new order can be realized.

This Second Liberation must be more thorough than the first. It must involve a transformation both of structures and human attitudes and of ways of thinking. It must enable people in Africa to recapture the role of active agents in their own history and become masters of their own destiny. The challenge to Africans in the 1990s is to nurture the seeds of this Second Liberation, planted by the predecessors of today's generation, so that they can grow and bear fruit.

The Second Liberation implies action at different levels and in different domains. It is not possible in this brief paper to map out a comprehensive outline of the form the Second Liberation should take, and

only some critical aspects of Africa's internal development in this new order will be sketched.

1. Redefining National Sovereignty

At independence, national sovereignty took a particular importance for African political leaders (Darkoh, 1983). Experience to date, however, suggests that the insistence on national sovereignty stands in the way of democratization, economic and social development. One of the biggest disappointments of the Organisation of African Unity (OAU), when it came into being over 30 years ago, was that it failed to address this issue of redefining national sovereignty. Instead, one of the cardinal principles was non-interference and the sacrosanctity of the boundaries inherited from the colonial situation.

That was a foreboding failure of political will, and now we see, for example, in Rwanda what that absence of African self-redefinition has wrought. Nobel laureate, Wole Soyinka, in referring to the recent pogrom in Rwanda, bemoaned the fact that African leaders have been so concerned with maintaining their power and authority "within those artificial ponds created by colonialism; they have been so eager to preserve their status as king toad, that they have never really addressed the humanity which is entrapped within those ponds" (Soyinka, 1994).

National sovereignty, while important, cannot be viewed as the sole overriding goal of public policy in the same way it has been in the past three decades. The mandate of the OAU must be redefined now that the organization's principal role as the spearhead for African liberation from colonial and white minority rule has ended. The besieged character of the African state will continue as long as political leaders are unable to transcend the national sovereignty argument. In the past as well as in the present, the national sovereignty issue has provided a very effective smokescreen for the abuse of power and for repressive actions of the state against its citizens. It is time Africans challenged political measures taken in the name of national sovereignty or "state security" whose real purpose is the harassment and prevention of citizens from publicly expressing views that challenge those in authority.

National sovereignty needs to be redefined in the light of both the economic unviability of some African states and the fact that an increasing number of policy issues are cross-national. To the latter belong

environmental concerns and human rights. A growing recognition by both political leaders and citizens that these issues are legitimate concerns of everybody is an important part of the Second Liberation.

It will be necessary to encourage regional co-operation over the use of common resources such as rivers and lakes, trade promotion and the harmonization of technical standards. Regional co-operation is reviewed in detail in the next sub-section.

Africa needs to demonstrate its ability to monitor and discipline its own government as a way of earning greater credibility among its citizens and in the rest of the world. This involves broadening the base for regional co-operation to include institutions other than governments. In recasting its role for a Second Liberation, the OAU could play a major role in accomplishing this.

2. *Regional Co-operation*

Regional integration has been a path strewn with obstacles in Africa. The obstacles have been many: parochialism, the lack of grassroots support; the death of local private businessmen and skills; the excessive external dependency of African countries; transport problems; policy-induced problems; problems inherent in co-operation arrangements; the multiplicity of organizations; political rivalry; the relative stagnancy of African economies and the international economic environment (Nomvete, 1993). No wonder that in the light of these formidable obstacles the 28th OAU Summit in June 1991 postponed the date for the attainment of an African Economic Community to 2035.

Past experience with successful market integration in Western type economies suggests economic homogeneity, national economic performance and political commitment as three key factors shaping the formation of free trade areas and customs unions. Past experience also indicates that economic homogeneity, that is, the lack of strong sub-regional disparities, prevented distributional conflicts from becoming stumbling blocks at an early stage of implementation. Sustained economic growth on a national level helped to contain domestic opposition to exposing domestic industries to regional competition. Political commitment in a legally binding way underlined the irreversibility of intra-regional liberalization and made economic integration credible (Langhammer, 1993).

Sub-Saharan Africa has never enjoyed the privileges of these three factors. Heterogeneity in terms of both per capita income differentials and resource endowment is large and has become even more pronounced. Economic performance has become vulnerable to external economic shocks, internal political mismanagement and long standing crises or even decay. Political rivalry has been a deep-seated and long standing problem.

Regional economic integration in Sub-Saharan Africa "through the market" faces several odds. Not least are the high costs of implementation and enforcement and the high political risks of failure. Political rivalry renders any gains uncertain and quantitatively small. The economic dependency status of many African countries is another factor.

Many African countries are still traditionally tied to their former colonial masters. Many still depend excessively on supplies and manufactured products originating from their former colonial metropolises and other developed countries, even where comparable products are available within a sub-regional preferential arrangement. This kills the rationale for creating bigger markets to facilitate growth of viable production enterprises. The preference for imports from former colonial masters and other industrialized countries is attributable not only to habit but also to the trading advantages enjoyed by the suppliers from the developed countries.

Many African purchases from overseas suppliers are tied directly to aid programmes which tend to favour imports from aid-giving countries. Nearly two-thirds of capital and commodity aid and an even higher proportion of technical assistance are tied. It is because of the excessive dependency problem that the great bulk of manufactured goods imported into Africa originates in the developed countries, even where some of these can be produced locally.

It would appear that the relevant option, given the present formidable constraints, is regional co-operation. However, regional co-operation must not be confused with regional integration. While integration aims at removing internal barriers to trade in goods, services and factor movements, economic co-operation includes concerted action to lessen discrimination in certain areas of common interest and to economize on scarce supra-nationally mobile resources (Langhammer, 1993).

Two aspects suggest their economic co-operation is much more relevant to Africa then integration. First, African economies are dis-

proportionately fragmented and small. For many goods and services, technical indivisibility acts against economically viable production at a domestic market level. Joint supra-national production with burden-sharing arrangements could help to reach the minimum output. Promising scope for internal regional co-operation exists in public goods and services, preferably physical and human infrastructure and resource management, such as energy, maritime resources, education and telecommunications or the harmonization of minimum standards. Concentration should be on truly public services which cannot be provided by individual states alone.

Secondly, national production increasingly causes cross-border negative externalities. That means that the welfare of country A is affected either by production or methods of production in country B (so-called *producer externalities*) or by the consumption of products from country B (so-called *consumer externalities*). Cross-border environmental pollution, national overfishing, or waste of river water causing shortages in downstream neighbouring countries are a few examples of cross-border negative externalities.

Since the mid-1970s, and especially since 1980, the liberal trading order that GATT helped to uphold has been steadily eroding. The resurgence of protectionism, especially in the guise of non-tariff barriers, is a reflection of the world economic crisis. Between 1981 and 1990, the proportion of imports to North America and the European Union that was affected by non-tariff barriers increased by more than 20 per cent (de Souza and Stutz, 1994:555). Trade between developed and underdeveloped countries is increasingly affected by non-tariff barriers; roughly 20 per cent of underdeveloped-country exports were covered by such measures in 1990. In the coming years and despite the Uruguay round of GATT negotiations, pressure on governments of developed countries to protect domestic jobs through trade is likely to mount and continue to negatively affect underdeveloped-country exports.

It is time African countries begin to look to one another in liberalizing and promoting trade among themselves. The trend in other parts of the world today is towards intra-regional trade. For example, in recent years, Western Europe has had more than 70 per cent of its imported items originating from within the region, and the percentage had reached 75 per cent by 1993. North American trade regionalization has fallen from 45 per cent to 35 per cent between 1970 and 1990, while East

Asia has increased from 35 per cent to 45 per cent (de Souza and Stutz, 1994). Africa's intra-regional trade on the other hand has continued to stagnate at about 5 per cent. Africa cannot compete in the world economy until the countries of Africa learn to co-operate and trade with each other. Barriers to successful regional co-operation appear stronger in Africa than in Europe, America or Southeast Asia. The most significant barriers are political — an unwillingness to make concessions. Another is the historical legacy that African countries have not historically traded extensively among themselves. Nonetheless, much potential for regional co-operation exists in African countries and between African countries and other countries of the South. Can African countries learn from the experience of other blocks of nations, notably those of Southeast Asia, about internal co-operation?

Finally, apart from internal co-operation, African countries have the option to agree to common views and demands in negotiations with third countries.

3. *Overcoming the Dependency Syndrome*

Excessive reliance on foreign aid has encouraged the worshipping of most things foreign in Africa. This obsession has served only to reinforce the existing colonial and neo-colonial mentality. And, as we have seen, it is one of the potent factors working against the viability and strength of sub-regional economic co-operation. A new domestic order is urgently required to overcome this dependency syndrome and its concomitant sloth and bureaucracies and build up highly efficient, democratic and self-reliant economies.

While foreign aid is important for African countries, it must not be seen as a panacea. It should be regarded as an important complement of domestic efforts and accepted on terms that strengthen sustainable development in their countries. Where aid is clearly inimical to a country's interest, or is likely to be used to divert a country from its non-stated objectives, it is incumbent on African governments to reject it. Aid proposals should be scrutinized more carefully by a broad range of qualified local personnel, and everything should be done to avoid using aid projects as channels for personal enrichment. As in any field of public administration, there should be transparency, accountability and public scrutiny in the administration of aid programmes.

4. *Sustainable and Equitable Growth and Development*

To ensure Africa's future welfare, the Second Liberation should lay the foundations for *sustainable* and *equitable* growth and development; *sustainable* because care must be taken to protect the productive capacity of the environment; and *equitable* because this is a precondition both for political stability and ultimately for sustained growth.

Sustainable growth calls for a development strategy that does not compromise the welfare of future generations. The issue of environmental sustainability cuts across all sectors. The awareness of environmental factors and the willingness on the part of governments to take politically difficult measures will largely determine whether the degradation of natural resources will continue to threaten economic growth in Africa. There is need to integrate environmental considerations and natural resource management into national economic planning.

The Second Liberation should evolve strategies to address poverty and better income distribution as issues in their own right. These strategies need to address two critical needs: first, how to make the poor more productive, and secondly, how to provide productive assets to the poor.

The focus of any strategy for equitable growth and development should be on access to assets and poverty-alleviation, not on the distribution of wealth. Creating wealth, in contrast to "rent-seeking," is seen as essential to growth. By giving the poor access to assets and promoting their productivity, a higher level of growth can be ensured.

5. *Agriculture as the Main Engine for Sustainable Development*

Too many African leaders and Western advisors in the past had come to look upon industrialization as the only way that countries could become developed. This view resulted in attention being focused almost exclusively on industrialization. The consequence was that, agriculture, the rural areas and, thus, the majority of the people became neglected. Genuine development is unlikely or even impossible so long as agriculture is neglected. Agriculture offers the best opportunities for sustainable development. Over the longer term and with policies that foster private investment and entrepreneurship (rather than state entrepreneurship), the industrial sector could undoubtedly contribute to Africa's economic growth. But, it is in agriculture that Africa should look for the primary foundation to sustained growth for the coming years.

It is important that any suggested strategies for agricultural development are ecologically sustainable. They should build on existing production methods and the local populations' priorities and understanding of environmental and developmental realities. The essence of appropriate strategies is not to import inappropriate solutions from outside, but to allow local knowledge, skills and initiatives to flourish at their own pace, with outsiders confining themselves to nudging these along. Nevertheless, far too many agricultural development projects have floundered and left the local people even poorer than they were before.

6. *Liberation of Women*

An element of critical importance in the agenda for a Second Liberation is the liberation of women from the historical and traditionally determined position of subjugation in many parts of the continent. Apart from the intrinsic human dimensions of this situation which is yet to be fully recognized, their subjugation and exploitation have a negative effect on the productive and regenerative capacities of African societies. African women face a variety of legal, economic and social constraints. Development strategies should, therefore, favour women. The best interests of Africa's present and future generations will be served by the liberation of women from drudgery and exploitation and by their empowerment.

Conclusion

At independence in the late 1950s and early 1960s, African states and foreigners alike entertained high hopes for economic and social development and improved standards of living for the masses of the population in the continent. During the first decade and a half after independence, a great deal was achieved on the social, economic and political fronts. However, from the mid-1970s onwards, the record has been one of stagnation and/or decline. Average living standards in many countries in Sub-Saharan Africa are now below what they were at independence. Most of the improvements in the physical quality of life achieved during the 1960s and early 1970s have been eroded; and in the

1980s, the record was almost everywhere — one of dismal failure, decapitalization and environmental bankruptcy.

The foregoing has sketched the crisis, its causes and the key elements of the Second Liberation — a concept that in the opinion of this author holds the answer to this crisis. Ultimately, the siege of the African state will only come to an end or at least be effectively countered, if African countries are individually and collectively capable of transforming their economic and social structures to create opportunities for sustainable and equitable development. In the light of the present circumstances, the objective is both ambitious and long-term. Above all, it means ending the situation where those in power use their position to enrich themselves at the expense of the people. An increasing number of Africans are calling for an evolution of new development strategies to enable all citizens to make a meaningful contribution both to their own development and to national development. The new perspective centres on the need to transform peoples' lives and productive systems. It involves a number of initiatives: redefining national sovereignty; reducing dependency and fostering self reliance and regional co-operation; promoting sustainable and equitable growth and development; reordering national priorities and creating an enabling environment for an ecologically sustainable agriculture; building on local knowledge and initiatives; strengthening the civil society and promoting an atmosphere in which citizens are free to express themselves without fear or intimidation; greater popular participation by the masses; the reform of land ownership and inheritance laws to end discrimination against women and give them access to financial credit and other banking facilities.

African countries also need to develop their own policy agenda that reflects the spirit of the Second Liberation, which involves citizens as well as their organizations in debates at relevant junctures.

NOTES

1. The concept of the state as used here refers to government and official political leadership.
2. The concept of a Second Liberation was first used to describe what Africa needs in order to move out of its present predicament by participants at the Mweya Conference on the "State and the Crisis in Africa" organized by the Dag Hammarskjold Foundation in May 1990; see Dag Hammarskjold Foundation (1992).

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CHAPTER FOUR

The Spatial Aspects of Political Change in South Africa

A.J. Christopher

The political transformation of the world since 1989 has been dramatic as the conflicts of the Cold War have been concluded and many of the dictatorships which it spawned have collapsed. Concepts of "New World Orders" and "global restructuring" have abounded in the political geographical literature (Taylor, 1993). Fundamental political change has been evident in many Commonwealth countries, not least on the African continent (Amnesty International, 1994). The emergence of a democratic South Africa has been one of the most remarkable features of the new world order. The process of democratization has been evident as one-party states and military dictatorships have opened themselves up to multi-party elections. Among African Commonwealth states, over half such states have gone through this process in the last five years (see Chapter 3 by Darkoh). Frequently, the process has been accompanied by a degree of decentralization of power within the state structure, in an attempt to prevent a recurrence of past abuses of power.

Aspects of federalism have been incorporated into the constitutions of a number of countries as a result of political compromise in order to facilitate the devolution of government within an existing state (Dikshit, 1975). Federalism was adopted in recognition of the significance of territorial differentiation and the promotion of local and regional economic and social interests within the state. This was achieved through establishing a balance between the powers of the central government and those of the sub-national regions (Paddison, 1983). It needs to be noted that essentially successful federalism is dependent upon the pro-

motion of participatory democracy. The fate of the Soviet Union and Yugoslavia illustrates the need for popular consent in holding together the disparate elements within a federation.

The promotion of democratic government has been one of the stated ideals of the Commonwealth. The first British dominions (Canada [1867] and Australia [1901]) adopted federal structures and decentralized decision making structures. The ideals of federalism continued to dominate Commonwealth constitution making in the post-Second World War period. Indeed, the British government appeared to have had a marked pre-disposition towards creating colonial federations. Colonies were grouped in areas as diverse as the West Indies, Central Africa and Malaysia (including Singapore). The states of traditional rulers were also linked as in Malaya and South Arabia. In many independence constitutions, spatially defined federal structures were established.

Federalism seemed to offer the British government a solution to the question of governing multi-ethnic states. The character of many colonies was such that the interests of diverse communities were considered to be better served by community self-rule than by centralization, essentially continuing the "divide and rule" approach of the colonial era (Christopher, 1988). Thus, at independence the regions of Nigeria essentially reflected the power bases of the country's three major ethnic groups. Elsewhere, ethnic regions were devised for electoral and administrative purposes as in Kenya and Uganda. The constitutions of countries as diverse as Cyprus and Mauritius regarded individuals as members of ethnic communities for decision making purposes, thereby creating non-territorial community federations. However, few of the new federations survived for long as independent indigenous governments considered the promotion of economic development and national integration to be of higher priority than the recognition of local and sectional interests. However, the post-1989 era has witnessed a resurgence of nationalism and ethnic identities, which need to be addressed in multi-ethnic states (Hoosen, 1994). The relationship between democracy, ethnicity and federalism has thus assumed a greater degree of significance for the emerging democracies of the Commonwealth, notably South Africa.

Options for South Africa

The transformation of South Africa from the apartheid state to a non-racial democracy is a complex process which is still in progress. At the time of President F.W. de Klerk's reform initiative in February 1990, the constitutional character of the "New South Africa" was only vaguely perceived by the various negotiating parties (Horowitz, 1991). Subsequently, a number of compromises were made to ensure the smooth transformation of the state, including a reconsideration of the issues of regionalism and ethnicity. African National Congress negotiators came to recognize the enduring significance of ethnicity, while National Party negotiators abandoned the expectation of a continuing White controlled state. A quasi-federal solution to containing ethnic diversity within a single state was adopted as a compromise for the duration of the government of National Unity (1994-1999). As a result, the spatial definition of the regions became a matter of some importance. It is notable that the apartheid African homelands have been deliberately and effectively erased from the political map. Thus, there has been a quest for new regions relevant to the new democratic era. It is proposed to examine the basis of defining regions in a federal state and, then, examine the South African experience.

Regions in a Federal State

In 1990, there were few comparable Commonwealth African or Asian federations which offered the South African constitutional negotiators much inspiration or assistance as models to emulate. Nigeria had been under military rule for much of the post independence period, while Malaysia exhibited relatively few features of a consociational federation (Rumley and Yiftachel, 1993). Only India, outside the "Old Dominions," had been able to create enduring democratic institutions on a federal basis.

The Indian experience in devising its state boundaries is, therefore, worth careful examination. The complexity of the administrative pattern at independence was such that initially *ad hoc* solutions had to be adopted to solve the specific problems of integrating the defunct princely states into the framework of the provinces of ex-British India.

However, in 1955 sweeping changes were adopted on the recommendations of the States Reorganization Commission (India, 1955). The Commission noted that the states existed at the behest of parliament and that they were not sovereign entities. The states could, therefore, be created, disbanded and their boundaries redrawn by the central parliament of the Indian Union, although this power had been sparingly used. A number of broad principles were drawn up to guide the legislators in the task:

1. the preservation and strengthening of the unity and security of India,
2. a regard for areas of linguistic and cultural homogeneity,
3. financial, economic and administrative considerations, and
4. the successful working of the national plan.

The place of language was the most controversial, but dominant, issue in the reorganization process. It was noted that in the previous century there had been a significant growth in local languages, developing into "rich and powerful vehicles of expression creating a sense of unity among the peoples speaking them" (India, 1955:35). As the areas within which the languages were spoken were well defined, they formed the basis for the unification of India as a quasi-federal state. However, the Commission noted two mutually incompatible trends. On the one hand, "conflict and discord are inherent in administrations in which diverse elements are forcibly held together" (India, 1955:37). On the other hand, there were dangers in creating ethnic "homelands" which accentuated linguistic differences and led to the idea of majorities and minorities, thereby inhibiting national unity (India, 1955:44).

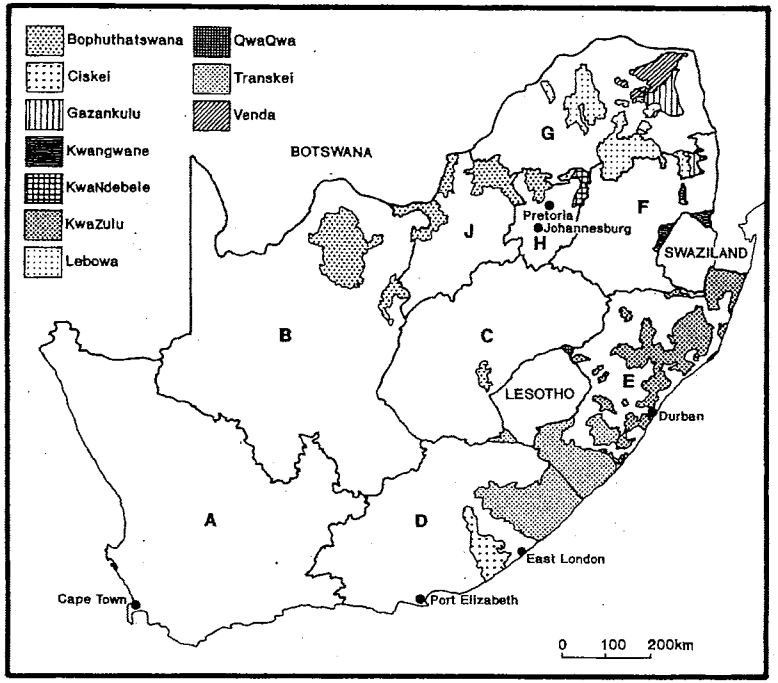
The result was the redrawing of the state map of India on the basis of linguistic patterns in the non-Hindi speaking regions. Subsequent fragmentation, notably in Assam, resulted in the emergence of a number of small states based on the distribution of small ethnic groups (Gopalakrishnan, 1990). It is a measure of the success of the enterprise that the Indian Union has retained its territorial integrity since independence and has not been subjected to military or one-party dictatorship, which has been the lot of so many developing countries. The Indian experience, thus, offers a positive example to South African politicians at a time of as fundamental a change as India experienced at independence.

It is worth noting that Ethiopia, in its current experiment with federalism, has adopted an ethnic approach to the delimitation of regions (Allen, 1993). In contrast, Nigeria abandoned ethnic regions in favour of a development based approach (Ikporukpo, 1986). The current dispute in Nigeria over the establishment of new regions has been taken be a ploy by the military government to delay the return to civilian administration.

The Apartheid Inheritance

Between 1948 and 1990, the National Party government adopted the policy of apartheid with the aim of perpetuating White minority control over South Africa. In pursuit of this policy it established ten African "nation-states," all but one of which were based on linguistic criteria (Christopher, 1994a) (Figure 4.1). However, within the rump South African state the indigenous African population remained in the majority. Indeed in 1991, the White population constituted only 24.7 per cent of the population of the proposed White area and 13.4 per cent of the entire country (South Africa, 1992a). The denial of political rights to the African majority undermined the internal and international legitimacy of the South African government. In practical terms, the policy demonstrably did not work by the 1980s (Christopher, 1994b). The attempt to restrict the majority of Africans to the homelands failed as migrants from the homelands entered the "white" urban areas in increasing numbers. The coercive pass laws designed to prevent this had ceased to be effective by the mid-1980s, and the policy of restricting African movement to the towns was abandoned (Kane-Berman, 1990). The attempt to create additional "independent" homelands in the mid-1980s floundered upon popular resistance (Ritchten, 1989). Finally, the "independent" homeland governments were overthrown by military *coups-d'état* or by popular movements (Peires, 1992). As a result, the South African government was forced to recognize the failure of the policy of apartheid. It was this recognition which prompted the reform initiative of 1990. It should be emphasized that the African experience of the apartheid era left the concept of ethnicity as a discredited political policy (Howe, 1993).

Figure 4.1 Economic Planning Regions and African Homelands in South Africa



The process of political transformation between 1990 and 1994 was overseen by a series of bi-lateral and multi-lateral negotiations between the various political parties and liberation movements. The whole process was dominated by the National Party, which wielded political power, and the African National Congress, which was anticipated to inherit the state apparatus after the first universal franchise elections. Other parties attempted to exert influence over specific issues, such as regionalism, human rights and the place of traditional leaders. One of the aims of the transformation process was to replace the concept of the

devolution of power on the basis of race with one based on geographical regions while strengthening the process of nation-building. The definition of the powers and functions of the regions occupied much of the negotiators' time. Fundamental powers, such as taxation, were left under the control of the central government, suggesting that only limited devolution was envisaged.

The National Party, which had abolished elected provincial councils in 1984 as part of its centralization programme, now sought to create strong regional authorities once it realized the inevitability of losing power over the central government. The African National Congress (1992), in contrast, sought a strong central executive to deal with the problems of social and economic transformation after the disaster of apartheid. Many of the smaller parties, including the Zulu-based Inkatha Freedom Party and the Bophuthatswana and Ciskei governments, sought to retain a measure of the local power they had enjoyed in the era of semi-autonomous African homelands. White right-wing parties continued to demand a separate Afrikaner homeland.

Drawing the New Map

The issue of federalism appeared in the constitutional negotiations as a result of a compromise between the National Party's insistence on "power sharing" and the desire of the African National Congress for a strong unitary state to facilitate national reconstruction and the redistribution of resources. Both parties reluctantly agreed to a limited degree of federalism as a means of concluding the constitutional negotiations. The degree to which the regions have exclusive control over particular functions, including education and social services, will await the practical functioning of the constitution.

The Negotiating Council of the Multi-Party Negotiating Process thus had to devise a series of regions for the new governmental structures. A Commission on the Demarcation-Delimitation of Regions was established to investigate the matter in May 1993. The Commission was instructed to take account of ten criteria:

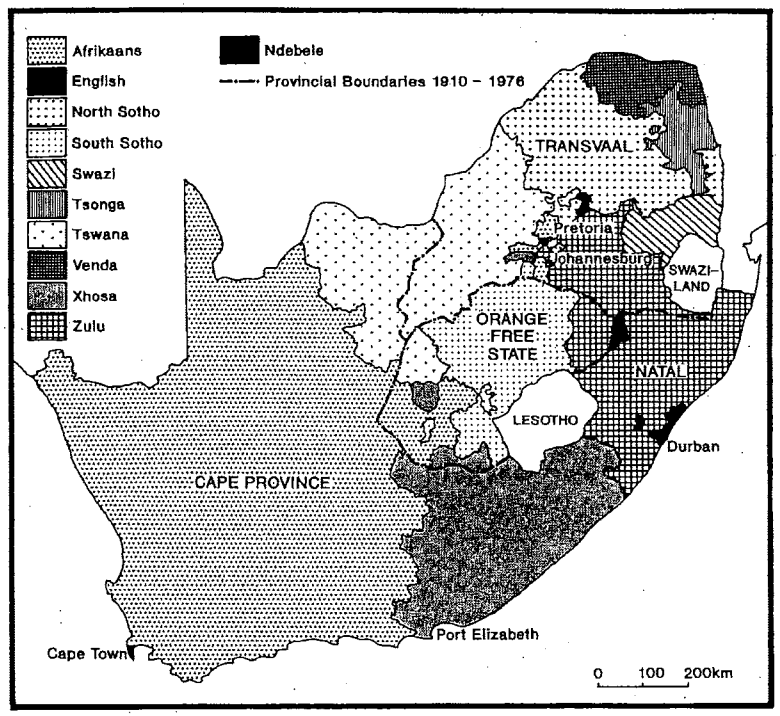
1. Historical boundaries including provincial, magisterial and district boundaries and infrastructures;

2. Administrative considerations including the availability of infrastructures and nodal points for services;
3. The need or otherwise to rationalize existing structures (including the homelands);
4. The need for financial responsibility;
5. The need to minimize inconvenience to the people;
6. The need to minimize the dislocation of services;
7. Demographic considerations;
8. Economic viability;
9. Development potential; and,
10. Cultural and language realities.

These were subsequently compressed into four: economic aspects, institutional and administrative capacity, socio-cultural issues, and "geographic coherence." The commissioners appear to have had little comprehension of the meaning of the latter.

In establishing regional boundaries, the negotiating parties initially concentrated upon the economic aspects of reconstruction and the redistribution of resources. They appear to have been constrained by the map of development regions originally devised as part of the National Economic Development Plan in 1982 (de Villiers, 1981). Some eight (later nine) alphabetically designated regions had been demarcated on the basis of developmental problems and resources (Figure 4.1). These bore little relationship to political and ethnic patterns (South Africa, 1992b) (Figure 4.2). Even more surprisingly, they ignored the boundaries of the nominally independent African homelands. Thus, Transkei was divided in two, while the various portions of Bophuthatswana fell into four regions. Critics had maintained that the government's regional economic development policies had been essentially elaborated in pursuit of apartheid goals (Todes, 1993; Tomlinson and Addleson, 1987). It is, therefore, all the more surprising that these economic planning regions formed the basis of the post-apartheid political regions which were to follow. They were chosen because they were already on the map and, therefore, appeared authoritative and coincided with the political agenda of the National Party seeking to retain control of some of the regions (Humphries, 1992). The economic planning regions also satisfied the broad objectives of the African National Congress in combining relatively prosperous urban and white farming areas with the poverty-

Figure 4.2 Largest Language Groups According to 1991 Census



stricken African homelands as a means of facilitating the redistribution of resources.

The Delimitation Commission received some 80 oral and 304 written submissions. In most cases, the nine planning regions were taken as a basis for the new dispensation, although a wide range of possibilities were proposed (Bernstein and McCarthy, 1993; Pienaar, 1992). Both the African National Congress and the National Party changed their proposals in the course of the negotiations. Two groups remained hostile to the process. The White right-wing parties demanded an Afrikaner *volkstaat* or homeland (*Weekly Mail & Guardian*, 9-15 July 1993). The basic

flaw in all such proposals was that Whites did not constitute a majority of the population in any of the regions devised (du Toit, 1991). The Inkatha Freedom Party was locked in a vicious power struggle with the African National Congress, which had cost several thousand lives since the late 1980s. The Party's demands were more related to Zulu autonomy, even secession (Adam and Moodley, 1993). Indeed, the Zulu king's declaration of "sovereignty" over the whole of Natal and KwaZulu further complicated the constitutional issue (*Eastern Province Herald*, 19 March 1994).

The Commission's proposals in August 1993 satisfied the demands of some but raised criticism from other parties (South Africa, 1993a). The compromise between the National Party and the African National Congress was evident in the unity of the Eastern Cape but division of the Western Cape. A second round of enquiry was then undertaken to examine the more specific questions raised (*Sunday Times*, 12 September 1993). A further 467 written and 177 oral submissions were presented to the Commission. The problems varied from the position of individual districts to the question of the viability of whole regions, when the socio-cultural issues were addressed. In the former case, the place of East Griqualand is significant. The district had been part of the Cape Province prior to 1976, when the Transkei received "independence." For administrative convenience it was then attached to Natal. In terms of communications and trade, links were already with the main centres in Natal, Durban and Pietermaritzburg. However, the majority of the population was Xhosa-speaking, not Zulu. Thus, in ethnic terms, the district had links with the Eastern Cape, not Natal. The fate of the district thus symbolized the broader struggle over ethnicity as opposed to economics in boundary determination. The Commission attached it to the Eastern Cape.

The creation of additional regions was also considered. The unification of the Port Elizabeth and the Transkei-Ciskei areas met considerable opposition from the White population of the former city. The local press and local action groups demanded a reconsideration of the plan. Condemnation of the joining of the two areas was met in the press with phrases such as "save us from this wasteland" and "a disaster in the making" (*Eastern Province Herald*, 6 and 9 July 1993). The different economic interests of the two major cities, Port Elizabeth and East London, were emphasized. However, the ethnic unity of the Xhosa-speaking

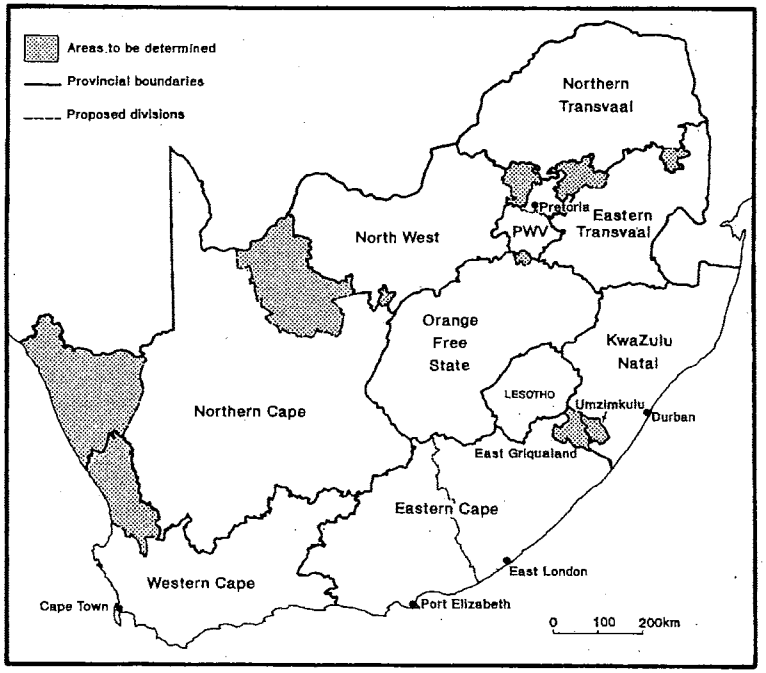
population proved to be a more significant factor in preserving the original proposals for a single Xhosa-speaking region. The economic arguments in favour of a unified region were also politically decisive. The Gross Geographical Product of the unified Eastern Cape region was estimated at R1,553 per head; whereas, if the region were to be divided, the Transkei-Ciskei area would produce only R961 per head compared with R3,587 per head in the Port Elizabeth area (South Africa, 1993b). The economic reasons for the citizens of the latter area wishing for separate status were evident, as were the political planning imperatives to combine a severely poverty-stricken area with an area of greater prosperity.

The second report of the Commission merely endorsed its original findings (South Africa, 1993b). The final constitutional negotiations passed over the question with only limited discussion, and the Commission's recommendations were accepted for the interim period. A number of minor changes only reinforced the basic ethnic configuration of the regions. However, East Griqualand was transferred to Natal, resulting in the Umzimkulu district becoming a detached outlier of the Eastern Cape. The possibility of rectifying this anomaly and indeed effecting further changes was deferred until the government of National Unity could consider the issue.

The New Provinces

The new regions, officially designated as provinces, bore a close relationship, not only to the economic development regions but, to the enthno-linguistic map of the country (Figure 4.3). The new constitution provides for eleven official languages and the promotion of indigenous cultures and mother-tongue education. The delimitation of linguistic based provinces may, therefore, reduce the problems inherent in such a fractured system. The Western and Northern Cape are dominated by Afrikaans-speakers, the Eastern Cape by the Xhosa, Natal by the Zulu, the Orange Free State by the South Sotho, the North West by the Tswana and the Northern Transvaal by the North Sotho.

Figure 4.3 The New Provinces of South Africa Indicating the Areas in Dispute



In the southern Transvaal the picture becomes less clear. The area is dominated by the major urban complex of the Pretoria-Witwatersrand-Vereeniging (PWV) region, which is responsible for generating approximately 40 per cent of the national Gross Domestic Product (Table 4.1). Within this province, no ethnic group is dominant. The population distribution exhibits a highly complex pattern resulting from the apartheid urbanization process, with its attendant series of segregated suburbs. Thus, reflecting the patterns of migration, districts of Xhosa, Afrikaans and English majorities can be determined as well as those linguistic groups which dominate the rural areas adjacent to the conurbation. This province, because of its population size and economic strength, is not only the dominant province in the country but also the most problematical in terms of potential for conflict. The Eastern Transvaal is also multi-ethnic in character.

Table 4.1 Salient Features of the New South African Provinces

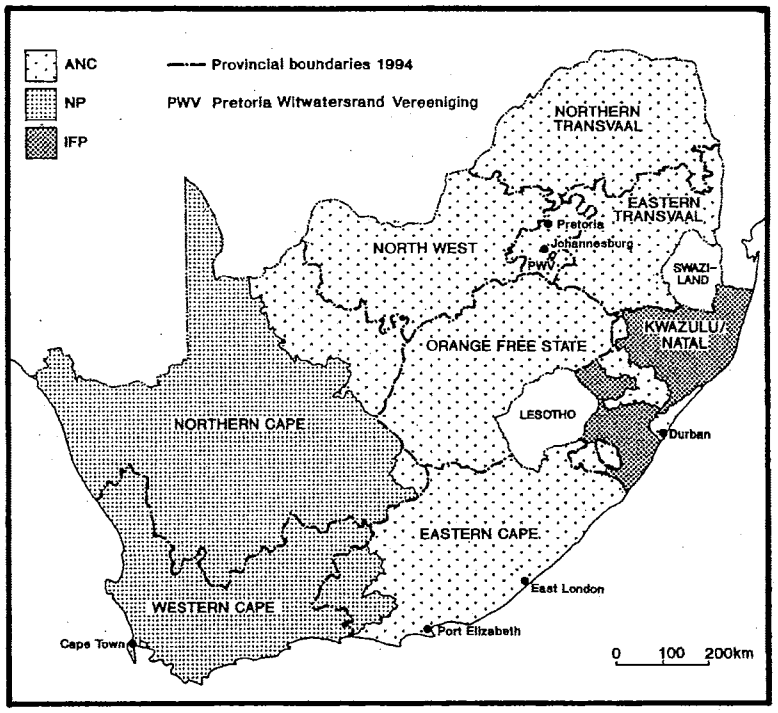
Province	Population (000s) 1993	Nominal GDP (R/head) 1988	Percentage functional urban
Western Cape	3,620	7,326	95
Northern Cape	764	5,890	78
Eastern Cape	6,665	2,317	55
Orange Free State	2,805	5,194	74
KwaZulu-Natal	8,549	3,537	78
Eastern Transvaal	2,838	6,064	43
Northern Transvaal	5,121	1,266	12
North West	3,507	4,092	44
PWV	6,847	10,949	100
SOUTH AFRICA	40,716	5,042	66

Sources: Erasmus (1994); Martins et al. (1994).

The April 1994 Election

In April 1994, the first elections under universal adult franchise were held in South Africa. They took place despite the declaration of a state of emergency in Natal and KwaZulu to stem the bloodshed. In many respects, the results reflected the essentially liberationary nature of the poll, resulting in an overwhelming victory for the African National Congress (Figure 4.4). Ethnicity was thus not the primary issue in most regions. The African National Congress gained control in seven of the nine provinces (Table 4.2). Significantly, the National Party's victory in the Afrikaans-speaking Western Cape owed much to the deliberate and successful fostering of coloured fears of African affirmative action programmes (*Weekly Mail & Guardian*, 8-14 April 1994). The White Afrika-

Figure 4.4 Provincial Election Results, 1994



ner-based Freedom Front failed to demonstrate any substantial support for a *volkstaat* in either the Transvaal or Orange Free State. However, the Inkatha Freedom Party won the majority of the vote in the province of KwaZulu-Natal, from where it may be expected to seek to exercise a high degree of autonomy and pursue a federalist, and potentially secessionist, agenda.

Table 4.2 Provincial and National Assembly Election Results, April 1994

Province	Percentage of votes cast for party				
	African National Congress	National Party	Inkatha Freedom Party	Freedom Front	Democratic Party
Western Cape	33.0	53.2	0.3	2.1	6.6
Northern Cape	49.7	40.5	0.4	6.0	1.9
Eastern Cape	84.4	9.8	0.2	0.8	2.1
Orange Free State	76.6	12.6	0.5	6.0	0.6
KwaZulu-Natal	32.2	11.2	50.3	0.5	2.2
Eastern Transvaal	80.7	9.0	1.5	5.7	0.6
Northern Transvaal	91.6	3.4	0.1	2.1	0.2
North West	83.3	8.8	0.4	4.6	0.5
PWV	57.6	23.9	3.7	6.2	5.3
National Assembly	62.6	20.4	10.5	2.2	1.7

Note: The results for the other 22 minor parties participating in the national and provincial elections have been excluded.

Source: *Sunday Times*, 8 May 1994.

The scale of the African National Congress victory suggests that the vast majority of the electorate was more concerned with the vital issues of national reconstruction and the redistribution of resources than constitutional matters. The success or failure of the federal experiment will, therefore, depend upon how efficiently these economic goals can be achieved under the present constitution. The new provinces may, therefore, become little more than agencies of the central government, as were the previous South African provinces between 1910 and 1994. However, they may be able to promote regional interests within the structures of the governing party to the benefit of their constituents through the decentralization of economic activity.

Postscript

The reality of ethnically defined provinces was noted by the government of National Unity as the clash over the powers and boundaries of the regions gathered momentum after the election. The First Deputy President, Thabo Mbeki, noted that South Africa would be riven with ethnic conflict between its new provinces unless urgent attention was given to building a united, non-racial country (*Sunday Times*, 11 December 1994).

The constitution had provided that disputed districts and the issue of new provinces should be settled by referenda, if 20 per cent of the electors in the area concerned petitioned the government. However, the disputes were conducted with increasing bitterness and violence. The position of East Griqualand was particularly complex as both the Eastern Cape and KwaZulu-Natal governments sought to exercise control over the district (*Imvo*, 10 November 1994). Sensational headlines, such as "Border war over Kokstad," heightened tensions in the main town (*Eastern Province Herald*, 20 October 1994). In the Eastern Cape, the attempt by Port Elizabeth and vicinity to secede was unsuccessful as only 10 per cent of voters signed the petition in favour of a referendum to settle the issue (*Eastern Province Herald*, 27 October 1994). The separation of Pretoria from the remainder of the PWV (now renamed Gauteng) province has been linked to the proposal for a separate national capital territory and so postponed while the issue of the siting of the national parliament is resolved. Recognizing the potential for ethnic conflict, the government has resorted to inter-provincial negotiation rather than referenda to resolve the issue. So far, no boundary changes have been agreed upon, although resolution of the most contentious issues, notably the status of East Griqualand, has been promised early in 1995 (*Eastern Province Herald*, 15 December 1994).

Conclusion

The drawing of regional boundaries in South Africa for an interim quasi-federal government system was accomplished in six months (May to November 1993). The speed with which the issue was finalized suggests that the pressure of political deadlines in the negotiation process

took precedence over a considered judicial or academic investigation, let alone the opportunity to test the opinion of the electorate. The negotiations over the powers and functions of the regions were regarded as of far greater significance than the delimitation of their boundaries. Thus, the latter formed only a minor element in the overall production of the interim constitution for the period 1994-1999. The resulting map emphasizes the continuing significance of ethnicity in the political process, despite widespread suspicion of the concept. Broad ethno-linguistic regions were accepted in a process akin to the Indian experience. However, in no region did a White majority appear, and the quest for an exclusive White homeland has finally been abandoned.

The success of the South African experiment with federalism is dependent upon the wider transition from oligarchy to democracy. The lack of any federalist ethos within the major political parties suggests that the whole exercise could be as irrelevant as many other complex African independence constitutions. However, the experiences of other African Commonwealth countries which have been subject to dictatorial regimes for long periods since independence will act as a salutary warning for the South African electorate. Thus, the willingness of the major parties to accommodate the two significant minority ethnic forces in South African politics, Afrikaner and Zulu, offers encouragement for the future of this compromise solution to accommodating the practical problems of ethnicity within a single state. Most significantly, the general popular acceptance of the interim, and therefore essentially temporary, federal structure suggests that the regions, and their boundaries, may survive the drafting of the country's permanent constitution.

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CHAPTER FIVE

Global Domicide: The Destruction of Home and Place

J. Douglas Porteous

> It is not what they built. It is what they knocked down.
> It is not the houses. It is the spaces between the houses.
> It is not the streets that exist. It is the streets that no longer exist.
>
> James Fenton

People continue to develop attachments to buildings, communities and places. This attachment is violated when such places are deliberately destroyed in the name of progress. We are then left lamenting, as Morris Berman does over his former home in the Bronx, lost to an expressway, in the aptly titled *All that is Solid Melts into Air* (Berman, 1982). Modern novels are replete with evocations of homes lost to planning, development and urban renewal in enterprise cultures. In David Lodge's *Nice Work*:

> Every morning Vic drives over the flattened site of his Gran's house and passes at chimney-pot level the one in which he himself grew up, where his widower father still stubbornly lives on in spite of all Vic's efforts to persuade him to move, like a sailor clinging to the rigging of a sinking ship — buffeted, deafened and choked by the thundering torrent of traffic thirty yards from the bedroom window. (Lodge, 1989:31)

For survivors like Vic's father, life is a matter of clinging to the wreckage until that, too, is destroyed. Lodge's words resonate with me,

personally, for through the broken window of the bedroom in which I slept for many years I can see the docks whose expansion threatens not only my former home but the whole village in which I grew up (Porteous, 1989).

I

Literature on the nature of home is usually quite upbeat, stressing the support given by home-making to personal identity and suggesting that home plays an important role in the phenomenology of being. In contrast, this chapter takes a gloomier view, confronting the normal practices of architecture, planning, business and bureaucracy, all of which are implicated in the destruction of homes and communities (Porteous, 1977).

First, some definitions. Initially it is important to distinguish between locations (which exist as coordinates in space, as in central place theory, and have characteristics but little character), places (which have character, via the process whereby love makes space place) and home (the individual's central place). Home is the landscape of the heart.

The concept of destruction must also be entertained. To destroy: to eradicate, obliterate, abolish, annihilate, efface, erase, expunge, remove, wipe out. When this happens to places, I call it *topocide*, the murder of place (a more mellifluous neologism than such purer locutions as *lococide* or *topothanasia*). When it happens to homes we may speak of *domicide*, the murder of a home. Alternatively, topocide refers to the process, usually performed by elite groups, while domicide refers to the effect, usually experienced by the vulnerable and powerless.

After a small surge of interest in the 1960s, mainly induced by the topocide of Boston's West End (Fried, 1963), geographers and planners have tended to ignore this downbeat theme. Generally, these professions have been too preoccupied with concepts such as growth, top-down hierarchies, and urban dominance, and have failed to investigate the effects of such dominance:

> We recognise, of course, that places "die" but there seems to have been an unwritten assumption that the places to which this happens are no longer important, that they no longer serve a useful purpose — an urban systems application of Darwinian doctrine. Yet there is abundant evidence that these places often continue to have real value to their residents, as witnessed by the passionate protests that attend the threat of extinction and by the way that people will cling on in the most daunting circumstances.... And when "death" is a consequence of public policy... the implications have to be addressed as a matter of social responsibility. (Smith, 1992)

Here, I attempt to look under this as yet unturned stone. One problem, of course, is that we are dealing with environmental intangibles — attachment, grief, loss — which are immeasurable, difficult to articulate, and thus easy to ignore by the cost-benefit brigade. Moreover, certain planners and social philosophers actually celebrate topocide — one thinks of Melvin Webber's "non-place urban realm" (1964) and "community without propinquity" (1963), wonderful, no doubt, for white collar professionals jetting through the one-way streets of the so-called global village, but less charming to those who retain pre-"enterprise culture" values.

The issue, therefore, is not merely loss and change (Marris, 1974) but deliberate change and enforced loss, actions committed by corporations and governments against ordinary people, and, at the world scale, by the North against the South. I am, therefore, concerned with who does what to whom, and why and how and to what effect. Specifically, the premises of this discussion are: that individuals and groups may be strongly attached to home; that home is a component of personal and group identity; that homes are being destroyed at a vast and accelerating rate, at all geographical scales, in peace and war, legally, and in all parts of the world; and that this domicide has negative social and psychological effects on its human victims. To illustrate these points in more detail, I will now discuss domicide in the context of general topocide and attempt to create a tentative typology as a framework for further study.

II

Planning studies include a significant amount of research on the "planned relocation" of groups of residents or even of whole communities. Most emphasis has been placed on the relocation of agriculturalists or the elimination of urban neighbourhoods. There is overwhelming

evidence that grandiose modern planning projects, from Third World "resettlement" schemes to World Fairs, have deleterious effects on impacted social groups. Change almost invariably means loss. Marris (1974) specifically included slum clearance and other planning-related issues along with mourning and bereavement in his general study of loss. Yet, his emphasis on the response to loss (domicide) means that he largely ignores the political and economic causes of loss (topocide). In my *Planned to Death* (1989) this emphasis is reversed, although some degree of balance has been aimed for.

Place destruction occurs at all times and in many regions. It may be due to natural causes, as with the destruction of whole towns by volcanic eruption. Or, it may occur because of deliberate human agency. The destroyed unit may vary in size from a house (Palestine), a neighbourhood (Boston's West End), or a city (*delenda est Carthago*) through the loss of integrity of provinces and counties (the loss of Rutland and other entities during British county-level administrative reorganization in 1974) to whole countries (Poland) and even empires (as after 1918).

The most spectacular efforts at "place annihilation" may be the least effective; Dresden, Hamburg, Hiroshima and Nagasaki have risen from the ashes, an astounding manifestation of place loyalty. Physical deconstruction, using crowbars, bulldozers, explosives, and fire can be effective, as with many cases of cities laid waste by Babylonians, Assyrians, and Romans to the American destruction of the Japanese-Micronesian town of Koror, in Palau, towards the end of World War II. Perhaps, the most effective method is drowning, as innumerable valley villages now below the surface of reservoirs bear witness. The most spectacular cases of drowning are currently ongoing in China and India, which involve the displacement of several million people.

The destruction of places by modern bureaucratic and political fiat is more common than might be supposed. Company towns, or, as they are known more euphemistically, single-industry settlements, are particularly vulnerable to destruction due to resource depletion or changes in market forces. As there are approximately 700 such towns in Canada, the problem has been addressed most frequently in that country. Bowles' *Little Communities and Big Industries* (1982) draws some attention to the issue of community death, including a study of the arbitrary closing and re-opening of the town of Elliot Lake with changes in the world uranium market. Another book by the same author (Bowles, 1981) raises the questions of possible, probable, and plausible futures for company towns in terms of social impact assessment methodology. During the 1970s, I chronicled the efforts of left-wing Chilean governments to rid their land of American-built company towns, hated symbols of economic dependence (Porteous, 1972). In the United States, small towns have commonly been relocated because of resource-extraction demands; one example involved a decision by the US Army Corps of Engineers that the best location for a second power-house at the Bonneville Dam on the Columbia River would be the site of the town of Bonneville itself (Comstock and Fox, 1982).

Contemporary studies of place annihilation more commonly concentrate on Third World locales. Military coercion is only infrequently investigated but has clearly led to the destruction of places through both bombing and the relocation of millions of peasants to resettlement areas, from Afghanistan and Algeria to Vietnam and Zimbabwe. Places have been destroyed or fundamentally reshaped by military policy throughout the Arab-inhabited areas of Israel. I have witnessed the loss of place experienced by Israeli Bedouin concomitant upon increasing military demands in the Negev subsequent to the Israeli withdrawal from Sinai. Coercive political and economic policy underlays the "villagization" policies in Tanzania and Mozambique. George Mackay Brown's *Greenvoe* (1972) chronicles in compelling detail, albeit in novelistic form, the destruction of a Scottish island community when external authorities decide that the island is the best location for a military installation. The inhabitants of numerous islands in the Pacific and Indian oceans — notably those of Bikini, Eniwetak, Kwajalein, Banaba, and Diego Garcia — have been removed wholesale to less viable environments and reduced to misery and penury because of the political, economic and military "needs" of Britain and the United States.

Surprisingly, it was not until 1976 that any significant attempt was made to generate a comprehensive theory of place destruction (Gallaher and Padfield, 1980). The "dying community" seminars held at the School of American Research in Santa Fe, New Mexico, in the 1970s brought together anthropologists, archaeologists, sociologists, psychiatrists, and members of departments of English and Social Work. Although little theory emerged, several insights are important for topocide study. First, the emphasis on the small community; little settlements are

clearly more vulnerable than cities. Second, the affirmation that community death is perhaps less common than community persistence in the midst of decay. Third, that the metaphor of death can be appropriately applied to communities; although sociologists and economists may debate this issue, "few archaeologists or historians will have any reservations on this score" (Adams, 1980:23). Fourth, we may profitably distinguish between communities which die a more lingering "natural" death and those which are "killed" by the violence of man or nature. Fifth, the two most interesting and pertinent questions are: why communities die; and how they die. These questions form the stuff of my *Planned to Death* study (Porteous, 1989), which dealt with a single English village.

More specifically, Gallaher (1980) provides context for the many unrelated case-studies by confirming the dependence of small communities on external authorities. Addressing himself to the deaths of communities which come about as a by-product of corporate policy change, he asserts that:

> The basis for such decisions is not the desire to destroy a community but rather relates more to company production, profits, or changes in technology. Thus, decisions made in distant boardrooms, involving variables not addressing human needs per se, have the incidental effect of destroying a human community. (Gallaher, 1980:93)

Dependence on external authority, further, often breeds a "culture of dependence" which encourages co-option of community inhabitants and discourages protest or reaction.

This emphasis on local powerlessness is confirmed by Padfield who affirms that:

> Clearly, *local* applies to the boundaries of small communities' political power and not to the boundaries of the political ties enjoyed by the industries which dominate them. The effective environment of industry... has grown continually larger, while the effective environment of the local community... has grown smaller. Clues to the mystery of the small community's demise are not to be found locally, but in far away places, like the central headquarters for multinational corporations, and regulatory agencies. (Padfield, 1980:173)

One's geographic sense of community relates to the area over which one feels a sense of control. In small communities dominated by big industries, especially those in which the company controls much of the housing and public services, the individual controls very little. When the individual sense of control is missing it diminishes the general sense of community.

Significantly, the "dying community" seminar series involved no geographers or planners. Little effort was made, therefore, to investigate the effects of normal planning decisions on the life of small communities. Nor have planners themselves paid much attention to this issue. Indeed, the dying community receives less attention in frontier Canada and Australia than future-orientated "boom-town" studies. Clearly, the boom end of the "boom and bust cycle" in frontier zones is deemed more exciting and lucrative. Yet, the growth of scholarly concern for those whose lives are disrupted by either growth or decay renders it imperative that planners and academics alike both provide data on, and interpretations of, such ongoing processes. Too often, despite the growth of social impact assessment, the reactions of the impacted population are simply neglected.

III

A tentative typology of topocide/domicide can best be grasped in terms of the total range of place-unmaking, levels of power, causal agents, and scale.

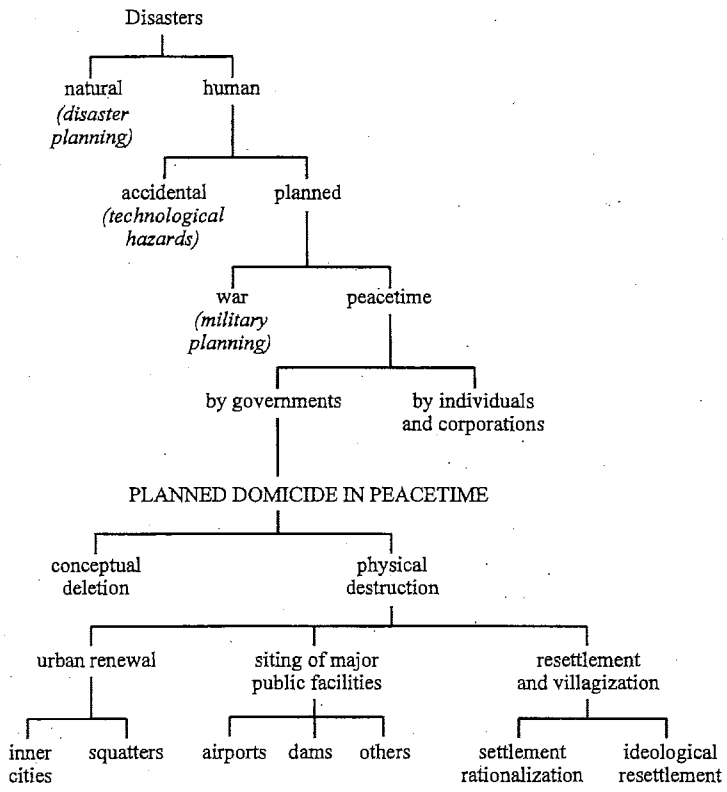
Topocide, defined as the physical destruction of place, is not the only way in which places lose their integrity and identity. The character of a place may be effaced by the extremely rapid growth associated with boom conditions. More generally, the spatial homogenization associated with global capitalism promotes feelings of placelessness in existing settlements (Relph, 1976). Topocide, in contrast, is a more violent process. In terms of power, it is clear that smaller places in the settlement hierarchy are generally at the mercy of the larger. In other words, global interests, often transnational corporations, dominate national interests; national interests in turn dominate regions, and all the above impact upon the local level where most of us live.

In terms of causal agents, topocide/domicide can best be conceptualized as a tree-diagram (Figure 5.1). The first distinction is between natural topocide (acts of God such as earthquakes, tsunamis, and the volcanic eruption which destroyed Clark Air Force Base in the Philippines in 1991) and topocide caused by human agency. The latter dichotomizes into accidental domicide, as occurs in cases of extreme technological accidents, such as Chernobyl, and planned domicide. In turn, planned domicide may occur during war-time (Lidice, Dresden, Hiroshima, etc.) and peacetime. In times of peace, topocide may be perpetrated by individuals, corporations, or governments. The latter are almost always involved in megaprojects ostensibly organized by large corporations.

Planned topocide, by governments, in peacetime, occurs when powerful agencies deliberately choose to delete a place from the landscape. At the larger scale, deletions are more likely to be conceptual, as when entities which command the loyalties of major communities lose their names, power, or identity. Poland is a celebrated example, and the current upheavals in the former USSR and Eastern Europe are cases where submerged identities are reasserting themselves in spatial terms. At the regional level, there has been much protest against the 1974 administrative reorganization of Britain which involved the total loss of several historic counties and the dismembering of others.

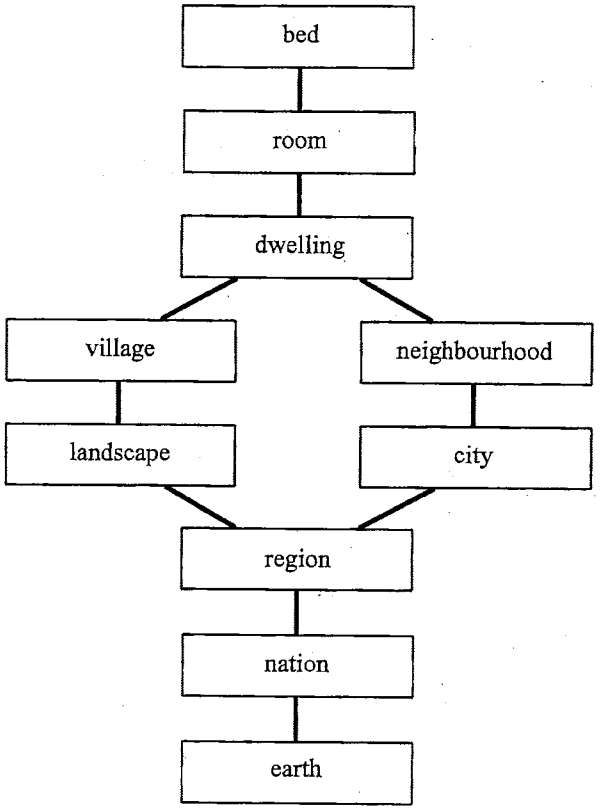
At the smaller scale, such deletions involve physical destruction, as when dwellings, neighbourhoods, villages, and even whole valleys or valley-systems are bulldozed or flooded. Three major types of domicide are apparent. Governments involved in urban renewal have destroyed many inner city neighbourhoods and continued to bulldoze squatter settlements. Major public facilities such as airports and dams often require the forcible removal of the inhabitants of villages, towns, and even cities. Governments interested in rationalizing settlement patterns in order to provide services more efficiently and close down outports in times of economic change have considerably changed the pattern of settlement in Newfoundland, Greenland, and Norway. Ideological resettlement, for greater control of population centres, was until recently very common in South Africa and Mozambique.

Figure 5.1 Domicide Typology



In terms of scale (Figure 5.2), it is clear that, from the individual's viewpoint, domicide can occur at every spatial level from one's bed, through room, dwelling and neighbourhood, to landscape, region, nation, and perhaps the earth itself. Ecological thinking is beginning to convince us that the whole earth is our home. To continue to foul this nest beyond recovery is to commit the ultimate act of domicide.

Figure 5.2 Levels of Domicide



Finally, my research in Britain, Canada and Chile (Porteous, 1972, 1975, 1989) emphasizes not only the motives for and mechanisms of topocide but also the domicidal effects of this violent process upon the uprooted inhabitants of destroyed settlements. Change almost invariably involves loss, and bereavement-like symptoms of grief are common among those uprooted and relocated. Resistance is usually ineffectual.

In the North, relocatees often improve their living standards dramatically, but pay for this in terms of considerable social and psychological disruption. In the South, the uprooted frequently suffer economically as well.

IV

It is possible to extend the above typology by creating a framework for the understanding of domicide which involves twelve characteristic features.

1. Domicide has occurred throughout history. We can cite examples of total settlement destruction from Carthage to My Lai. Nevertheless, the technological capacity to cause domicide has vastly improved since the early nineteenth century, so that domicide has become a major scourge of the twentieth century.
2. Domicide is spatially ubiquitous. Domicide occurs on all continents and in most regions of the globe. The number of people uprooted is significant, perhaps equal to the 15-20 million refugees (from war, political upheaval, famine, and environmental causes) currently recognized by the United Nations. Refugees from domicide are given little official consideration.
3. Domicide is instigated and implemented by powerful elites. These elites may be war leaders, academics (as in South Africa and the former Yugoslavia), government agencies, or powerful corporations. Such elites are often led by a single individual having extraordinary power (Roosevelt, Ceausescu). Their will is implemented through the creation of special authorities (e.g. the Tennessee Valley Authority) and frequently succeeds through the services of the "evangelistic bureaucrat" (Davies, 1972).
4. The motives for domicide include the desire for revenge (Lidice), the desire to uplift economic and social standards (urban renewal, settlement rationalization), ideological beliefs, often involving forms of "ethnic cleansing" (South Africa, Bosnia), the assertion of sovereignty (Inuit resettlement in Arctic Canada), or profit. In all cases benefits accrue chiefly to the elite and are justified on the basis of "the national interests," "the public interests," or similar rhetorical tropes.

5. The victims are often disempowered or poor. These "victims of the common good" (Smith, 1995) are rarely consulted in any manner which could make a difference. Indeed, if the victims are rural people, the elites frequently assume that their lifeways have no value and that future generations would not have wished to continue them.
6. There is usually a law, decree or regulation which justifies the actions taken. Newfoundland's *Resettlement Act* and South Africa's *Group Areas Act* are examples. "Common good" rhetoric is used to support these laws (e.g. "these people are being liberated," or "it is necessary for people to be moved for their own good").
7. Special euphemisms develop during such projects. "Ethnic cleansing" is the best-known, but a great deal of other human misery has been effaced by bland terminology such as "homelands," "designated outports," "Approved Land Assembly Areas," and the like. Rarely are honest terms used, such as "drowning squads" or "oustees" (India).
8. The victims may receive mitigation, but this is not always the case. At best, relocatees may enjoy a new public infrastructure and receive compensation for dwellings, land, and crops lost. Such mitigation is most common in developed countries. In some cases, compensation is still being sought many years after the event. In many cases, small farmers find themselves relocated to poorer land and are forced into city wage-labour.
9. Resistance occurs but is often ineffectual. At first, people do not take the threat of domicide seriously, for the destruction of their homes is somehow unthinkable. Thus, they are often unprepared to resist. When resistance comes, it frequently takes the form of civil disobedience. In court or planning hearings, however, resistors usually cannot cope because they do not operate in the same "world of discourse" as the planning elites (Porteous, 1992). Too often, resistance is seen as mere sentiment by elite groups, who refuse to "compensate for sentiment" and fall back on "common good" rhetoric.
10. Home is destroyed, and a place lost. Relocatees must adapt to strange new places. What is lost ranges from a mud hut to a civic treasure or a whole landscape. For the oustees, there is loss of identity, loss of possessions, loss of memories, loss of security, loss of social networks and community, financial loss, and severe inconvenience at best. The greatest loss is to those who have worked the land or who, like aboriginal peoples, have a special relationship with their land.
11. Grief and sadness are common among victims. "Relocation trauma" frequently mirrors the stages of bereavement. Many mourn lost land or lost ancestors. Some are physically and mentally affected. Old people, in particular, may die or commit suicide. For the majority, grief may turn into resentment against authority. Although a few may enjoy new benefits, most suffer in some way.
12. Victims are compelled to adapt through a significant process of change. "Strategic change management" notwithstanding, many relocatees eventually find themselves in situations which cannot match what they have lost.

The last ten characteristics form an operational sequence which outlines the domicide process. Despite a broad range of measures, means and motives, these twelve features are common to most projects involving domicide.

V

In conclusion, there is considerable evidence that grandiose modern planning projects involving domicide have severe deleterious effects on impacted populations. Much research is required on the effects of past, current and imminent projects, especially in the Third World, where vast valley-drowning schemes are on line in India and China. And, mechanisms for both prevention and mitigation demand the attention of planners and citizen groups.

Attachment to place is a common human trait. Recent work in France (Burgel, 1992) suggests that attachment is the strongest at the extremes of the spatial spectrum, i.e. the dwelling and the nation, and the next strongest at neighbourhood and regional levels. These are the spaces people fight for and grieve over. They certainly complain that changes brought about without consultation drastically reduce their self-esteem, feelings of control, and the ability to make choices. Domicide is not democratic at the grassroots level. Yet, land-use theory continues to speak of the "invasion and succession" of urban land-uses as if

dealing with plant rather than human communities. Theorists still subscribe to the notion of the "highest and best use" of land, expressing this chiefly in financial terms. Ideas about land-use efficiency rarely focus on social efficiency and have little to say about intangibles such as the psychic relationships between people and place.

Domicide is extremely common throughout the world and is probably increasing. It is euphemistically explained away as "progress" or "development" or as being "in the interests of the nation" (which often means in the interests of plutocrats and professionals). And thus, topophilia becomes topophobia, and domicile becomes domicide.

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CHAPTER SIX

Globalization, Postmodernity and Development in the Commonwealth Caribbean

Robert B. Potter
Graham M.S. Dann

Introduction

As elsewhere, there is a growing public and official awareness of the pressing nature of environmental and ecological issues in the Caribbean. Such concern is witnessed in a number of different ways, not least in the attendance of Caribbean representatives at the Earth Summit or United Nations Conference on Environment and Development held in Brazil in June 1992, and the associated emergence of Agenda 21. Many also participated in the deliberations of May 1994, when Barbados acted as host for the United Nations conference on sustainable development strategies in small island states.

In popular terms, environmental awareness is shown by the Peoples' Parks which sprang-up in many areas of Barbados at the end of the 1980s, testifying to spontaneous efforts on the part of the public to beautify the environment. It is also demonstrated with the appearance of various environmental associations, "green teams" and conservation strategies undertaken by the Barbados National Trust and other NGOs. The longstanding efforts of West Indians with respect to the upkeep of their popular dwellings (Potter, 1992a, 1994), and in relation to family land (Barrow, 1992), also attest to this recognition of the salience of the environment and the need to promote sustainability.

By contrast, Lowenthal (1961) observes that land and the environment in the region are primarily evaluated in commercial terms. He

argues that, compared with Pacific island communities, in the Caribbean land is invested with little in the way of spiritual or religious meaning. Seeking to reconcile these two apparently contradictory facets of contemporary Caribbean life, Potter (1992b) attempts to combine the results of a cognitive empirical survey and a political economy perspective. Such a task is relatively simple, for it is the history of these territories together with the activities of the state in effectively selling land — or the right to use land — to the highest bidder, that has led to this situation.

In the Caribbean, land has always been a vehicle for short-term profit, not a resource to be husbanded for future generations (Richardson, 1992). Further, economic benefits from Caribbean environments have primarily accrued to outsiders. This is perhaps nowhere better attested than in the realm of tourism. For example, it is estimated that 70 per cent of all tourist expenditure in the Caribbean is repatriated, primarily as a result of the foreign ownership of hotels and the importation of foodstuffs. In Barbados, 75 per cent of Grade I hotels are foreign owned (Potter, 1983). In several instances, whole islands have been sold to private concerns. Thus, Colin Tennant, now Lord Glenconner, purchased the island of Mustique for $45,000 in 1957 (Miller, 1992).

In other words, while there may be a rising tide of environmental consciousness in the Caribbean, this is unlikely to be transformed into increasingly sustainable forms of development in nations where land has so often in the past been sold to the highest bidder, and where states are desperate to *"modernize."* And, this is in a world which is increasingly being referred to as being influenced by *"post-modern"* trends.

This makes for some early conclusions that are more generally applicable than to the Caribbean alone. First, sound development involves maintaining a careful balance between indigenous peoples and their environments, taking into account exogenous influences and pressures on development. Secondly, all too frequently, it is poverty and inequality amongst people that ultimately result in the destructive and wasteful use of the environment.

A Brief Overview of Caribbean Environment and Development

The Caribbean is, of course, one of the most transformed environments in the world. As both Watts (1987) and Richardson (1992) emphasize in their recent texts, within a matter of 40 years of the initial establishment of settlers, the natural vegetation cover of small islands such as St. Kitts and Barbados was completely cleared and replaced by colonial plantation agriculture, generally tobacco and then sugar. This "Great Clearing" organized from without led to sensational cases of soil erosion, for example, in the cases of Martinique, Guadeloupe, and the present-day Dominican Republic and Haiti, as noted by both Watts (1987) and Richardson (1992), and set the scene for present-day land degradation. Other smaller scale examples include those which characterize the Scotland District of Barbados, and the Yallas Valley of Jamaica (McGregor and Barker, 1991).

In most Caribbean nations agriculture remains the mainstay of the economy, with cash crops generally providing between 60 and 85 per cent of total exports and between 20-40 per cent of GDP. Nevertheless, most Caribbean countries import a very high proportion of their day-to-day food needs — frequently as high as 30 per cent (Potter, 1993a; Potter and Welch, 1994). Furthermore, the Caribbean is one of the most demographically and racially transformed environments. During nearly 400 years of slavery, an estimated 4.6 million African slaves were brought against their will into the region (Richardson, 1992).

Yet, despite the fact that the economies of so many territories are so strongly based on agriculture, the Caribbean is highly urbanized, showing a larger urban proportion than the world as a whole (Potter, 1993b). In terms of early settlement patterns, plantations dominated inland and formed the only salient unit of the settlement fabric (Rojas, 1989). All that was necessary in addition was a point of commercial, administrative and political control. This external imposition of mercantile and commercial control during the early colonial period witnessed strong linear-urban concentration within most Caribbean territories.

On the small islands of volcanic origin, these patterns clearly relate to physical conditions, for flat land is frequently restricted to the immediate coastal zone. However, they have been intensified in socio-economic terms by post-war paths to development, which have stressed

enclave manufacturing, offshore banking, and recently, data processing. The region was quick to assimilate the industrialization by invitation model, at least in part because it was a West Indian economist who did so much to advance the approach in the first place (Lewis, 1950, 1955). But, tourism has also been causal in this respect. Whilst the region is home to 35 million inhabitants, it is also the vacation playground for over 8 million North American, European and other tourists every year, amounting to 3 per cent of the world tourist trade. Tourism in particular has given a new expression to coastal-urban development in many territories. It is also connected with cultural dependency, neo-colonialism and neo-dependency.

Elsewhere, one of the present authors has argued that the differential adoption of such an array of activities has affected the varying economic profiles of Caribbean states and goes a long way in explaining the degree to which development and change are sustainable in the different constituent parts of the region (Potter, 1993a). Yet, one of the major characteristics of Caribbean states remains their general level of poverty (Table 6.1). Thus, Guyana currently returns a GDP per capita of around US$454 per annum, Jamaica 1,442 and the Windward Islands around 2,300-2,700 per annum (Caribbean Development Bank, 1992).

As in most post-colonial states, in the post Second World War period, Caribbean states have endeavoured to modernize as the royal road to catching up. Thus, Barbados in its 1979, 1983 and 1988 National Development Plans emphasized the need to modernize. Indeed, Barbados has achieved a good deal in the past thirty years and, with a GDP per capita of 6,572 at current prices in 1991, is regarded as a More Developed Country (MDC) within the Developing World. But, the intention to "catch-up" still remains, and in the run up to the 6 September 1994 elections, the leader of the Democratic Labour Party (DLP), David Thompson, stated publically that by the year 2005 Barbados would be a "First World Country." Although a contradiction in terms, such a statement signals clearly the intention to follow the path set by the so-called developing countries. Indeed, David Thompson continued by citing in support of his assertion that United Nations data showed Barbados in twentieth position in terms of GDP per capita, ahead of Ireland and Portugal.

However, the overriding intention of the present chapter is not to dwell on people-environment-development relations in the past but to focus attention on their likely nature and implications in the near future, in relation to the prospects for environmental sustainability in the region. In our eyes, the Caribbean currently faces two major threats which relate directly to people and the environment, and it is to these that the account now turns.

Table 6.1 Selected Indicators for Caribbean States

Country	Area (km^2)	Population (000s) mid-1991	GDP per capita 1991 US$
Bahamas	13,942	259.0	–
Barbados	432	258.1	6,572
Guyana	214,970	754.7	454
Jamaica	11,424	2,425.5	1,442
Trinidad and Tobago	5,128	1,237.4	4,266
Belize	22,960	189.4	2,089
Antigua and Barbuda	440	64.0	6,591
Dominica	750	71.2	2,491
Grenada	345	90.6	2,319
Montserrat	102	11.0	5,387
St. Kitts and Nevis	269	43.0	3,974
St. Lucia	616	154.4	2,730
St. Vincent and the Grenadines	388	107.6	2,630
Anguilla	91	8.5	6,778
British Virgin Islands	150	16.7	10,479
Cayman Islands	264	26.5	28,270
Turks and Caicos Islands	417	12.5	5,975

Source: Caribbean Development Bank (1992).

Global Environmental Change and Contemporary Caribbean Development

The first threat stems from the fact that, like most Third World nations, whilst they contribute but little to greenhouse gases, Caribbean nations

potentially stand to be the most affected by global warming and climate change. It has been estimated by the Intergovernmental Panel on Climate Change (1990, 1992) that there is likely to be a regional precipitation decrease of up to 350 mm per decade, accompanied by the likelihood of increased seasonality and the tendency towards fewer, but more intense rainfall events (see also Smithson, 1993, for a more general account).

These physical environmental trends should be viewed in a context of rapid population increase and residential expansion in the region, due both to demographic change and the trend towards smaller household size. In St. Vincent, for example, the major growth in population during the last ten years has been in the outer suburban zones of Kingstown (see Potter, 1992c). Most of these areas are mountainous, the existing settlement being on the limited coastal plain. It has been estimated that in localities such as Upper New Montrose, Camden Park and Ottley Hall, as high a proportion as 30-40 per cent of the population are squatters (Potter, 1994). Much the same can be said of River Road and Grand Anse Valley in St. George's, Grenada. Thus, at the very time when there may be the chance of greater storm damage, residential development is occurring rapidly on less favourable land.

And, this is not just happening on steeper and less stable land, it is also occurring on flatter, low-lying and marshy areas, many of which are adjacent to the sea. This is true of the Conway, Four-a-Chaud and Bananes residential communities of Castries, St. Lucia. In the case of the windward coast of St. Vincent, there are literally hundreds of families living on the upper parts of the beach facing the full force of Atlantic storms. Many of these residents are there because plantation owners instructed them to move to the beach (see Robertson, 1987; Potter, 1994). The passage of Hurricane Allen for instance on 4 August 1980 resulted in extensive damage in the Byera-Mangrove-Gorse areas of eastern St. Vincent. Despite a resettlement scheme financed by the British Development Division, given the overall housing situation, a very substantial number of beach dwellers remain today (Potter, 1994).

The fact that states have provided little technical building assistance to members of the general population, in the form of information handouts, self-help manuals, peripatetic and advocacy planners, is particularly worrying in these circumstances (see Potter, 1994, for a detailed account). For example, in the wake of the passage of Hurricane Gilbert

in September 1988, it was estimated that 70 per cent of all Jamaican dwellings had been damaged or destroyed, thereby obliterating most of the gains made with respect to housing in the period since independence (Clarke, 1989). As in any such storm event, the main occurrence was the lifting of flat corrugated roofs. The simple expediency of constructing traditional hip and gable-roofs would greatly reduce the incidence of such damage (Potter, 1994).

Globalization, Postmodernity, Environment and Caribbean Development

The second major issue relates to the process of *globalization* and its impact on the Caribbean. Globalization may be interpreted as a set of socio-economic and cultural processes which in certain respects leads to homogenization, but which in others witnesses the emergence of growing differences between world regions and localities. Globalization thus relates to the processes of *convergence* and *divergence* both of which are evident in the Caribbean context (Potter, 1993b). Convergence relates to the increasing tendency towards the adoption of western models and modes of consumption, so that places are becoming ever more similar in this respect. On the other hand, divergence relates to the increasing differences which are occurring between places with respect to production, the ownership of capital and decision-making.

A salient argument is that convergence on western norms of consumption is raising propensities to consume far more quickly than production can be increased. The net result is a rising tide of imports, a burgeoning of the informal sector, and an increasing dependency on overseas markets. The role of the so-called tourist "demonstration effect" is critical in this process. The lack of indigenous principles and practices of development is noticeable throughout the Commonwealth Caribbean region. Only Grenada during the 1979-1983 Peoples' Revolutionary Government under Maurice Bishop seriously endeavoured to indigenize tourism and associated patterns of development (Brierley, 1985; Potter, 1993a; Potter and Welch, 1994).

Within the dominant capitalist world system, urban areas have traditionally acted as the principal points of articulation in this complex, and frequently contradictory, process of global economic, social, cul-

tural and environmental change (see Potter, 1993b). Whilst it is true that there has been considerable *cultural resistance* to such processes, this seems generally to have been overshadowed by the hegemony of *economic* and *political* influences in the region.

The influence of the mass media, and that of television in particular, is likely to be especially critical here. The televising by local channels of North American soap operas may well lead to a mismatch between extant lifestyles and aspirations, along with the metropolitanization of tastes, preferences and desires. The potential scale of the trend can be ascertained from data on the use of household amenities taken from the 1990 Census for Barbados (Table 6.2). These data indicate that ownership of television and radio receivers is near universal among even low-income households. Further, a surprisingly high proportion have a video recorder, even among those who live in all wood houses. The rapid spread of cable television adds a further twist to this development in a postmodern setting. Recent discussions in Trinidad witnessed that, in certain areas of Port of Spain, a quarter of household are thought to have installed cable television.

This situation is particularly applicable in the Caribbean regional context, where traits of postmodernity in the socio-cultural realm contrast starkly with the continued efforts of the state to "modernize" the economy. We have recently written about this phenomenon in respect of the Caribbean (Dann and Potter, 1994, in press), where tourism is closely associated with the postmodern condition, via the activities of both multinational companies and individual tourists (Urry, 1990, 1991). Further, tourism can be regarded as emblematic of fantasy, created imagery, hyper-reality and commodification. Specifically, Third World destinations which are trying to *modernize* are playing host to the *postmodern* "Future Shock" denizens of the First World.

Such a situation is conducive to the promotion of "paradise," where the "simulacrum" is more pervasive and more important than reality itself — a major characteristic of postmodernity in which the mass media and multinational businesses create images to promote their own ends. It is in this light that the "*sun, fun, rum,*" and "*sand, sea and sex*" images which render the Caribbean the status of an exotic beach can be interpreted; whilst the realities of highly unequal environmental and socio-economic conditions remain largely ignored. Thus, whereas indigenous views of the environment perforce stress economic values

Table 6.2 Availability of Household Appliances by House Type in Barbados, 1990

Material of outer walls of dwelling	Number of occupied dwellings having household appliances in use											Total occupied dwellings
	Radio	Television	Video recorder	Telephone	Refrigerator	Washing machine	Solar water heating	Other water heating	None of these	All of these	Not stated	
Wood	25,566	21,797	8,347	13,719	21,769	1,424	286	845	1,610	273	854	30,004
(%)	(85.21)	(72.65)	(27.82)	(45.72)	(72.55)	(4.75)	(0.95)	(2.82)	(5.37)	(0.91)	(2.85)	
Wood and concrete block	13,971	13,968	7,282	12,026	14,210	3,089	1,256	2,204	72	1,120	201	15,090
(%)	(92.58)	(92.56)	(48.26)	(79.70)	(94.17)	(20.47)	(8.32)	(14.61)	(0.48)	(7.42)	(1.33)	
Wood and concrete	829	843	443	714	843	197	83	148	4	76	14	907
(%)	(91.40)	(92.94)	(48.84)	(78.72)	(92.94)	(21.72)	(9.15)	(16.32)	(0.44)	(8.38)	(1.54)	
Concrete block	23,615	23,765	14,548	21,569	24,291	11,963	9,400	4,503	96	6,961	394	25,529
(%)	(92.50)	(93.09)	(56.99)	(84.49)	(95.15)	(46.86)	(36.82)	(17.64)	(0.38)	(27.27)	(1.54)	
Stone	2,130	2,149	1,191	2,085	2,208	1,367	840	702	30	775	71	2,401
(%)	(88.71)	(89.50)	(49.60)	(86.84)	(91.96)	(56.93)	(34.99)	(29.24)	(1.25)	(32.28)	(2.96)	
Concrete	1,082	1,075	663	994	1,100	555	496	217	6	340	13	1,150
(%)	(94.09)	(93.48)	(57.65)	(86.43)	(95.65)	(48.26)	(43.13)	(18.87)	(0.52)	(29.57)	(1.13)	

Table 6.2 Availability of Household Appliances by House Type in Barbados, 1990 (Cont'd)

Others	96	84	42	80	91	48	23	25	6	21	5	115
(%)	(83.48)	(73.04)	(36.52)	(69.57)	(79.13)	(41.74)	(20.00)	(21.74)	(5.22)	(18.26)	(4.35)	
Not stated	7	6	4	7	7	1	1	0	0	1	8	15
(%)	(46.67)	(40.00)	(26.67)	(46.67)	(46.67)	(6.67)	(6.67)	(0.00)	(0.00)	(6.67)	(53.33)	
Barbados	67,296	63,687	32,520	51,194	64,519	18,634	12,385	8,644	1,824	9,567	1,560	75,211
(%)	(89.48)	(84.68)	(43.24)	(68.07)	(85.78)	(24.78)	(16.47)	(11.49)	(2.43)	(12.72)	(2.07)	

Note: Percentage of total occupied dwellings in brackets.
Source: Barbados Population and Housing Census (1990).

(Lowenthal, 1961; Potter, 1992b), external perceptions are being moulded to focus on a contrived view of the environment, one which carefully filters out the realities of poverty and deprivation (Dann and Potter, 1994). This fabrication can also be referred to as the "*Coconut Bar*" syndrome, effectively involving the peddling of paradise as a commodity.

Postmodernism is also associated with the hawking of heritage for the purpose of the promotion of tourism. This is well-illustrated by the Barbados National Trust's Heritage Passport which offers discounts to those visiting various historic sites, including a number of plantation houses, military posts, the museum and the synagogue (see Figure 6.1). The advertisement for the passport specifically invites the discerning visitor to reject the sun, sea and sand formula. But there is an associated danger here that, in the interests of attracting and pleasing tourists, the real history of these sites is obfuscated or totally misrepresented.

Typical examples of such an occurrence are afforded by the promotion of plantation-based holidays, where the realities of slavery are at best ignored or at worst intentionally misrepresented. Thus, for example, a recent advertisement for the Sunbury Plantation House, one of the attractions included in the Barbados Heritage Passport, emphasizes features such as the "mahogany antiques," "the original old prints," together with elegant horse-drawn carriages in creating a vivid impression of life on a sugar plantation in the 18th and 19th centuries which visitors are very welcome to see. The logo of this stately home shows an elegantly dressed lady, complete with parasol, descending from a carriage where the horses are being tended by a groom (Figure 6.2). There are no references of any sort to the hardships and horrors of plantation slavery which made such opulent living possible in the first place. In much the same vein, a recent advertisement (Figure 6.3) for a plantation house hotel in Bequia, St. Vincent and the Grenadines, avers that the hotel is a place to which visitors go "not to escape the realities of life, but rather to return to them." Suffice it to say that returning to the realities of the plantation system would indeed be sobering for such tourists.

As a further example, in St. Lucia, a 488 acre all inclusive holiday resort has been developed on the site of the former Jalousie Plantation. This complex of cottages is set between the Pitons, one of the most scenic spots on the islands. The complex was initially developed by Lord

Figure 6.1 Advertisement for the Barbados National Trust's Heritage Passport



Figure 6.2 Advertisement for Sunbury Plantation House

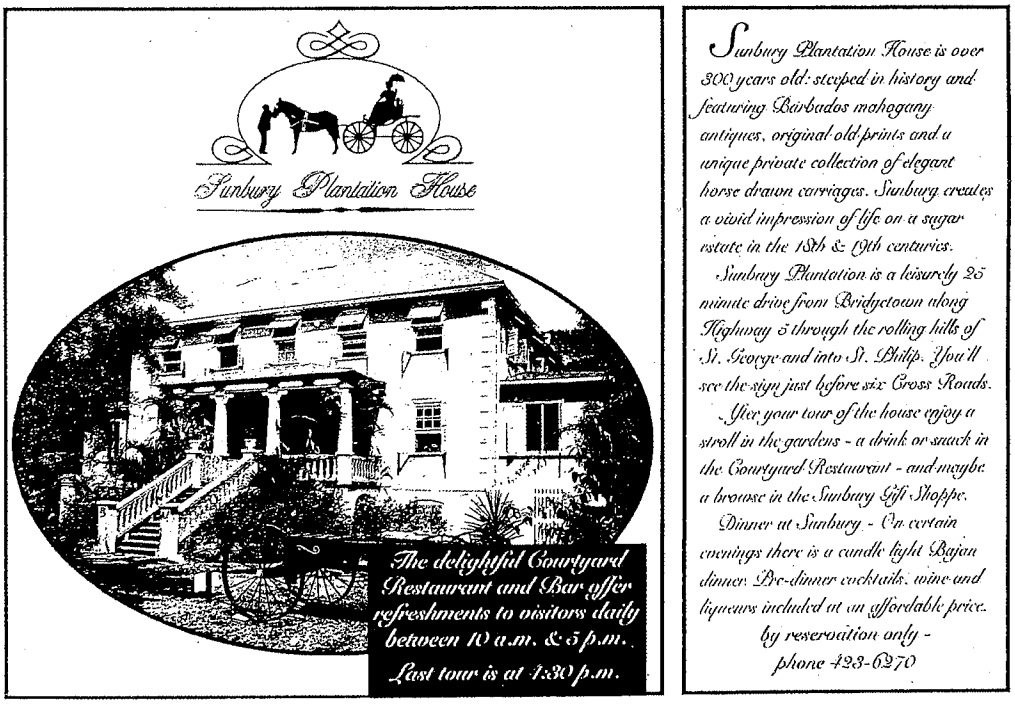
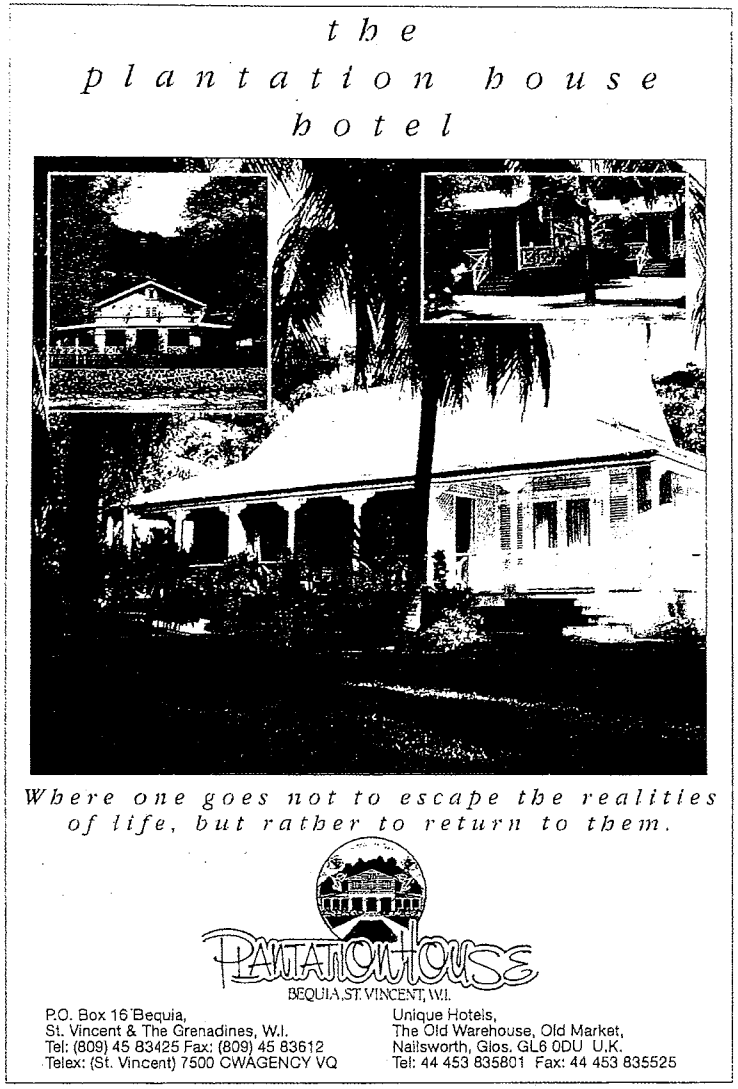


Figure 6.3 Advertisement for the Plantation House, Bequia



Glenconner, who bought the land for £200,000 following his departure from Mustique. However, the resort, which opened in September 1992, was in the end developed with investment from several Iranian families. It was built despite a good deal of environmental outcry and opposition over the eight-year planning period, not least from Sir Derek Walcott, Nobel laureate and a national of St. Lucia (Davies, 1993). The resort complex now features strongly in the offerings of a number of leading package tour operators in the United Kingdom.

Just as symptomatic, a floorshow in Barbados under the title "Barbados by Night" invites potential members of the audience to come along and experience what are described as "the cultures of the Caribbean as influenced by the Spanish, French and *African settlers*." By such means, the greatest enforced movement of slave workers in history is reduced to the status of a seemingly voluntary migration, presumably lest this should offend those who are on vacation (see Dann and Potter, 1994, for further examples). The re-interpretation of history, heritage and present-day circumstances in ways which ease the consciences of tourists is, of course, all too common. The important point is that such devices appear to be in the business of negating any barriers which might result in fewer tourists. The fact that such misinformation is rendering many visitors profoundly ignorant about the communities that are hosting their visits does not seem to be regarded as worthy of serious concern.

But, the central argument is that such machinations are blurring the boundaries between fact and fantasy in such a way as to allow states to continue to expand tourism for commercial gain, even when ecological and/or socio-cultural saturation may have been reached. In Barbados, for example, it is argued that 80 per cent of the west coast coral reefs are now dead, and most of the Caribbean Sea on the leeward side of the island has been entirely screened off by development. In so far as Barbadian tourism seems to be becoming increasingly unsustainable — both ecologically and socially — so it is probably necessary to ponder the sustainability of that nation's entire pattern of urban and economic development in the past twenty-year period, during which tourism has increasingly invaded all parts of the society (see also Dann and Potter, 1994).

The subtlety of contemporary relationships between people and environment, fact and fantasy, and tourism and development is well exemplified by an event which occurred in late 1993 and early 1994. The

Barbados Wildlife Reserve, located in St. Peter, is a tourist attraction which is promoted as an "Untamed paradise... situated in a lush mahogany forest, where uncaged animals are undisturbed in an idyllic environment." Within this promotional discourse it is noticeable once again how images of the beautiful and bountiful natural environment predominate. But in November 1993, the British Union for the Abolition of Vivisection (BUAV) published evidence of hundreds of African Green Monkeys being kept in tiny cages out of public view, awaiting export for laboratory research (Figure 6.4). BUAV mounted a boycott of Barbadian holidays during the busy season for holiday bookings, in respect of a country that had until very recently been losing tourists (Dann and Potter, 1994).

The theme of unspoilt nature also features strongly in a recent advert giving details of Outdoor Tours on the East Coast of Barbados (Figure 6.5). Prospective participants are invited to "experience the life of a 16th century [sic] Barbadian Amerindian Carib for one wonderful day as you escape to the unspoilt areas of Barbados that are as beautiful today as they were three and a half centuries ago when the island was discovered." Leaving aside the fact that the great clearing of the island is entirely ignored, errors are compounded when it is stated that "At lunchtime the atmosphere is typically *Carib* with a three course traditional *planters lunch*." The confused environmental and historical picture is presented in an advert which depicts safari outfits, and on examination it becomes clear that the head of the figure on the extreme left of the main photograph has been altered and superimposed.

The theme of heritage being re-worked in relation to the promotion of tourism is also illustrated in the Caribbean by the redevelopment of waterfront areas, such as in Curacao, Netherlands Antilles; Bridgetown, Barbados; and St. John's, Antigua. In the case of the latter, Thomas (1991) has recently shown how, since 1980, an area of nineteenth century buildings on the waterfront in St. John's has been restored and renovated. This commercially gentrified area, known as Redcliffe Quay, now includes boutiques, restaurants, a disco and commercial offices. Following this, the Heritage Quay shopping complex to the north was developed and includes expensive outlets such as Gucci, Benetton, The Body Shop, Little Switzerland and Colombian Emeralds. Thomas refers to the Redcliffe Quay area as restored architecture for sale to the North American tourist, a process stemming directly from the fostering of an image



Figure 6.4 BUAV's Campaign against Barbados' Involvement in the Sale of Wild Monkeys

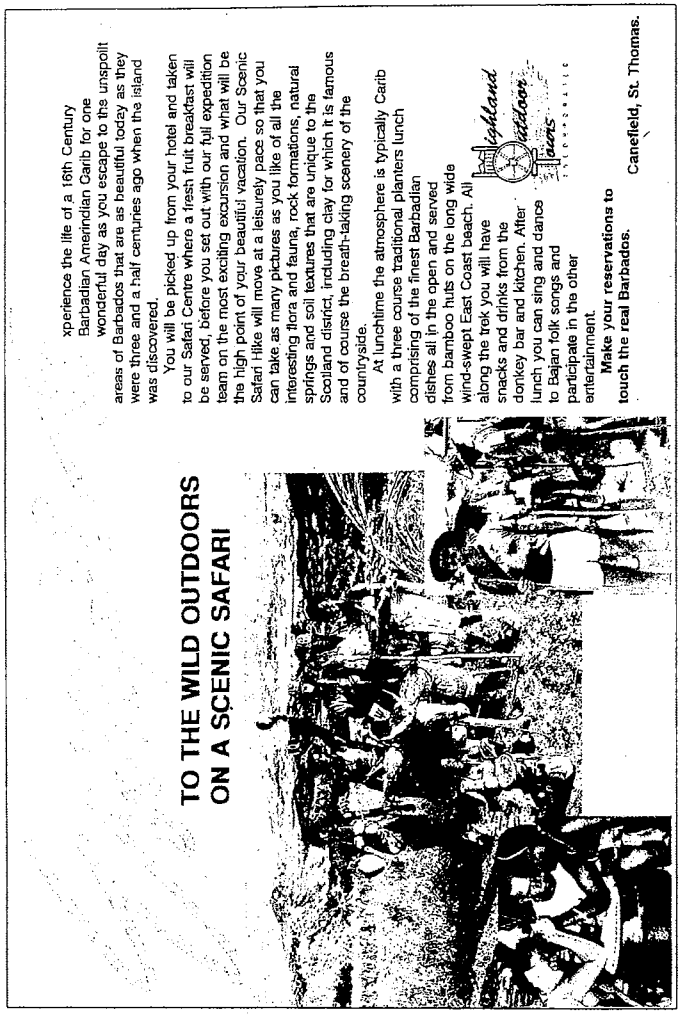


Figure 6.5 Advertisement for Highland Outdoor Tours

of paradise created by the North American tourist industry, so that the "central point here is that tourism has led to the production of the built environment of St. John's as a commodity for sale to foreigners" (Thomas, 1991:482).

The expression of postmodernity clearly leads to all manner of strange paradoxes. Another example is that whilst the local sustainable Caribbean vernacular architectural house form suffers from state, elite and consensual rejection (see Potter, 1992a, 1994), at the same time, it is both promoted and lauded within the private and tourist sectors. This contradiction reflects the drive for modernity on the part of the state and elites, whilst the tourist sector seeks to return to the small-scale delights of the pre-modern or vernacular house form, in order to attract customers. Despite calls to use modular, movable folk houses, state policy has involved concrete houses — whether in the form of the barrack-like structures of central Castries, or the starter houses of Barbados.

All of this is well exemplified in the case of the Chattel House Shopping Village, which is located in that most touristic of spots, St. Lawrence Gap, Barbados (Figure 6.6). It consists of a number of replica vernacular houses, each of which is the base for a tourist-oriented shop (Dann and Potter, 1994). There are a large number of further developments of this type in the commercial sector, including the Chattel Plaza and Sandy Bank retail centres on the Hastings and Worthing coasts.

Similarly, whilst planners ignore the possible contributions of the traditional low-income house, the multinational Marriott Hotel, Sam Lords Castle has just as busily set up chattel houses and rum shops (Figures 6.7 and 6.8) within its grounds and, from them, serves buffet meals to its guests (Dann and Potter, 1994). Such happenings are leading to other features of postmodernism in the blurring of boundaries and the establishment of playful placelessness. During June 1994, Banks (B'dos) Breweries Ltd. built a replica of a Bajan chattel house in its Wildey, Bridgetown grounds, in order to satisfy tourist's numerous requests for souvenirs (Figure 6.9). As can be seen, interestingly, in the newspaper article which appeared in the *Advocate*, such houses were described as "old-time Bajan chattel houses" — or effectively as things of the past.

Figure 6.6 Advertisement for the Chattel House Shopping Village

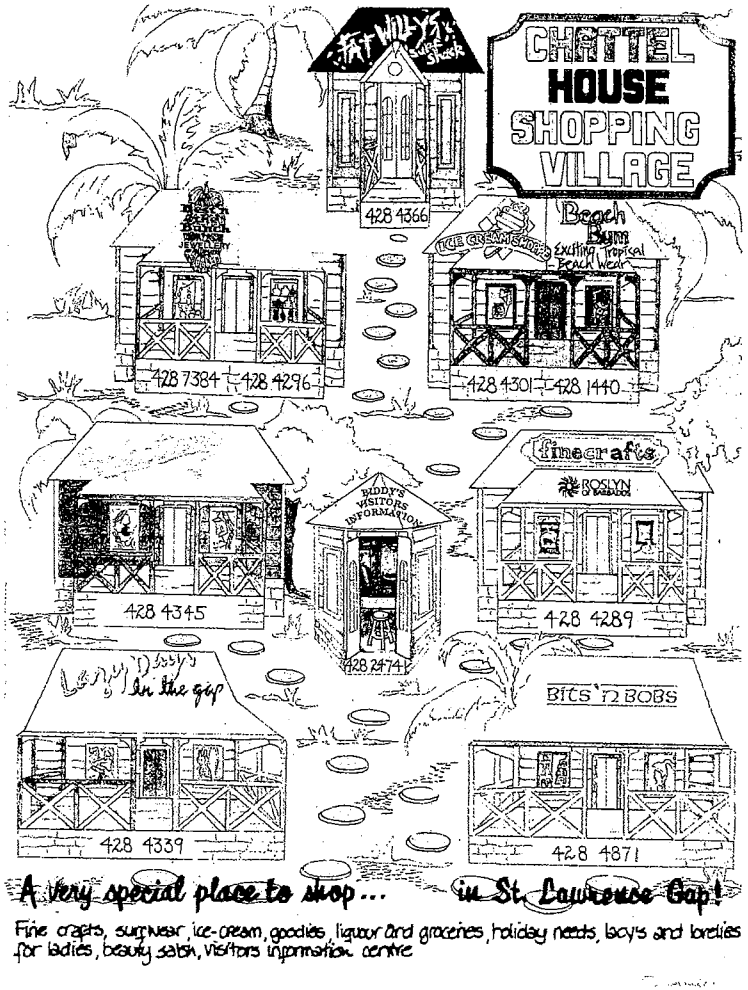


Figure 6.7 A Replica Chattel House at Sam Lords Castle

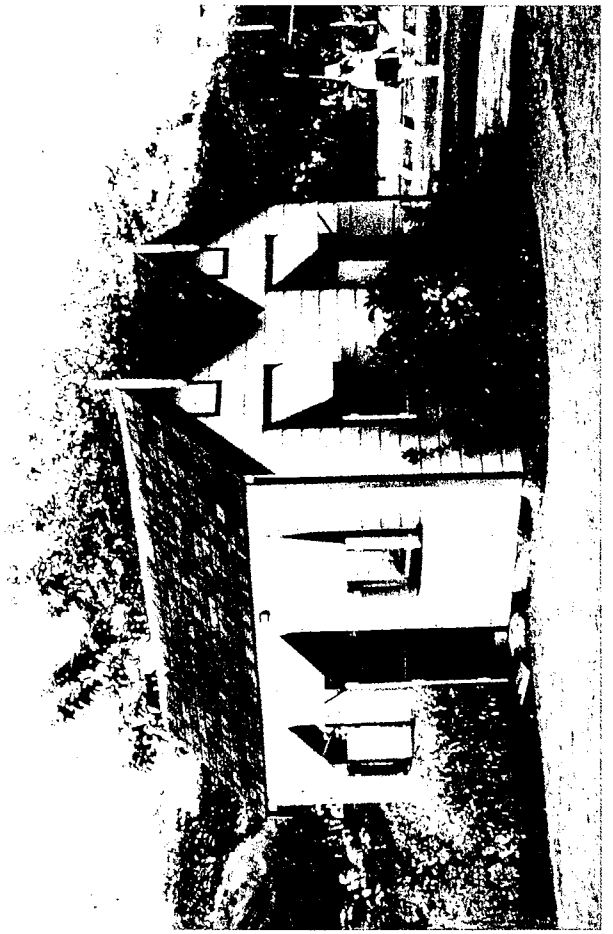
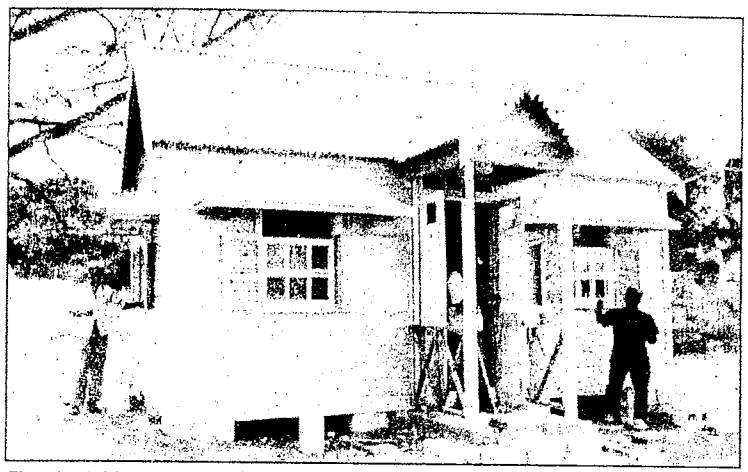




Figure 6.8 A Replica Rum Shop at Sam Lords Castle

Figure 6.9 Newspaper Cutting Explaining the Banks Replica Chattel House

LIFESTYLE Page 22 Friday, June 24, 1994



The chattel house going up on the grounds of Banks breweries plant in Wildey, St. Michael.

Banks building replica of chattel house

STEP onto the Wildey grounds of Banks (B'dos) Breweries Ltd., and you'll see workmen building a replica of old-time Bajan chattel houses, with fretwork, eaves and all.

According to Chairman and Managing Director of Banks Breweries, **Allan Fields**, the company will soon be selling souvenirs out of that chattel house, to satisfy tourists' numerous requests for souvenirs of the island's award-winning brew.

"We have built a replica sticking as closely as possible to what a chattel house should be," he said. In it, Banks souvenirs, including T-shirts, pens, signs, beach towels, ashtrays and keyrings, will be sold five days a week for a period in every day.

The shop should be open to business by early July.

Those souvenirs which can be manufactured locally will be supplied by local producers, Mr. Fields added.

Another project which the brewery hopes will hit the road by year-end is a replica of the buses which served Barbados as public transport in the years before the Transport Board and ZR services.

"A lot of children don't even know how their parents got around"; it is "a part of our heritage that is definitely missing," said Fields.

"The bus will be used, in a manner as yet undetermined, for travel by Barbadians and tourists," he beamed.

Thus, the yearning for the pre-modern on the part of the tourist and the tourism industry, on the one hand, contrasts starkly with the efforts of the state to modernize the economy, on the other. The danger here is that whilst the postmodern tourist slips back to the past and stresses the indigenous, the host society is driven evermore to forms of development and change which reject the local and the small scale in favour of the exogenous and large scale. The impacts on the environment are potentially substantial indeed.

The need to restructure mass market tourism can be seen in the same light. In mature destinations like Barbados the state appears unwilling or reluctant to move from mass tourism, blaming the global economy whenever tourist numbers decline (Dann and Potter, in press). Increasingly, the tourist industry is promoting the interests of the traveller and explorer, and eco-tourism and sustainable tourism. Perhaps, there is indeed more chance that those countries which are newer to the industry, those which are more mountainous and volcanic, such as Dominica, St. Vincent and Guyana will resolve things in a more appropriate manner (see Britton, 1994, for example), one which provides a better balance in terms of the needs of people and of the environment. Or, is this return to small-scale, ostensibly locally-sensitive tourism the next logical step in late-capitalism following the attainment of saturation in long-established resorts, and one which will be fully exploited by host states and the tourist industry? Should one be just as cynical regarding the recent emergence of all-inclusive "couples" holidays, rather than the sand, sea and sex formula, in these days of AIDS and HIV? Having saturated the potential of the mass-market, is the only alternative for late capitalism to move on to specialist niche-marketing for couples?

Conclusion

Problems of interpretation such as these confront all those who seek to examine postmodernity in the wider context. On the one hand, postmodernism involves liberation. In rejecting meta-narratives and monolithic functionalism, it can potentially focus on Otherness in the form of Other voices and Other words, and the fact that groups have the right to speak for themselves (Harvey, 1989). It is, thereby, associated

with small-scale developments and the rejection of modernism and is sensitive to vernacular traditions and local history. On the other hand, postmodernity can be regarded as the cultural logic of late capitalism, effectively representing the new conservatism. Thus, it focuses on the market and is strongly product-oriented. It is preoccupied with commodification, commercialization, and cheap and tacky commercial developments.

It is being posited here that it is this latter aspect of postmodernity that can most readily be discerned in the current development conundrum in the Caribbean. Here, the ultimate loser may well prove to be the natural environment which will almost inevitably come to be overexploited. Certainly, the Caribbean experience briefly outlined in the present chapter would seem to bear out remarkably vividly Harvey's (1989:54) observation that "... postmodernism abandons all sense of historical continuity and memory, while simultaneously developing an incredible ability to plunder history and absorb whatever it finds there as some aspect of the present." The potential for accelerated social and environmental degradation in a region of almost total ecological transformation is quite literally awe-inspiring.

Finally, it is evident that the Caribbean region illustrates only too well the links between people, environments and development, both through history and at the present time. It also demonstrates just how global in nature these issues are becoming. The pressure to develop for short-term gain rather than for long-term sustainability is likely to be exacerbated in the future as the result of both global climate change, and increasing trends of socio-cultural globalization and postmodernity. Since many of these issues have been neglected until quite recently, attention must be placed on them over the next decade if effective paths to sustainable development are to be established in the Caribbean region as a whole, as elsewhere in developing societies.

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CHAPTER SEVEN

Restructuring Oceania: Regional Reconfigurations of Economic and Political Relations in the Pacific

John Overton

The Old Pacific Order: Hierarchies of Colonialism

For much of their history since European settlement, many Australians and New Zealanders have seen themselves functionally and emotionally more as a part of Europe than Oceania. These ties have been accompanied by attitudes and policies by these states towards Commonwealth Pacific Island countries which have added a second tier to the colonial relationship: in many ways the Pacific Islands are to Australia and New Zealand as what they are, in turn, to Britain — colonial, client and dependent states. Despite independence being granted to the island states, the relationship has remained. Yet recently, there have been signs of fundamental change in Oceania. These have involved not just the weakening of the European connection with Australia and New Zealand and their attempts to seek a new economic future in the Asia-Pacific Rim, but also the growing assertiveness of Pacific Islanders and their governments to make the most of opportunities in an evolving new world order yet maintain the advantages of the old dependence.

This chapter reviews some of the main features and trends in relations between Australia and New Zealand on one hand (Australasia), and the Pacific Islands on the other. Given the relative freedom of movement and closeness of association between them, attention is given particularly to New Zealand and its present and former Pacific Island territories in Polynesia. This chapter draws upon much recent literature

concerning changing social and economic relationships and attempts to put them in a broad historical framework which suggests both significant change with the new world order, but also major elements of continuity.

It is difficult to generalize about a century and more of Australian and New Zealand history, for much has occurred since 1788 or 1840 respectively (when British power was established) to establish viable economies, explore new national identities and forge new political and military alliances. Yet, a colonial structure has existed for much of the intervening time, and some vestiges remain.

The Australasian economies were colonial economies *par excellence*. For many decades wool, meat, gold, grain and dairy products were produced in bulk and exported across the world to be traded for (mainly) British manufactured goods. There were attempts to develop local industrialization behind protectionist barriers but, in New Zealand especially, the dependence on agricultural exports remained. As late as 1960, 53 per cent of New Zealand's exports and 44 per cent of her imports were from Britain. Despite the dangers of dependence, this economic structure served Australasia well for many years and allowed the development of welfare state systems and the maintenance of near full employment.

Politically, too, the ties were strong. Antipodean support for Britain in two world wars was readily forthcoming and, to help maintain the Empire, as well as pursue their own imperialist aims, Australia and New Zealand developed their own mini-empires in the Pacific Ocean, notably after 1918 when the German colonies of New Guinea and Western Samoa effectively passed to their control. Furthermore, the Australian presence was strong in Pacific Island economies, whether in plantation systems (as with the Colonial Sugar Refining Company in Fiji) or trading companies, such as Burns Philp, throughout (Bishop and Wigglesworth, 1982). New Zealand companies were also prominent in the domination of the Polynesian trade in fruit (Bellam, 1981), and in the 1970s and 1980s Australasian capital has been prominent (Utrecht, 1984).

Australia and New Zealand, then, acted as agents for the extension of European power in the Pacific. The colonial Pacific could be seen as divided between two southern zones of influence: the Australian-Melanesian zone (Papua New Guinea, the Solomons, Vanuatu) and the

New Zealand-Polynesian zone (Samoa, Tonga, Cook Islands, etc.). These spheres of influence were clear in spite of British colonial control of, for example, the Solomon Islands. Australia and New Zealand were not in all cases the formal colonial authority but their proximity resulted in economic domination and high-degree political influence. Fiji lay between the two zones. The two zones were bisected by two lines of colonial control by France (in the south through French Polynesia and New Caledonia) and the United States (in the north through Hawaii, American Samoa and its Micronesian trust territories) (Antheaume and Bonnemaison, 1988:11).

The decade of the 1960s proved a watershed in many ways. As Britain moved to join the European Economic Community, new markets had to be found for exports, and new products had to be found to meet the demands of new markets. Then, with the withdrawal of a significant British military presence in Southeast Asia, notably in Singapore, the United States assumed a hegemonic role, and both Australia and New Zealand followed it into the Vietnam war. Finally, Pacific Island states began to gain independence. Though somewhat later than in other ex-colonies, decolonization followed a similar pattern with ostensibly democratic systems being put in place and effective power being handed over to local elites. For some colonies, though, the process was slow in coming. France continued to hold power in New Caledonia and French Polynesia, supported by large resident populations of French settlers; the United States maintained power in its Micronesian territories; and for microstates, such as the Cook Islands, the Tokelaus or Niue, the high cost of maintaining the full infrastructure of self-government led to voluntary forms of "self-government in association," whereby New Zealand retained some government functions.

Yet, these changes did not overturn the basic structure of economic and political relationships in Oceania. Australia and New Zealand still looked outward to Europe, North America or, increasingly, Japan for economic well-being, whilst little seemed to change in the island economies, in terms of the dependence on a narrow range of both exports and markets.

One of the main symbols of the continuation of the old world order in the Pacific, despite independence, has been aid. Pacific Island nations are amongst the largest recipients of aid per capita in the world and this reflects more their small populations and perceived strategic import-

ance rather than high relative levels of poverty (Knapman, 1986; Sevele, 1987; Campbell, 1992). Australia and New Zealand as aid donors are small in world terms, but regionally very important, for the Pacific is seen as part of their "sphere of influence" in the international aid community and, for them, greater advantage comes from concentrating their aid visibly in countries nearby, rather than dispersing it thinly over the whole developing world (Taylor, 1986; Connell, 1986, 1988; Gibson, 1991). Data for aid distribution in the Pacific reveals some interesting patterns (Figure 7.1; Table 7.1).

One of the most prominent aspects of aid in the Pacific is the very close relationship between former colonial relationships and the source of aid. Pacific Island countries generally rely heavily on their former colonial masters, or "patrons," for most of their aid. Furthermore, those which maintain closer relationships (such as the free association model with New Zealand, or continued direct connection with France) receive much higher rates of aid per capita — indeed, in aggregate, their aid receipts per capita are higher than the total GDP per capita for the "independent states." For aid receipt, then, there seems to be some advantage in a continuing relationship of dependence. Another dimension to aid is the question of scale. Countries seem to receive aid by virtue of their status of nationhood rather than in proportion to their population. This is because small states (in terms of population) still have the right, say, to take a seat at the United Nations and they often command large maritime exclusive economic zones. In the climate of the Cold War, their support was important, regardless of size, and it was also seen by donor countries that the Pacific had to be kept on side as an "American Lake" to prevent Soviet or Chinese expansion into the region. A powerful symbol of the Cold War atmosphere was the testing of French nuclear weapons on Mururoa Atoll in Polynesia. Some states, such as Tonga, Kiribati and Vanuatu, were able to turn this situation to their advantage and attracted extra aid by making overtures to the Soviet Union or Libya. Others benefited as the French sought to quell Pacific Island criticism of their policies in the Pacific in the late 1980s through generous aid donation (Campbell, 1992:61).

Other economic indicators showed similar patterns of dependence. Typically, small Pacific Island nations ran large trade imbalances (Fairbairn, 1985). Most of their exports supplied Australia and New Zealand, in particular with bananas, phosphate, pineapples, taro, fish or

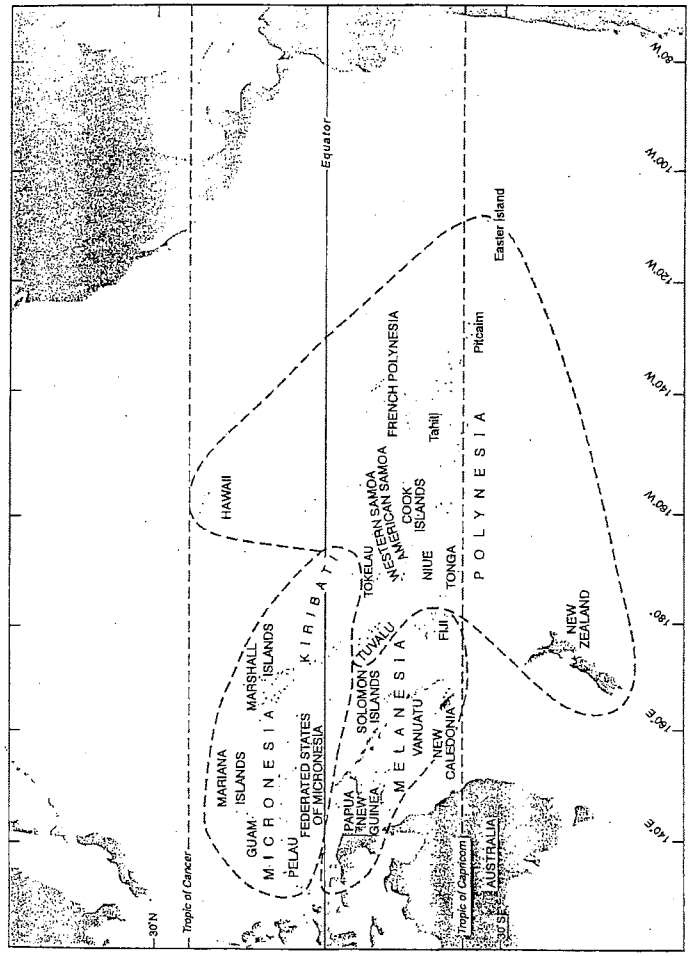


Figure 7.1 The Pacific Islands

Table 7.1 Foreign Aid to Selected South Pacific Countries, 1986

	Estimated total population	Total aid (A$ 000)	Aid per capita (A$)	"Patron" state	% from "patron"	GDP per capita (A$)
(A) "Dependent" states						
American Samoa	36,100	63,235	1,752	USA	100	7,336
Guam	117,200	49,119	419	USA	100	12,913
TTPI*	165,200	341,471	2,067	USA	99	1,410
French Polynesia	176,100	325,830	1,850	France	100	17,168
New Caledonia	150,500	139,442	927	France	100	6,045
Wallis & Futuna	14,300	26,012	1,819	France	87	n.a.
Cook Islands	17,200	16,821	978	NZ	77	1,822
Niue	2,500	6,651	2,660	NZ	89	1,499
Tokelau Islands	1,600	1,845	1,153	NZ	92	n.a.
Total dependent states	**680,700**	**970,426**	**1,426**		**92**	**9,206**
(B) "Independent" states						
Papua New Guinea	3,390,400	431,500	127	Australia	93	1,137
Western Samoa	161,000	25,343	157	NZ	29	901
Fiji	711,100	40,683	57	UK	6	2,444
Kiribati	65,300	18,500	283	UK	35	489
Soloman Islands	282,100	51,363	182	UK	–	797

Table 7.1 Foreign Aid to Selected South Pacific Countries, 1986 (Cont'd)

Tonga	94,500	13,360	141	–	–	865
Tuvalu	8,400	5,758	685	UK	33	452
Vanuatu	140,200	33,443	239	France/UK	17	1,266
Total independent states	**4,853,000**	**619,950**	**128**			**1,289**

Notes: "Patron" state refers to the former colonial power. "Dependent states" are those still with colonial status or in close association with a colonial power.
1986 data are used as the most recent available for a period prior to the collapse of the former Soviet Union and therefore indicative of a climate of Cold War diplomacy.
GDP figures exclude Northern Mariana Islands for TTPI (not available) and the total figure for the "Dependent states" excludes the Tokelau Islands and Wallis & Futuna.
* Trust Territory of the Pacific Islands: former American territories now comprising Federated States of Micronesia, Marshall Islands, Northern Mariana Islands and Palau.

Source: *South Pacific Economies Statistical Summary No. 10 1986*, South Pacific Commission, Noumea (1989).

copra. In return they received fuel, manufactured goods and foodstuffs. In most cases, the imbalances were large and increasing (Bellam, 1980; NZCTD, 1982). Only the larger Melanesian countries of Papua New Guinea or Fiji developed more diversified economies based on minerals (in the case of Papua New Guinea) or sugar (Fiji) and were able to run more healthy trading accounts. As with trade, tourism showed a similar pattern of dependence with most tourists to the Pacific (at least to the non-French territories) coming from Australia or New Zealand.

Yet, for the Australasian countries, Pacific trade was but a small part of their total trade (Table 7.2). Markets, such as Fiji, New Caledonia or Papua New Guinea, might have been important for some exporters of manufactured goods, or importers of tropical produce, but, in aggregate, the Pacific did not figure prominently in the trade statistics of Australia or New Zealand. Where it did assume some economic importance was in the New Zealand labour market. In the decades of the 1960s and 1970s (at least prior to the oil shocks of the 1970s), New Zealand experienced near full employment. Its protected manufacturing industries supplied the local market, and industrial expansion took place. Pacific Island immigration grew steadily from the late 1960s (Bedford, 1984; NZCTD, 1982), and this provided a labour force that helped the factories of Auckland and Wellington expand without too great an inflation of wage rates (Gibson, 1983; Loomis, 1990). However, when economic recession struck, this labour was no longer required, and tighter immigration laws were introduced (hitting Samoans and Tongans in particular) together with attempts to deport illegal "overstayers," hitherto tolerated. Nonetheless, Pacific Island labour, largely low skilled and low paid, continued to constitute an important component of the New Zealand labour market.

There were other dimensions to the neo-colonial relationship. As citizens of colonies, Pacific Islanders, in theory, were treated with the same rights of citizenship as those of the metropolitan country. Critical here was the free right of entry into the metropolitan country — not often used in the days before cheap international air travel. This persists in the French and American territories still under colonial control, but it has also been maintained for some territories in free association with New Zealand, such as the Cook Islands.[1] Also, although immigration laws have been tightened for residents of Pacific Island countries without such a close relationship, such as Western Samoa or Tonga, historical and family links, together with quota systems, have allowed freer access to New Zealand than for people from non-Pacific countries (Bedford, 1985, 1986; Bedford et al., 1987). Such access has enabled Pacific Islanders in the workforce to remit sums of money home to support families and consumption patterns above that sustainable from the products of the local economy. There is a large literature on the issue of remittances which addresses both the positive and negative aspects of these flows of resources. The negative view, which has been dominant, stresses the decline in remittances over time and the tendency for them to be spent on consumption rather than production (Connell, 1980, 1981; James, 1991; Macpherson, 1992).

In a number of microstates, the result of this regional flow of people and money, as well as high aid receipts, is what has been termed MIRAB

Table 7.2 Australian and New Zealand Economic Links with the Pacific, 1984-1985 (%)

	Bilateral aid	Exports	Imports
A. Australia			
Pacific Islands	58	2	1
Southeast Asia	28	7	6
New Zealand	–	5	4
Japan	–	27	23
USA	–	12	22
UK	–	3	7
B. New Zealand			
Pacific Islands	81	4	1
Asia (exclude Japan)	13	9	10
Australia	–	16	19
Japan	–	15	20
USA	–	15	16
UK	–	9	9

Sources: *Year Book Australia 1988*; *New Zealand Official Yearbook 1986.*

economies: those lacking a firm economic base in terms of commodity exports but able to sustain reasonable living standards through migration, remittances, aid and a high proportion of the workforce employed in the bureaucracy (Bertram and Watters, 1985, 1986; Watters, 1987). In such cases, "development" remains a mirage (Connell, 1991) and forms of continued dependence, rather than the pursuit of independence, seem to offer better prospects for higher material standards of living.

Supporting these economic and social relationships has been a plethora of other connections, well analyzed in the New Zealand case by Crocombe (1992). Pacific Islanders have gone to New Zealand and Australia for schooling and tertiary education. Australasian missionaries have worked in the islands in the past, though more recently, island ministers have joined the Pacific communities in Auckland, Wellington and Sydney. There are sporting links, perhaps personified in the large number of Polynesian faces in New Zealand's national rugby, rugby league and netball teams. Cultural exchanges are also common. So, the bonds between the Pacific Commonwealth states and New Zealand have been strong and of long standing.

The "old Pacific order," then, was one which survived political independence for most Pacific Island countries. It involved a hierarchy of dependence. Australia and New Zealand looked to the large industrialized countries or Europe, North America and Japan for economic and political links. To Australia and New Zealand, economic links with the small Pacific Island countries counted for little, even if they saw the region as their "back yard" in terms of international politics. Yet, for most of the Commonwealth Pacific countries (those not tied to the United States or France), Australia and New Zealand were critical, and it was apparently their beneficence which provided aid, protection, advice and an emigration channel.

In Search of a New Pacific Order

The old order described above — a caricature of very complex relationships over a long period of time — has been undergoing significant change in the past decade, though the origins of change are often of longer standing. They involve not only global processes transforming economic and political relationships but also important national and

individual responses and initiatives. To a large extent, they have begun to shift the emphasis away from decisions made in Canberra or Wellington and towards both the boardrooms of multinational corporations at one level, and the dwellings of Pacific people at another.

The Seeds of Change

New Trading Patterns for Australasia

One of the main bonds holding together the old world order for Australia and New Zealand was the colonial pattern of trade. In the 1960s, this changed as Great Britain saw its economic future lying more within Europe than with a far-flung Commonwealth. Its formal admission to the European community in 1973 signalled an end to the economic base of the British Empire but, though there had been warning that this was to happen, New Zealand took a long time to react. Australia, largely through its mineral reserves, was able to find new markets, particularly in Japan, but New Zealand, so long Britain's antipodean farm, had to turn from the bulk production of lamb, cheese and butter to products that were more in demand in other markets. The transition was painful, yet supported by government subsidies in the 1970s and early 1980s; one of the main responses was to produce more and more of the agricultural commodities that were less and less in demand. Change came in 1984 when the newly-elected Labour government removed most farming subsidies and opened up the New Zealand economy to the global market to an extent not seen for more than 50 years. It led to a period of hardship for farmers and manufacturers who had sheltered behind a state protective screen. But, rapid adjustment followed, much based on export-orientation in a mixture of both old and new products, and now economic recovery is beginning slowly to remedy some of the economic and social dislocation of the past ten years.

The sharp change in the New Zealand economy and a somewhat more gradual change in the stronger Australian economy have, to a large extent, been guided by the globalization of the world's economy. New production and communication technologies have meant that the old handicaps of isolation (half a world away from Europe's markets) are much less pressing: Australian-made car engines are used in multinational automobiles assembled in Asia, and live New Zealand crayfish

reach the Japanese fish markets within a day of catching. Yet, the global economy is not yet the dominant feature, for both countries still depend on the export of bulk products: coal, timber, butter and wool. And, for New Zealand, one of the most significant economic links is Australia, especially since the Closer Economic Relations Agreement (CER) that largely ended tariff barriers for each other's products. For New Zealand, Australia now takes 20 per cent of her exports and is the country's largest trading partner. New Zealand is much less important for Australia, Japan taking the dominant position.

A consequence of globalization has been a gradual diminution of the dominance of Australasia in Pacific Island economies. The old Australian Pacific trading companies have attempted to diversify their operations in the Pacific and in Fiji, for example, where they have a much less prominent position (Taylor, 1984). Similarly, Australasian dominance of the banking, insurance and shipping industries has become much less pronounced with the growth of both Pacific companies and foreign investment from France and Japan (Crocombe, 1992). Similarly, aid sources seem to have become more diversified, with the latter two countries now more involved.

An example of these changing trading relationships is New Zealand's trade with the Pacific Islands over the decade 1982-1992 (Table 7.3). Economic contraction within New Zealand was matched by significant falls in the real value of trade with other countries, such as Fiji and Papua New Guinea. There was a slight overall increase of 4 per cent in the total value of trade with the Pacific over the period, though it is interesting to note that this was due to an increase in the value of exports of 14 per cent but a fall in imports of 28 per cent. This reflects a worsening of the trade imbalance between New Zealand and the Pacific and, in 1992-1993, the value of exports from, was nearly five times the value of Pacific imports into, New Zealand.[2] A colonial pattern of trade thus seems to continue, marked by sharp inequality.

Table 7.3 Changes in New Zealand Trade and Aid with Selected Pacific Island Countries, 1982/83-1992/93

(NZ$ 000 — 1992$ deflated by CPI to 1982$)

	Trade*			Aid (Bilateral ODA)		
	1982/83	1992/93	% change	1982/83	1992/93	% change
Cook Islands	24,102	21,191	-12	9,887	7,059	-29
Fiji	134,286	120,475	-10	4,995	2,671	-47
Niue	3,293	2,008	-39	5,922	3,784	-36
Papua New Guinea	86,896	66,723	-23	2,696	2,902	+8
Tokelau Islands	32	50	+117	2,162	2,329	+8
Tonga	21,614	15,555	-18	3,623	2,842	-22
Vanuatu	6,154	5,438	-12	1,064	2,091	+96
Western Samoa	22,363	48,242	+116	4,911	3,709	-24
Total Pacific Islands	421,183	436,104	+4	37,261	32,251	-13

Notes: Total Pacific Islands comprises all Pacific Island countries, including the French territories with which there is significant trade.
* Trade figures comprise NZ export (f.o.b.) to plus import (c.i.f.) from the country stated.

Sources: *New Zealand Official Yearbook 1984*; *New Zealand Official Yearbook 1994*; *Report and Analysis of External Trade 1982-3*; *New Zealand's External Trade Statistics June Year's Ending 1993*. Wellington: Ministry of Foreign Affairs and Trade.

This weakening of New Zealand's economic influence in the Pacific, whether expressed in trade or aid, has taken place strangely at a time when the country's Pacific identity has been expressed much more strongly. Partly because of the long-overdue attention to Maori land rights under the Treaty of Waitangi legislation, and partly because of a recognition of the place of Pacific Islanders in New Zealand society, New Zealanders and their politicians have been much more willing to acknowledge Aotearoa/New Zealand's Pacific heritage and its geography as a group of islands in the South Pacific.

The implications of economic changes for the Pacific Islands have not been clear. On one hand, some of them have sought to engage with the global economy. Fiji, for example, has adopted a much more export-led and market-oriented economic strategy since 1987. Papua New Guinea's mining industry or the logging industries in Papua New Guinea, the Solomon Islands or Fiji are closely tied to the expanding (and largely Asian) demand for raw materials. But, on the other hand, many countries depend on continued favoured treatment for access to nearby markets. Fiji's sugar industry, arguably the most successful form of commercial agriculture in the Pacific Islands, is largely built upon its privileged access to European markets under the Lomé Convention, and returns are significantly higher and more stable than on the open market (Grynberg, 1993). Similarly, the spectacular development of its garment industry is one that is bolstered by easy access to Australian and New Zealand markets under the SPARTECA Agreement — a non-reciprocal agreement signed in 1980 allowing duty-free and unrestricted access of Pacific Island exports to the Australasian market (Chandra, 1993; Sutherland, 1982). This agreement has become somewhat devalued by the Closer Economic Relations Agreement between Australia and New Zealand which allows free trade between the two countries and no extra advantage for Pacific exporters (South Pacific Policy Review Group, 1990, see also Joint Committee on Foreign Affairs, Defence and Trade, 1989). Open competition with Asian garment manufacturers would probably see the Fijian industry in serious trouble. So, it can be argued that Pacific Island economies have maintained elements of the more closed neo-colonial trade pattern much more than their major trading partners which see their future in a much more liberal unprotected global market.

Political Realignments

These economic changes have been mirrored by political change. As the Cold War has ended, the South Pacific has assumed much less strategic importance, and its nations have not been pursued as actively as when their voting power was considered important. They have lost much of their political leverage. There has been a change also for New Zealand and Australia and their relations with the Pacific. In the 1980s, the region occasionally held centre-stage in international politics, as for example

when New Zealand's anti-nuclear stance and the calls for a South Pacific nuclear free zone caused some consternation on the part of the United States. Today, they barely warrant a mention. The two larger countries, thus, have less call to be seen to be "protecting their patch," and there have been calls within the countries for a lessening of heavy and continual aid donations, for example Australia's direct budgetary support for Papua New Guinea or the high per capita rates of aid to Niue from New Zealand (South Pacific Policy Review Group, 1990:56; Joint Committee on Foreign Affairs, Defence and Trade, 1989:79). Non-humanitarian aid is less easy to defend in the new world order. In the case of New Zealand aid (Table 7.3), total aid to the Pacific has declined some 13 per cent in real terms in the decade 1982-1992 and, notably, this has involved sharp falls in aid to the Cook Islands and Niue, both heavily dependent on New Zealand for aid (Table 7.1).

There have been other subtle changes within Australia and New Zealand. Both governments have been vocal in expressing the view that they should "look to Asia" and "become a part of Asia." This is driven by economic considerations, principally the trading opportunities with Japan, China and the emerging industrial economies of Southeast Asia. It is also evidenced in the rapid rate of growth in tourism or the perceived high rates of immigration from Asia and is behind the Australasian enthusiasm for the Asia Pacific Economic Co-operation (APEC) group. With this new Asian emphasis, the Pacific Islands tend to figure much less prominently. Papua New Guinea is a party to the APEC talks, but the smaller Pacific Islands have been left largely on the sidelines, hanging on the coat-tails of New Zealand and Australia. They are, no doubt, rather nervous of talk of a free trade region which would affect their favoured access to Australasian markets but would offer little in return, for Asia competes with their garments or agricultural products.

State Restructuring

Another major process of significance affecting new relationships in Oceania has been fundamental changes in the ideology and functions of the state, especially in New Zealand, but also in Australia. "Economic rationalism" has become a guiding principle for successive governments in New Zealand since 1984, replacing the former emphasis on protectionism and the welfare state (Britton et al., 1992). It is a shift by no

means unique to the region, mirroring the reforms of the Thatcher and Reagan era, and it has been driven, to a large extent, by the growing integration of the world's economy and the realization that protectionism and self-sufficiency have not succeeded in promoting economic or social goals.

The ideological change has resulted in a major restructuring of the state. This has involved an end to most producer subsidies, the dismantling of trade barriers and a weakening of the welfare state safety net. The economic and social dislocation of these changes has been great in New Zealand and not insignificant in Australia. Unemployment has risen, especially after the stockmarket reverse of 1987, and has hit those manufacturing industries that were formerly protected. Pacific Islanders in New Zealand, formerly major contributors to this labour force, have been much affected (Larner, 1990). One study (Krishnan et al., 1994) has pointed to the rise in Pacific Island unemployment rates from 12 per cent in 1986 to 28 per cent in 1991 and has concluded that "the Pacific Island workforce has been more damaged by economic policy changes than any other group in New Zealand" (p. 86). The impact has been felt in the islands as well, either through lower remittances home (Macpherson, 1992) or the return home of workers who had lost their jobs (Hooker, 1994).

Yet, the impacts of restructuring, whilst major in the past ten years, may not be entirely deleterious in the long run. Economic recovery has occurred in the mid-1990s, with employment increasing, the number of New Zealand tourists visiting the Pacific growing, and the adaptation of employment to new conditions. In this latter process, more flexible (and often lower paid) working arrangements involving part-time or temporary work have allowed some re-engagement of Pacific Island workers, notably women.

Overall, then, these economic and political seeds of change are signalling fundamental shifts in the nature of Oceanic relationships. In many ways, these have worked to the detriment of Pacific Islanders. One important change has been in the way the smallness of Pacific Island states and economies has been recast. In the Cold War era, nationhood brought status, regardless of small size. Small Pacific states were able to attract attention and aid much in excess of their proportionate size. Smallness had its handicaps (Ward, 1967; Benedict, 1967; Selwyn, 1980; Fairbairn, 1987; Overton, 1993b), yet, it was almost regarded as an

asset as smaller states received more aid per capita and often had higher incomes per capita (Table 7.1). Now, the new order involves more emphasis on the economic rather than the political and the global scale rather than the nation. The smallness (and isolation) of the Pacific Islands in this emerging global economy is now more exposed as a handicap, and its fragility in this context more apparent.

Pacific Perspectives

The above view is one which sees the dynamics of change being driven from outside the Pacific Islands — from within the global economy, or from metropolitan capital cities — and it is one which leads to rather bleak prognoses for the island states (Overton, 1993a). It sees the island states as being carried along by global processes and external decisions: Pacific Islanders are price takers, political subordinates and, in terms of numbers, very small drops in a very large ocean. Yet, this is a view which is under recent challenge. Ward (1989, 1993) and Hau'ofa (1993) have shown how outside perspectives of the Pacific Islands (ones which stress the size, power and importance of the Pacific Rim in contrast to the emptiness and fragility of the Pacific Islands in the middle) are not matched by Pacific Islanders' own views which see the Pacific as a "sea of islands," an ocean of opportunity bisected by many lines of communication and interaction. These Pacific perspectives are critical in any understanding of the contemporary Pacific, and they are embodied in the responses of both governments and individuals.

At the state level, economic dependence and large trade imbalances remain critical issues. These are not perceived as crippling problems if neo-colonial relationships maintain stable and substantial flows of aid and remittances. They assume rather more serious proportions if those flows dwindle, for the export base of most Pacific Islands (apart from Papua New Guinea, Fiji and perhaps the Solomon Islands) cannot sustain the present relatively high standards of living without recourse to significant external sources of income. Hence, there is concern that the GATT or APEC negotiations may result in a world where trade liberalization displaces preferential treatment for certain ex-colonies.

Government planners have tried various strategies, many attempting to take advantage of the islands' status as nations or factors that

otherwise are seen as disadvantages. Tourism is seen as a panacea by some, where isolation and smallness are attractions rather than obstacles, though there remains a considerable debate about the efficacy of tourism as a development strategy (Britton, 1987). Economic diversification away from a narrow range of primary products export is desirable but difficult to achieve when resources are limited. Pacific countries are also keen to diversify their aid sources, but with a few exceptions (as when France quickly stepped in after Australasian withdrawal of aid following the Fiji coups of 1987) these opportunities are few. Two countries, Vanuatu (Connell and Pritchard, 1990) and the Cook Islands, have experimented with offering tax haven status to foreign companies, although their ability to monitor the process is very limited, and tax evasion by companies has run the schemes foul of Australasian governments. Others have attempted strategies such as philatelic sales, which trade on the country's independent status, but, with some exceptions, this is not a large revenue earner. Tonga has even attempted to sell limited citizenship rights to foreigners (without full citizenship and residency rights), but this scheme has attracted international disfavour. So, the prospects for Pacific Island economic development in a globalized new world economic order are not promising.

What is much more optimistic and dynamic, however, is the wide range of individual perceptions and actions on the part of Pacific Islanders in the wider world. Pacific Islanders are mobile people. Since the settlement of the islands, people have voyaged widely, seeking out new homes, adapting to a wide range of new environments and maintaining contact with their former homes. This has not changed, other than the fact that jumbo jets have replaced ocean going canoes and the times of voyaging have been compressed. Mobility remains a key aspect of Pacific Island life at many different levels (Chapman, 1991; Overton, 1993c; Ward, 1989; Hayes, 1991, 1992).

What often surprises non-Pacific observers, but which seems commonplace to many in the islands, is just how well integrated many thousands of Pacific Islanders are with the economies and societies of other countries. When living in Australia, I met up with a Fijian friend who was "visiting" Sydney, as he had done on two previous occasions. He stayed for several months, lived in a house with a dozen or so other Fijian men and, very easily (though illegally), found work as a nightclub bouncer and later as a night security guard. His room mates worked in

factories, as drivers and also in the security business. He, like many others, had a family at home in Fiji. He was sending money home regularly, he was able to save for his return ticket, and he was able to return with a healthy bank draft and a new stereo. It was a rather precarious existence, for he had to evade detection by the immigration authorities (though employers turned a blind eye). Many others operated in this way. Others sought, and received, residency status. His income, even allowing for the cost of living and travel, was much higher than he could get at home, though it was low by Sydney standards. Back in the Pacific, it is very common to meet people who have worked overseas, have business interests spanning different countries and who, in effect, commute between homes and workplaces in both the Pacific Islands and Australasia (for example, Brown and Connell, 1993). Remittances are but one aspect of the many and varied links within the Oceanic region in what might be termed a Pacific regional labour market.

Such interaction is carried out within kin networks. People's movement is facilitated by family connections to help with airfares, accommodation and employment and, in return, money flows from person to person and country to country. It is a system that is enabled by, yet reinforces, customary social structures and interactions. Old ideologies of communalism, kin-based land tenure and reciprocity exist strongly beside the new goals of materialism and individualism. And, these are people who span a range of ages, educational backgrounds and gender (Hooker, 1994). People have one foot firmly planted "at home" in the Pacific to take advantage of social networks, cultural familiarity and a pleasant environment. They have another in the *palangi* (European/foreigner) world to exploit the opportunities for money earning and an exciting social life. Furthermore, these two worlds overlap in both places, and people can be comfortable in both. What may appear as a contradiction to outsiders is perhaps just a set of entirely rational practices using "transnational corporations of kin" (Bertram and Watters, 1985; Munro, 1990) in a wider social formation and economy that spans the Pacific.

So, rather than seeing Pacific Islanders as marginalized, whether in terms of their isolation from the world economy or their displacement by economic restructuring in New Zealand and elsewhere, we should accept the view that Pacific Islanders have room for manoeuvre, are

adept at exploiting the opportunities open to them in a wider world and are even perhaps pre-adapted to living in a restructured and open region than those of us on the Pacific Rim. Maybe, too, the idea of the smallness of Pacific Islands comes from a world view from the Rim looking in, rather than a view from within looking out which sees the great size of an ocean and a region of opportunity.

Furthermore, the Pacific perspective is one that puts emphasis much more on individual actions, not on state policies. There is a neat parallel here with the new world order which has seen, in the new market-led ideology, a weakening of the state in the face of economic integration. There is much more in common between the world view of mobile Pacific Islanders and the developing global economic system than there is between that view and the old closed neo-colonial Pacific regional order.

Yet, before such a perspective can be accepted fully, it is important to realize that there are important casualties in the new order. There are Pacific Islanders who have moved and become marginalized in the Australasian societies and have lost touch with (or do not have the resources to re-engage with) their Pacific hearth and safety net. There are others, particularly in the majority of Pacific countries which do not have close relations with a particular metropolitan "patron" and whose citizens cannot move freely overseas, who may be caught — left at home in the islands but working in an increasingly vulnerable economy (and often deteriorating environment) with less and less external support. Overall, then, an ideal new order is one where Pacific Islanders can operate within, and contribute to, an expanding regional economy yet, at the same time, protect much of the old ways at home. There is much to be said for independence, for the ability to determine what to maintain or change in the islands and for the status and advantages of nationhood. Yet, there are also advantages in keeping the doors open, for having a special, and non-reciprocal, relationship with a patron state which can continue the flows of aid and provide a second home for those who wish to seek new opportunities. That is a situation already enjoyed by a few states (the Cook Islands, Niue and, maybe, in time, Guam, American Samoa, New Caledonia and French Polynesia), but it is not so for the likes of Tuvalu, Kiribati or the Solomon Islands. Without further political recognition and response, they may become the main Pacific casualties of global restructuring.

In summary, then, there has been a fundamental shift in economic, social and political relationships within Oceania. There is still a basic division between Australia and New Zealand on one hand and the island states on the other (despite major differences within both these sides). There is still a basic division which is unequal in terms of power and asymmetrical in terms of the flow of resources. There is still a hierarchy of dependence, in which the island states are highly dependent on the two Australasian countries, but they, in turn, look elsewhere for their main economic and political links. Yet, increasingly, there is a sense that Australasian economic influence in the region is weakening (Crocombe, 1992), especially in terms of aid and trade. Correspondingly, with the end of the Cold War, there is a decline in the potential political clout island states can wield internationally. Exploitation remains, benefiting the larger countries as the trade imbalance works very strongly in their favour, but it is now much more a two-way street — "mutual exploitation" perhaps. Pacific Islanders, at least those who are able, exploit the opportunities for work and trade in the wider region and their savings and remittances (along with official aid) go some way to redressing trade imbalance and sustaining material standards of living higher than might be expected in more closed societies. A more globalized and liberal world economy opens many opportunities for the Commonwealth Pacific, as does a post-colonial political environment. It also has costs and dangers.

NOTES

1. There is an interesting literature on such relationships and their relevance to the decolonization of the Pacific (for example Bertram, 1987; Connell, 1988; Connell and Aldrich, 1991; Hau'ofa, 1987; Michal, 1992, 1993; Neemia, 1992; Overton, 1993b).
2. Crocombe (1992:51) however, in an analysis of 1990 trade, states that when re-exports are taken into account a New Zealand-Pacific Island trade imbalance of 4:1 drops to 3:1. Aid and expenditure by New Zealand tourists in the Pacific further redress the imbalance.

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PART III

Technological Change

CHAPTER EIGHT

Radar Satellite Remote Sensing: A New Era in Global Monitoring

J.T. Parry

Environmental change is not a new phenomenon. However, the accelerating demands and pressures of a growing world population and the intensification of economic activity armed with a precocious technology have magnified local stress fields into global vectors. Man-induced changes are now sufficiently powerful to impinge on earth-atmosphere systems and threaten disruption of the biosphere equilibrium. An agenda for environmental protection is long overdue. It requires a comprehensive land, soil, water and forest management programme, the conservation of biodiversity, the harnessing of non-polluting energy sources, population control, the up-grading of the urban environment for healthy living, pollution control, waste beneficiation by recycling and the promotion of environmental awareness by education.

It is fortunate that, at a time when the possibility of an imminent environmental crisis has been appreciated, technology can provide synoptic imaging and data gathering and the computing capacity to manage the information. Remote sensing and geomatics are at the forefront of this technology. However, experience demonstrates that developments and innovation in remote sensing, data handling and environmental management far outpace the capacity to make effective use of these powerful tools. The "absorption capacity" of a user group is limited, first, by its level of awareness with regard to the availability of a particular technology; and, secondly, by a lack of experience with regard to analysis and potential applications. The "application capacity" (the users' ability to make effective use of the information) is often limited by

the inadequacy of the infrastructure in their country or region. The essential link is that of education and training, not only technical and professional skills in handling and applying new techniques, but also the education of planners and policy makers with regard to the potential of the available technology. The goal of remote sensing in the 1990s must be that of increasing both the absorption and the application capacities in a series of new domains and in those areas where environmental problems are most severe.

In this study, the domain is radar remote sensing, and attention will be focused on the special features of radar as a data source in the monitoring of environmental problems and in orchestrating planning responses.

Special Capabilities of Side-looking Airborne Radar (SLAR)

One of the most important features of radar is its day/night, all-weather capability. Radar is an active system operating at frequencies from 8 to 40 GHz;.thus, the wavelength is large relative to the size of moisture droplets, allowing the penetration of haze, cloud, fog and even rain. Radar is also the only viable sensing systems for cloud-persistent equatorial areas where the acquisition of imagery in the visible and infrared wavelengths is practically impossible (Trevett, 1986). It is in these areas that extensive SLAR coverage has been obtained in the last 30 years (Figure 8.1). However, it is important to note that there are other areas in the tropics and subtropics with relatively few good days (cloud-free, haze-free, etc.) in the best flying season (Figure 8.2). SLAR operations in these areas could provide valuable environmental data.

A second important capability of radar is the provision of synoptic coverage of the terrain with broad swath widths (Table 8.1) ranging from 100 km (Motorola's X-band systems) through 37 km (Goodyear/ Aeroservice's X-band systems), 21 km (Westinghouse's Ka-band systems) to 18 km (the ERIM SAR-580 multi-frequency radar). Mosaics can provide block coverage of large geographical areas. At the same time, landscape patterns are portrayed at a level of detail superior to that achieved in reconnaissance field surveys or airborne remote sensor surveys other than the photographic. However, it should be noted that the

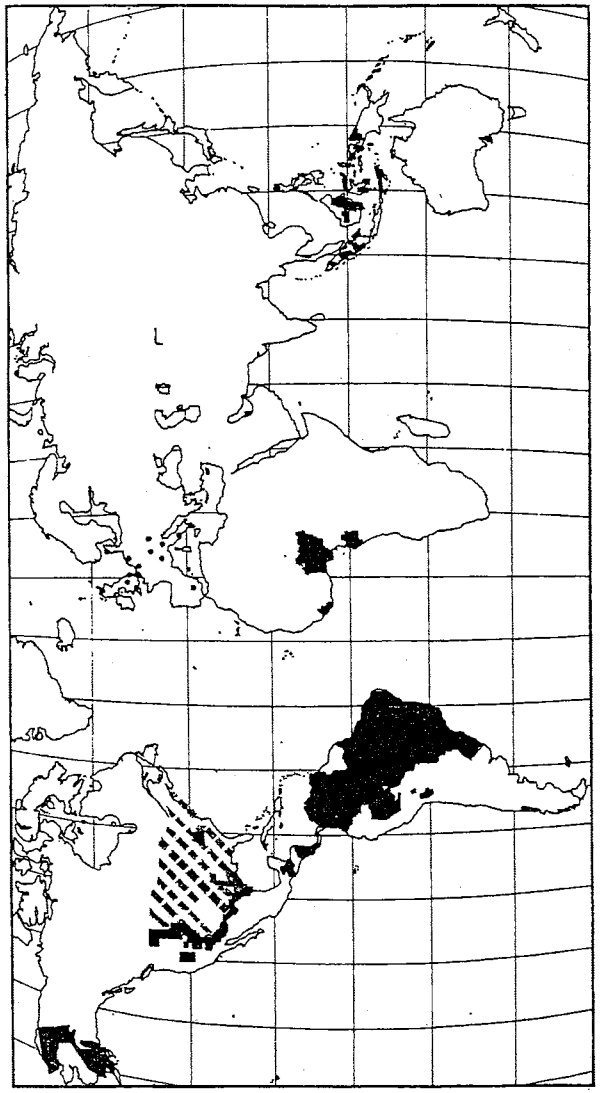
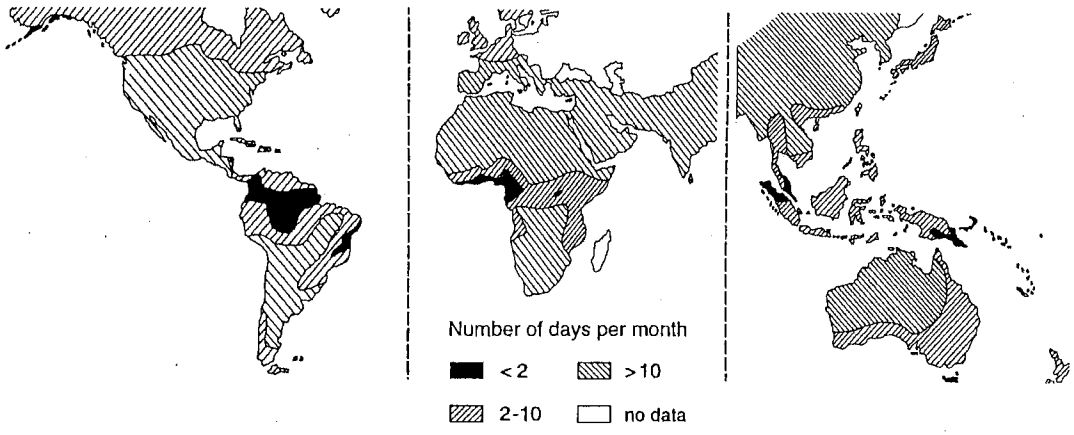


Figure 8.1 World Coverage by Airborne Radar Including ERIM SAR-580 in Europe and Various Systems in the USA

Note: Precise boundaries are not available; coverage of the former USSR is not known.
Source: Trevett (1986).

Figure 8.2 Number of Days Per Month with Good Weather for Aerial Photography during the Best Season



Source: Gribben et al. (1971).

Table 8.1 Summary of System Parameters for Commercially Operated Airborne Radar Systems

Manufacturer	Model	Type	Wavelength (cm)	Nominal resolution		Ground swath width (km)	Polarization
				Along track (at 15 km) (m)	Across track (m)		
Westinghouse	APD-7	R	0.86				
	APD-8	R	0.86				
	APQ-56	R	0.86				
	APQ-97	R	0.86	25	8	21	HH and HV
Goodyear	APD-10	Syn	3.1	10	10		HH
	APQ-73	Syn	3.1				
	APQ-102	Syn	3.1	15	15	37	
Texas Instruments	APQ-55						
Motorola	APQ-86	R	0.86	46	15	16	
	APS-85	R	2.5	116	75	100	HH
	APS-94	R	2.5	116	75	100	HH
	APS-94D	R	2.5	116	30	100	HH
General Dynamics	APQ-69	R	3.1	380	15	25	
Philco-Ford	DPD-2	R/Syn	1.8	30-60	12-25	18	H and V
Kelvin-Hughes	–	R	3.0				
EMI	P 391	R	0.86	52	15	28	HH

Table 8.1 Summary of System Parameters for Commercially Operated Airborne Radar Systems (Cont'd)

University of Michigan	WW	Syn	3.1	10	10	18	H and V
			3.4				HH
RCA/NRL			6.7				HV
			24.5				VV
			70.0				VH
Thomson CSF	RAFALE	Syn	3.3				
Thomson CSF	VIGIE	Syn	3.22	30	15	21	HH
Ericsson		R	3.1	75	75	21 km+	
JPL/NASA	–	Syn	25.0	25	25	–	HH, HV
Toros	–	R	–	–	–	–	–

Source: Trevett (1986).

microwave image often reveals patterns which, although detectable on the air photograph, are not identified as such because the portion of the pattern recorded is not seen in the context of its surroundings or is insufficiently representative to allow pattern recognition.

The representation of regional pattern and texture on radar images does not preclude the detection of local detail. Spatial resolution has progressively improved from the 75 x 115 m cell of the early real aperture systems to the 3-5 m cells of present-day's focused, synthetic aperture systems, which provide more than enough details for the examination of most environmental problems.

A fourth capability of airborne radar systems is the rapidity of data acquisition. For example, the ERIM system with a swath width of 18 km operating in a turbo-prop Convair 580 with a ground speed of 550 km hr^{-1} can image 10,000 km^2 hr^{-1}. The Aeroservice SAR operating in a Caravelle jet during the *Projecto Radambrasil* (1973-1979) with a swath width of 37 km and a ground speed of 850 km hr^{-1} achieved a mapping rate of 31,450 km^2 hr^{-1}.

Airborne radar has additional capabilities as a function of the look angle. In all SLAR systems, the energy pulse "illuminates" the ground at relatively large incidence angles. This is analogous to a low sun angle in aerial photography. Radar shadowing emphasizes small differences in elevation creating landscape texture enhancement. Changes in the shape, frequency and pattern of numerous individual shadows call attention to significant changes in landscape texture. These may be associated with geological, geomorphological, vegetative or land use variations.

A special feature of the side-look geometry of radar systems is the concentration of energy and strong signal returns associated with corner reflector configurations. Dihedral configurations generate a strong return because all the unabsorbed radar energy is returned to the receiver. Configurations of this type are quite common, for example, a steep river bank and the adjacent water surface, the side of a building and the adjacent street or parking area. Even a clear-cut line in a forest canopy can approximate a dihedral geometry giving a characteristic bright signature matched by the radar shadow on the far side of the clearing. In the trihedral reflector configuration, all unabsorbed energy impinging from directions included within the solid angle created by the feature is returned to the radar receiver creating a very strong signal. Bright re-

turns generated by trihedral configurations are generally associated with L-shaped buildings and structural details in the urban environment. Point targets of this type often produce a very strong radar return quite out of proportion to their actual size.

With the exception of corner configurations described above, the strength of radar backscatter from a surface is a function of the terrain geometry and the surface roughness. It is apparent that the slope of a planar surface relative to the depression angle of the radar beam will determine the proportion of the incident energy returned to the receiver with the return varying inversely with the incidence angle, other factors being constant. The effects of roughness (surface micro-relief) are less obvious. Many natural surfaces have small scale features comparable in amplitude to radar wavelengths. The radar response can be summarized as follows: surfaces composed of elements having an amplitude less than half the wavelength of the radar will behave as specular reflectors, whereas surfaces composed of elements significantly larger than the radar wavelength will behave as diffuse reflectors and generate backscatter. The sensitivity of airborne radar to slope variation (macro-relief) and roughness (micro-relief) provides a capability in differentiating rock types and in terrain analysis that is unique (Figure 8.3).

The final feature of airborne radar systems that needs mention is the stereoscopic capability. It is perfectly possible to lay out flight paths that obtain appropriate base-height ratios for the parallax required in stereoscopic imagery (Figure 8.4). However, radar stereoscopy differs from the conventional stereoscopy of aerial photography in that radar is a slant-range presentation even when corrected to give the appearance of a ground-range (vertical) view, thus the effects of range and shadow remain. Opposite-side imaging offers a partial solution to the problem, but, even then, detail in shadow zones is only observed once, and the differences in aspect — illumination and shadow direction — make for difficult stereo-viewing. In spite of these limitations, interpretation from the radar stereo view is improved, and the confidence level of interpreted data increased (Koopmans, 1974).

Relatively little stereo radar imagery has been obtained. However, a pseudo-stereoscopic effect is created in all SLAR imagery as a result of the oblique illumination. This effect is similar to the cartographic device of relief shading. The pseudo 3D effect is particularly valuable in the portrayal of relief (Figure 8.3). It results from the fact that microwave



Figure 8.3 Terrain Analysis by Airborne Radar

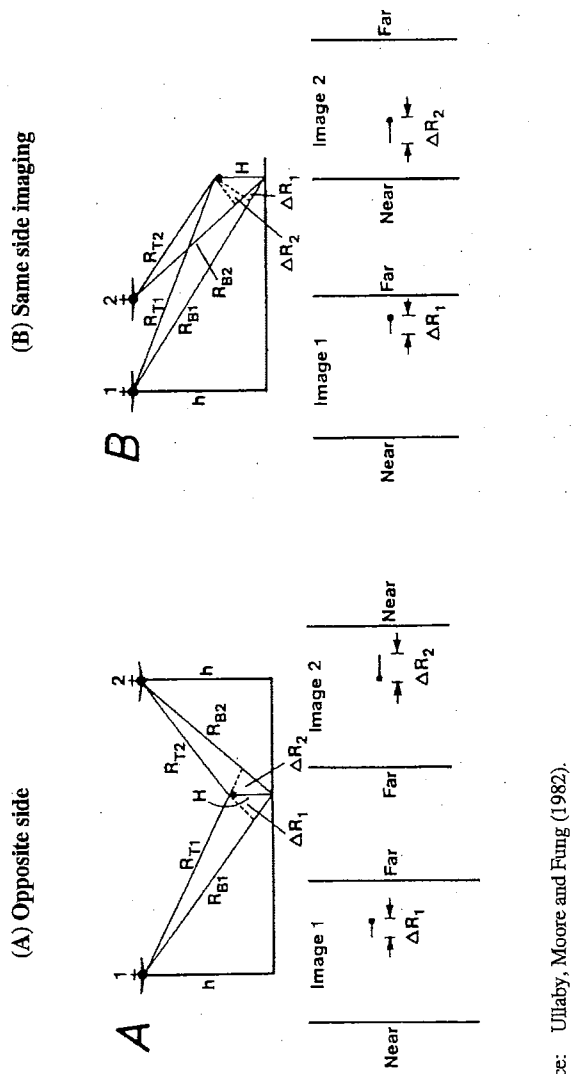


Figure 8.4 The Geometry of Radar Stereoscopy

Source: Ulaby, Moore and Fung (1982).

energy does not experience atmospheric scattering, thus there is no radar illumination within shadow areas. The sharp boundary between illuminated and non-illuminated areas produces a high contrast image compared with the more gradual tonal transitions of aerial photography.

Special Capabilities of Satellite Radar Systems (SRS)

With the launch of SEASAT in 1978, spacecraft radar made its début. This led to renewed interest in microwave remote sensing and directly stimulated the SAR-580 programme of the European Space Agency (1981-1983) as a prelude to their development of a satellite radar system. SEASAT was dedicated to ocean research and its coverage limited to the zones within range of receiving stations for real-time transmission, no provision being made for on-board recording. This left most Third World countries beyond its imaging capability. The special features of satellite imaging radar were only fully realized after the launch of the Shuttle Imaging Radar (SIR-A) in the second Space Shuttle mission (November 1981). The SIR-A mission was followed by SIR-B in October 1984, which, although beset with problems, provided valuable experimental data on radiometric calibration and optimum incidence angle configuration for different tasks including stereoscopic radar imaging (Ford et al., 1983, 1986; Elachi, 1986).

The launch of the European Radar Satellite (ERS-1) and the Russian ALMAZ satellite in 1991 provided a renewed C-band (HH) and a new S-band (HH) capability. ERS-1 is primarily configured as a sea-observation satellite with fixed incidence angle viewing, an 80 km swath width and 30 m spatial resolution. ALMAZ provides adjustable off-nadir viewing on either side of the ground track out to 50° incidence angles. The swath width is 40 km and the spatial resolution 15 m. With a two-year operational life, ALMAZ was a general purpose radar satellite, which also provided passive microwave and thermal infrared data and imagery. With the launch of the Japanese SAR satellite (J-ERS-1) in 1992, an L-band system was added providing 25 m resolution over a 75 km swath. The decade of the 1990s is the first in which operational, multi-frequency radar imagery of the Earth's surface is available from spacecraft.

Three special features of satellite imaging radars result directly from their orbital characteristics (Elachi, 1988). Spacecraft systems operate at altitudes 30 to 100 times greater than aircraft systems and this has an important effect on the imaging geometry. Airborne systems can only achieve a wide swath width by sweeping the radar beam across the surface from near to far range with progressive change in the depression (incidence) angle. This has a direct effect on the image characteristics since backscatter, foreshortening and radar shadowing all vary as a function of incidence angle. In contrast, the viewing geometry of a spacecraft SAR varies by only a few degrees across a similar swath width. The microwave illumination is essentially uniform, and variations in radar return due to incidence angle effects are minimal. Different incidence angles have been selected for different missions depending on the requirements: SEASAT 23°±3°, SIR-A 50°±3°, SIR-B selectable between 15° and 60°, ERS-1 23°±3°, RADARSAT selectable between 10° and 60°. It is worth noting that the optimum incidence angle for one task may be far from optimum for another, hence the value of a multi-mode capability.

The second advantage of spacecraft radar systems is their freedom from the effects of atmospheric turbulence. Even when equipped with motion compensation devices, airborne imagery is often marred by motion artifacts resulting from pitch, roll and yaw. Spaceborne systems operate well above the atmosphere and are unaffected by erratic movements due to turbulence.

A third feature of spacecraft systems relates to the speed and frequency of data acquisition. With a satellite in near polar orbit, the earth continues its rotation within its orbit resulting in consecutive imaging swaths. RADARSAT with an orbital period of 101 minutes has an effective ground speed of 7.4 km sec^{-1} (26,640 km hr^{-1}, compared with perhaps 850 km hr^{-1} for a jet aircraft). Not only is the rate of coverage faster, but the swath can be significantly wider than for aircraft systems. This is important when one remembers that approximately 19.5 million km^2 of the earth's land surface experience perennial cloud cover that can only be penetrated by radar systems.

RADARSAT: The New Technology of Spacecraft SAR

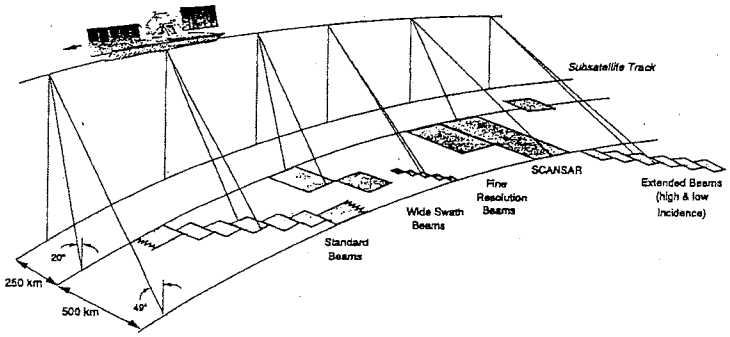
Experience with SEASAT and the Shuttle radar demonstrated that in the long term the most effective way of collecting radar data was by satellite. Regular revisit with repeat coverage of critical areas and processes is of great importance for countries in the developing world where there is an urgent need for information about resources and environmental problems. RADARSAT is an advanced SAR system with features designed to meet Canada's requirements for resource management and environmental monitoring — essentially the same needs as for large territories in the Third World. RADARSAT is to be launched in 1995 with a five-year operational life. A review of its capabilities provides an opportunity to examine the future role of satellite microwave remote sensing.

The RADARSAT SAR is a C-band (5.6 cm wavelength), horizontally polarized system. It will be launched into near polar orbit (inclination 98.6°), permitting coverage of all the world's environmentally sensitive zones — polar ice caps, desert margins, rainforest and ocean basins. RADARSAT has a large demand for power and so it is essential that it receives lengthy periods of solar illumination. For this reason, a sun-synchronous, dawn-dusk orbit has been selected. This has important benefits because it means that the radar can operate on solar rather than battery power. Thus, there is no operational difference between ascending (south-north) and descending (north-south) passes, and nearly twice as many imaging opportunities are available compared with a non-sun-synchronous orbit.

In the normal imaging configuration, RADARSAT will look to the north along the orbital path. However, there is provision for 180° rotation around the yaw axis to allow opposite side viewing of selected areas. Radar operation time is determined by the power available to the satellite. In a typical orbit, 10-15 minutes of radar data collection is planned. This corresponds to an along-track distance of 4,440 to 6,660 km — the equivalent of a traverse from Cairo to northern Angola and on to southern Namibia. The maximum data collection time is 28 minutes per orbit which would cover nearly a third of the Earth's circumference.

A special feature of RADARSAT is the provision of a variety of imaging modes and a range of ground resolutions (Figure 8.5). These have been selected as a result of more than fifteen years of study of radar systems and user needs (Raney et al., 1991). The standard image format

Figure 8.5 RADARSAT — Imaging Modes, Swath Widths and Resolution



Beam mode	Swath width (km)	Resolution range x azimuth (m)	Incidence angles degrees (°)	Looks
Standard beams 7 positions >10% overlap	100	25 x 28	20 - 50	4
Wide swath beams 3 positions 3% overlap	150	25 x 28	20 - 40	4
Fine resolution beams 5 positions 10% overlap	50	11 x 9	37 - 48	1
Narrow ScanSAR	300	50 x 50	20 - 40	2
Wide ScanSAR	500	100 x 100	20 - 50	2
High incidence beams 6 positions 3% overlap	75	25 x 28	50 - 60	4
Low incidence beams	75	25 x 38	10 - 20	4

provided by RADARSAT covers a 100-km swath positioned within an "orbital accessibility zone" of 500 km spanning a range of incidence angles from 20° to 49°. This is achieved using a relatively large antenna (15 m x 1.5 m) that provides variable beam directions and different elevation beam widths. Only one incidence angle is available at any one time, and the swath is continuous and parallel to the sub-satellite track. At the maximum operation time of 28 minutes, this would result in the collection of 1.25 million km^2 of radar data. The provision of a range of seven incidence angles allows the user to select the most appropriate radar illumination angle for the task and for the terrain conditions.

In addition to the standard beam mode, RADARSAT has a wide swath mode available at incidence angles between 20° and 39° and a fine resolution mode offering five positions in the incidence angle range 37°-48°. The size of the ground resolution cell using the standard beam is 25 x 28 m (comparable to LANDSAT TM). The wide swath mode resolution is similar, and the fine beam mode offers 11 x 9 m resolution (comparable to SPOT). Extended coverage is available in both the near (10°-20° incidence angle) and far range (50°-60° incidence angle) with comparable resolution to the standard beam. The combination of selectable incidence angles and selectable resolving power provides RADARSAT with great flexibility. For example, in a single orbit it would be possible to obtain high resolution information on the progress of a flash flood in southern Libya, to continue the routine monitoring of the shoreline of Lake Chad using the wide swath mode, to identify illegal forestry operations in the Cameroon, again, at high resolution, and to map the extent of flooding in the coastal wetland of Gabon.

A special feature of RADARSAT is the provision of Scan SAR in which extended range coverage is achieved using a set of contiguous beams to illuminate a total swath width of 300 km or 500 km. Scan SAR has been designed to provide regional coverage with moderate to coarse resolution (50 x 50 m for the narrow scan and 100 x 100 m for the wide scan).

Ground coverage varies according to mode and latitude. In the Scan SAR wide-scan mode, RADARSAT offers 35-40 per cent coverage of tropical regions each day and complete coverage every four days. Thus, comparative coverage of tropical areas and rapid revisit become a reality.

Image products generated by RADARSAT can be grouped into three categories available both as hard copy (photographic) and in digital formats (CCTs). Data collection along the swath is continuous; however, data products will be formatted and made available on a frame-by-frame basis. *Geo-referenced* products which incorporate systematic geometric corrections for Earth rotation, eccentricity and curvature are considered as standard. For *geocoded* products, the data are resampled and rotated to conform to a specific map projection. Ground control points and corrections for terrain elevation will be included for the scene when available. *Special* products, such as unprocessed signal data, external calibration reference data and full resolution image files will be available on special request. The main concern in data product delivery has been the design of a fast processor capable of handling an input of approximately 25 Mb sec^{-1}. Data will be processed as received, providing a rapid response to users in need of radar imagery and CCTs for operational applications.

RADARSAT will complement the ERS-I (European) and J-ERS-I (Japanese) satellites operating at C- and L- band wavelengths, respectively. It will fill an important five-year window (1995-2000), one which may be critical for the monitoring and management of the Earth's resources.

Applications of Radar Remote Sensing: Hazard Response, Management and Planning

Each new environmental report seems to add to the litany of hazards and debilitating effects resulting from the increased intensity of human impacts. There is a geographical face to all these problems. They involve mosaics of rock, soil, vegetation, crops and urban communities. To understand the scale and global teleconnections of these problems, it is essential to have access to accurate and timely information. The keys to understanding environmental perturbations are the synoptic viewing of regional patterns and change detection.

Radar remote sensing has much to offer in this regard, yet it has been grossly underestimated as a monitoring tool. Set against the successes of the SLAR surveys of the late 1960s and early 1970s in Central and South America, Indonesia and New Guinea were the relatively high

cost area in the sense that the operations were experimental with little prospect of repeat coverage. Hopefully the availability of operational satellite radar systems in the 1990s will awaken renewed interest in microwave systems. Is the user community ready for these developments? Probably not. Many environmental specialists are unfamiliar with the radar image and radar systems. In consequence, they are reluctant to consider microwave remote sensing as a valid tool in the investigation of environmental problems. In an effort to make a wider circle of users more aware of the value of radar data in examining environmental issues, a series of interpretative examples are offered in the pages that follow. They are not intended as final or exhaustive studies but, rather, as exemplars and stimulants in the wider applications of radar remote sensing.

Flooding: Inundation

The increased incidence of flooding in many river systems is a direct result of mismanagement of the watershed through deforestation or overgrazing. There are serious economic consequences not only in terms of flood damage *per se*, but also with regard to infrastructure renewal. Bridges, spillways, culverts and levees built according to design criteria based on fifty-year old hydrological data are generally inadequate to cope with the increased volatility of the present-day river regimes.

Radar is an excellent tool for flood assessment because of the format of the imagery — a continuous swath that can follow the river course, and the capability for real-time monitoring at peak flood even in adverse weather conditions. Acquisition of flood data using airborne visible or infrared techniques is often limited or prevented by the cloud and rain associated with the flooding. Radar's day-night, all-weather capability is particularly valuable for monitoring the dynamics of flooding following the breaching of levees or control structures and for co-ordinating emergency operations (Ormsby et al., 1985).

The imagery selected to illustrate radar applications in flood monitoring (Figure 8.6) shows a section of the Mississippi River upstream from Quincy, Illinois. The flooded area (F) behind the levee gives a specular (dark) return except where interrupted by field boundaries, embankments and patches of forest. Differentiation of flooded land from rain-soaked, but non-flooded land, and the exact delineation of the

Figure 8.6 Radar Application in Flood Monitoring



flood limit, is achieved more effectively with radar imagery than conventional air photography because of the special characteristics of microwave-terrain interactions. The smooth water surface of flooded areas reflects energy away from the radar receiver, hence the specular (dark) radar signature. In contrast, the strength of the radar return from an area of wet soil intensifies with increase in the moisture content due to changes in the complex dielectric constant (permittivity). Thus, a saturated soil has a relatively strong radar return. The area behind the levee in the eastern sector of the flood plain (G) has escaped inundation, and the flood limit can be traced out field by field based on the differences in the radar return. Exact delineation of flood limits is of great significance in damage assessment and the evaluation of insurance claims.

Flooded wetlands (M and X) are readily identified. They generate high-contrast edge returns on the radar imagery because of the juxtaposition of specular responses from the water surface and strong returns (dihedral re-inforcement) from the vegetation, as illustrated in Figure 8.4. Dykes, levees and field boundaries are also good corner reflectors, particularly when oriented orthogonal to the radar beam. The breach point (B) where flood waters broke through the levee is marked by a "gap" in the radar return.

Other features in this radar scene include urban areas (U), yazoo channels with a gallery forest (Y), an abandoned rail line (R) and a flood control structure with a lock at the western end (L).

Flooding: Flash Flood Susceptibility

Most desert streamflows are entirely storm-fed, consequently they reflect the characteristics of the precipitation in their rapid onset, short duration, and intensity. The high flood discharge rates that occur in desert washes result from the large run-off response to heavy rainfall on bare sloping surfaces. The torrential nature of these events is reflected in high flow velocities. Peak flows as high as 6 m sec^{-1} and mean velocities of 3 m sec^{-1} are not unusual.

The mosaic of GEMS X-band SLAR (Figure 8.7) shows the desert area northwest of Tucson, Arizona. A basic zoning of the area for planning purposes has been undertaken, and annotation 6 identifies the zones that are unsuitable for any type of development because of their

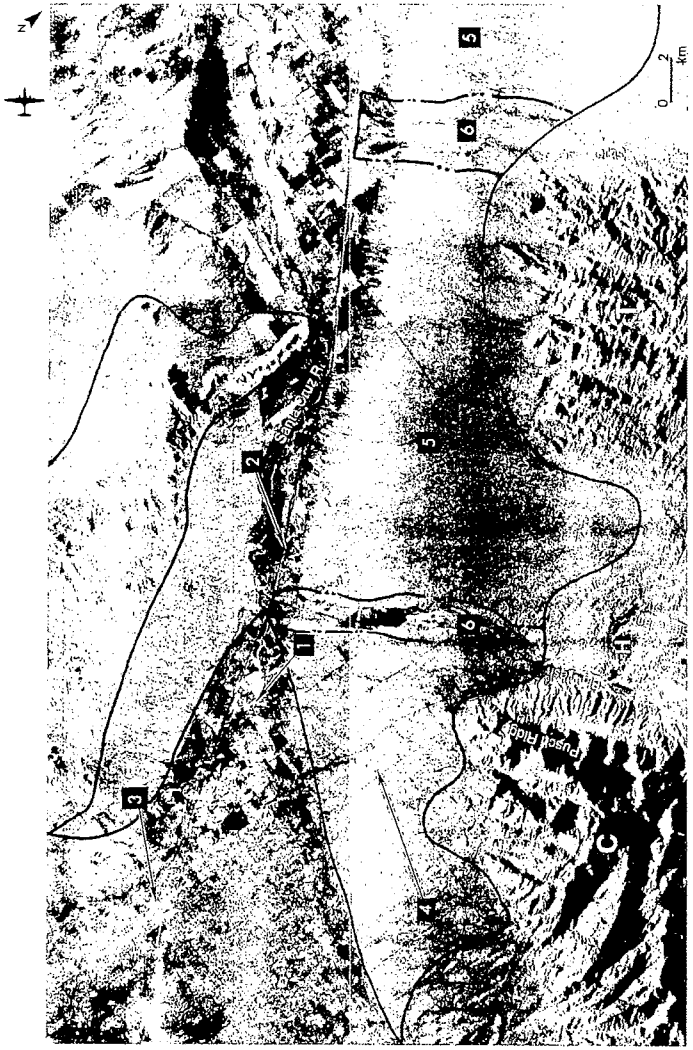


Figure 8.7 Desert Area Northwest of Tucson, Arizona

susceptibility to severe flash floods originating in the mountains to the northeast.

The pattern and character of the washes displayed on the radar image indicates their susceptibility to flash flooding. They are gently winding rather than sinuous, locally braided and relatively wide. The dark radar signature suggests that the channel-fill is fine grained, probably sand, with intermeshing longitudinal braids of coarser material, probably gravel. Terrace remnants along the channel margins attest to lateral erosion, the product of flash-floods of considerable magnitude in the past.

The location of the zones susceptible to flash flooding indicates that there is no threat to Tucson itself. However, it is apparent that the road and rail links to the west could be severed in the event of major flood events. The greatest risk is associated with zone 6 east because of the possibility of a coincidence of flood crests from Big Wash and Sutherland Wash and the alignment of the rail line and highway at the margin of Big Wash fan adjacent to the Santa Cruz River.

Forest Depletion: Ranching

Tropical deforestation has received increasing attention from the scientific community in the last thirty years. The local effects of forest removal-laterization of soils and rapid reduction in fertility have been known since the beginning of the century, when large scale plantation cropping was first attempted. The more far-reaching effects on global biosphere teleconnections with reduction in the oxygen supply and diminishing convective rain cell generation are only beginning to be understood. The analysis of these processes requires a knowledge of the extent of deforestation and reliable information on the rates of change of both continuing forest depletion and regeneration (Grainger, 1984). The same types of data obtained at prescribed monitoring intervals are also of great significance in regional and national planning.

SLAR and SRS (satellite radar systems) are eminently suited for this task. The texture (roughness) differences between the forest canopy and cleared areas are readily identifiable using visual interpretation methods, and there is good evidence to show that various stages of regeneration can be identified using digital techniques (Riom and Le Toan, 1981; Wu, 1984). Radar returns from the edges of clear-cuts show some vari-

ability depending on orientation, incidence angle and the regularity of the felling. However, as shown in Figure 8.8, clear evidence of deforestation is provided by shadow alignment and corner reflector enhancement along the forest edge. These permit accurate area measurements. In this example from Acre Territorio Federal in western Brazil, the area cleared for ranching in the centre of the image covers more than 30 km^2. Variations in the radar backscatter from parts of the cleared area indicate that regrowth is already taking place.

This image is a RADARSAT simulation with an incidence angle of approximately 40° and a resolution of 10 m comparable to the satellite's narrow beam operating mode as described in a later section.

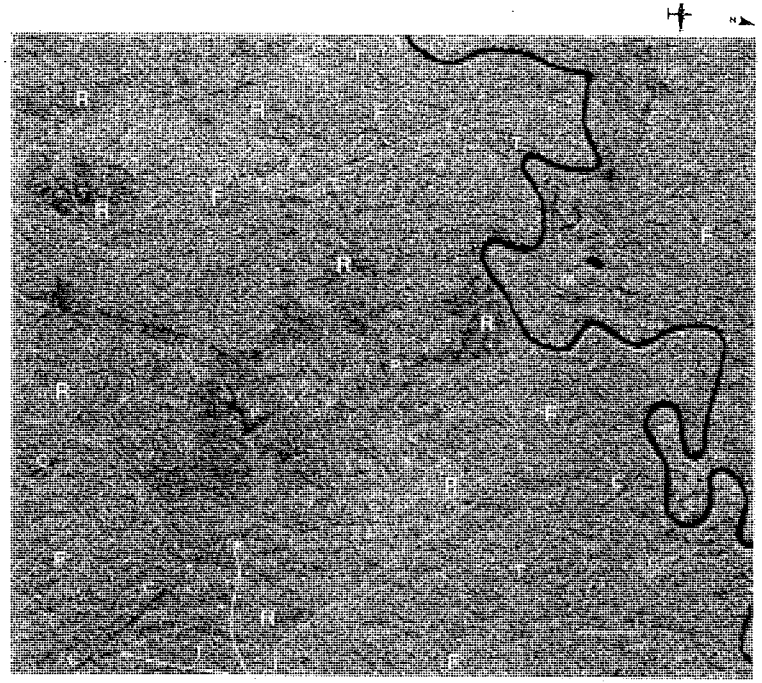
Forest Depletion: Timber Cutting

The logging of tropical hardwoods is one of the most destructive types of exploitation because, although only selected species are cut, there is damage to up to a third of the area by bulldozers and skidders in the search for and removal of these trees. Timber concessions are granted to large companies over extended periods of time, and there is minimal control or even knowledge of their activities in remote areas of the equatorial rainforest.

A section of the coastal lowland in southwest Cameroon is shown in Figure 8.9. This image obtained by the Space Shuttle Imaging Radar (C-band HH) covers an area of approximately 1,225 km^2 in Département Kribi, east of the town of Campo. Since this is one of the more accessible sectors, extensive logging has occurred. The relatively large cut-over area shown here (approximately 155 km^2) displays the typically irregular margins of logging activity and good contrast between recent (R) and earlier (O) operations. Hill outliers of the Ngovayangqui crystalline massif within the cut-over remain forest-covered as do some of the valleys because of the difficulties of logging the steeper terrain. The change in radar backscatter between the cut-over and the untouched areas is explained by differences in surface roughness. Cut-over areas are relatively smooth compared to the irregularities of the forest canopy and, therefore, image in darker tones.

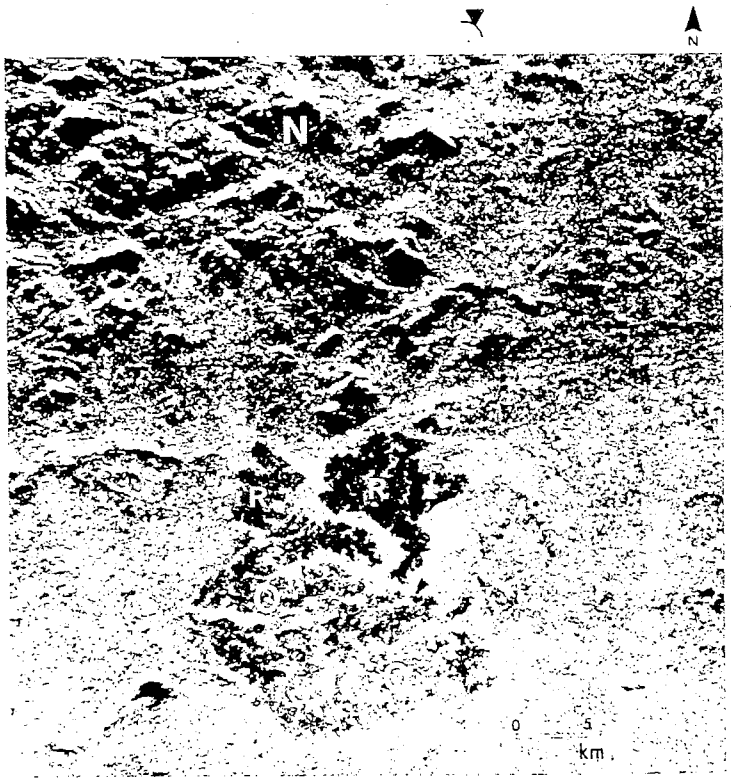
So far little research has been attempted on the feasibility of using radar remote sensing to obtain a measure of the rate of forest depletion in the tropics as a result of commercial timber harvesting operations

Figure 8.8 Deforestation Shown by Shadow Alignment and Corner Reflector Enhancement



(Stone et al., 1989). Equally important is the assessment of regeneration. Satellite radar systems can supply accurate data on the location and extent of forest depletion and on regrowth over an extended time frame using the revisit capability. Such information is important for developing countries where basic resource data are limited and forest management is minimal.

Figure 8.9 Coastal Lowland in Southwest Cameroon



Coastal Wetlands: Hazards and Management

Coastal zones contribute significantly to the economies of most countries. This is particularly true in the tropics where coastal wetlands provide a nutrient base for aquaculture and near-shore fisheries, sandy shores offer a potential for tourism and estuarine and deltaic lowlands provide suitable soils and drainage conditions for rice cultivation. With

varied and frequently intense human impact on the coastal zone, there is an increasing need for information about environmental conditions, changing land use, development conflicts, etc., in order to establish effective management planning (Bacon et al., 1988).

An image obtained by the GEMS X-band system along the South Carolina coast has been selected to demonstrate the value of SLAR in giving a broad view of both coast and hinterland and providing important data for coastal zone management.

In Figure 8.10, the strong radar backscatter from the closely spaced cylindrical stems of rushes and salt grass permits precise delimitation of the coastal marsh (M), which lies behind a narrow barrier of sand dune and beach. Farther north are the coastal communities of Floral Beach and Garden City Beach (R), both of which are directly exposed to the dangerous storm surges that develop in hurricane conditions. To the west of the coastal highway (H), the dark radar signature with irregular, brighter patches denotes an area of pine forest on stabilized sand dunes.

The Intracoastal Waterway (I) follows the Waccamaw River wetland in this section and so is well protected from stormy conditions along the coast. Radar image tone and texture provide excellent discrimination between non-forested (N) and forested (D and P) wetland. The former displays dark image tones and a non-textured surface, apart from a "ribbing" effect produced by more luxuriant vegetation along the creeks. Forested wetland with a cover of broad-leaf trees (D) generates considerable volume scatter of microwave energy giving rise to a relatively bright radar signature. This results from the multi-layer arrangement of the leaf surfaces and their high moisture content (large dielectric effect). In contrast, the dark returns from areas of southern pine (P) result from loss of energy within the needles and a small dielectric effect because of the low moisture content.

These differences in radar return provide very significant information for land management in the Waccamaw wetland. The edaphic controls which promote the dominance of pine in one area and broad-leaf species in another provide clearer evidence than the topographic map with regard to small variations in elevation. Thus, the pine only occurs in areas where the terrain is above ground water influence (generally above 5 m elevation), whereas, the broad-leaf forest can tolerate bottomland conditions (generally between 0-5 m elevation). Controlled cutting of the deciduous forest in parallel swaths is occurring at (S).



Figure 8.10 Delimitation of the Coastal Marsh

Extending this application of surrogate detail, it is apparent that the bottomland forms a broad Y-shaped zone that should be treated as a single unit for planning purposes, especially in view of continuing shifts of the river channels, which appear to be misfits in an infilled, estuarine setting.

Mining Impact and Mine Waste

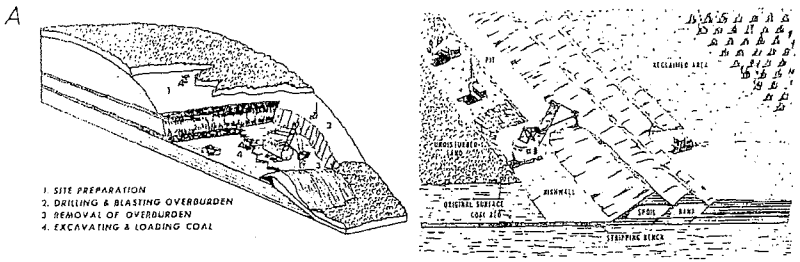
By its very nature as an extractive industry, mining is destructive. Open pits leave a scar in the landscape, shafts contribute their spoil heaps, but these are minor impacts compared with the devastation wrought by area strip mining for coal. This is practised in coal basins with relatively thin overburden. The area is cleared, drilled and blasted, and the overburden is removed and deposited in long, narrow banks which parallel the working face (highwall). As the seam is worked, the spoil banks succeed each other in regular series as illustrated in the ERS-1 image of the Jharia basin (Figure 8.11).

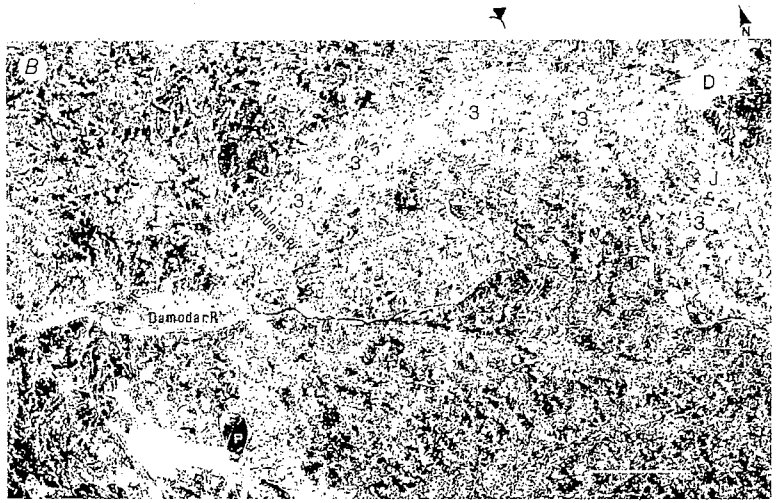
Various environmental problems are associated with strip mining — erosion of the bare or thinly vegetated spoil banks and the discharge of highly mineralized, acidic water from the concentration of iron sulfides in the waste materials. In active mining districts the area of stripping expands daily and can extend over tens of kilometres in a few months. Field mapping is time-consuming, and there is generally no reason for up-dating the aerial photography of mining districts. Radar systems, particularly spacecraft systems, can provide initial surveys and repetitive monitoring of strip mining in a timely and cost-effective manner. In addition, the effectiveness of reclamation can be assessed, and the potential sources of acidified water identified.

Urban Dynamics: Synopsis

For many countries the increasing size of urban areas constitutes the most serious challenge to the planning process. Third World cities are beset with menacing and seemingly intractable problems of pollution and deterioration. Most new megacities are experiencing the same processes: industrialization, rapid increase in population, accelerated expansion, and reduced living standards. In the underdeveloped world, the flow of people from rural to urban areas has been uncontrolled. The urban infrastructure and life-support systems are generally inadequate

Figure 8.11 Successive Spoil Banks in the Jharia Basin





with, at best, haphazard and piecemeal responses to the most urgent problems. The urban area presents one of the most complex and rapidly changing environmental systems requiring comprehensive and timely information for effective monitoring and management. Because of their synoptic capability, radar systems can provide some of this information in a convenient spatial format allowing rapid evaluation of different aspects of urban change within a specific time frame.

The example selected to describe SLAR applications shows the city of Djakarta, Indonesia, in 1973 (Figure 8.12). Development has been so rapid that this is already an historical document, but it serves to illustrate the dynamics of urban development and the value of the synoptic view. The main physical constraints on development in this area are the poor drainage conditions along the coast and the frequent floods of the rivers flowing north to the coastal lowland (the Pesanggrahan, Krakut, Ciliwung and Sunter). Canals have been dug to alleviate these problems. In the older section of Djakarta (L) these canals define the town plan and the main streets were constructed alongside. However, to the west and north, the Banjir and Kali Ancol Kanals and, to a lesser degree, the Kali Sunter Kanal have formed barriers to development. The flood problem in the low-lying, coastal flats prevented development until flood control basins (F) were provided, a task already underway in 1973.

To improve communications, a semi-circle of thru-ways was planned to loop around the city. Part of this was already in place in 1973 — the Gatot Subroto Thru-way, the Yos Sudarso Panjaitan Toll Road and a small section of the Jagorawi Toll Road. The inner loop thru-way system is now complete, apart from the east-west Harbour Toll Road, and an outer loop is under construction. The development of new suburban residential areas has taken place in the zone immediately beyond the inner loop of thru-ways from Halim P.K. Airport (H) in the southeast to the area of raised shorelines (V) in the northwest. Extensive clearing for residential development is evident in this area in 1973, with strong radar returns (W) produced by the irregularities of the bulldozed ground surface.

The process of rapid urban expansion is best demonstrated in the area immediately east of the old core (L): an area of marsh with both flood and foundation problems. The airport (A) has been relocated 14 km to the west, and the site is now occupied by the Indonesia International Trade Centre and Jakarta International Trade Fair. The two run-

Figure 8.12 SLAR Imagery of Djakarta, Indonesia



Area — Djakarta, Java, Indonesia
System — Goodyear (GEMS) X-band (HH)

A airport (relocated)
B commercial buildings
C cemetery
D industrial estate
E shipbuilding yards
F flood control basin
G golf course
H Halim P.K. Airport
J race track
K fuel tank depot
L older subdistrict
M Monas National Monument and park
N TNI industrial complex
O Olympic Odeon complex
P fish-shrimp ponds (aquaculture)
Q container terminal
R rail line
S rail station
T Taman Mini Indonesia Indah (museum park complex)
U university campus
V raised shorelines
W development (site clearing)
X residential suburb
Y rail yard
Z zoological garden

ways have been modified and extended to form road links, and the whole area to the east (unoccupied in 1973) is now developed for housing and a large industrial estate. The result is a continuous built-up area extending from the port facilities (E, Q) to the industrial estates in the south and the commercial centre to the west. Extensive development has also occurred along the sea front, particularly in the western section where fish farms have given way to low-cost housing, a power plant and new wharfs.

The advantage of the small scale radar image is that the different vectors in the urbanization-development process can be examined in their spatial context, and an overview of the whole conurbation is provided. This includes a perspective on site controls, such as flood hazard, and the landscape alteration that accompanies most development projects.

Urban Dynamics: Suburban Expansion and Map Revision

In addition to the synoptic view, imaging radars can provide detailed information about landscape change occurring as part of the urban process at the local level. Radiometric distortions and slant range to ground range errors can be removed in digital processing, and registration of the radar data to a topographic map base is possible using selected ground control points (Curlander et al., 1987).

In the example shown in Figure 8.13, an entire new community, Sun City, Arizona, has been established in a five-year period with new development still continuing (X). The available map (1:50,000) shows none of this development, since the area was rangeland with a few small orchards at the time of the survey. Details of the new development can be easily overprinted on the map once rectification of the radar data has been completed, as indicated in Figure 8.13B.

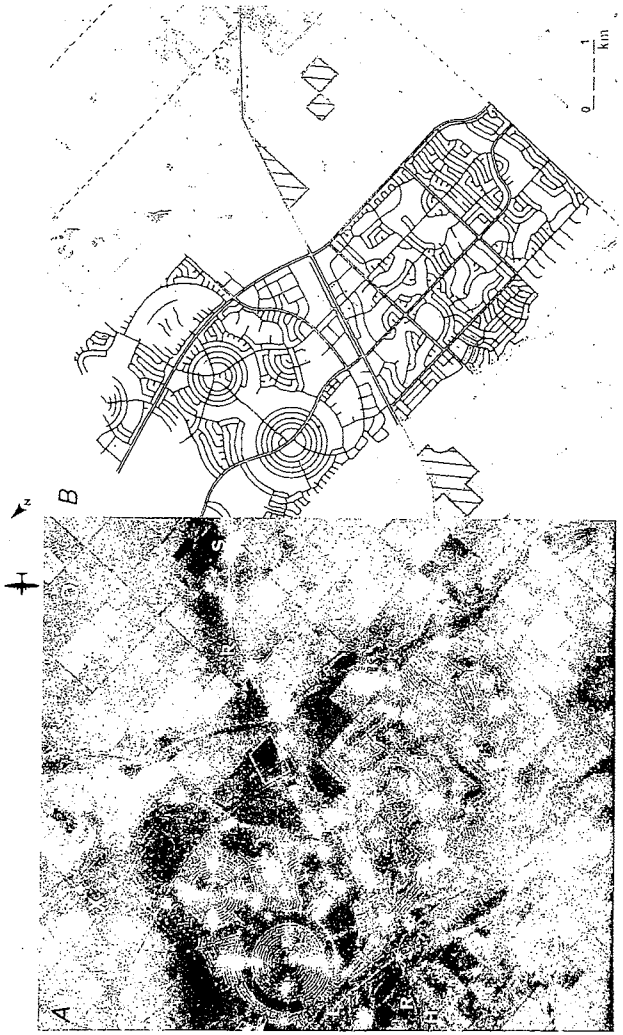


Figure 8.13 Sun City, a New Community in Arizona

Conclusion

There can be little doubt that by the turn of the century great advances will have been made in radar systems. The real challenge may lie in the *modus operandi*: the manner in which radar data are used for resources surveys, environmental monitoring and the implementation of management plans. As a conclusion to this review of radar remote sensing, it seems appropriate to call attention to some of the problems that need to be addressed before effective use can be made of this new technology.

- Our knowledge of the interactions between different types of material and microwave energy is still incomplete. Much has still to be learned about the effects of other factors, such as moisture content, wind, the micro- and macro-geometry of the individual elements that make up a cover type, incidence angle, directional bias, etc. Our knowledge is particularly scant with regard to C-band radars imaging tropical environments, hence the need for a co-ordinated programme of research.
- Most resource scientists and managers are unfamiliar with radar remote sensing. Realizing the full potential of radar in environmental studies is, therefore, dependent to a considerable extent on the provision of training programmes in a broad field of applications. The aim is to develop an indigenous capability in a particular country in accordance with local needs.
- The most appropriate "implant" procedure for a new technology is by means of pilot projects in order to assess the chances of success and develop modifications or alternate strategies. Before embarking on a full-scale radar project, it is vital to organize the participation of local users and potential users in a variety of disciplines. Land use studies can serve as a bridge in this regard since, by their nature, they are multi-disciplinary. There is the added benefit that, in many developing countries, one of the essential needs is for land use data as a prerequisite for management planning.
- Acquisition and processing of SAR data is a complex and costly process. It demands a high degree of technical expertise. Like many other aspects of technology transfer, the pace of development should be set by the host country in order to develop an indigenous capability and to amortize the cost (debt) over a period of time.

- It is clear that radar is already of proven value in environmental studies, particularly those of a regional nature. Its role in more detailed studies has yet to be demonstrated. Such studies are urgently needed to provide the touch stone against which the claims of the marketing managers of different radar systems can be judged. It would be foolhardy to promise results which are never realized, and it would be short-sighted to leave unexplored potential avenues of application. In this regard, it should be emphasized that there is no substitute for field-based studies. The ultimate accuracy of any radar interpretation and application hinges on the level of knowledge of what actually exists on the ground.

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CHAPTER NINE

Sustainable Silvicultural Systems in the British Commonwealth, with Particular Reference to Guyana

Michael J. Eden

Forest exploitation is currently occurring on a global scale, with significant impacts apparent in many tropical countries where unsustainable extractive logging is contributing to widespread degradation of forest land. Of late, increasing attention has been paid to the possibility of establishing sustainable forest management in lieu of extractive logging, but progress on the ground has been slow for a variety of technical, economic and political reasons.

In assessing the prospects for sustainable forest management, it is evident that considerable silvicultural experience has been accumulated in the past 150 years, particularly in Commonwealth countries like India and Malaysia, and that such silviculture has been widely diffused to other parts of the tropics. Given the persisting technical and political linkages that characterize the Commonwealth, it is reasonable to assume that Commonwealth countries should be in the forefront of promoting sustainable silviculture. A few encouraging signs exist in that some institutional strengthening has lately occurred at the Commonwealth level, exemplified by the Iwokrama Rainforest Programme in Guyana, initiated in 1989, and the Commonwealth Forestry Initiative, dating from 1991 (Anon., 1993a). At the same time, it is evident that establishing and maintaining silvicultural systems in the tropical Commonwealth is often as fraught with difficulty as it is elsewhere and that, in spite of widespread recognition that such systems will eventually have

to be adopted, their current extent is limited and their immediate prospects uncertain.

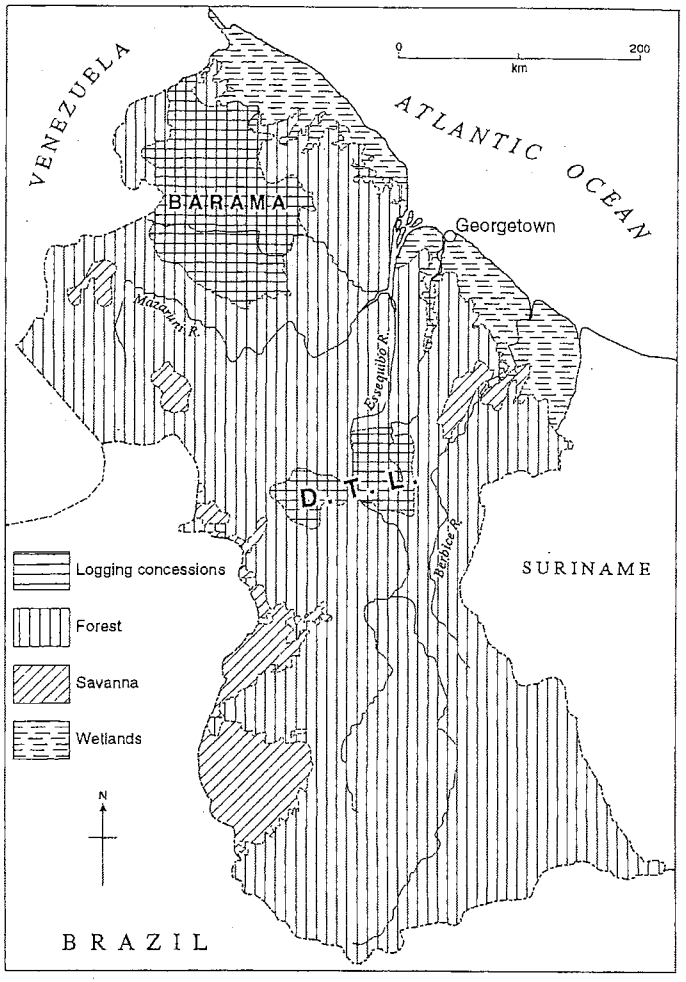
The present chapter aims to explore aspects of sustainable silviculture, particularly the technical and other factors that have constrained its development in tropical Commonwealth countries. In view of the indirect environmental benefits in terms of protecting climatic and hydrologic systems and conserving biodiversity that derive from maintaining an existing forest cover (Eden, 1990), the present emphasis is on mixed-forest or natural-forest silviculture as opposed to industrial plantations, although the latter are acknowledged to play a significant role in tropical timber production. Initially, attention is focused on one Commonwealth country, namely Guyana, where large-scale commercial logging is currently being established and where, in the face of limited silvicultural experience, a few attempts are being made to establish sustainable forestry operations. Thereafter, the broader background and functioning of mixed-forest silviculture in the tropics is considered, and, finally, the specific prospects for such systems in Guyana are reviewed. In this context, the key role of forestry monitoring is emphasized.

Forestry in Guyana

Guyana has an area of 21.4 million ha, of which approximately 16-17 million ha are covered by tropical forest (Anon., 1991; Colchester, 1993). The national population, estimated at 760,000 in 1993 (Amsterdam, 1993), is mainly located in the coastal wetland zone, with sparsely populated forests covering most of the interior of the country (Figure 9.1). Extractive logging has long been conducted in more accessible areas but has traditionally been unintensive, with emphasis on a few hardwood species like greenheart (*Chlorocardium rodiei*). In local areas of dry evergreen forest flanking the coastal zone, wallaba (*Eperua falcata, E. grandifolia*) and dakama (*Dimorphandra conjugata*) have also been exploited for fuelwood, charcoal and telegraph poles (King, 1968; Amsterdam, 1993).

In 1925, a Forestry Department was established in Guyana. Some experimental plantings of teak (*Tectona grandis*), mahogany (*Swietenia macrophylla*) and Caribbean pine (*Pinus caribaea*) were undertaken in the early 1930s. Further planting of Caribbean pine occurred in the 1960s

Figure 9.1 Logging Concessions of Barama Company Limited and Demerara Timbers Limited, Guyana



(Vieira, 1967; King, 1968), but its growth was poor and the operations were discontinued (Anon., 1991). Early "forest improvement" activities were also initiated (Clarke, 1956; King, 1968), but for the most part unintensive extractive logging prevailed under Crown Forest leases. By 1960, approximately 1 million ha of forest were being exploited, although, after independence in 1966, the economy stagnated and forestry was as adversely affected as other commercial activities.

Since the mid-1980s, there have been signs of national revival as political changes have encouraged economic liberalization and foreign investment. In respect of forestry, a notable initiative was the formulation, in 1989, of a National Forestry Action Plan. Its aim was to revive and expand the forestry sector and establish effective government control over logging, reforestation and the use of non-timber forest products (Colchester, 1993). The plan was evolved against a background of declining timber output during the 1980s and of active exploitation, by 1989, of no more than 2.4 million ha of forest land.

Since the mid-1980s, several major logging concessions have been negotiated with foreign-owned companies. These included Caribbean Resources Limited and Demerara Timbers Limited, which obtained concessions in central Guyana in 1989 and 1991, respectively, and Barama Company Limited, which acquired a concession in northwest Guyana in 1991. By early 1993, an estimated 8.2 million ha of forest land had been leased to foreign and Guyanese logging companies, and negotiations have subsequently been reported with other foreign companies, notably Buchanan Company Limited, Mazaruni Forest Industries Limited, and Leeling Timbers Limited (Table 9.1). In many instances, Malaysian, South Korean and other Southeast Asian commercial interests are involved, as well as some Canadian ones (Colchester, 1993, 1994).

Hitherto, extractive logging in Guyana, although scarcely organized on a sustainable basis (Colchester and Lohmann, 1990), has not occurred on a sufficiently large scale to inflict gross damage on the forest cover. However, given the recent surge of commercial interest and the likely expansion of timber production, increasing concern exists over the potential impact of logging activities (Colchester, 1993, 1994; Tickell, 1994). In two major instances, namely the concessions to Demerara Timbers Limited and Barama Company Limited, which cover 552,000 ha and 1.67 million ha, respectively, extended leases have been granted, and the contractual intentions are that logging should proceed on a sustained

Table 9.1 Summary Statement of Forest Cover and Logging Concessions in Guyana

National territory: 21.4 million ha	
estimated forest cover: 18.6 million ha (87%)	
existing logging concessions (end-1993): 8.2 million ha (38%)	
Existing major concessions:	
Caribbean Resources Limited (CLICO) (1989)	c. 0.30 million ha
Demerara Timbers Limited (1991)	0.55 million ha
Barama Company Limited (1991)	1.67 million ha
Additional concessions being sought/under negotiation:	
Mazaruni Forest Industries Limited (MFIL)	c. 0.60 million ha
Leeling Timbers Limited	c. 1.20 million ha
Berjaya Company	c. 0.50 million ha
Buchanan Company Limited	c. 1.40 million ha

Sources: Eden (1990); Colchester (1993, 1994).

yield basis. However, direct experience of what constitutes sustainable exploitation in Guyanese forests is generally lacking, and the companies have been obliged to plan their operations on the basis of experience elsewhere in the tropics. In broad terms, they have looked to "selection" or "polycyclic" systems of the kind that were originally created in Europe, were subsequently developed in the Old World tropics, notably in India and Malaysia, and have lately been transferred to the neotropics.

In the case of Demerara Timbers Limited, which has a 50-year lease, the intention is to log 12,000 ha/yr at a rate of some 10 trees/ha, yielding approximately 20 m^3/ha of timber. Individual stands will then be left to regenerate for 20 years before re-logging occurs. The system assumes that the growth rate of the natural forest is about 1 m^3/ha/yr and that, if such is replicated in harvested stands, the timber yield will be sustainable. Likewise, in the case of Barama Company Limited, which has a 25-year lease extendable for a further 25 years, an initial harvest of a

maximum of 25 m^3/ha is envisaged, followed by natural regeneration and subsequent re-logging after 25 years (Ferrier, 1993). Given that the concessions of Demerara Timbers Limited and Barama Company Limited cover 2.2 million ha, or some 10.4 per cent of Guyana, the prospects for such systems are of considerable importance to the country. For most other logging companies in Guyana, simple extractive logging rather than sustainable exploitation is the explicit basis of their operations.

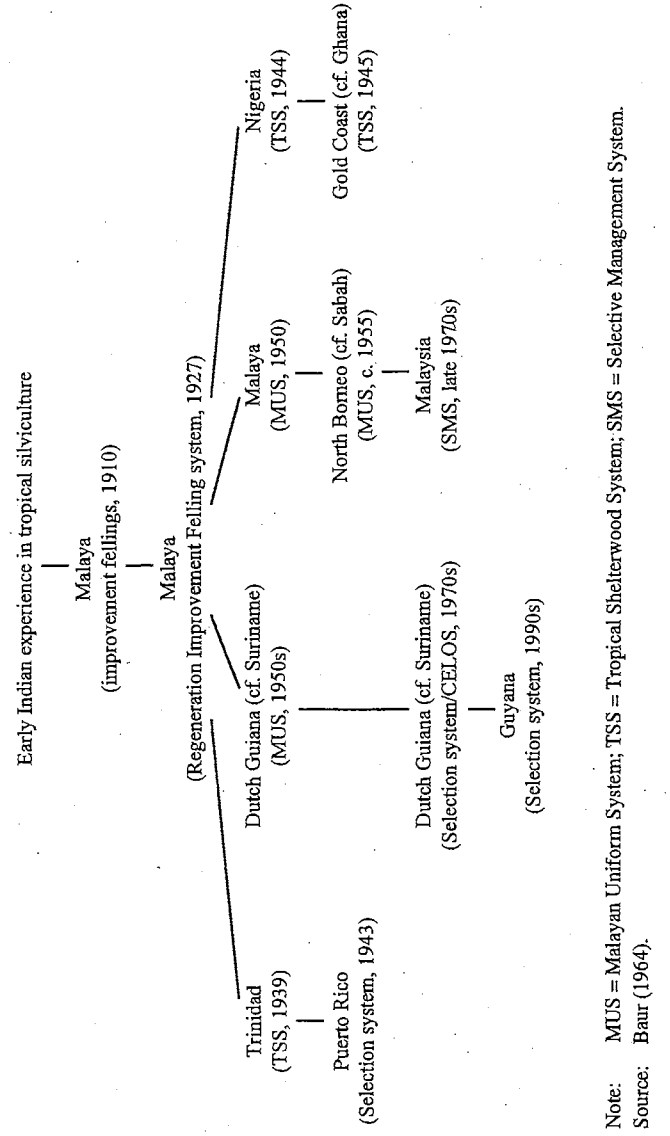
Mixed-forest Silvicultural Systems

The merits of the selection or polycyclic silvicultural system have long been debated in European and tropical contexts (Troup, 1952; Dawkins, 1958). Attempts to put the system into practice have been most widespread in India where it was established by British foresters in the mid-19th century (Whitmore, 1975) and where, by 1935, approximately 3.6 million ha of forest were considered to be so managed, mostly on 15- to 30-year cutting cycles (Champion and Trevor, 1938; Wadsworth, 1987). A selection system was also established in Malaysia in the early 20th century, where logged forests were subjected to a treatment known as Regeneration Improvement Fellings, which aimed to promote the regeneration of marketable species for the next harvest (Ismail, 1966; Chin, 1989).

Selection systems of this kind are considered to be technically sustainable and have in places resulted in well-regenerated forests (Ismail, 1966), but various problems are encountered, which, in the case of Malaysia at least, led to their replacement. A major problem is that the removal of 8-12 trees/ha is a slow and time-consuming process, and that, unless great care is taken, much damage can occur to the residual stand which is the basis of the next harvest (Ismail, 1966; Dawkins, 1958; Wadsworth, 1987). A further problem is that a selection system favours shade-tolerant rather than light-demanding tree species, and thus produces harder timber which is less marketable than hitherto. According to Whitmore (1975), the selection system is quite uneconomic in most forests under modern conditions.

Against this background, more intensive "shelterwood" or "monocyclic" silvicultural systems were widely established in tropical forests (Figure 9.2). This occurred in Malaysia where Regeneration Improve-

Figure 9.2 Selected Linkages in the Diffusion of Mixed-forest Silvicultural Systems in the Tropics



Note: MUS = Malayan Uniform System; TSS = Tropical Shelterwood System; SMS = Selective Management System.
Source: Baur (1964).

ment Fellings were abandoned in the late 1940s in favour of the Malayan Uniform System (MUS), which was developed in the lowland dipterocarp forest of Peninsular Malaysia. In the MUS, all large commercial species are harvested, and any unwanted trees are poisoned in order to open up the canopy without damaging established saplings. The system depends on the natural regeneration of the saplings in order to produce a new crop of timber some 70 years later. The MUS thus gives a higher initial timber yield than a selection system but involves a much longer logging cycle. Crucial to the system is the presence of sufficient seedlings and saplings in the initial forest to sustain the regeneration process. In the lowland dipterocarp forest of Malaysia, this condition was generally met, and the possibility of a sustainable system existed.

In these circumstances, the MUS was considered to be economic, giving a higher initial return on the capital invested in road construction and mechanized logging (Whitmore, 1975; Wadsworth, 1987). The system also favoured the regrowth of light-demanding species that currently provided more marketable timber. In reality, however, much of the Malaysian forest in question was subsequently converted to other uses, mainly oil palm and rubber plantations, which precluded long-term testing of the MUS (Gillis, 1988). Albeit technically sustainable, the system was not in fact sustained.

The application of shelterwood systems elsewhere has also encountered problems. This includes hill forest areas in both Peninsular Malaysia and adjacent Sarawak, where the abundant natural regeneration that characterizes lowland dipterocarp forest is generally lacking and where serious soil erosion occurs on logged slopes. In response to this, some attempts were made to revert to a less intensive selection system, known as the Selective Management System (SMS) which was based on 25- to 30-year logging cycles (Chin, 1989). Especially in Sarawak, however, where substantial logging of hill forests commenced in the mid-1970s, regulation of logging has been poor and much damage has been done to logged stands. The Sarawak government claims that the logging was in fact sustainable, but there is little evidence to confirm this. In many areas, careless mechanized logging has reportedly caused substantial damage to residual stands, and extraction rates often exceed natural regeneration rates, which precludes sustainability (Hurst, 1990).

Shelterwood systems have also been established in the African tropics, notably in Nigeria, Ivory Coast, and Ghana (Okali, 1992). In the case

of Nigeria, silvicultural experiments began in the late 1920s (Kio and Ekwebelam, 1987; Nwoboshi, 1987), while a more substantial programme commenced in 1944. The shelterwood system adopted in that year, with assistance from forest officers from Malaysia, was an adaptation of the MUS. In subsequent years, as much as 200,000 ha of forest came under management (Kio and Ekwebelam, 1987). Despite efforts to improve the system, however, it was judged unsatisfactory for managing Nigerian forests and was abandoned in 1966; since then, industrial plantations of indigenous and exotic species have been given priority.

Various factors were involved in the abandonment of the shelterwood system in Nigeria. Again, there was the problem that the seedling and sapling populations of marketable forest species were often low, impairing natural regeneration after logging; while difficulties also arose in controlling the growth of climbers after the canopy was opened (Kio and Ekwebelam, 1987; Nwoboshi, 1987; Okali, 1992). Socio-political factors were also involved. Considerable pressure on forest land existed from shifting cultivators and other land users, and it was acknowledged that more explicit, productive use should be made of the land. Many areas under shelterwood management were thus converted to stands of industrial timber, via agroforestry (*taungya*), which provided some benefit to small farmers and yielded a timber crop for which there was increasing national demand (Lawton, 1978; Kio and Ekwebelam, 1987). Moreover, the mean annual timber yield for *taungya* plantations in Nigeria greatly exceeds that of shelterwood systems (Nwoboshi, 1987). Current plantation species include *Tectona grandis*, *Gmelina arborea*, *Eucalyptus spp.* and *Terminalia spp.* Elsewhere in the African tropics, similar shifts to plantation production have occurred (Wadsworth, 1987).

A few experimental shelterwood systems were set up in the neotropics, notably in Trinidad in 1939 and in northern Brazil and Suriname in the 1950s (Pitt, 1961; Baur, 1964; Dubois, 1971; Jonkers and Schmidt, 1984). The situation in Suriname was of particular interest because of its adjacency and similar environmental conditions to Guyana. The initial emphasis in Suriname was on a shelterwood system, with experiments again based on the Malayan Uniform System. However, the results were disappointing with poor regeneration of commercial species after logging and excessive regrowth of climbers and undesirable secondary species in the stand (Jonkers and Schmidt, 1984; de Graaf, 1986, 1991).

Attempts were also made in the 1960s to establish industrial plantations of pine (*Pinus caribaea*), but again tree growth was poor, and the system often less productive and more expensive than anticipated (de Graaf, 1991).

Against this background, attention in Suriname shifted in the 1970s to a selection system, locally designated the CELOS system, which was based on an initial timber extraction of 20-30 m^3/ha and an assumed re-logging cycle of 20-30 years (de Graaf, 1991). For this to be sustained, it was stressed that very careful initial logging was required in order to minimize damage to the residual stand. Also, given the very low natural growth rates of commercial species recorded in the logged forest, i.e. 0.2-0.5 m^3/ha/yr, it was concluded that silvicultural treatment, notably refinement (i.e. poisoning of non-commercial species), was essential to stimulate regrowth.[1] On this basis, it was considered that a sustained yield was feasible, although further experiments were required to determine optimal silvicultural treatment in ecological and economic terms. Latterly, however, political problems in Suriname have ended the silvicultural experiments.

Prospects for Guyanese Forestry

The above review of mixed-forest silviculture is by no means comprehensive but indicates some of the problems encountered in seeking to establish sustainable systems in the tropics. It also illustrates the regional linkages, mostly emanating from early silvicultural experience in the Asian tropics, that have characterized such activities. In this respect, colonial and subsequently Commonwealth connections have frequently been involved. In the Guyanese context, it is evident that the present dilemma over expanding forestry activities recreates a situation previously faced in other tropical countries. On the assumption that forestry exploitation of some kind seems bound to continue in Guyana, it is desirable to explore how far mixed-forest silviculture is a sustainable commercial option. Given the recurrent problems of shelterwood systems outside lowland Peninsular Malaysia, particularly in terms of the poor regeneration of economic species and excessive regrowth of climbers and other non-commercial species, it would appear that a less intensive selection system is technically more appropriate for Guyana.

Even so, selection systems of this kind are not without their local problems. In particular, there is a lack of data from Guyana on forest dynamics as a basis for predicting regeneration processes and growth rates, both naturally and after selective logging. As indicated, some information is available from Suriname, but as yet insufficient to identify optimal timber extraction rates that will allow sustained exploitation (Anon., 1991, 1993b). Admittedly, in Guyana, both Demerara Timbers Limited and Barama Company Limited are aware of the problem and have engaged forestry consultants to undertake relevant ecological research. Meanwhile, both companies presently assume a natural growth rate of 1 m^3/ha/yr as a basis, in the case of Demerara Timbers Limited, for harvesting 20 m^3/ha on a 20-year cycle, and, in the case of Barama Company Limited, up to 25 m^3/ha on a 25-year cycle.

The question that arises is whether this assumed growth rate is valid for the forests in question. As indicated, the CELOS experiments in Suriname recorded a very low growth rate (0.2-0.5 m^3/ha/yr) for commercial species in logged forest, when no silvicultural treatment was applied. Given repeated stand refinement after logging, growth rates were raised to more than 2 m^3/ha/yr (de Graaf and Poels, 1990; de Graaf, 1991). However, in Guyana, no plans currently exist to apply such treatment in commercially logged forests. Of particular concern in this context is the regenerative performance of greenheart (*Chlorocardium rodiei*), which is the dominant commercial species in Guyanese forests but is exceptionally slow-growing, even by local standards.

A further technical concern is the need to minimize damage to the residual stand when extracting the proposed 20-25 m^3/ha, comprising, say, 8-12 trees. The value of careful logging has been demonstrated in the CELOS experiments in Suriname, while the level of damage inflicted by careless extractive logging is all too apparent elsewhere in Amazonia. In Brazilian Pará, Uhl and Vieira (1989) describe the removal of 8 large trees/ha, totalling some 52 m^3 of timber, which killed or damaged 26 per cent of remaining trees and resulted in a reduction in canopy cover from an original 80 per cent to 43 per cent. Both Demerara Timbers Limited and Barama Company Limited acknowledge the need for careful timber harvesting, but consistently achieving this is much more difficult under operational than experimental conditions. Among other logging companies in Guyana, few have any commitment to sustainable harvesting. Logging remains relatively unintensive and is not as yet inflicting gross

damage on the forest. However, any shift to more mechanized extraction by such companies would significantly increase the impact on residual stands. If major canopy opening occurs in such areas, fire could also become a major threat to forest regeneration, given the combustible slash that would accumulate at ground level and the warmer, drier microclimatic conditions that would prevail (Uhl and Kauffman, 1990; Nepstad et al., 1991).

As indicated, some ecological research is being undertaken in Guyana by forestry consultants to establish technical parameters for sustainable long-term timber harvesting. According to Barama Company Limited, the Edinburgh Centre for Tropical Forests "will be monitoring Barama's... logging operations and regrowth of logged forest. If the research indicates that a change in logging intensity will allow maintenance of sustainable forests, then these changes will be incorporated in the Forest Management Plan" (Anon., 1993b:3). It is assumed this allows for a possible reduction as well as an increase in logging intensity! Similar ecological research has been commissioned by Demerara Timbers Limited, although, in the case of most logging companies, public information on forestry management is unavailable, while the main emphasis is on extractive logging of a few marketable species rather than sustainable exploitation (Colchester, 1993).

Even assuming that technically-sound, sustainable silvicultural systems are established for Guyanese forests, such exploitation also needs to be economic and properly regulated. Given the increased labour costs involved in a selection system when careful extraction techniques and repeated silvicultural treatment are required, the temptation will inevitably exist to over-exploit the forest, sacrificing long-term sustainability for short-term profit. As Colchester (1994) indicates, recurrent problems of this kind have been encountered elsewhere in the tropics and will be an increasing risk in Guyanese forests if regrowth rates are found, on further investigation, to be less favourable than anticipated and if effective external forestry monitoring is not undertaken.

Role of Forestry Monitoring

Fundamental to managing forestry operations in Guyana and elsewhere is effective monitoring. Initially, such needs to be undertaken by the

Guyanese government, as a means of protecting national forest resources and maximizing their long-term economic and environmental benefits to the country. The prime agent here is the Guyana Forestry Commission (GFC), which was created from the earlier Forestry Department and now has responsibility for managing forestry resources. Its function was confirmed by the National Forestry Action Plan, dating from 1989, which emphasized the need to increase government revenues from forests through a substantial expansion of logging and related activities, based on sustained yield management (Colchester and Lohmann, 1990).

In this context, the GFC currently seeks to monitor and regulate the field operations of logging companies, but, in recent years, it has been acutely constrained in this objective by a lack of personnel and resources. In 1989, the GFC employed only two qualified foresters and was described as "moribund"; subsequently, the number increased to five, but there is currently no Commissioner of Forests appointed (Colchester, 1993). The GFC is thus scarcely equipped to manage logging concessions that currently occupy some 8.2 million ha, or 38 per cent of the national territory. Strengthening of the GFC is due to occur, but its current institutional capacity is inadequate to the task. It was reported in June 1995 that the Guyana and British governments had recently signed an agreement for a grant of £3.46 million to strengthen the GFC.

There is also a need for independent forestry monitoring in Guyana, undertaken by non-governmental research or consultancy groups. In some quarters, such activity might be perceived as intrusive given the GFC's statutory role in the process, but, in the context of general concern with global environmental change and of the explicit local objective of sustainable forestry exploitation (Colchester and Lohmann, 1990; Thompson, 1992; Anon., 1993b), serious complaint can scarcely be made against objective independent monitoring. The justification for such is that governments and logging companies elsewhere have at times failed to honour their intentions in respect of forestry management and that significant environmental degradation has resulted (Repetto and Gillis, 1988; Grainger, 1993). Lack of will on the part of governments, as well as corruption, are commonly cited as the main reasons for this. In the case of Guyana, the immediate problem is that the government lacks the resources to achieve adequate monitoring and regulation through the

GFC, which increases the risk that logging companies will neglect their contractual obligations.

In these circumstances, there is a role for independent, large-area forestry monitoring using satellite remote sensing systems. Hitherto, such systems, notably the long-serving Landsat, have been technically unsuited to monitoring the impact of selective logging. However, a new generation of satellite sensors, with higher spatial resolution and cloud-penetrating microwave capability, is currently becoming available and offers new opportunities for forestry monitoring. The opportunities are further enhanced by the declining cost and hence increasing accessibility of computer-based image processing systems. Preliminary fieldwork to validate satellite-based forestry monitoring is needed, but such systems should soon be in a position to yield timely synoptic data on the nature and impact of selective logging.

Such data can play an important role in alerting external funding agencies to forestry conditions in the country and in informing their policy making. The data can also be made locally available to individuals, non-governmental organizations and the media as a basis for influencing government policy in respect of forestry and related environmental issues. This should increase the chances of achieving sustainable forestry in the country and of avoiding the environmental degradation associated with over-exploitation of forestry resources.

Discussion

In this chapter, attention has mainly focused on Guyana, where increasing forestry operations create both commercial opportunities and environmental risks. The situation is by no means unique among Commonwealth or other tropical countries, but a notable feature is that Guyana is in the early stages of developing its forestry resources, which makes it easier, if appropriate silvicultural systems are adopted, to establish exploitation that will yield long-term revenues and also protect the forest environment.

For such to be achieved, several conditions need to be met. Firstly, the exploitation systems adopted must be ecologically sustainable. There is no reason to doubt that selective logging of the kind adopted by Demerara Timbers Limited and Barama Company Limited potentially

meets this requirement, provided careful harvesting, an appropriate timber yield, repeated silvicultural treatment and a suitable logging cycle are specified and implemented. In this respect, the critical question is the growth rate of commercial species in logged forests. On the basis of the best available information from Suriname (de Graaf and Poels, 1990; de Graaf, 1986, 1991), it is in fact doubtful whether extraction rates of 20-25 m^3/ha are sustainable, unless repeated silvicultural treatment or logging cycles longer than 20-25 years are adopted. For this reason, the ecological research commissioned by Demerara Timbers Limited and Barama Company Limited obviously needs to continue and its results be applied to operational logging.

Secondly, the exploitation systems adopted have to be economic. Elsewhere in the tropics, doubts have previously been expressed regarding the economic viability of the selection system (Whitmore, 1975). Likewise, in Suriname, it has been concluded that such exploitation will not be economic in the long term without repeated silvicultural treatment (de Graaf, 1986). If careful harvesting and appropriate treatment are applied, however, the selection system will be significantly more productive and is expected to be economic, provided sufficiently large tracts of forest are under single management (Boxman et al., 1985; de Graaf and Poels, 1990). A similar assumption presumably applies in the case of Guyana. Clearly, this judgement also depends on economic variables that operate beyond the logging cycle itself, such as the terms of individual company contracts, the extent to which local timber processing is established, and the amount of competition from unsustainable extractive logging. Ultimately, a fine balance has to be struck that allows a continuing economic return to both logging companies and the Guyanese government and, by implication, safeguards the forest itself under sustainable management.

Thirdly, the exploitation systems adopted need to be monitored to ensure that logging contracts are adhered to. The role of the GFC is critical in this respect and will only be fulfilled if increased investment is made in personnel and equipment. In general, remote sensing techniques, as well as ground-based monitoring, need to be exploited, and, although additional research is required to refine the technical basis of satellite-based monitoring, the latter should in future enable independent research or consultancy groups, as well as government agencies like the GFC, to monitor forestry operations in a timely way at relatively

low cost. Independent monitoring is desirable to provide a basis for comparison with official findings and for informing individuals, non-governmental organizations and the media in Guyana and elsewhere about forestry and related environmental issues.

Fourthly, political will is required to establish and enforce sustainable silvicultural systems. This is obviously a problematic area, with government often under legitimate pressures to sacrifice long-term production for more immediate economic returns and with individuals in government at times distracted from designated priorities by short-term political or other interests. The most effective control in this context is an open system of government, allied to an informed electorate that, individually and collectively, is concerned inter alia with environmental issues and desirous of influencing relevant government policies.

Against this background, the need exists to clarify outstanding ecological and economic issues relating to forestry exploitation in Guyana, and to ensure that an improving institutional framework is created for managing forestry operations. If this is not achieved, widespread over-extraction of timber will surely occur, and much forest land may well be converted to other uses, either as industrial plantations or for agricultural production. Precedents for this exist in other Commonwealth countries, notably Malaysia and Nigeria (Lawton, 1978; Gillis, 1988). Localized forest clearance for alternative land use of this kind will no doubt also occur in Guyana, but since the prospects for intensive exploitation of the acid infertile soils that cover much of the interior of the country are poor, it is likely to be in Guyana's long-term interest to develop, if practical, sustainable mixed-forest silviculture over at least part of its interior forests. However, such silviculture has to be genuinely sustainable and properly managed. It also needs to co-exist with an adequate extent of national parks and other reserved areas, including Amerindian reserves.

While this conclusion is specifically applicable in a Guyanese context, it has broader application elsewhere in Commonwealth and other tropical countries. Throughout the tropical region, mixed-forest silviculture faces problems that relate to technical and economic factors, but its viability is as much dependent on institutional and political factors. There is widespread, nominal acceptance of the need for sustainable forestry management, but its translation to actual forestry operations is elusive in many countries.

NOTE

1. Some variability exists in the reported experimental growth rates. Thus, de Graaf (1991) cites an estimated rate of "about 0.2 m^3 annually," while de Graaf and Poels (1990) specify "less than 0.5 m^3/ha." Such compare with the fuller account of de Graaf (1986:99) who states: "Annual volume increment monitored in the group of listed commercial species was approximately 0.2 m^3/ha in Sarwa [experiment], and approximately 0.9 m^3/ha in Goliath [experiment]. Data for Sarwa were more suitable for extrapolation to large forest areas, because those for Goliath were affected by unusually low mortality rates." Each experiment was 5 ha in extent and was monitored for almost a decade.

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CHAPTER TEN

Countering Land Degradation by Organic Methods: Prospects in Commonwealth West Africa

Edwin A. Gyasi

Introduction

Land degradation is the progressive loss of the intrinsic quality of the land, a fundamental source of agriculture and human livelihood. It involves devegetation and decline in biodiversity, soil quality, productive capacity of the land and agricultural yield, with consequential loss of substantial GNP, as reported for Ghana and Nigeria, two British Commonwealth countries in West Africa. According to Norse, "Recent estimates suggest that, if remedial action is not taken, Ghana could lose 7 per cent of its gross national product because of land degradation and that Nigeria could lose more than 17 per cent of its gross national product because of deforestation, soil degradation, water contamination, and other environmental problems over the long term" (Norse, 1992:35).

Land degradation is a universal problem (Blaikie and Brookfield, 1987; Norse, 1992; Postel, 1994; Turner et al., 1990). It appears to be accelerating in Africa, especially in the sub-Saharan portions including West Africa. The accelerated land degradation poses a threat to agriculture, the basic livelihood, and, thus, to sustainable socio-economic development, by the attendant erosion, desiccation and compaction of the soils occasioned by widespread vegetation removal which threatens the forests with extinction (Population Reference Bureau, 1991). The deteriorating natural fertility of the soils is a primary factor in the generally

declining, stagnating or, at best, marginally increasing agricultural output, which has adverse effects upon the food supplies, nutritional status, income levels and general welfare of the expanding population, as illustrated by the indices in Table 10.1 (Food and Agriculture Organization, 1990a, 1990b, 1990c; Goliber, 1989). Since the pivot of every agricultural system is the fertility of the soil (Benneh, 1972), it becomes imperative to reverse the degradation in order to restore to good health the soils and the other vital biophysical elements.

Possible Solutions to the Land Degradation and Essay Objectives

One view attributes the land degradation in Africa to the rapid population growth and the concomitant increase in the pressures on production and other forms of anthropogenic stress on the land resources (Benneh and Agyepong, 1990; Gyasi, 1976; Gyasi et al., forthcoming; Population Reference Bureau, 1990). According to this view, the growing stress has, in the absence of appropriate advanced land management systems, reduced the productive or carrying capacity of the land by upsetting the delicate ecological balance by overuse, especially through farming which is the principal form of land use. It follows, then, that a solution to land degradation lies in population control and moderation of consumption habits so as to ease the pressure on land. This view is rooted in the Malthusian thesis on the relationship between population growth and food production (Malthus, 1798).

A counter view championed by Boserup (1965) holds that the stress of population tends to stimulate the kinds of technological innovations that are necessary for stimulating production and the sustainable use of the land. It, therefore, follows from this, at least implicitly, that the basic panacea for land degradation lies, not necessarily in population control, but rather in concerted land improvement measures on the basis of appropriate technologies. However, because the land degradation in Africa has continued unabated with the increase in population, population control is now popularly advocated to counter the problem. Another popularly advocated measure, which may be applied either alone, or in conjunction with population control and other measures to counter

Table 10.1 Population Growth Rates, Food Production and Supply Measures, and Per Capita GNP in Selected West African Countries and Other Parts of the World

Country	Annual natural population increase (%)[1]	Food production		Food supply (1986-1988)		1988 per caput GNP (US$)[1]
		Index per caput[3]	Annual growth (1986-1989)[3]	Calories per caput per day[2]	Protein per caput per day[2]	
Burkina Faso	2.8	113.61	-0.2	2,002	61.5	150
Cote d'Ivoire	3.1	92.02	0.6	2,405	49.2	740
Ghana	3.1	110.92	-4.3	2,167	42.3	390
Liberia	3.1	91.70	-2.0	2,344	38.9	450
Mali	2.9	99.38	0.0	2,114	59.0	170
Mauritania	3.0	87.15	-0.5	2,465	71.0	440
Niger	2.9	83.82	-2.5	2,321	65.0	260
Nigeria	2.9	94.79	-1.7	2,083	45.8	640
Senegal	2.6	103.35	0.6	2,162	67.9	420
Sierra Leone	1.8	87.27	-1.9	1,813	37.8	310
Denmark	-0.1	122.76	N.A.	3,605	100.5	12,640
France	0.4	102.32	N.A.	3,312	112.6	10,740
Japan	0.5	95.73	N.A.	2,822	89.8	12,850

Table 10.1 Population Growth Rates, Food Production and Supply Measures, and Per Capita GNP in Selected West African Countries and Other Parts of the World (Cont'd)

New Zealand	0.8	102.75	N.A.	3,476	109.9	7,110
USA	0.7	94.99	N.A.	3,644	109.0	12,500
USSR	1.0	113.01	N.A.	3,382	106.0	7,400
Brazil	2.0	117.04	N.A.	2,703	62.5	1,810
China	1.4	128.83	N.A.	2,637	63.6	300
Colombia	2.1	104.69	N.A.	2,544	55.8	1,230
India	2.0	118.39	N.A.	2,104	51.3	270
Averages						
West Africa	2.8	96.40	-1.2	2,188	53.8	397
Developed countries	0.6	105.24	N.A.	3,374	104.6	11,373
Other countries	1.9	117.24	N.A.	2,497	58.3	903
GRAND AVERAGE	2.0	103.23	N.A.	2,605	70.0	3,791

Note: N.A. = Not available.
Sources: 1. Population Reference Bureau (1988).
2. Food and Agriculture Organization (1990a).
3. United Nations (1990).

land degradation, is sustainable ecologically compatible land use practices such as organic farming.

This chapter discusses indigenous organic farming systems as they are practised in West Africa, with special reference to the British Commonwealth countries, the Gambia, Sierra Leone, Ghana and Nigeria, but with most of the examples drawn from Ghana and Nigeria (Figure 10.1). It attempts a tentative assessment of the prospects of improving and propagating the indigenous organic systems for the purpose of countering the deterioration of the soils and land in general, in order to sustain food production, conserve nature, and improve rural living conditions.

General Agricultural Background in West Africa

West Africa is a tropical region of 6 million sq km with some 200 million inhabitants, a 3 per cent annual population growth, and a basically rural economy centred on agriculture (Figure 10.1). There are 16 countries which, in 1975, were constituted into the Economic Community of West African States (ECOWAS) with the objective of promoting "co-operation and development in all fields... among its members...." (Akinyemi et al., 1984:672). Most of the countries are French-speaking. Only five, Liberia, the Gambia, Sierra Leone, Ghana and Nigeria are English-speaking. The Gambia, Sierra Leone, Ghana and Nigeria are former British colonies which now form part of the British Commonwealth of nations. Although the 1.3 million sq km covered by the Commonwealth countries comprise only 22 per cent of the total area of West Africa, their combined population of 140 million makes up about 70 per cent of the region's total population, primarily because of the influence of Nigeria which, alone, contains over 50 per cent of West Africa's population. Thus, population density is considerably greater in Commonwealth West Africa than in the rest of the region.

There is evidence of major changes in the biophysical environment of West Africa, and in the agricultural systems which have evolved from indigenous migratory systems to increasingly sedentary indigenous systems, exotic modern sedentary systems and hybrids of the indigenous and exotic modern systems. These changes, which have fundamental implications for human livelihood, predate the era of European colonization of the region from 1900 to 1960. However, they accelerated from

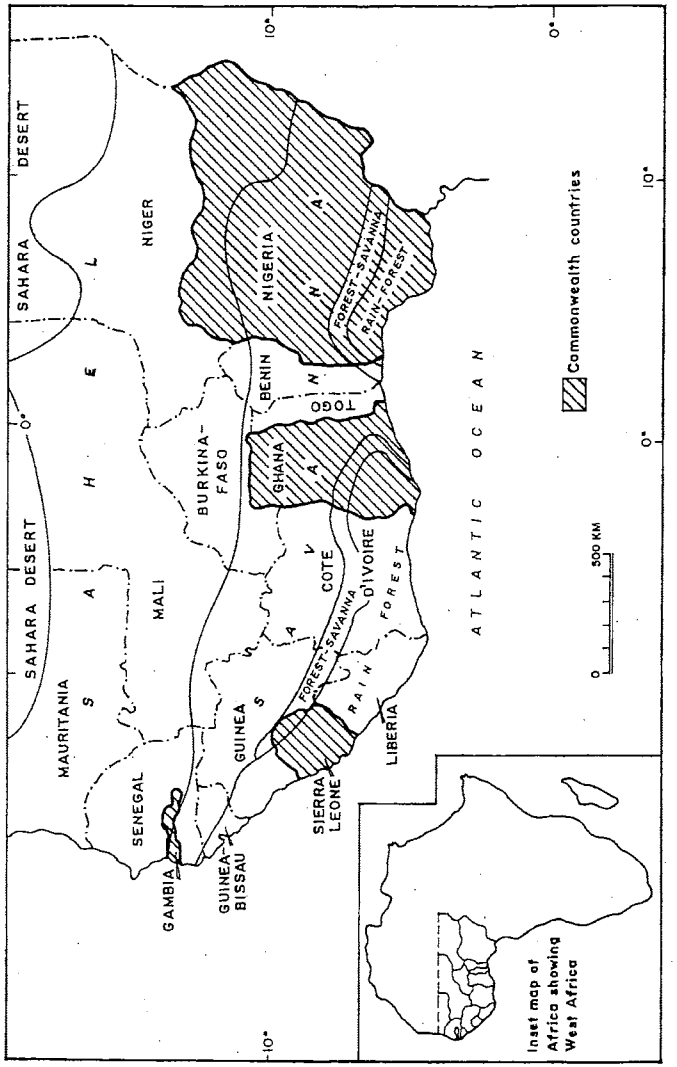


Figure 10.1 Major Agro-ecological Zones in West Africa

that period displaying varying shapes, trajectories and intensities in the different agro-ecological zones which vary from humid forest, through a mosaic of forest-savanna to dry savanna, sahel and desert (Figure 10.1). The agro-environmental changes appear, on one hand, to entail enrichment of the landscape and of the life-support capacity of the land in some areas. On the other hand, they impoverish many others, especially in areas of limited land versus high production pressures associated with greater population densities as commonly found in the Commonwealth countries (Benneh, 1972; Benneh and Agyepong, 1990; Fairhead and Leach, forthcoming 1995; Gleave and White, 1969; Morgan and Pugh, 1969; Udo et al., 1992). A central contention of this chapter is that the impoverishment or degradation of land (which involves arable land shortage, biodiversity loss, soil deterioration, pest infestation, landscape aesthetic devaluation and, above all, declining food yields), could be countered by sedentary, permanent or fixed intensive organic farming.

Organic Farming Defined

Organic farming is an ancient system that excludes artificial agro-chemicals or involves them only minimally. It is sustained or regenerated by natural recycling of natural soil to replenish nutrients. It relies mainly on natural organic matter (biomass, compost, mulch, green matter, manure and other forms of organic residue) to maintain soil fertility, on biological methods to control pests, and on crop rotations and intermixture of species adapted to local conditions to sustain agro-ecological stability, food security and balanced utilization of soil nutrients. Because it is nature-based and involves low artificial external energy inputs, organic farming appears to be less financially costly, and certainly less environmentally stressful than the monocultural agro-chemicals-based high energy consuming "green revolution" methods, which are extensively applied in the developed countries, and are now increasingly encouraged in Africa and other developing regions to boost the agricultural output.

In Ghana, the Ministry of Agriculture seeks to promote the continued use of organic material to sustain food crop production not only because it is known to farmers, but also because it is "cheap, benefits soil

structure and soil moisture holding capacity, reduces the need for chemical fertilizers and helps to increase the efficiency with which these are used by the plant" (Ghana, Republic of, 1990:64). Furthermore, organic produce are assumed by many to be gastronomically superior because of their "natural" quality. These and the other actual and assumed or perceived advantages noted above underlie the growing popularity of organic farming in the more developed countries (Gyasi, 1992; Kopke and Schulz, 1992). The advantages also point to the need to promote organic farming in the less developed regions, especially on the basis of their rich indigenous systems.

Africa, as illustrated by the West African situation, abounds in the indigenous organic farming systems (Jackson, 1984; MacDonald, 1982). However, there, as in most other developing regions, the traditional organic systems and the indigenous knowledge which underpin them, are threatened by various forces including the modern monocultural agro-chemicals-based "green revolution" systems which have disadvantages of:

- high capital and external energy requirements;
- vulnerability to natural and socio-economic vicissitudes; and
- profound perturbation of the natural ecosystem.

Systems of Organic Farming in Commonwealth West Africa

In Commonwealth West Africa, perhaps the earliest known indigenous, traditional, native or autochthonous systems of farming that might be classified as organic, to the extent that they basically depend on naturally recycled biomass for soil fertility regeneration, are the classical examples of shifting cultivation and its offshoot, bush fallow or land rotation.

Under a relatively low population density prevailing up to the early parts of this century, it appears that the main system of farming in Africa was shifting cultivation — a migratory agriculture characterized by the cultivation of the area around a temporary settlement for up to about four years, after which period the land together with the settlement was abandoned in favour of another more fertile location. The exhausted soil at the original farm site was then allowed to rest for many years or for an

indefinite period so that the soil could recover its fertility through natural regeneration processes. The burning of the bush was both to save labour cost and to enhance soil fertility by the residual ash from the burnt vegetation which stored much of the soil nutrients; while the intermixing of the diverse crops among the selected uncleared natural trees and bushes in the form of proto-agroforestry as reported for Sierra Leone (Hoskins, 1984) had the following advantages:

- minimizing soil erosion;
- preserving agro-bio diversity;
- maintaining ecological stability;
- optimizing utilization of the different soil nutrients; and
- enhancing food security and balanced diet.

In the wake of the growing population-generated pressures on the land, the shifting cultivation system has, in line with Boserup's hypothesis (Boserup, 1965), been generally modified into more settled systems including bush fallow whose main departure from the shifting cultivation system is a much shorter fallow length.

Shifting cultivation and its primary offshoot, bush fallow, have the advantages of minimizing ecological disturbance and land degradation, and of enhancing food security. However, they can be sustained in their pristine form only when or where there are plentiful supplies of land, a condition no longer met in most of the areas. Implicitly, therefore, the survivability of shifting cultivation and bush fallow systems would seem to depend upon population pressure reduction, given that the physical size of land cannot be extended. Alternatively, they may, as has started happening, be transformed into fixed agroforestry systems which involve the traditional methods of intercropping, as well as the modern methods of crop rotations and planting of leguminous nitrogen-fixing and other selected species in combination with field crops, particularly in the form of alley cropping and with the possibility of integrating livestock. Research at various institutes, notably IITA (International Institute of Tropical Agriculture) in Ibadan, Nigeria, together with farmers' fairly positive response to the system in Ghana's Yensi valley, 70 km north of Accra, the national capital, suggest modern agroforestry as a possible feasible alternative to the traditional shifting cultivation and bush fallow, the proto-agroforestry systems whose prin-

ciples have inspired the modern agroforestry systems (Gyasi, 1993, forthcoming; Gyasi, et al., 1990; Reijntjes et al., 1992).

Other indigenous organic systems that conserve the land include no-till or zero-till and minimum-till, which involve planting with little or virtually no disturbance or turning of the soil. Like the shifting cultivation and bush fallow systems, the main drawback of the zero-and-minimum-till systems is their extensive land requirements which throw their sustainability into doubt under conditions of expanding population.

The indigenous organic systems that hold the greatest promise for minimizing land degradation and for sustaining food production, are those more or less permanent bio-intensive systems. They include the kitchen or home garden system, and the compound farming system which incorporates kitchen garden and more.

The kitchen gardens are those small parcels operated within the home or living compound or immediately outside it. Typically, the kitchen garden zone extends for a maximum 15 m from the house. The kitchen gardens are operated in the backyard for the primary purpose of producing vegetables and other crops frequently required by the kitchen or household of the operator. Therefore, their location near the home may be explained in terms of von Thunen's land use model which shows a direct relationship between agricultural land use patterns and distance from the market centre (Chisholm, 1962). Because of their greater proximity to the home, the kitchen gardens not only receive regular care, but also benefit more from the household refuse, manure and other organic waste which facilitate the more or less continuous cropping.

The compound farming system also centres on the home or household compound and occurs most extensively in the northern savanna and sahel areas. Under this system, the land immediately surrounding the compound is the most intensively cropped on the basis of organic soil regeneration techniques which, mainly, involve the use of household refuse and manure from the livestock kept by virtually every household. This intensively cultivated inner kitchen garden zone carrying mainly vegetables or horticultural plants, is succeeded by an area committed to the cultivation of the staples and other crops, on an increasingly less intensive basis with increasing distance in the manner

postulated by von Thunen. Some striking examples of the compound farming system occur in:

(a) the rural areas of the northeast and northwest Ghana; and

(b) Nigeria around Soba, Kano, and Katsina in the north, and in villages in the southeast where the great diversity of crops, trees and shrubs managed in close association with livestock, and the frequent addition of manure, result in micro-climatic, soil moisture and fertility conditions that favour more or less permanent cultivation (Agboola, 1979; Okafor and Fernandes, 1987).

There are also market garden systems based either wholly or partly on organic principles. Typical examples occur in:

(a) all the major urban centres, the peri-urban areas, and in other areas near the urban centres, for example, Akuapem, a rural area which increasingly produces vegetables for the nearby Accra, Ghana's capital and most populous settlement;

(b) the "fadama" floodplains of rivers such as the Sokoto in northern Nigeria; and

(c) the densely populated dry sandy Anlo area of southeastern Ghana, which boasts one of the most advanced indigenous rural market gardening systems based on organic principles (Benneh, 1972).

Clearly then, in West Africa, organic farming is not a romanticized fiction but a long standing practice of common occurrence which requires nurturing and propagation on the basis of solid research to help to secure the food supplies and the environment.

Promoting Organic Farming

A possible strategy of enhancing the spread and sustainability of the compound and the other intensive organic farming systems to save the land, ensure food supplies and generate employment and income, is to make greater use through recycling of the growing amounts of organic waste or residue generated by the swelling population in both the rural and urban areas. The waste emanates from domestic sources and from by-products of industries, especially agro-processing ones and others

using biomass for raw material or for fuel. They include household or domestic garbage, manure, night soil and sludge.

In the rural areas, the residues result mainly from the farming and the processing of the farm produce. They include the cleared vegetation; corn stalk and cob; rice stalk and chaff; cocoa husk and sub-standard beans; cotton seeds; plantain and cassava peels; palm kernel; palm fibre and the sludge from the processing of palm fruit. Table 10.2 provides estimates of quantities of some rural- and urban-generated agro-industrial by-products and waste products having actual or potential use for organic farming and other purposes in Ghana. These and the other underutilized by-products and wastes, including the huge quantities of urban solid and liquid wastes, could be recycled or used directly for organic farming as is sporadically done in Ghana. As Owusu-Bennoah and Visker (1994) have argued, if waste products could be recycled and returned to the farms, the nutrient output or export from the field would diminish, thereby minimizing the need for the expensive import of inorganic fertilizer which, in Ghana, averaged 46,684 tonnes during 1987-1990 (Ministry of Agriculture, 1991). Such a strategy of recycling for organic farming within and outside urban centres would also help to minimize the serious environmental pollution and health problems associated with some of the present methods of disposing of the urban solid and liquid wastes which, excluding the officially uncollected and unrecorded ones, amounted, according to unpublished official records, to 22,418 tonnes in one month (June 1993) in Accra, one out of the many cities in West Africa. Although some of the urban wastes in Accra and other West African cities are recycled for gardening, especially by the municipal authorities, it appears necessary to discourage, through popular education, the common aversion to the use of recycled night soil for the growing of vegetables and food crops within and outside the cities. More generally, the popular utilization of organic wastes for farming would be considerably enhanced by reducing their cost, relative to the cost of inorganic fertilizers, especially those imported ones, through greater research, and by intensifying general public awareness of the environmental gains from organic farming based on recycled wastes.

Table 10.2 Quantities and Present Use of Some Agro-industrial By-products and Waste Products in Ghana

Agro-industry	Quantity	Present use
Fish processing	20 tonnes/day	animal feed
Cocoa		
chocolate processing	1,980 tonnes/year	exported for animal feed
sub-standard beans	500-1,000 tonnes/year	exported for pharmaceuticals
Oil mill (copra)	1,240 tonnes/year	animal feed
Cotton industry		
cotton seeds	8,736 tonnes/year	exported for animal feed
refuse	304-604 tonnes/year	fertilizer
Timber industry		
sawdust	not available	some for compost
scrap wood	not available	charcoal/energy
Juice factory	9-18 tonnes/day	none
Slaughter house	not available	some for fertilizer
Breweries		
spent grain	15 tonnes/week	animal feed
spent yeast	4 tonnes/week	animal feed
Palm oil industry		
bunch ash	630 tonnes/year	fertilizer
slurry	29,610 tonnes/year	fertilizer
fibres/shells	28,350 tonnes/year	energy
fibres/shell ash	not available	road repair
Municipal waste		
refuse compost	not available	some for compost
night soil compost	not available	some for manure

Source: Owusu-Bennoah and Visker (1994).

Another possible way of promoting organic farming is to encourage research into the inventorying and mapping of the indigenous systems including the knowledge which underpins them, and to intensify or-

ganic farming education at the elementary school and rural farm community levels. Rural farm service centres and credit facilities are considered to be of fundamental importance for agricultural development (Mosher, 1969). Since these are generally lacking in West Africa, it can be argued that their improvement is likely to strengthen the prospects of the diffusion and adoption of organic farming and other environmentally benign agricultural systems. Another relevant strategy is the promotion of organic farming associations such as the Network for Sustainable Agriculture in Ghana and the Africa chapter of the International Federation of Organic Agriculture Movements (IFOAM).

A key to the achievement of these envisioned ideals is research co-operation through technical information and personnel exchange among the Commonwealth countries, mainly on the basis of their shared colonial experience, their colonial heritage of a common national language — English — and their common desire for food security and sustainable development in the context of a sound biophysical environment.

Conclusion

Land degradation, including soil deterioration, poses a serious threat to food security and human livelihood in English-speaking Commonwealth West Africa. Associated with the growing population density, poverty and inadequate technology, the situation may be countered by the promotion of organic farming based on research, the various indigenous agricultural systems and the huge quantities of the waste generated by households, farming, and agro — as well as other industries in both the rural and urban areas. The use of recycled waste for farming would, besides strengthening food security, improve sanitation and human health, especially in the urban centres where disposal of wastes has proved to be particularly problematic. A key to sustained successful organic farming within and among the Commonwealth countries lies in technical research co-operation, information exchange and other relevant forms of multilateral interaction founded on their common colonial cultural heritage and common desire for sustainable development.

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CHAPTER ELEVEN

Socio-cultural Factors Affecting Non-adoption of New Water Harvesting Technology among the Dryland Communities in East Africa

J.P. Msangi

Introduction

The drylands the world over are suffering from moisture deficiency in the eyes of those who are used to high rainfall environments, be they tropical or temperate in nature. However, those used to the dry environments know that there is adequate moisture to meet the respective traditional water needs of the dryland communities. Through advanced technology, the hidden waters have been tapped and made use of in countries such as Israel, Mexico and the United States. In these areas, mist, fog and dew harvesting produce adequate amounts of water to support domestic water supplies and/or crops of sizeable quantities. Much research work has produced crop varieties which can be grown successfully by utilizing the small quantities of water available in the atmosphere as well as that on and below the ground surface. In addition, the little rainfall which occurs erratically and unreliably has been used efficiently through different methods of water harvesting. While technology developed by the more advanced communities, such as those in Israel, Mexico and the United States, can trap substantial quantities of the occurring precipitation, in East Africa it has not been the case. Much of the rain water runs off into streams and gullies and is soon lost into inland water bodies and the ocean where it evaporates back into the atmosphere (Msangi, 1991, 1990, 1987, 1984, 1982).

The three East African countries — Uganda, Kenya and Tanzania — are located on the east coast of Africa astride the Indian Ocean (Figure 11.1). To the north, they border the vast dry horn of Africa (Somalia) and, further north, the dry Saudi Arabia Peninsula. These neighbours adversely affect the climate of East African countries in that dry winds blowing into the northeastern part of East Africa and sometimes parallel to the coastline have contributed greatly to the aridity of this area. Originating in the Saudi Arabian desert, these winds are strong, hot, dry and dusty, picking any little moisture that might exist in the East African drylands where they raise the evaporation and evapotranspiration rates to astronomical levels. Other factors, such as continentality and rainshadow effects, have caused the southward extension of this dry zone into the central parts of Tanzania (Figure 11.2).

The drylands of Africa, and indeed those found in East Africa, share the characteristics of other drylands of the world, namely, little unreliable rainfall occurring in short intense storms, high temperatures and high wind speeds which produce high water losses through evaporation and high evapotranspiration rates. Most of the rain water received is often lost back to the atmosphere in this manner.

The rain storms occur after the long dry seasons when vegetation is scarce and soils are dry and too compacted to allow quick water infiltration. Where infiltration takes place, the soils do not retain much of the water so that soon after the rain, the soils dry up again supporting only quick growing grass and drought resistant acacias, cactus and other succulent plants. The soils of these lands are generally of poor quality being mostly sands, often reddish sandy loams and black clays (soils of impeded drainage) which crack extensively upon drying and whose pores swell and close quickly upon wetting. Such soils adversely affect infiltration rates and ground water recharge.

The drylands of East Africa referred to above are those often referred to as arid and semi-arid areas covering a substantial zone stretching into the three countries (Figure 11.2). In Tanzania, the area so designated has been estimated to be as much as 75 per cent of the country, while that in Kenya has been estimated to cover slightly over 80 per cent (Msangi, 1982, 1990). Uganda, on the other hand, has the least area, being only the northeastern corner bordering northwestern Kenya. These lands receive an annual precipitation of between 200 and 800 mm with high temperatures of up to 38°C during the day. Some clear nights

Figure 11.1 Location of East African Countries

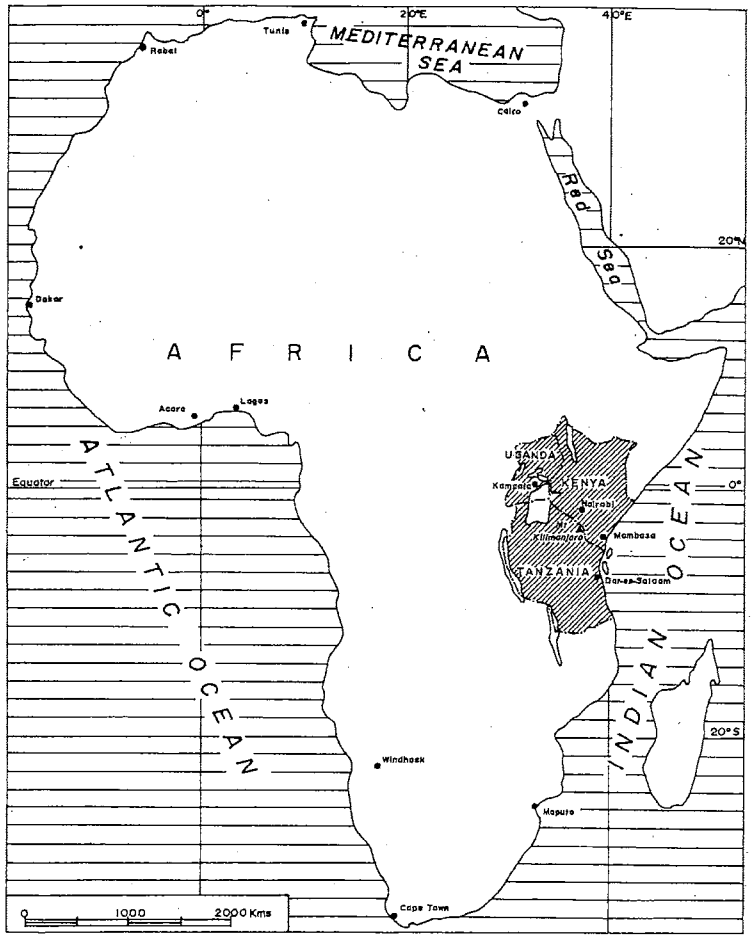
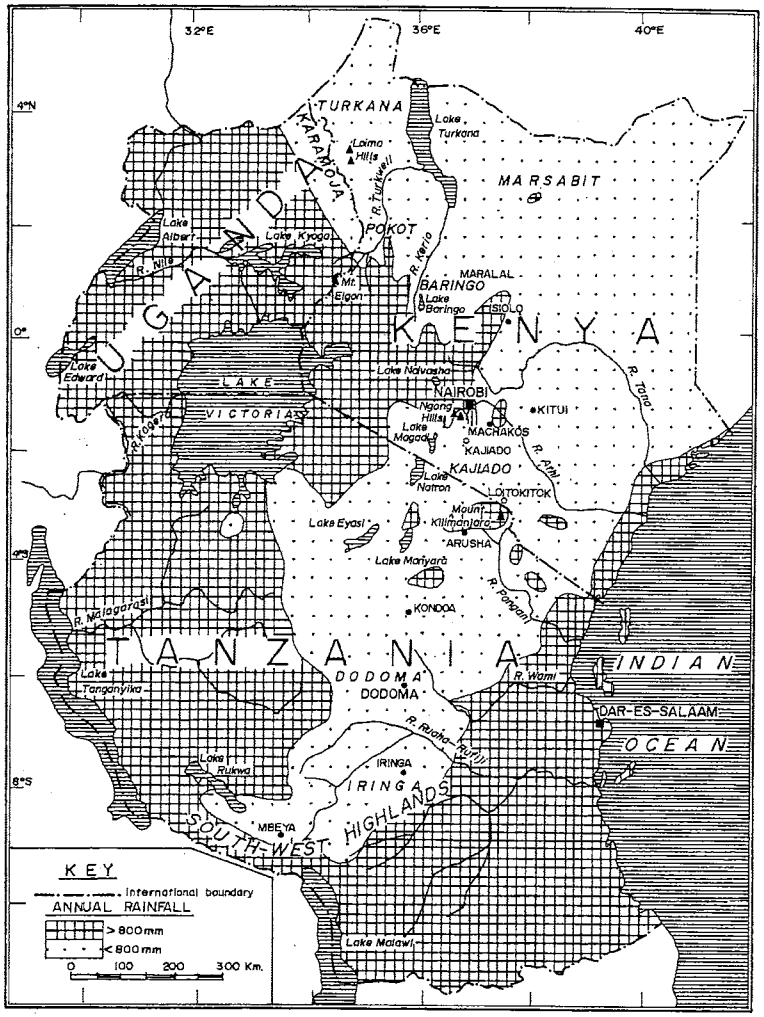


Figure 11.2 Drylands in East Africa



experience very low temperatures due to heat loss into the upper layers of the atmosphere. A few high altitude areas like Loitokitok and Ngong Hills in Kajiado District, Loima Hills in Turkana, Chamwino in Dodoma and many others have low average monthly temperatures of 16°C (Moshe and Darkoh, 1991; Msangi, 1991). Most of the precipitation is lost through quick surface run-off, high evaporation and high transpiration rates. Annual water losses of up to 2,500 mm have been recorded in some of the arid parts within the Rift Valley like those around lakes Magadi, Turkana and Natron. The vegetation of these areas is sparse and is of the type which is especially adapted to tolerate moisture deficits.

These East African drylands are inhabited by semi-nomad pastoralists, subsistence farmers and few large-scale farmers who either own large ranches or with the aid of irrigation, grow rice, sugar-cane, vines, vegetables and fruits. The subsistence farmers heavily depend on livestock for food and for sale to obtain much needed cash to meet both social and institutional demands. The diets of these people are dominated by milk and meat. Crop cultivation and livestock development are hampered by the aridity of the land which forces the pastoral communities, such as the Maasai, Turkana, Rendile, Somali, Karamajong and Wagogo, to lead nomadic life in search of green pasture during the long dry seasons. Women and children of both the pastoralists and subsistent cultivators are often seen trekking long distances searching for water to meet household needs. Spared of this arduous task are the few who happen to live near a wetland or in the vicinity of large permanent rivers traversing these lands. Rivers such as the Turkwell, Kerio, Tana, Athi, Pangani, Wami and Ruaha-Rufiji have their sources located on the better watered lands bordering the drylands. Many other smaller rivers, some seasonal, empty into internal water bodies and wetlands (Msangi, 1991).

The Maasai, the Wagogo of central Tanzania, the Somali, Borana, Rendile, Turkana and Pokot of Northern Kenya, the Karamojong of northwestern Uganda as well as the other smaller tribes inhabiting these lands share a great deal of similar social and cultural practices (Msangi, 1991, 1990, 1984, 1982). Such practices greatly influence the adoption of new technologies recently introduced into the drylands of East Africa. Practices governing ceremonies during initiation into adulthood, during marriages, deaths and other practices such as fines, compensations and worship revolve around livestock for both pastoralists and cultivators.

Livestock constitute the major source of much needed cash to meet both personal and institutional demands (Stone, 1991; Msangi, 1992).

The communities inhabiting the drylands have lived and adopted to the environmental conditions arising from many years of experience and folklore handed down generations. This harmonious existence with nature was interrupted and interfered with during the last hundred years or so through the introduction of western cultures and new ways of viewing the environment. The introduction of improved health and nutritional facilities, as well as a monetary economy together with the institutional requirements which go with it, has disrupted and partially changed the life styles of these communities (Msangi, 1992; Stone, 1991; Dietz, 1987; Ellis and Swift, 1988).

The population of both people and animals has increased rapidly in the drylands from both natural factors and immigration from the high potential areas where population increases and newland development approaches have produced many landless people. Food aid and western medicine have increased survival chances and increased fertility rates.

Before the introduction of new technologies and new cultures, land, water and vegetation resources had successfully supported pastoralism and transhumance. The forces of nature had adequately checked imbalances between man and nature, so that simple social and cultural patterns had developed and had been harmoniously maintained. The installation of schools, hospitals, central governments and all their branches imposed new requirements on the communities and, therefore, the environmental resources. Water, being the central and most scarce resource in these lands has been subjected to various manipulations and new development approaches geared towards meeting both the communities' traditional and new institutional demands.

Many cases of efforts to conserve, increase and manage the water resources in the drylands have been made and are documented in numerous plans and consultant reports (Msangi, 1992). Experiments in the name of improved technology have been introduced. Few successes have been recorded, and many failures have been experienced. The reasons for failure are mainly due to the inappropriateness of the technologies adopted to either the existing environmental conditions or, most often, to the wants and wishes of the local communities.

Water Harvesting Methods

The principal source of water for the East African drylands has been precipitation in the form of rainfall, fog and mist occurring only rarely on elevated grounds and where there are substantial tree covers. In Kitui District, wattle tree branches are bent downwards and containers placed underneath to collect water droplets formed at night. Such collected water is removed early in the morning before the sun rises and the fog lifts. In other countries, such as Peru, Ecuador, Oman and Chile, fog droplets are intercepted by using polypropylene mesh, and substantial water quantities have been tapped to support sizeable populations (Schemenauer and Cereceda, 1993). Such technology is yet to be introduced to East Africa, even on an experimental basis. Dew which may form during clear cool nights is rare and, when formed, quickly disappears soon after daybreak. A few cases observed during fieldwork carried out in central Tanzania merits mention here.

During excessively cool nights, in some areas of Dodoma, dew is harvested by grazing animals very early in the morning. The herders place metal tins facing downwards at night and turn them up early in the morning. Some drinking water is obtained from water droplets which would have formed on the inner surface of the tin. In some localities some herders were seen sweeping dew from long grass blades into containers. Such precious water provides these early risers with their daily drinking water. In other localities, onions and water melons are grown at the base of large rocks where dew, formed at night, drips to the base to support such plants.

One of the water harvesting technologies introduced into the East African drylands has been to tap rainwater before it hits the ground or soon after reaching the ground surface or after it has just infiltrated the soil. Water harvesting from roof catchments has been introduced and intensified during the last fifty years or so. While evidence is not easily available due to lack of documentation, roof catchment systems at mission and similar buildings have existed in East Africa since the early 1900s (Kanyanjua, Wagura and Njogu, 1994; Otieno, 1994). It has been a tradition to collect run-off water from roofs for many years even before the coming of new cultures, and recently the technology has been improved to include gutters and storage tanks. Such practice has been common among the cultivators and sedentary communities in the

humid areas and, in isolated cases, in the semi-humid areas like those in Kilimanjaro, Machakos and Kitui Districts. However, it has not taken root in the drier areas predominantly inhabited by pastoralists and shifting cultivators because their grass thatched huts and/or the dome-shaped/flat roofed huts (tembes and manyattas) do not allow the practising of this technology (Msangi, 1992, 1990, 1987, 1984). Where practised, widespread adoption is limited by lack of investment capital into improved roofs, gutter and tank construction and maintenance (Gould and Nissen-Petersen, 1994).

Water harvesting at the ground level involves such technologies as soil moisture conservation, pans, dam construction, micro-catchments and many others. The widely advocated method of soil moisture conservation requires avoiding bare ground during the dry hot months to reduce water loss through direct evaporation. Reducing or restricting tree cutting, preventing overgrazing the rangelands, planting trees such as prosopic and grass such as aristida species which generate easily in these lands as well as mulching methods on cultivated areas are some of the ways of limiting direct evaporation from the soil. The creation of shelter belts is documented to cut down evaporation by as much as 24-30 per cent. Terraces on steep slopes and earth bunds to retain water in specific areas so that it infiltrates into the ground have all been recommended as ways of improving the water situation in the drylands of East Africa (Smith and Critchley, 1983; Barrow, 1983).

The full adoption of these technologies leading to soil moisture improvement suffers several setbacks emanating from the social set-up and cultural practices of some of the dryland communities. Communities, such as the Maasai, Somali, Turkana and many others, believe in large herds of animals as a sign of wealth and social recognition. In all the communities, bride price/dowry is payable in the form or equivalents of cattle and goats. Animals must be offered as sacrifices to get rid of evil spirits which cause disease and bring bad luck. Medicinemen and rain-makers are also paid in equivalents of goats or cattle. Other social festivities and ceremonies require that animals be slaughtered while meat and milk form the basic diet of these communities. Moreover, the drylands are the main source of meat products for the fast growing urban population of East Africa (Msangi, 1992; Darkoh, 1989; Ellis and Swift, 1988). Meat products are also exported to earn foreign exchange. School fees, fines, taxes and other institutional obligations are met

through the sale of animals and, occasionally, the sale of crops such as rice, cotton, grapes, fruits and vegetables. Consequently, the stock of animal herds remains high to meet all the above demands, reducing the grazing land through commitment of large tracts to cultivation, continual over-utilization and, hence, over-grazing.

During the early 1900s, grazing areas were further reduced when large tracts of the drylands of East Africa were designated as national parks and game reserves. Despite the need to expand cultivation and grazing areas, these lands remain inaccessible to the cultivators and pastoralists alike. The governments of East Africa heavily depend on the parks and game reserves to earn much needed foreign exchange. Very often, encroachers on these reserved lands are prosecuted, and heavy fines imposed on them. Those who cultivate or graze their animals in the vicinity of the parks and game reserves often suffer heavy losses from vermin and wild animals protected in these reserved areas.

As the dryland communities struggle to meet the numerous demands both imposed upon them and those essential to their social systems, the land gets exhausted and degraded, quantities and quality of products fall as well. Like elsewhere in the developing world, the East African economies have been adversely affected by the introduction of the money economy and global trade. Declining terms of trade fetch less and less cash from raw materials and products produced by these countries, thus necessitating increasing quantities produced. To achieve that, cultivators have had to expand areas cultivated and pastoralists their animal herds. The cultivators in the better watered areas of East Afrcia have, therefore, committed large tracts of their land to cash cropping, and food crops have been grown elsewhere. Expansion has thus reached the periphery drylands where the pastoralists retreated to (from the drier plains) during the dry seasons. These expansions have enabled cultivators to increase cash incomes and maintain food production levels.

Such expansion of humid agriculture into the marginal areas has occasioned accelerated land degradation processes, so that some of these areas are threatened with irreversible desertification. The drier plainlands suffer the worse desertification threat due to the concentration of large herds throughout the year. Having no access to the periphery areas previously used as dry season grazing lands, the pastoralists

are forced to overgraze and, hence, degrade the dry plain lands not suited to extended grazing.

Consequently, in the dry parts of Africa, such as Botswana's Kalahari sandveld, land degradation is at its worst around permanent water points where the herders gathering their flocks have caused a great deal of damage to land and vegetation in the surrounding areas (Darkoh, 1989; Msangi, 1991). Botswana is already more fortunate since its development of a market-oriented economy has given cattle a high market value through negotiation of EEC subsidies which raised the price of Botswana beef 60 per cent above world market since 1971 (Darkoh, 1989). The East African pastoralists, on the other hand, have had to struggle unaided, with their only means of survival being to over-exploit the environment. When the environment continues to be degraded, naturally less and less is left for those directly dependent on it.

As documented elsewhere, land and resources misuses and subsequent degradation are symptomatic of more fundamental problems inherent in societal structures both at local, national and international levels (Darkoh, 1989). At the local level, over-exploitation of lands, forests, grasslands to produce food, fuel, cash crops and meat for food and for sale is encouraged by national policies. At the national level, balance of payments problems and recurrent budgets lead to demanding policies which encourage expansion in cultivated land and herds as a means of increasing production. At the international level, the global capitalist economy and the economic forces resulting from the world's inequitable financial arrangements and terms of trade impose demands upon the weaker economies of the developing countries which in turn impose demands on the producers, ultimately leading to overuse and/or misuse of resources and environmental degradation.

Trees provide the main source of energy (woodfuel) and building materials for homes and animal enclosures in the East African drylands. Tree branches and pods are also an important source of fodder for animals during the dry seasons. Branch coppicing, pods harvesting and goat grazing in woodlots bordering wetlands limit tree regeneration and lead to the uprooting of young trees. Large fires are lit at night to keep wild animals at bay; hence restricted tree cutting, restricted grazing and mulching practices are not feasible in these lands where trees and grass form the backbone of the livelihood practices. Moreover, planting and

tending trees are not feasible in a situation where people and animals are in continuous migration in search of pasture and water.

All over the East African drylands, overland flow is harvested through pans and dams. Ground catchments and pans are used by both individuals and institutions. Circular pans with storage capacities ranging from 40 cu m to 1,000 cu m and surface areas 3 sq m - 1,350 sq m have been constructed by either individual owners, government or non-government organizations. Such pans are fairly shallow, ranging between 0.5 m - 4.5 m in depth. The water collected in these pans is used mostly for domestic and livestock purposes (Gould and Nissen-Peterson, 1994; Kanyanjua, Wagura and Njogu, 1994; Msangi, 1990, 1987; Smith and Critchley, 1983; Matango and Mayerle, 1971). A little is used for irrigation purposes by individual owners. On average about 200 persons use each pan, the number varying between 10 and 2,500. Water is drawn manually from the pan if it is for domestic use while livestock drink directly from the pan. Sometimes donkeys used to fetch water for domestic use are driven right into the water where containers are filled and loaded into bags straddled onto their backs.

Despite their wide usage, the pans lose much water through evaporation and leakage, their volumes get reduced by sediments from unprotected catchment areas so that they get filled up after a few years (e.g. Kisongo dam in Arusha and Imagi dam in Dodoma, Tanzania) (Msangi, 1987; Kitheka, 1993; Christiansson, 1981). The water in these pans is turbid, sometimes with bad odour due to organic pollution emanating from animal dung and urine. Efforts to improve on this technology and control pollution have met with little success since, culturally, man is used to mingle with his animals. Field investigations carried out between 1982 and 1992 in both Tanzania and Kenya have revealed that many pastoralists feel that they loose their identities if they cease to own and mingle with their animals. The Maasai, the Wagogo, the Somali and the Turkana, for example, would and could not adopt a technology not revolving around their livestock.

An improved form of tapping ground surface flow is dam construction across rivers to store flood waters for use during the dry seasons. Such stored water is used to meet domestic water demands or irrigation needs. The large investments required to meet both construction and maintenance costs limit its widespread adoption. Moreover, lack of knowledge or lack of apprehension of the consequences of overgrazing

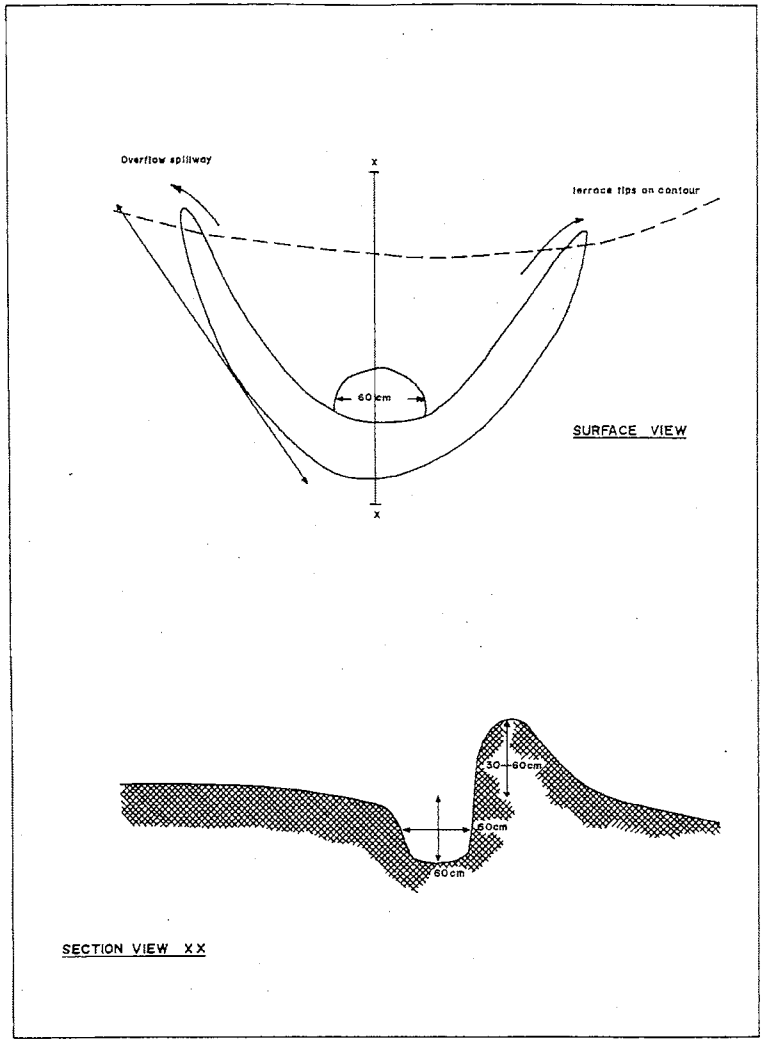
the catchment areas shortens the life span of these dams rendering them uneconomical. Changed ecological conditions, such as the creation of an ideal habitat for disease-carrying flies, snails and mosquitoes, have also made these water bodies undesirable in the areas where they have been created (Kaduma, 1977, 1972).

Sub-surface dams, on the other hand, although being more environmentally feasible than the surface dams, have not been extensively adopted due to water recovery problems. Shallow wells, like dam construction, require large amounts of money non-existent among the dryland communities. Investments required during construction, maintenance and operation of pumps are much too high and often unjustified for these otherwise lands of low productivity.

A more widely resorted mode of water harvesting in the drylands all over the world is that of borehole drilling to tap groundwater. Often petrol/diesel pumps are installed to bring the water to the surface. In a few instances, solar energy pumps are used and sometimes windmills. Like in the case of shallow wells, the limiting factor is the cost involved. Although the East African governments have drilled a substantial number of these boreholes, operating and maintenance costs are prohibitive. Where windmills have been installed without storage facilities, thousands of litres of water are wasted each day through evaporation and evapotranspiration.

A more feasible method of water harvesting in the drylands is that of micro-catchments designed to aid in tree growing (Figure 11.3). In Israel, catchments of up to 100 sq m have been established in the Negev desert, and trees grow in areas where rainfall is as low as 100 mm per year (Barrow, 1983; Smith and Critchley, 1983). In East Africa, this water harvesting method has been successful in a number of pilot projects, but adoption by the communities has been very limited. The amount of labour and time required to establish the catchments is beyond the cultural practices of many of the communities. Some of these, like the Turkana, Rendile and Maasai, regard land tilling as the work of the socially low. Often, the arduous work is left for the women and children; men being too high socially to handle the soil, they take care of security and tend the large animals. Small stock is the job of the women and young children (Msangi, 1992, 1990). To many communities, trees, like grasses, are for the animals. Conservation of trees and the surface cover is, thus, unimportant. Therefore, micro-catchments have not been fully

Figure 11.3 Surface and Sectional View of Micro-catchment



adopted as the planted trees, even when allowed to grow, do not reach maturity. They get trampled, grazed and/or uprooted by animals or are cut to provide firewood or to build animal enclosures.

Rock catchments are an old form of water harvesting which has been and is still successfully practised in some parts of Africa and the East African drylands (Figures 11.4a and 11.4b). Introduced in some drylands of Kenya during the 1950s (Kitui and Magadi areas), rock catchments have been constructed by either paving a steep hill with concrete to harvest rainwater which is then stored in tanks constructed above ground or where there are rock surfaces extensive enough to produce run-off which can be obstructed using locally available materials. The collected run-off is used for domestic water supply for animal watering or for small irrigation projects. The catchments in Magadi have areas of 300 sq m and 5,000 sq m and storage capacities of 30-50 cu m while those in Kitui have storage reservoirs of between 500 and 10,000 cu m capacity. The number of users per storage vary between 500-3,000 persons (Gaciri, 1994; Gould and Nissen-Peterson, 1994; Msangi, 1992).

Figure 11.4a Rock Catchment

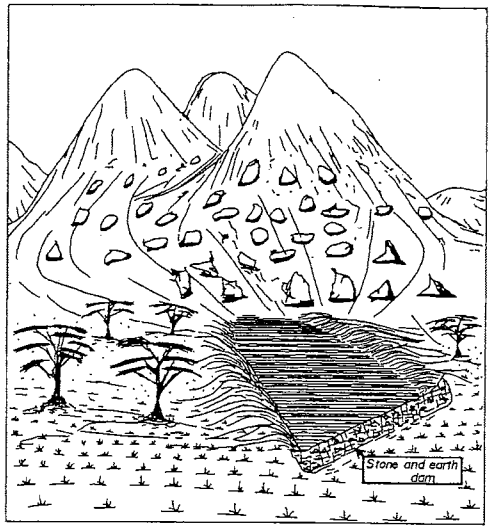
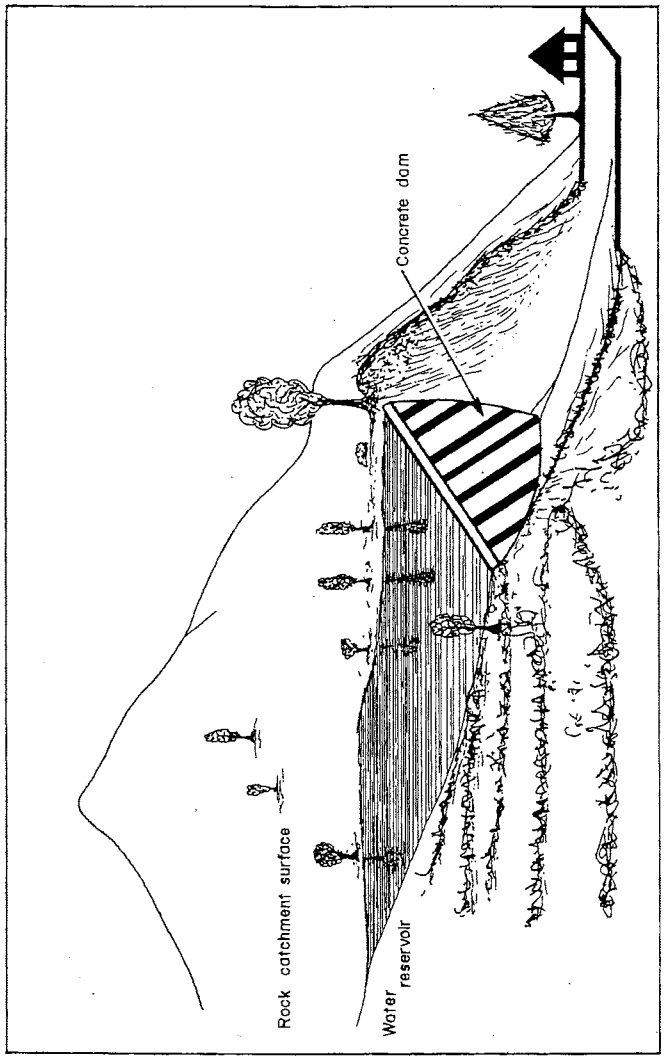


Figure 11.4b Rock Catchment System



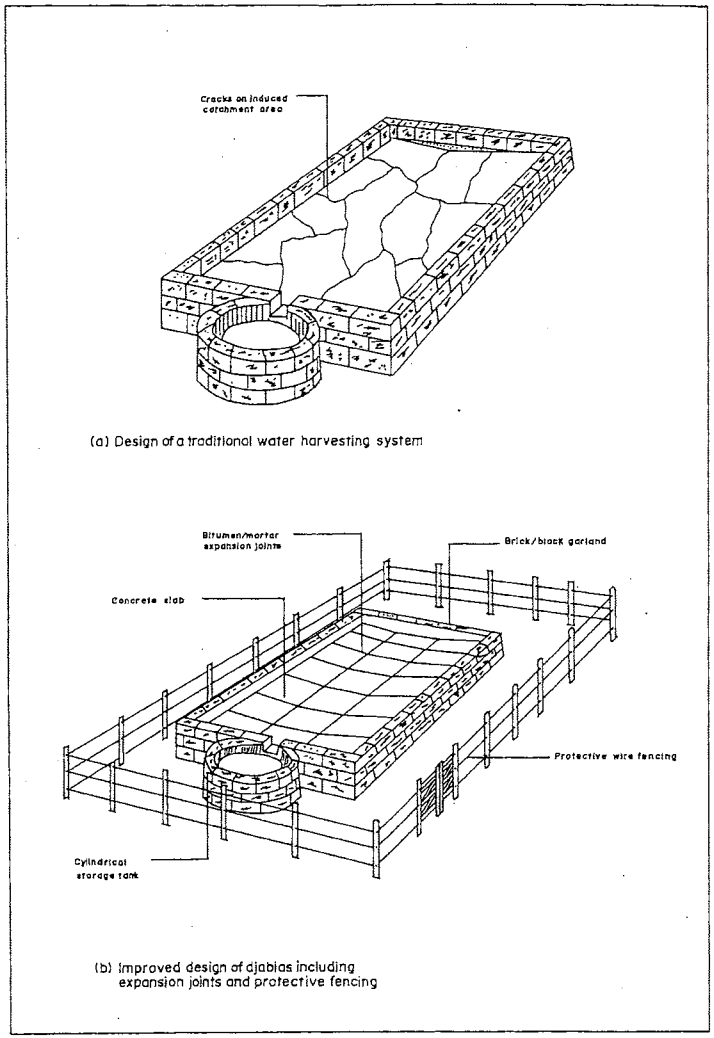
A similar method to the rock catchments is that of ground catchments which is a form of improvement to the pans. Here, a catchment is attached to a hemi-spherical sub-surface ferrocement tank (Figure 11.5). Such tanks as found in parts of Kenya (Lamu along the Northern Coast) have varying capacities of between 50-80 cu m (Biamah, Choge and Cherogony, 1994). The non-adoption of this technology is largely due to high investments required to treat (cement) the earth catchment and to purchase the materials for the storage tanks. Many of the pastoral communities in other parts of East Africa have not yet adopted this improved form of ground catchments; most still use the bare ground and pans method.

Conclusions and Recommendations

This chapter has underscored the role of a community's social and cultural practices in the adoption of water harvesting technologies. It becomes obvious that the non-adoption of new water harvesting technologies by the dryland communities of East Africa stems largely from the social organization and cultural practices of these communities. The land use practices which revolve around livestock and transhumance greatly determine what technology is used in harvesting the water available in the drylands of East Africa. The appropriateness of the technology greatly determine success and sustainability.

Women and children are the ones mainly responsible for collecting water for domestic use and, sometimes, also building the animal enclosures. They tend the small stock which are the most destructive to young trees and low tree branches. Consequently, successful adoption of water conservation and water harvesting techniques largely depends on the women. Women should, therefore, be at the centre of any training aimed at improving the existing technologies or in introducing new ones. Sustainability depends on clear understanding of the people's social organization, gender roles and cultures as well as the local human and financial resources. Women should, like in the case of other rural projects, be considered as the target group since they are the key actors. Necessary assistance should be accorded to this group especially when manual work and/or tasks are of a technical nature. Men should be involved in accordance with the social organization of each community.

Figure 11.5 Traditional Water Harvesting System



(a) Design of a traditional water harvesting system

(b) Improved design of djabias including expansion joints and protective fencing

It becomes obvious that an acceptable alternative to nomadic pastoralism must be identified. A market-oriented pastoralism stands a better chance of succeeding as demonstrated by cases from elsewhere in Africa, such as Botswana's beef industry and the periodic auctioning of goats in Baringo, Kenya. Although the Baringo case is on a very small scale and is basically controlled by the Head of State, it has indicated that animal numbers can be reduced to get cash circulating in the system. The regular auctioning of animals also offers a source of animals should one want to buy to meet ceremonial and other functional requirements.

Irrigated agriculture is both unacceptable and unsustainable in the drylands of East Africa. Dryland farming based on indigenous crop varieties should prove more successful if preceded by relevant research and awareness building. In the past, emphasis has been to settle the pastoralists and shifting cultivators so that they can better adopt new technologies, including those on water harvesting and conservation. Recent studies have, however, convinced some policy-makers that the best way to achieve success is in trying to understand traditional social and cultural needs as well as risk-avoidance strategies of the dryland communities. It is now felt that introducing broader knowledge and improved technologies to reduce risks involved in living in the drylands would meet with more success than attempting to introduce drastic changes. The technologies, it is stipulated, should be simple, small scale, transferable, cheap and closely related to local people's wishes and wants. The fragile ecosystems as existing in the drylands of East Africa should not be over-exploited in any way. Pressure on any part of these ecosystems should be removed through spreading the exploiters rather than concentrating them in small areas.

The people living in the transit ecosystems, i.e. semi-arid zones, practise at the same time irrigated agriculture, dryland cultivation and livestock keeping. Irrigated agriculture, where feasible, should be practised on small scales using the transit zones as examples whenever water harvesting activities are planned in the drier ecosystems. The people's cultures, social practices and beliefs should be respected so that mistakes experienced in some of the introduced techniques are avoided. Adherence to traditional social-cultural values has led to the failure of many of the donor-introduced techniques. Approaches such as food-for-work and many others constituting imposition should be avoided at all

costs. The pastoral and semi-pastoral communities possess cultures and social organizations which guaranteed sustainability over the years before externally induced pressures forced them to over-use and, ultimately, mismanage their environmental resources. Such knowledge should be used to ensure more success than has so far been the case.

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PART IV

Economic Change

CHAPTER TWELVE

Flying from Empire to Commonwealth, 1919-1994

Peter J. Rimmer with
Sandra M. Davenport

Introduction

Dominant forms of transport and communications are closely associated with national innovation systems (or regimes of accumulation). The British regime of accumulation (1850-1920) was characterized by industrial capitalism, the development of port cities, steamships and steam railways supported by national telegraph systems. It was superseded by the American regime of accumulation (1920-1980) which was marked by Fordist multilocational enterprises and the suburbanization of production, and distinguished by long-distance national and international motorways, specialized bulk and container shipping, telephone and telex networks, and high-speed rail and air travel. Since 1980, there has been a transition to the Japanese regime of accumulation featuring network firms, a new management of economic space and logistical platforms or storage centres, and encompassing international air cargo and passenger networks linked by information technology (IT).[1]

The dominance of the British regime of accumulation was, therefore, virtually over before the start of international air travel in 1919. Thus, air travel in the Commonwealth between 1968 and 1994 was under an American regime before it too was superseded by a Japanese regime. In this study, significant issues are raised about the antecedents of air transport in the Commonwealth and their relationship to developments in the United States; the nature of the flight pattern in 1968; the

marked cyclical changes between 1969 and 1993 which led to explorations of liberalization, deregulation and privatization; the character of the flight pattern in 1994; and likely future developments.

The pattern of air transport in the Commonwealth in 1968 has been reconstructed using ABC (1968) timetables to derive *through flights* (i.e. including stops but excluding transfers). Key changes between 1969 and 1993 are then outlined (Ashworth and Forsyth, 1984; BTCE, 1988; Doganis, 1991; IATA, 1967; ICAO, 1965, 1969; Kelly, 1963; Michalski, Andrieu and Stevens, 1993; Sampson, 1984; Sochor, 1991). The pattern of air transport has also been reconstructed for 1994 using ABC (1994) timetables to derive *non-stop flights*. Airline timetables were examined because it was not possible to obtain reliable and consistent statistics from other sources. (Data available from the International Air Transport Association (IATA), the International Civil Aviation Organization (ICAO) and other organizations are often incomplete and unreliable.)

The development of air transport between 1919 and 1967 is considered first to show how it has been closely associated with the decline of Britain as a world power. This draws upon Stroud's (1962) *Annals of British and Commonwealth Air Transport, 1919-1960*, Higham's (1960) interpretive study of imperial air transport, 1918-1939, Pudney's (1959) study of BOAC, the company histories of Air Canada (Vernyi, 1992), Air-India (Ferrara, 1992), British Airways (BA, 1988; Endres, 1989; Reed, 1990), Cathay Pacific Airways (Vlessing, 1992a), Malaysian Airlines System (Vlessing, 1992b), Qantas Airways (Gunn, 1985, 1987; Hawkins, 1992) and Singapore Airlines (Tanner, 1992). This material is supplemented by traffic statistics for a range of Commonwealth airlines providing domestic and international services (Table 12.1).

Table 12.1 Availability of Traffic Statistics for Commonwealth Countries

Date	Airline
1924-25/1937-38	Imperial Airways
1934/1940	Jersey Airways
1935/1939	Guernsey Airways
1945-46/1946	Channel Islands Airways
1934/1946	Railway Air Services
1933	Great Western Railway
1940-41	BOAC
1946-47	British European Airways
1950	Australian National Airways and Ansett-ANA
1935-36	Qantas Empire Airways
1946	Trans-Australia Airways
1942	Canadian Pacific Air Lines
1938	Trans-Canada Air Lines
1947	Central African Airways Corporation
1949	Air Ceylon
1946	East African Airways Corporation
1948/1952	Air-India International Ltd
1953-54	Air-India International Corporation
1953-54	Indian Airlines Corporation
1936-37	Aer Lingus
1952	Malayan Railways
1949	New Zealand National Airways
1944-45	Tasman Empire Airways
1954	Pakistan International Airlines
1949	South African Airways
1949	West African Airways Corporation and WAAC (Nigeria)

Source: Derived from Stroud (1962:630-643).

Antecedents

Between 1850 and 1920, trade with Britain's dominions and colonies was undertaken by shipping. As shown in *Harmsworth's New Atlas of the World* (Hammerton, n.d.) — produced soon after the Great War (1914-1919) — British possessions were invariably shaded in red and connected by red broken lines marking the shipping routes: the "Red Routes of Empire" (Kelly, 1963:108-109). Due to the supremacy of her navy and merchant marine, Britain was slow to turn to air transport. However, during the inter-war years much progress was made and a useful network of routes and services linking different parts of the British Empire were laid down; though more could and should have been done by government had it not failed to appreciate the key role of air transport in imperial affairs (Higham, 1960:310). After World War II, Britain tried unsuccessfully to retrieve the position by pioneering jet aircraft.

Inter-war Years

Britain was reluctant to offer subsidies to private companies following the Armistice in 1919. Churchill's dictum was "Civil Aviation must fly by itself" (Higham, 1960:310). Several companies, however, began operations. In 1919, the first private company flight was undertaken between Hounslow (later Heathrow) Airport and Le Bourget Airport in Paris by Aircraft Transport and Travel Ltd (AT&T). Other early airlines included Daimler Airway, Handley Page Transport Ltd and Instone Air Line Ltd. By 1921, they were bankrupt. In 1922, Handley Page and Instone were offered small subsidies to revive their Paris-London services. This "half-hearted" remedy was also extended to Daimler Hire Ltd and British Marine Air Navigation Co Ltd in 1923. These airlines could not compete, however, with their heavily subsidized continental rivals.

In 1923, the Civil Air Transport Subsidies' Committee appointed by the Secretary of State for Air rejected the idea of a public company as it could become overly bureaucratic. Instead, the Hambling Committee recommended all four subsidized airlines — British Marine Air Navigation, Daimler Airway, Handley Page and Instone Air Line — should be merged into a single company. In March 1924, Imperial Airways Ltd

was incorporated as the "chosen instrument" of British policy with a capital of £1 million and a government subsidy of the same amount spread over 10 years (Stroud, 1962:59). The monopoly's mission was to develop British commercial air transport to service the Empire — a matter of economic necessity and political prestige. Although mail was given a high priority, much effort was also devoted to attracting both passengers and freight.

Initially, Imperial Airways concentrated on European routes which had been established by its component companies prior to its inception. In 1926, a special sub-committee of the Imperial Conference held in London was established to report on "Imperial Communications." It recommended that these could be furthered by both aeroplanes and airships. In particular, it favoured the latter and suggested the Dominions and India should erect mooring mast bases for demonstration flights. Subsequently, these were built in Montreal, Ishmalia and Karachi, and an airship shed was also constructed at Karachi. The main outcome of the Committee, however, was that Imperial Airways shifted its interests to providing Empire-linking routes (Table 12.2).

In planning these routes, Imperial Airways adhered to the *Report on Imperial Air Routes* of 1919 by the Weir Committee. In its recommendations, the Committee stated:

> They have no hesitation in deciding the proper place for initial action is the route from this country to India, and ultimately thence to Australia. In the second place stands the route from this country to South Africa... it would be wise in the first instance to deal with the problem in reference to one section of the route from this country to India, viz., the section between Egypt and Karachi... as the conditions of aerial navigation on this section are judged to be more favourable than elsewhere. (Cmd. 449, 1-2 cited by Higham, 1960:24)

This early preference for India was dictated by the unavailability of aeroplanes capable of crossing wide bodies of water. As detailed in Table 12.3, efforts were directed to ground surveys of these routes before commercial traffic was introduced. As there were few airports, Britain concentrated on the flying boat — access to water being a distinctive trait of the British Empire.

Table 12.2 Date of Initial Flight Ex-London, 1919-1939

Date	Route
1919	London-Paris
1922	London-Rotterdam
1922	London-Brussels-Cologne
1923	London-Cologne (direct)
1927	London-Le Touquet
1929	*London-Delhi*
1929	*London-Karachi*
1931	*London-Mwanza*
1932	*London-Cape Town*
1933	*London-Calcutta*
1933	*London-Rangoon*
1933	*London-Singapore*
1934	*London-Brisbane*
1934	*London-Jersey*
1935	London-Budapest
1936	London-Dublin
1936	*London-Hong Kong*
1936	London-Stockholm
1936	*London-Lagos*
1938	*London-Accra*
1939	London-Stockholm

Note: Commonwealth routes in italics.
Source: Derived from Stroud (1962).

Table 12.3 Route Surveys, 1919-1945

Year	Route
1919	India-Australia ground survey
1920	Canadian air routes
1922	Desert Air Mail (Cairo-Baghdad) ground survey
1925	Cairo-Karachi ground survey
1926	Egypt-Aden
1929	Cairo-Cape Town ground survey
1930	The Gambia, Gold Coast, Nigeria and Sierra Leone
1933	Australia, *Astraea's* flight
1935	Australian east coast flying boats
1937	African flying boat routes
1937	Alexandria-Singapore flying boat
1937	Australia and New Zealand *Centaurus* flight
1937	Bermuda-New York
1937	Lisbon Bathurst
1937	North Atlantic commercial
1937	Southampton-Azores
1938	London-Bathurst
1938	Natal-Buenos Aires ground survey
1939	Indian Ocean
1940	England-West Africa flying boat
1941	Hadramaut coast
1943	Ceylon-West Australia
1944	Mombasa-Ceylon
1945	England-South America
1949	Southampton-Madeira

Source: Derived from Stroud (1962).

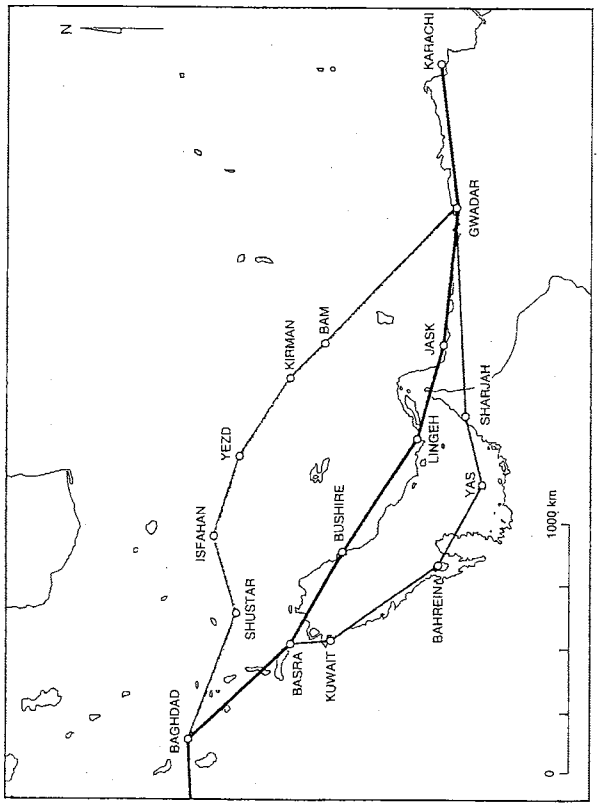
The Route to India: By 1925 a route via Egypt and Suez had been surveyed — the golden rule being to cross as little foreign soil as possible (Kelly, 1963). In 1926, the Cairo-Basra (Mesopotamia) route was

opened — the featureless Arabian deserts between Amman and Baghdad making it easy to lose bearings, and difficult to maintain rest houses, meteorological aids and radio stations (BA, 1988:92). Three years later, the route was extended to Karachi and Delhi in the East and Britain in the West. The route between Baghdad and Karachi was opened in 1929 (Figure 12.1). It first operated along the Persian Gulf under a three-year agreement with the Persian government. When the agreement expired, the Persian government insisted on an inland route, but this was considered to be too hazardous, and the route was switched to the Arabian side of the Gulf in October 1932. As Britain opposed freedom of the skies, both France and Italy blocked the Imperial air service. Travel between Paris and Brindisi, therefore, was by rail — the route was not fully airborne until 1938 (Brett, 1933).[2]

The All Red Route to Africa: The first commercial air service in Africa was from Cairo by flying boat to Mwanza on Lake Victoria in 1931. In January 1932, the England-South Africa route was inaugurated by developing an extension from Cairo to Cape Town (Figure 12.2). Services were scheduled to leave Croydon Airport on Wednesdays at 12.30 GMT and arrive at Cape Town at 17.40 LT on the following Sunday week. Two nights were spent on the train between Paris and Brindisi. Air route night stops were arranged in Athens, Cairo, Wadi Halfa, Khartoum, Juba, Nairobi, Mbeya, Salisbury and Johannesburg. In February 1936, an east-west African route was established between Khartoum and Kano in northern Nigeria.

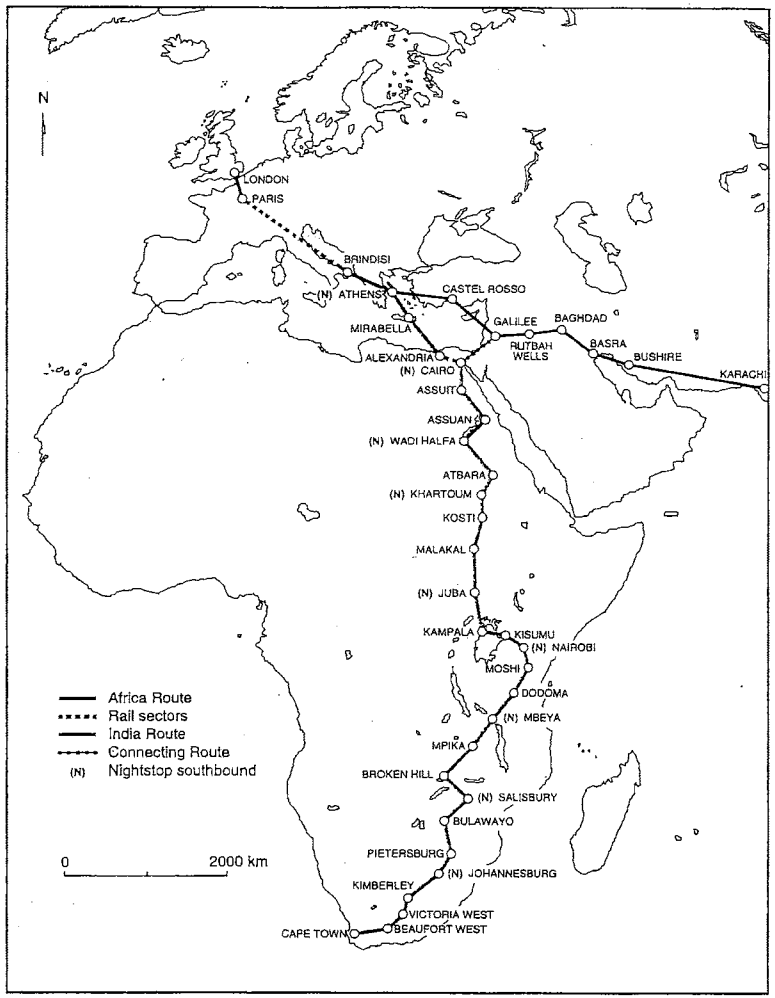
The Australian Route: In 1933, the Indian service was extended to Calcutta, Rangoon and Singapore and, in December 1934, to Australia (Figure 12.3). The Karachi-Singapore sector of the England-Australia flying boat route was operated by Imperial Airways and its associate Indian Trans-Continental Airways. Queensland and Northern Territory Air Service (Qantas), which was renamed Qantas Empire Airways (QEA) Ltd in 1934, was responsible for the Singapore-Brisbane sector. Imperial Airways operated the Singapore-Darwin sector until February 1935, when QEA took over. Flying boats did not operate at night as it was impossible to see the swells and gauge the height above water (Barlay, 1990:15). Flying only by day, the whole journey from Britain to Australia was covered in a week compared with 20 days for the fastest steamer between London and Bombay, 33 days to Hong Kong and 40 days to Australia (Kelly, 1963:109).

Figure 12.1 Persian Gulf Section of Imperial Airways' India Route



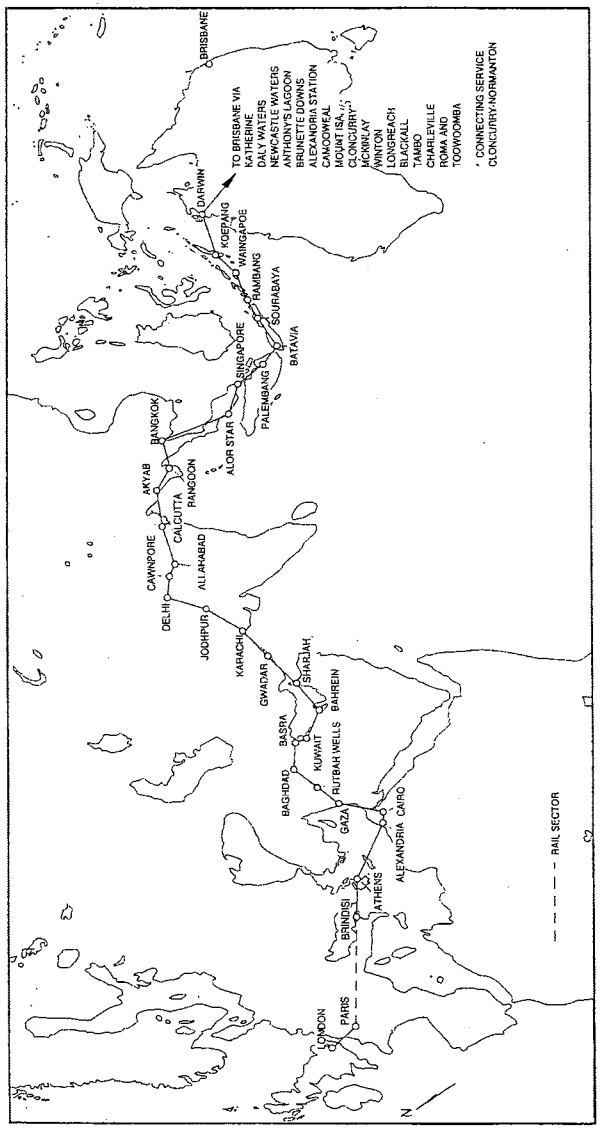
Note: The Figure shows (a) the Persian Coast route; (b) the proposed inland route; and (c) the Arabian Coast route.
Source: Stroud (1962:98).

Figure 12.2 Imperial Airways' England-South Africa Route, January 1932



Source: Stroud (1962:94).

Figure 12.3 Imperial Airways' England-Australia Route, December 1934



Source: Stroud (1962:116).

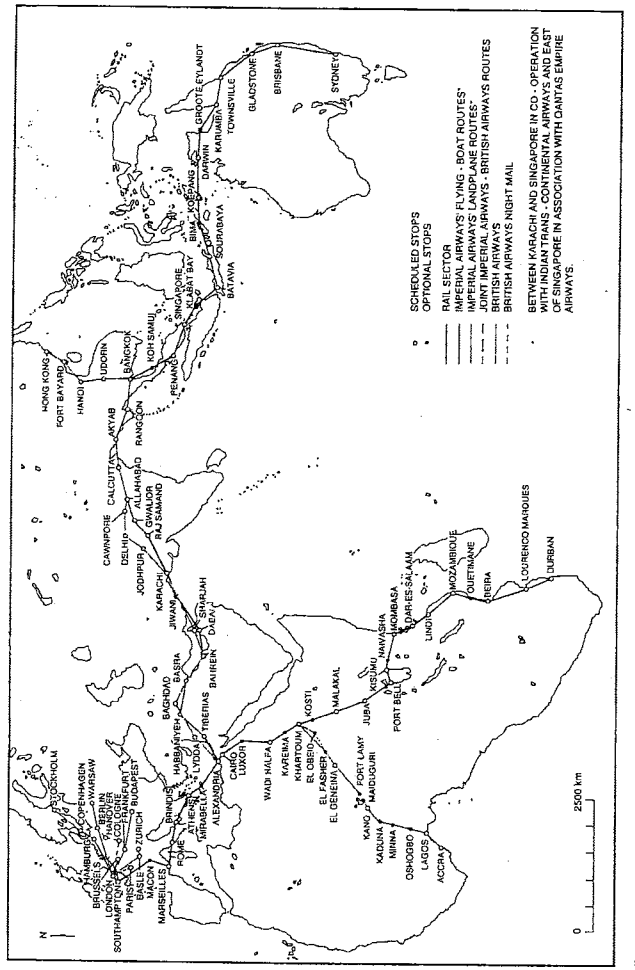
In 1935, there was a marked change in policy following the establishment of the Fisher Committee to coordinate national policy and overseas airline development. The Committee stated that Imperial Airways could not handle all British overseas services and recommended the introduction of a second airline. British Airways was appointed to share continental services with Imperial Airways in 1936. The latter, however, was primarily concerned with its own routes which by then linked all countries in the British Empire.

The introduction of summer schedules in April 1939 demonstrated the respective roles of Imperial Airways and British Airways (Figure 12.4). Imperial Airways operated flying boat services on its Mediterranean route and its "horseshoe" route linking Durban-Alexandria-Sydney. Landplane services paralleled this horseshoe route between Alexandria and Bangkok before it branched-off to Hong Kong. There were also landplane services between Khartoum and Accra on the Gold Coast and between London and Zurich. The route time between Britain and South Africa was 4.5 days and between Britain and Hong Kong 5.5 days.

An analysis of the traffic statistics of Imperial Airways between 1924 and 1938 shows that the company enjoyed steady growth until the Great Depression (Table 12.4). Passenger numbers declined sharply between 1929 and 1930 but recovered markedly in 1931. This improvement continued at a higher level, and a new peak was reached in 1935. Although air transport enjoyed a distinct comparative advantage over surface transport, Imperial Airways' routes were of limited commercial value given that loads were restricted to "opulent passengers and surface mail" (Higham, 1960:314). Mail was a prime source of revenue (though subsidies promised under the Empire Air Mail Programme for carrying first-class mail in 1934 did not eventuate until 1937 when larger planes were available to carry the agreed 2,000 tonnes per year).

In 1936, the Short Company — the Imperial Airways' principal supplier of flying boats — had introduced its C-class carrier which carried 18 passengers, weighed 18 tons and flew at 145 miles per hour (233 km/h). Not only could this plane now carry mail but could by-pass politically-sensitive areas. When fitted with extra tanks, the flying boat was able to make Imperial Airways' first transatlantic flight. The plane also allowed the Britain-Australia service to be upgraded to three services per week and extended to Sydney. Qantas, however, regarded

Figure 12.4 The Routes of Imperial Airways and British Airways after the Introduction of Summer Schedules, April 1939



Source: Stroud (1962:66).

Table 12.4 Traffic Statistics of Imperial Airways, 1924-1938

Year	Passengers	Miles flown	Revenue ton-miles
1924-25	11,395	853,042	391,032
1925-26	11,703	851,553	393,937
1926-27	17,083	791,443	512,967
1927-28	26,479	867,675	583,668
1928-29	35,522	1,032,842	803,192
1929-30	29,338	1,345,217	900,793
1930-31	20,993	1,295,848	1,017,773
1931-32	34,162	1,721,962	1,251,753
1932-33	60,966	2,030,993	2,196,722
1933-34	58,060	2,354,176	2,733,603
1934-35	62,382	2,885,761	3,511,528
1935-36	68,372	4,560,718	4,803,427
1936-37	60,367	5,231,655	5,171,504
1937-38	62,105	6,223,968	8,353,618

Source: Stroud (1962:630).

KLM's service between Amsterdam and Batavia (Jakarta) in the Dutch East Indies as more attractive because it used American aircraft. Although British aircraft had originally been superior to American, the role had been reversed in the 1930s.

Competition between Imperial Airways and British Airways in Europe led to a proposal to nationalize the airlines. In November 1939, these two state-subsidized airlines were merged to become the publicly-owned British Overseas Airline Corporation (BOAC) — the first industry to be nationalized by a Conservative government. However, BOAC — familiarly known as the BOA Constrictor — was expected to perform as a commercial undertaking.

BOAC's creation was overshadowed by World War II (Figure 12.5). In 1940, the Mediterranean sector was cut prompting the development of the circuitous flying boat route from London via neutral Lisbon and

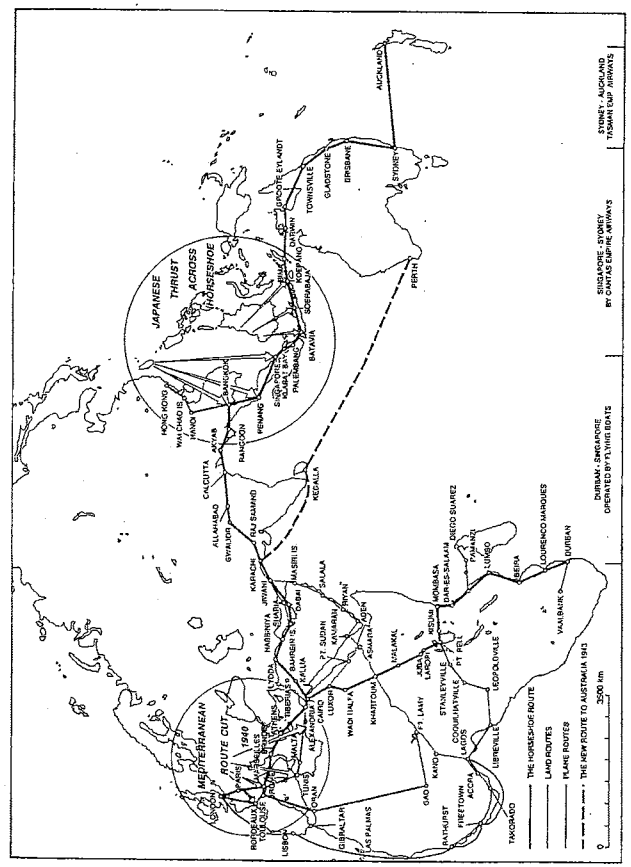


Figure 12.5 The Cutting of the Horseshoe Route in 1940 and 1941 and the Alternative Route to Australia in 1943

Source: Based on frontispiece in Pudney (1959).

West Africa to Khartoum on the horseshoe route linking Durban-Cairo-Auckland (Pudney, 1959). In 1941, the Japanese advance into Southeast Asia severed this route prompting BOAC and Qantas to operate a non-stop service on the 5,600 km sector between Perth and Colombo — the longest single ocean route ever undertaken. When the War ended, BOAC had 160 aircraft and a route network covering 54,000 miles (BA, 1988:93).

Post-war Boom, 1946-1967

After World War II, BOAC's role was to undertake a world-wide commitment and become a prime instrument in integrating the British Commonwealth. In 1946, London (Heathrow) Airport was opened. As routes were restored and new ones pioneered — largely outside the confines of the Commonwealth — Manchester was developed as a secondary international airport, and both Poole and Southampton were retained as important flying boat bases (Table 12.5). BOAC resumed its services to Europe and commenced commercial North Atlantic services. British European Airways (BEA) became responsible for continental services — a strategy allowing BOAC to concentrate on its inter-continental role.[3] Its half ownership of QEA did not persuade the latter to purchase British aircraft. In 1947, the Australian government acquired BOAC's share in its national overseas airline and also Qantas' share to create a nationalized QEA.

Freed from its responsibilities in Australia, BOAC purchased the then Hong Kong Airways from Jardine Matheson in 1948. Although BOAC was favoured by the British government, there was strong support within the Colony for the fledgling Cathay Pacific (Vlessing, 1992a).[4] Cathay's founders — Roy Farrell, an American businessman and pilot, and Sydney de Katznow, an Australian pilot — were foreigners, so they were barred from holding more than 20 per cent of the airline; Butterfield and Swire (later the Swire Group), a leading Hong Kong trading company, became the leading partner. Swire's influence on the British government, which had concluded the Bermuda agreement with the United States in 1946, was critical. (This agreement regulated routes and fares and excluded unscheduled "tramp" operations like Cathay Pacific.) Cathay Pacific was revamped as a scheduled operator and proved to be a strong competitor with BOAC's Hong Kong Airways. In 1949, BOAC incorporated British South American Airways Corporation which had been in existence for three years as a separate state corporation.

Table 12.5 Date of Initial Flight Ex-London, Manchester, Poole and Southampton, 1946-1959

Date	Route
1946	London-Buenos Aires
1946	London-Santiago (Chile)
1946	London-Caracas
1947	London-Geneva
1947	*London-Montreal*
1947	London-Santiago via Lima
1948	London-Tokyo (landplane)
1953	London-Majorca
1955	London-Salzburg
1956	London-Venice
1957	London-San Francisco
1957	London-San Francisco "Polar" route
1957	London-Valencia
1959	London-Moscow via Copenhagen
1949	Manchester-Birmingham-Paris
1952	Manchester-Zurich
1946	*Poole-Hong Kong*
1948	Poole-Iwakuni
1948	Southampton-Tokyo
1949	Southampton-Madeira
1954	Southampton-Capri
1955	Southampton-Genoa
1956	Southampton-Canary Islands

Note: Commonwealth routes in italics.
Source: Derived from Stroud (1962).

After 1951-1952, BOAC was able to operate without government grants, but commercial solvency was no longer an end in itself. Possession of a commercial airline became a symbol of sovereignty and independence — an unbridled gesture of self-assertion and propaganda. The new operators included some from former British Colonies which had acquired independent status and inexpensive war surplus aircraft after World War II. Few of them operated without the support of direct or concealed subsidies from their respective governments. Some were assisted with both advice and finance from BOAC (including Malayan Air Lines (MAL) Ltd jointly controlled by BOAC and Qantas). During the early 1950s, 11 of 21 new airlines established were in India. The Indian government intervened by nationalizing the airlines and creating Air-Indian International and the Indian Airlines Corporation for domestic services.

Considerations of national prestige also applied to the aerospace industry. The British sought to by-pass the development of four-engined piston aircraft because the United States had an insurmountable lead in that technology. Given that the turbo-jet was a British invention, the government supported design studies which led to the creation of the de Havilland Comet. BOAC introduced its first Comet on its Commonwealth routes in 1952, thus offering a marked improvement in speed and comfort for travellers. However, it was unable to offer non-stop, transatlantic services because of the aircraft's high fuel requirements; routes were restricted to BOAC's London-Rome-Johannesburg link and the Far East route via Colombo and Singapore (Kelly, 1963:188).

In 1954, a series of crashes occurred when the Comet disintegrated in flight. Eventually, these problems were traced to its pressurized cabin being inadequately designed to withstand low air pressures at altitudes over 25,000 ft. British aerospace never recovered from these events, and its lead was lost to the adventurous Americans. Even Commonwealth airlines purchased American jets. Indeed, Qantas' decision in 1959 to purchase the Boeing 707s for its "Kangaroo" route to London via Singapore and its "Southern Cross" route to London via San Francisco and New York was significant. It persuaded BOAC to run counter to the "Buy British" slogan and add similar planes to its fleet. Although BOAC flew the first transatlantic jet service in 1958, this was merely a ploy by Pan American to lessen British resistance to the environmental impacts of its own fleet of Boeing's 707 and Douglas DC-8 jets. In 1959, BOAC

introduced a Commonwealth round-the-world jet service — the first having been inaugurated by Pan American.

BOAC also agreed to merge its loss-making Hong Kong Airways with Cathay Pacific. While BOAC obtained a seat on the board, the Swire Group gained control of the airline and extended its operations beyond the region to link Hong Kong to Sydney. Qantas retaliated with a jet service of its own. Not wanting Qantas to gain a foothold in Hong Kong, the British government persuaded Cathay Pacific to compete vigorously with its Australian rival (Vlessing, 1992a). Although Cathay Pacific was content to be a regional airline, the dictates of the British government often took precedence. The British Board of Trade was able to use Hong Kong as a pawn to bargain access to the Colony by foreign-flag carriers in return for highly lucrative landing rights in other parts of the world, so securing advantages for BOAC, Britain's principal flag carrier (Polsky, 1968).

In 1960, 15 Boeings were delivered to BOAC. They enabled the company to maintain its round-the-world service via San Francisco and Tokyo and to restore its services to South America which had been terminated after the Comet mishaps (Figure 12.6). Also, the new jets assisted BOAC to link the terminals in Montreal, Toronto, Chicago, Kingston, Bogata, Santiago, Accra, Johannesburg, Aden and Melbourne.[5] Soon after the introduction of these new aircraft, BOAC, like many world airlines, experienced a loss of traffic and revenue. Its accumulated losses of £64 million were underwritten by the government, and BOAC staved-off bankruptcy. Subsequent restructuring led to the suspension of unprofitable services and an improvement in its financial situation. A second, round-the-world service was established by BOAC in 1967 (BA, 1988:93).

The progressive introduction of faster and more productive jets at the expense of propeller-driven aircraft permitted BOAC and other Commonwealth airlines to improve the quantity and quality of their services. In 1962, Air-India became the world's first all-jet line (Ferrara, 1992). Air-Canada's jets monopolized all trans-border routes with the United States until 1967 when CP Air was allowed one trans-border route to augment its transpacific services (which had been in operation since 1948) (Vernyi, 1992). In 1967, QEA changed its name to Qantas Airways, standardized its fleet with Boeings and put in an order for 747Bs which were particularly suited to long-haul operations (Hawkins,

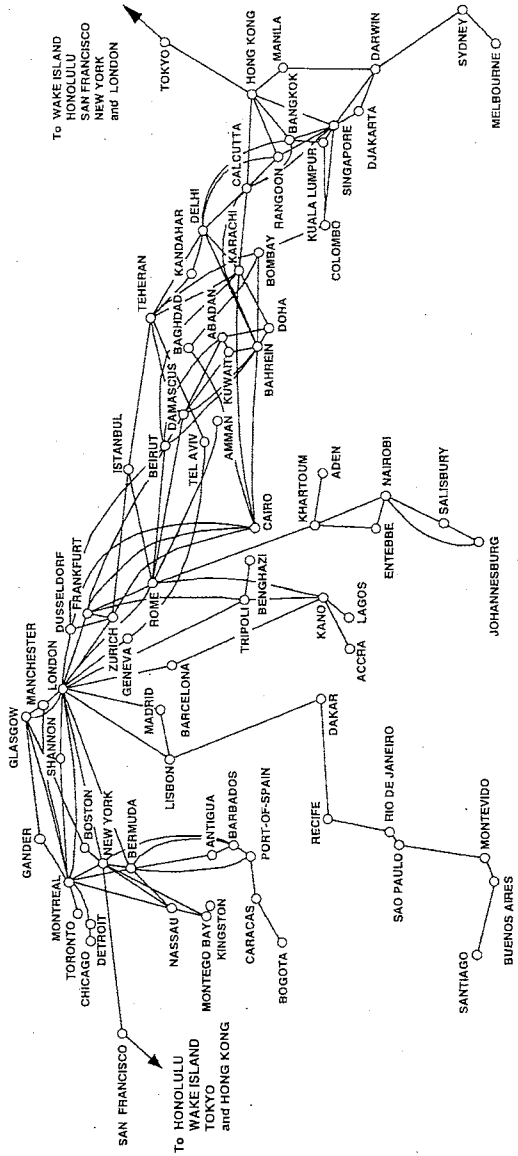


Figure 12.6 BOAC Routes, December 1960

Source: Stroud (1962:326).

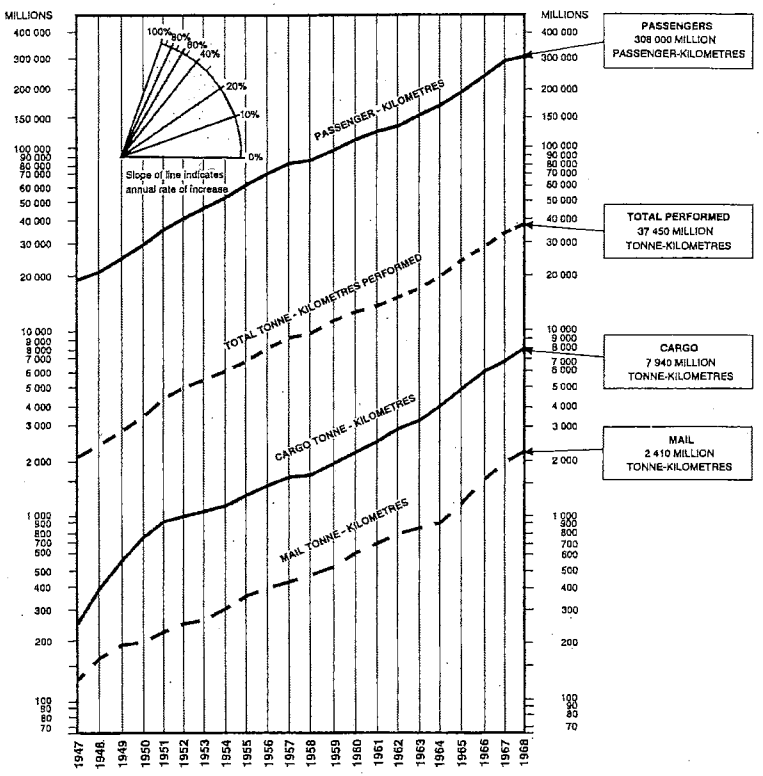
1992). After losing its initial skirmish with the government-based Qantas inter-continental airline, Cathay Pacific resisted the temptation to become a regional carrier and acquired jets to service Canada, Japan and the United States (Bluck, 1967). The British government was dilatory in making improvements at Hong Kong's Kai Tak Airport to accommodate jumbo jets (Polsky, 1968). Extensions, however, were made in the late 1960s at Singapore's Paya Lebar and Ceylon's Katunayake Airport, and a new terminal was introduced at Sydney Airport (*FEER*, 1967).

Thus, the foundation of the Commonwealth Geographical Bureau coincided with the end of the post-war boom in civil aviation (Figure 12.7).[6] Its inception also corresponded with the beginning of an era of mass transport which followed the introduction of jets and the gradual breakdown of government monopolization of the airways.

Through Flights, 1968

An examination of Commonwealth airports in 1968 focused on weekly international *through flights* to Commonwealth destinations (Table 12.6).[7] These statistics were derived from an analysis of ABC Timetables for August 1968. Twenty-seven airports were identified as having 2,430 through flights. They ranged from 375 through flights from London to one flight from Gabarone. Trinidad's Port of Spain (271 flights) ranked second, Singapore third (267 flights), Barbados' Bridgetown fourth (252 flights) and Nairobi fifth (150 flights). Collectively, the "top five" accounted for almost 55 per cent of all flights. These rankings, however, were unhelpful. The figures for Port of Spain and Bridgetown were bloated by short-distance flights to neighbouring Caribbean islands. In turn, Singapore's figures were similarly vitiated due to its proximity to Malaysia, and Nairobi by its links with neighbouring Tanzania and Uganda. Attention was, therefore, concentrated on London — a strategy recognizing the capital's importance to Commonwealth countries. All airports had through flights to London, except Gabarone and Nauru.

Figure 12.7 Development of Revenue Traffic for Scheduled Civil Air Transport Services, 1947-1968



Source: ICAO (1969:19).

Table 12.6 Through Flights from Commonwealth Airports, August 1968

Airport	Flights (per week)	%	Airport	Flights (per week)	%
Accra	36	1.48	Kuala Lumpur	108	4.44
Auckland	52	2.14	Lagos	32	1.32
Bathurst	9	0.37	London	375	15.43
Blantyre	10	0.41	Lusaka	26	1.07
Bridgetown	252	10.37	Malta	36	1.48
Colombo	39	1.60	Mauritius	11	0.45
Dar es Salaam	122	5.02	Nairobi	150	6.17
Delhi	62	2.55	Nauru	4	0.16
Entebbe/Kampala	80	3.29	Nicosia	15	0.62
Freetown	15	0.62	Port of Spain	271	11.15
Gabarone	1	0.04	Singapore	267	10.99
Georgetown	25	1.03	Sydney	130	5.35
Hong Kong	133	5.47	Toronto	88	3.63
Kingston	81	3.33			
			Total	2,430	99.98

Note: Rounding errors in percentages.
Source: Derived from ABC (1968).

London generated 375 flights per week to 40 airports in the Commonwealth during August 1968 (Table 12.7). The largest number of flights was to Malta (34 flights). Delhi and Sydney (both 25 flights) ranked equal second, followed by Nairobi (23 flights), Bombay (22 flights), Montreal and Toronto (both 21 flights) and Hong Kong (20 flights). Although Malta's high ranking was attributable to its short distance from London, these statistics were more revealing of the relative status of Commonwealth airports. Together, the "top five" destinations accounted for over one-third of all flights.

Table 12.7 Through Flights from London to Commonwealth Destinations, August 1968

Airport	Flights (per week)	%	Airport	Flights (per week)	%
Accra	6	1.60	Kano	5	1.33
Antigua	3	0.80	Kingston	8	2.13
Auckland	2	0.53	Kuala Lumpur	7	1.87
Bathurst	1	0.26	Lagos	8	2.13
Blantyre	1	0.26	Lusaka	3	0.80
Bombay	22	5.87	Malta	34	9.07
Bridgetown	5	1.33	Mauritius	1	0.26
Brisbane	3	0.80	Montego Bay	7	1.87
Calcutta	12	3.20	Montreal	21	5.60
Calgary	4	1.07	Nairobi	23	6.13
Colombo	4	1.07	Nassau	12	3.20
Dar es Salaam	5	1.33	Ndola	2	0.53
Darwin	3	0.80	Nicosia	16	4.27
Delhi	25	6.67	Perth	5	1.33
Edmonton	3	0.80	Port of Spain	5	1.33
Entebbe/Kampala	9	2.40	Singapore	16	4.23
Freetown	2	0.53	Sydney	25	6.67
Georgetown	3	0.80	Toronto	21	5.60
Halifax	4	1.07	Vancouver	15	4.00
Hong Kong	20	5.33	Winnipeg	4	1.07
			Total	375	99.94

Note: Rounding errors in percentages.
Source: Derived from ABC (1968).

Regional differences are emphasized when London's statistics are divided into quartiles, and the first two quartiles mapped (Figure 12.8). All regions, except South America, are represented among the first quartile (i.e. more than 16 flights per week) — four airports in Asia, two each in North America and Europe, and one each in Africa and Australasia. North America is augmented by four airports, Africa three, and

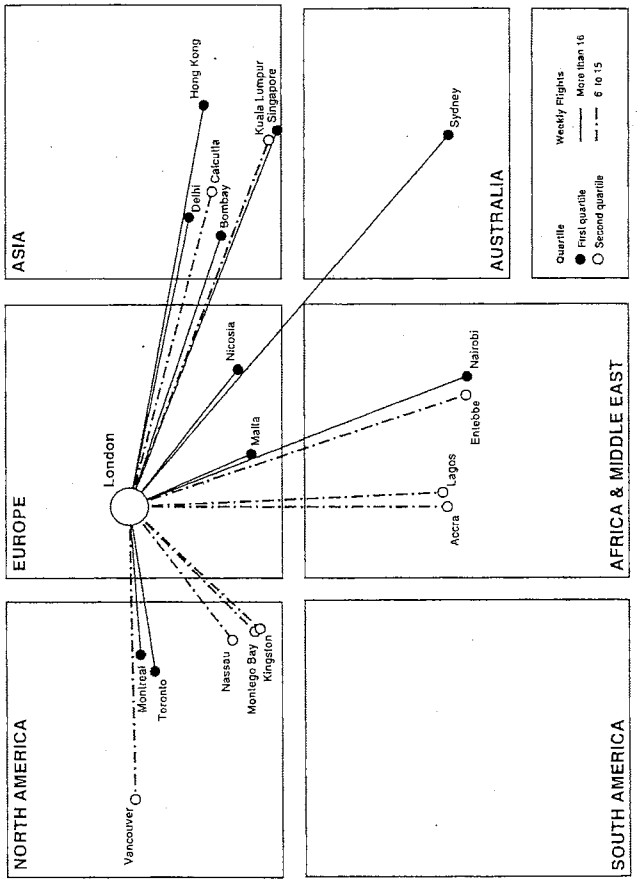


Figure 12.8 London's Through Weekly Flight Connections with the Commonwealth, August 1968

Source: Derived from ABC (1968).

Asia two when the second quartile is mapped (i.e. between six and 15 flights per week). Clearly, when the Commonwealth Geographical Bureau was established in 1968, as expected, London was the pivot of the Commonwealth's air transport system offering a range of through services to dispersed locations. When looking at countries rather than airports, Canada ranked first with a total of 72 through flights, India (59 flights) second and Australia (30 flights) third — not quite half of total flights — a reflection of these being the largest Commonwealth entities.

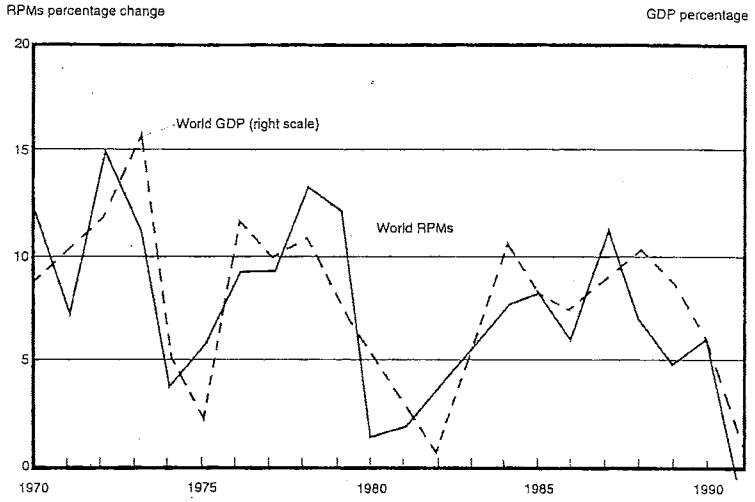
Cyclical Changes, 1969-1993

Trends in air transport since the Commonwealth Geographical Bureau's inception have reflected shifts in world economic growth — a safe and efficient air transport system being perceived by Commonwealth countries as a generator of economic growth and second only in political importance to expenditure on defence. In 1969, BOAC and Qantas were two of four airlines offering round-the-world services (the others being Japan Airlines and Pan American). Three years later BOAC and BEA became part of the British Airways Group which was renamed British Airways in 1974. British Airways was privileged at London Heathrow because it enjoyed access to the airport at lower than market prices (Ashworth and Forsyth, 1984).

A highly irregular series of cycles closely related to shifts in the world economy occurred in world air transport systems over the next 25 years (Figure 12.9). These were characterized by successive upswings which were less positive and downswings which became progressively deeper until the first-ever decline in world air traffic occurred in 1991 — the first year in which air traffic did not grow faster than world Gross Domestic Product (Condom, 1993; Doganis,1993).

The recovery in passenger traffic after the recession of the early 1970s was aided by the introduction of jumbo jets (e.g. 450-seater Boeing 747s costing $20 million each, and 350-seater McDonnell Douglas and Lockheed airbuses). Their prime advantage was a lower-than-average operating cost per kilometre and their much vaunted passenger appeal. These developments in jumbo jets coincided with the opening up of transpacific routes due to the United States' Civil Aviation Board (CAB) approving new routes and corridors as part of an overall global strategy

Figure 12.9 World Revenue Passenger Miles versus World Gross Domestic Product, 1970-1991



Source: Condom (1993:22).

(Doty, 1968). Significantly, the CAB had discarded the concept that all international traffic must flow through traditional seaport gateways. In the jet age traffic was able to move directly from major inland population centres to foreign destinations. On a global scale, this meant the end of restrictive practices designed to maintain Utopian high fares, low frequencies and high-load factors (Hotz, 1968).

All of the major Commonwealth airlines — Air-India, BOAC, Cathay Pacific, Qantas, Singapore Airlines — purchased jumbo jets. To offset competition from charter operators between Europe and the Far East, Qantas embarked on a deliberate policy, in the early 1970s, to fill its jumbos by offering lower fares and rationalizing its route network — both London via Hong Kong and London via the United States were

dropped from its schedules (Hawkins, 1992). By the late 1970s, Qantas had a fleet comprised entirely of jumbo jets (Boeing 747s). Cathay Pacific, however, returned to challenge Qantas on the Hong Kong-Sydney route with its Boeing 707s. Its biggest problem was to break BOAC's monopoly of the "Golden Route" between Hong Kong and London (Vlessing, 1992a). Rival competitors for Britain's Civil Aviation Authority's licence in 1979 were British Caledonian and Laker Airways. British Caledonian was successful, but, on appeal, Cathay gained access enabling it to follow Qantas' lead in purchasing Boeing 747s.

The mass market created for cheap international travel was increasingly being served by charter aircraft at the expense of traditional scheduled carriers — particularly for packaged tours to Europe ex-London. This new market triggered the imagination of entrepreneurs. No doubt the activities of the Commonwealth Geographical Bureau were stimulated by the wide availability of advance purchase fares, if not by the Laker Skytrain and standby fares. The United States abandoned plans for Boeing's Supersonic Transports (SSTs), and the time-slashing Anglo-French Concorde introduced in 1976 had less impact than expected. Although it reduced the seven-hour flying time between London and New York by half, the joint British Airways-Singapore Airlines service did not succeed on the Singapore route and was suspended in 1980 — three years after its introduction. However, it did help transform Singapore Airlines into a household name (Tanner, 1992).

The effect on this process of the *United States Airline Deregulation Act* of 1978 is difficult to determine. (The United States domestic market is not open to foreign entrants and airline stock cannot be purchased by foreigners.)[8] Deregulation coincided with the onset of a world recession and the second oil shock. The United States recorded its first-ever decline in domestic air traffic in 1980. As its domestic market matured, there was more emphasis on liberal access to overseas markets. The deregulatory process in the United States resulted in the *Air Canada Act* of 1978; this ended the national carrier's monopoly and put it on an equal competitive footing with CP Air — a belated bid to stem the drift of Canadian passengers attracted by the lower fares and improved services offered by their American competitors (Vernyi, 1992).

The trend in North America was paralleled by the corporatization and partial privatization of state-owned airlines in Europe as governments sought to lessen investment in their flag carriers. In 1980, Lord

King was appointed by Prime Minister Thatcher to prepare an inefficient British Airways for privatization. This involved scaling down the company, reducing costs by terminating unprofitable services and paring staff from 60,000 to 38,000 in three years (BA, 1988). In 1985, British Airways was made a public company, and two years later 51 per cent was offered for sale. Later, BOAC acquired British Caledonian which had pioneered a different set of routes — the new company having a route structure of 670,000 km (BA, 1988:95). The merger enabled a larger British Airways to compete with mega-American airlines on equal terms and encouraged the deregulation of the European market. The privatization of British Airways created interest among several state-owned Commonwealth airlines including Air Canada, Air New Zealand, Qantas and Singapore Airlines.[9] On occasions, Commonwealth airline managements were in conflict as Qantas was part of a consortium which defeated a British Airways consortium in Air New Zealand's privatization.

Air Canada's privatization was first mooted in 1985 when it required new capital to upgrade its fleet. The policy, however, was not enacted until the *National Transportation Act* of 1987 (Vernyi, 1992). Initially, 45 per cent of the airline's shares were offered for sale in 1988 — employees being given first chance, followed by small shareholders, institutional investors and foreigners. No individual shareholder could own more than 10 per cent, and foreign shareholders were restricted to 25 per cent. Although Air Canada's shares traded profitably, its operating results were less attractive, prompting a restructuring of operations and a reduction in staff.

In 1987, the Australian government proposed the privatization of Qantas because it needed capital injections to fund its purchase of Boeing 747-400s.[10] (These jets were capable of flying non-stop between London and Sydney — a distance of 17,850 km.) Further losses in 1990 led to the Australian government agreeing to the privatization of 49 per cent of Qantas. In 1992, the government opted for a trade sale of 49 per cent with a later float of 51 per cent on the stock exchange. The Australian government retained a "golden share," and foreign interests were restricted to 35 per cent (Hawkins, 1992). As part of its plan to become a global mega-carrier, British Airways purchased 25 per cent of Qantas to revive its historical relationship.

Privatization was not a universal phenomenon among Commonwealth carriers as many located in the Third World still pursued non-commercial objectives — tourism development, employment creation, foreign currency earnings — to say nothing of national prestige (Doganis, 1993). Air-India, for example, kept a number of routes open for such purposes which a commercial airline would have closed. Not surprisingly, Air-India incurred net losses on three occasions between 1976 and 1985. As it depended on the patronage of local citizens, "ethnic discounting" was the norm. Reportedly, flights to New York were full but they ran at a heavy loss for a number of years because they attracted few business class passengers. As loads rarely exceeded 55 per cent on Air-India's Canadian flights, losses were even greater on this route. In 1987-1988, Air-India lost $23 million (Ferrara, 1992). Only at that stage were overstaffing, high gasoline taxes, union limitations on flying hours, an ageing fleet and bureaucratic interference addressed. The government reduced the gasoline tax to mitigate the necessity of refuelling outside India and persuaded the pilots to fly for longer hours to reduce the number of profit-sapping intermediate stops.

Recovery from the early 1980s recession had occurred by the mid-1980s, and the subsequent period of traffic growth was marked by the Japanese ascendancy in world economic growth. Increasingly, the Commonwealth was becoming an irrelevant focus for considering air transport. The Commonwealth Air Transport Council could be contacted in Britain's Transport Ministry, but it was in limbo (Adamson, 1989:124). Unlike the Commonwealth Telecommunications Organization, it had not adapted to changed circumstances. In September 1987, a special committee was established in Ottawa to gauge whether the Council had outlived its usefulness as its functions overlapped with the International Civil Aviation Organization. Meanwhile, Commonwealth carriers based in the Asia-Pacific region — notably Cathay Pacific, Malaysian Airlines System and Singapore Airlines — matched the rapid pace of market development by their counterparts in Korea, Taiwan and Thailand. In 1987, the Swire Group reduced its share in Cathay Pacific to permit China International Trade and Investment Corporation (CITIC) to take a 12.5 per cent interest in the airline ahead of Hong Kong's reversion to China.

These relatively low-cost Commonwealth airlines achieved profit margins in excess of the industry average. Their performance led to the

Asia-Pacific region being identified as the key territory for future growth (which was expected to be between 5 per cent and 9 per cent per year). The upper limits of growth were already reflected in congested gateway airports. Consequently, decisions were made to expand Singapore's Changi Airport and to build Hong Kong's $13 billion Chek Lap Kok Airport. A new airport was envisaged for Kuala Lumpur and Sydney, needed for their increased aircraft parking capacity.

Some sections of the airline industry had not enjoyed healthy profit margins in the late 1980s. Invariably, unit costs (operating cost per available kilometre) increased faster than yields (measured in revenue per passenger-kilometre). Many North American airlines (including Air Canada) and European airlines recorded massive losses during the recession and the Gulf War in 1991 (the highest loss since international flights began in 1919). As state-owned carriers were protected in regulated markets, it was only in a free market environment that losers were driven out of business or into mergers. Cost-cutting became the norm.

British Airways was an exception. Having developed into a mega-carrier, it enjoyed higher revenues and increased traffic. In particular, the recovery of the higher-yield Concorde was the key to British Airways' impressive earnings performance. Dividends from its 44 per cent share in USAir (21.8 per cent of its voting stock) and its 25 per cent in Qantas were other prime contributors to its profits (Shifrin, 1994; Debbage, 1994). In turn, Singapore Airlines, Cathay Pacific and a rejuvenated Air-India have featured among a group of low cost, highly efficient, internationally scheduled carriers based in Asia-Pacific countries. They have managed to avoid heavy cost-cutting, and enjoy growth rates above the world average assisted by a strong cargo element in their activities.[11]

Four major Commonwealth airlines ranked among the world's "top 15" international carriers in 1992 (Table 12.8). They included British Airways (ranked 1), Singapore Airlines (7), Qantas (10) and Cathay Pacific (12) — the non-Commonwealth component comprised four United States carriers, three Asian carriers and four European carriers. Although no major technological developments were scheduled for 1994, both British Airways and Singapore Airlines were interested in introducing 600-800 seats super jumbos for their routes between London, Hong Kong and Sydney; Qantas is also considering a similar acquisition.

Table 12.8 "Top 15" International Carriers, 1992

Rank	Airlines	Revenue/passenger-km (million)
1.	British Airways [1]	67,870
2.	United Airlines [2]	54,560
3.	Lufthansa Airlines [4]	43,895
4.	Northwest Airlines [5]	42,808
5.	American Airlines [7]	42,599
6.	Japan Airlines [3]	41,918
7.	Singapore Airlines [6]	37,105
8.	Delta Airlines [12]	33,111
9.	KLM Airlines [8]	31,054
10.	Qantas Airlines [10]	30,083
11.	Air France [9]	29,746
12.	Cathay Pacific [11]	24,994
13.	Alitalia [16]	21,560
14.	Korean Air [15]	18,634
15.	Thai International [14]	18,616

Note: Figure in parentheses refers to 1991 ranking.
Source: *IATA World Trade Statistics — 1992* cited by Mecham (1993).

Non-stop Flights, 1994

The study of Commonwealth airports in 1994 has been based on weekly international *non-stop flights* to Commonwealth destinations. These flights were derived from an analysis of timetables for August 1994 (ABC, 1994).[12] Attention was restricted to the leading airport in each country. Even then, 3,988 non-stop flights were identified (Table 12.9). This initial analysis highlighted that London had lost its first-ranking position to Singapore (608 flights). London ranked second (401 flights) followed by Antigua (288 flights), Kuala Lumpur (249 flights), Hong Kong (215 flights), Port of Spain (170 flights) and Barbados (166 flights). Collectively, the "top five" accounted for almost 46 per cent of the total. As in 1968, these figures — except for London and Hong Kong — are bloated by short-distance flights. Nevertheless, they suggest London should be displaced as the centre of the Commonwealth.

Table 12.9 Non-stop Weekly Flights from the Leading Airport in Each Commonwealth Country, August 1994

Airport	Flights	%	Airport	Flights	%
Antigua	288	7.22	Mauritius	26	0.65
Australia (Sydney)	143	3.58	Namibia (Windhoek)	24	0.60
Bahamas (Nassau)	8	0.20	Nauru	5	0.13
Bangladesh (Dhaka)	21	0.55	New Zealand (Auckland)	137	3.44
Barbados	166	4.16	Nigeria (Lagos)	24	0.60
Barbuda	14	0.35	Pakistan (Karachi)	24	0.60
Belize	10	0.25	Papua New Guinea (Port Moresby)	22	0.55
Botswana (Gabarone)	33	0.83	Samoa (Apia)	3	0.08
Britain (London)	401	10.06	St. Kitts	65	1.63
Brunei	71	1.78	St. Lucia	139	3.48
Canada (Toronto)	118	2.95	St. Vincent	113	2.83
Cyprus (Larnaca)	45	1.11	Seychelles (Mahe Island)	9	0.23
Dominica	49	1.22	Sierra Leone (Freetown)	8	0.20
The Gambia (Banjul)	7	0.18	Singapore	608	15.24
Ghana (Accra)	25	0.63	Solomon Islands (Honiara)	15	0.38
Grenada	76	1.96	South Africa (Johannesburg)	150	3.76
Guyana (Georgetown)	37	0.93	Sri Lanka (Colombo)	61	1.53
Hong Kong	215	5.39	Swaziland (Manzini)	18	0.45
India (Delhi)	74	1.86	Tanzania (Dar es Salaam)	11	0.28
Jamaica (Kingston)	34	0.85	Tongatapu	13	0.33
Kenya (Nairobi)	54	1.35	Trinidad/Tobago (Port of Spain)	170	4.26
Kiribati	4	0.10	Tuvulu (Funafuti)	1	0.03
Lesotho	20	0.50	Uganda (Entebbe/ Kampala)	19	0.48
Malawi (Blantyre)	3	0.08	Vanuatu (Port Vila)	12	0.30
Malaysia (Kuala Lumpur)	249	6.24	Zambia (Lusaka)	24	0.60
Maldives (Male)	29	0.73	Zimbabwe (Harare)	56	1.40
Malta	37	0.93			
			Total	3,988	100.05

Note: Rounding errors in percentages.
Source: Derived from ABC (1994).

This notion of a new centre is dispelled, however, by an examination of the first quartile of flights to Commonwealth destinations from potential challengers — Delhi, Hong Kong, Johannesburg, Lagos, Singapore, Sydney, Toronto and Vancouver (Figure 12.10). In Australasia, Sydney's connections are confined to New Zealand. Within Asia, Delhi's links are stronger but still limited. Indeed, Singapore has the best developed network, but its activities are concentrated in Asia and Australasia with the exception of its London route. Hong Kong has fewer bonds but they join Asia, London and North America. Within North America, Vancouver is linked to both Hong Kong and London, and Toronto has strong ties with London, Manchester and the Caribbean. Apart from strong local attachments, both African airports only have links to London. As flights to London still dominate the schedules of all major airports except Sydney, it is still the most accessible place in the Commonwealth.

During August 1994, 401 non-stop flights per week left London to 39 Commonwealth airports (Table 12.10). Toronto was the prime destination (72 flights). Larnaca (35 flights) ranked second followed by Hong Kong (31 flights), Malta (29 flights), Delhi (27 flights), Singapore (26 flights), Vancouver (24 flights), Montreal (20 flights), Calgary (15 flights) and Bombay (12 flights). No other destination had more than 10 flights per week. Together, the "top five" accounted for over 48 per cent of all flights. Although the data for 1994 are not strictly comparable with 1968, they suggest there has been a marked strengthening of London's connections with Canada which accounted for almost 38 per cent of all non-stop flights. Also, there was a slight weakening in London's Indian connections with Calcutta — no longer a major destination.

When London's non-stop weekly flights in 1994 are divided into quartiles and the first two are mapped, marked regional differences emerge (Figure 12.11). All regions except Australasia are represented among the first two quartiles (i.e. more than five non-stop flights per week). The first quartile, however, is restricted to four destinations each in North America and Asia, and two in Europe (i.e. more than 12 non-stop flights per week). Destinations in Africa (three airports) and South America (two airports) only feature in the second quartile which also includes two destinations in North America, one in Europe and one in Asia (i.e. between five and 11 non-stop flights per week). These changes raise the question of how this pattern will be affected by the

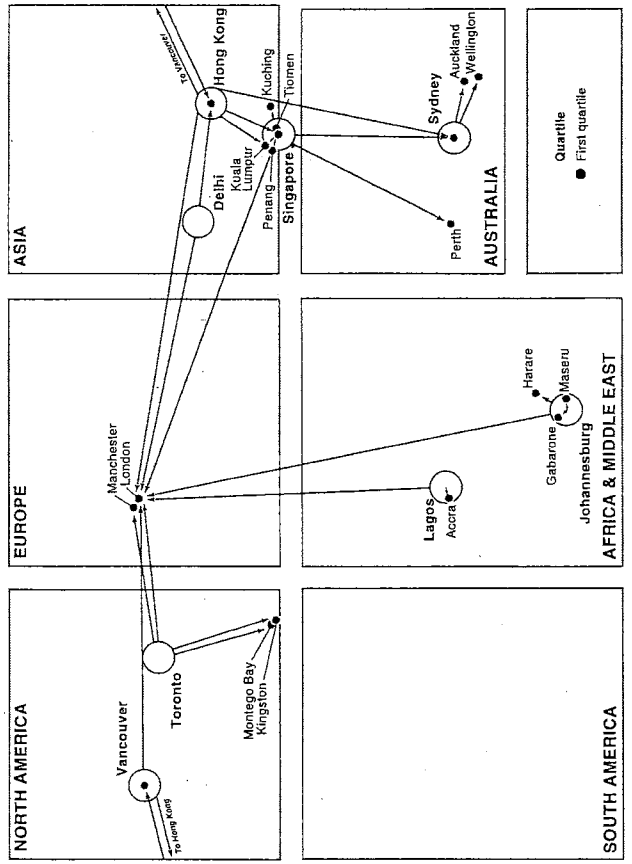


Figure 12.10 The Main Weekly Non-stop Flight Connections from Delhi, Hong Kong, Lagos, Johannesburg, Singapore, Sydney, Toronto and Vancouver to Other Commonwealth Destinations, August 1994

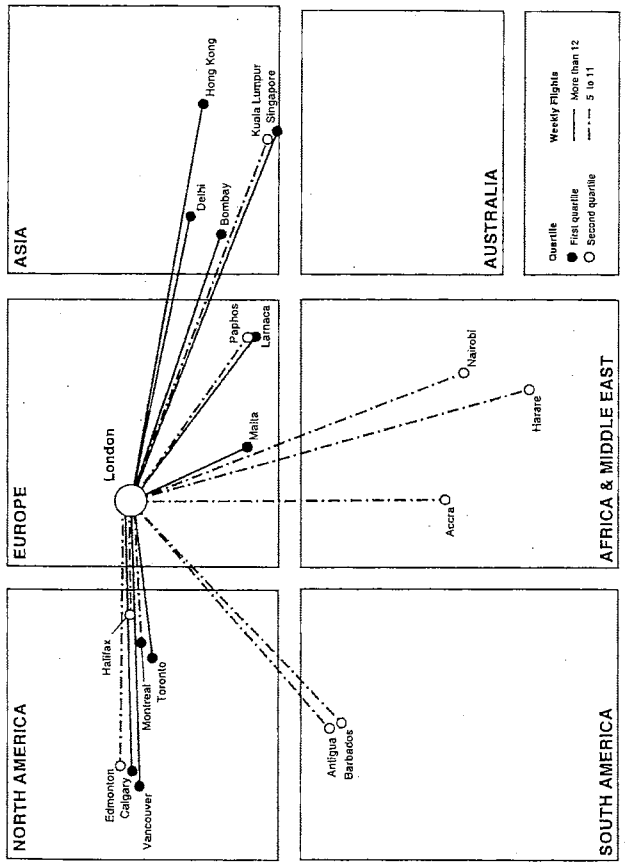
Source: Derived from ABC (1994).

Table 12.10 Non-stop Weekly Flights from London to Commonwealth Destinations, August 1994

Airport	Flights	%	Airport	Flights	%
Abuja	1	0.25	Larnaca	35	8.73
Accra	5	1.25	Lusaka	3	0.75
Antigua	6	1.50	Mahe Island	2	0.50
Banjul	2	0.50	Malta	29	7.23
Bombay	12	3.00	Mauritius	2	0.50
Bridgetown	6	1.50	Mombasa	1	0.25
Calgary	15	3.74	Montego Bay	3	0.75
Cape Town	4	1.00	Montreal	20	4.99
Delhi	27	6.73	Nairobi	10	2.49
Dhaka	1	0.25	Ottawa	2	0.50
Edmonton	10	2.49	Paphos Cyprus	9	2.24
Entebbe/Kampala	2	0.50	Port Harcourt	1	0.25
Halifax	5	1.25	St. Lucia	2	0.50
Harare	6	1.50	Singapore	26	6.48
Hong Kong	31	7.73	Toronto	72	17.95
Islamabad	2	0.50	Vancouver	24	5.98
Kano	4	1.00	Victoria	2	0.50
Karachi	2	0.50	Windhoek	1	0.24
Kuala Lumpur	10	2.49	Winnipeg	2	0.50
Lagos	4	1.00			
			Total	401	100.01

Note: Rounding errors in percentages.
Source: Derived from ABC (1994).

Figure 12.11 London's Major Direct Weekly Non-stop Flight Connections with the Commonwealth, August 1994



Source: Derived from ABC (1994).

further growth of mega-airlines, such as British Airways, and the creation of hub and spoke networks on a global scale.

Conclusions

Looking ahead, those attending future Commonwealth Geographical Bureau meetings will experience problems caused by the congestion of airport facilities and air space. As we have seen, traffic is concentrated on gateway airports (e.g. London Heathrow), and secondary airports (e.g. Manchester) are underused. Substantial investment is required to relieve airport congestion and to provide adequate access and egress. Alleviation of infrastructural bottlenecks is also handicapped by environmental concerns (particularly about air pollution, excessive use of land for airports and aircraft engine emissions). Additional investment in air traffic control is warranted — particularly on trunk routes linking the Asia-Pacific region, Europe and North America. These activities offer scope for standardizing traffic control over a range of countries and the introduction of autonomous authorities to manage airports.

Major restructuring is occurring within Commonwealth airlines, and international strategic alliances are being sought to compensate for losses. Although some liberalization has taken place, continuing bilateral agreements and national restraints on foreign ownership of airlines (e.g. revenue sharing and market sharing agreements) distort international competition and prevent network economies. This is exemplified by British Airways being restricted by the United States government from acquiring a controlling interest in USAir. More consideration will have to be given to the interests of travellers if government disengagement from the air transport industry is to be achieved and the special privileges enjoyed by government airlines ended. Further liberalization is likely with the blurring of the distinction between overseas and domestic services and the creation of hub and spoke networks.

Hub and spoke arrangements permit carriers to combine passengers on flights bound for or departing the hub. In the United States, this network configuration has enabled airlines to use *more* economical aircraft and to compete *more* effectively by offering *more* frequent flights to *more* destinations. Cargo reservation systems, frequent flyer programmes, and the hub and spoke system have raised barriers to new

entrants. The outcome of a liberalized market in the United States will lead to the emergence of three or four mega-carriers. The issue facing members of the Commonwealth is whether the hub and spoke system will be extended on a global scale.

Hubbing is likely to occur in the fastest growing market — intercontinental travel — because the stopover at a hub is a small proportion of total travelling time. Hub development, however, is predicated upon the restructuring of the international airline industry producing relatively few global carriers (Michalski, Andrieu and Stevens, 1993).[13] Inevitably, this process will accelerate privatization, lead to the formation of transnational corporations and raise concerns about the contestability of international airline markets. The process of international hub and spoke configuration will probably be prolonged because the continued existence of bilateral agreements, cabotage rights, restrictions on multinational ownership and a myriad of differences in ownership, taxes, and subsidies, between nations is likely to prevent carriers realizing network economies.

These hub-spoke developments can be expected to affect the airline industry's financial viability. Although benefits will be derived from technology-related efficiency, these will be offset by the estimated need for 12,000 aircraft acquisitions over the next 20 years. In all probability, weaker airlines will be eliminated in this process which favours the further development of mega-carriers. Asian carriers are in a good position to meet these requirements, together with those that have survived the deregulation process in the United States.

Epilogue

British historical geography has the disturbing habit of ending in 1914 (Pawson, 1990). Admittedly, these truncated studies do give some credit to the importance of transport and communications (Thrift, 1990). Moves to discuss geography and Empire, however, have all but abandoned studies of transport and communications for textual discourse (Godlewska and Smith, 1994). This study shows that not only was there life after 1914 but that air transport has been inextricably part of the ensuing history of the Commonwealth. Between 1968 and 1994, air

transport has been a crucial component in the activities of the Commonwealth Geographical Bureau.

Mobility is not only a key attribute of the Commonwealth geographer, but the cornerstone of the "new regional geography" (Thrift, 1993). Although there has been an outpouring of work on travellers, geographers — Commonwealth or otherwise — have been omitted from the extensive list. Yet, geographers have been spectral tenants of airports and aircraft for hours if not years.

ACKNOWLEDGEMENTS

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NOTES

1. IT involves both international computer networks, such as electronic data interchange, and modern personal communications, such as electronic mail and video-conferencing.
2. Other passengers flew from Paris to Basel where they boarded a train to Genoa. From there they took a flying boat to Alexandria and flew in stages to Karachi. Thus, the three-week passage to India by sea was reduced to one week by air (BA, 1988:92).
3. In 1946, BOAC's South American routes were assigned to British South American Airways (BSAA). Equipment failures at BSAA led to the company being absorbed into BOAC in 1949 (BA, 1988:93).
4. In 1948, Cathay Pacific boasted a ticket office in the Peninsula Hotel and Portuguese air hostesses from Macau and Hong Kong.
5. BOAC was allowed to buy American jets, but its sister BEA was instructed to "Buy British" (i.e. B-111s and the Trident rather than Boeing 727s and 737s). These were used by BEA in developing its holiday packages to European venues.
6. Between 1955 and 1969, the average growth in tonne-kilometres performed by the world's scheduled airlines averaged 14 per cent (Doganis, 1991:8).
7. In 1968, ICAO's Contracting States' airlines carried 263 million passengers, for a total of 308,000 million passenger-kilometres (ICAO, 1969).
8. According to Doganis (1993:70), foreign airlines would need to compete in domestic markets (e.g. British airlines operating in US sectors) to achieve both consumer and welfare gains.

9. Singapore Airlines is 54 per cent owned by the Singapore government. Both Delta and Swiss Air have minor holdings.
10. In 1989, Qantas' reputation was damaged by the disclosure that it had reached a secret financial agreement with Brierley Investments Ltd, American Airlines and Japan Airlines to prevent control of Air New Zealand passing to British Airways.
11. Cathay Pacific and Singapore Airlines have joined with Malaysian Airlines to fend off competition from the United States and European mega-carriers by introducing a combined frequent flyer programme called "Passages."
12. No other figures are available for 1994. Worldwide, however, in 1990 there were 300 airlines employing more than three million people and serving 14,000 airports with a total fleet of about 15,000 aircraft. Passengers on scheduled and charter flights exceeded 1.25 billion.
13. Strategies include code sharing, consolidation, expansion, merger and strategic alliances.

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CHAPTER THIRTEEN

Ethnicity and the New Economic Policy in Malaysia: A Penang Case Study

Jill Eyre
Denis Dwyer

It has been estimated that, in 1991, 25 of the 37 major armed conflicts in the world were internal conflicts and that most of the internal conflicts could plausibly be described as ethnic conflicts (Eriksen, 1993:2-3). The British Commonwealth has by no means been immune from this contemporary trend towards ethnic division and conflict. In what is now Malaysia, however, the experience of dealing with ethnic tensions, and on occasion violence, has been much longer, for colonial development in Malaya was heavily dependent upon the labour of Chinese and Indian immigrants. This left a very difficult legacy in the form of a deeply entrenched plural society.

The spatial pattern of colonial development consisted of the formation of immigrant-dominated enclaves devoted to the production of primary products for export. There were two principal products, each associated with a different immigrant group. During the second half of the nineteenth century, the production of tin increased rapidly. Then came the "rubber boom" of the first decade of the twentieth century, during which rubber plantations multiplied, following lines of road and rail communications originally established for the tin mining industry and, thus, forming the classic tin-rubber belt of Peninsular Malaya. At least until the onset of the Great Depression, a major concern both of the colonial authorities and entrepreneurs in general in Malaya was persistent labour shortage. The native Malay population was reluctant to accept wage employment, and the solution thus became the large-scale

import of Chinese for the tin mining industry, which was developed on the basis of both Chinese and European entrepreneurship, and of Indians for the rubber plantations, which were largely owned by European companies. Chinese immigration was always much larger than Indian, and between 1895 and 1927 some six million Chinese arrived in Singapore from poverty-stricken areas in south China (Mehmet, 1978:105). In time, the Chinese were represented heavily not only in the tin industry but also as entrepreneurs and workers in business and commerce in the developing towns. The Malays, in contrast, remained largely rural and traditional, whilst the Indians were characteristically associated with low-level plantation work in the rubber industry.

Malaya became independent in 1957, by which time the Malays were barely in a majority within their own country.[1] In part to forestall the growth of communist influence among Singapore's Chinese population, a merger with Singapore was under active discussion by the early 1960s. To offset the inclusion of a million Chinese of Singapore in the new state, the Borneo territories of Sabah and Sarawak, which had largely indigenous populations, were included in the ethnic equation and, thus, in the formation of the new Federation of Malaysia in 1963. However, Singapore left the Federation in August 1965 after public calls by Lee Kuan Yew, its Prime Minister, for a "Malaysian Malaysia" rather than a Malay Malaysia had produced an unstable internal situation.

Before independence, the increasing marginalization of the Malays, especially *vis-à-vis* the more economically successful Chinese, had become recognized by the British colonial authorities, and some limited steps had been taken to try to correct the balance. These included the education of a Malay elite for administrative positions and the reservation of positions in government, the army, the police and other official administrative services for them. The number of such persons was always very small, of course, and the senior administrative posts continued to be occupied by expatriates. Another such policy involved the reservation of areas for Malays, where only they were entitled to land ownership. The idea of the special needs of the Malays was extended into the Constitution of 1957, which was essentially an exercise in ethnic balancing. The Constitution made Islam, the religion of the Malays, the religion of the new state. It also made Malay the official language and confirmed the position of the sultans, the traditional rulers of the Malays. In the drawing of electoral boundaries, greater weight was assigned to the rural, predominantly Malay, areas. The Malays were to be politically dominant, and the political leaders of the Chinese and the Indians accepted this, for in return the immigrant races were granted citizenship and freedom to follow their own cultures and religions.[2] Politics have since been dominated by the United Malays National Organisation (UMNO), which has formed an unbroken Alliance (later Barisan Nasional) government, with the principal parties representing the Chinese and the Indian communities as very much subsidiary partners. Although there are also smaller political parties both inside and outside the government, there has never been a significant political threat to the Alliance government as the ruling group. Class-based parties have failed to make an impact, and politics in Malaysia have remained polarized along ethnic lines.

The New Economic Policy

In common with that of many of the newly independent countries of the time, development policy in Malaya/Malaysia from an early stage was concerned with the diversification of the economy and the encouragement of industrialization. The initial strategy for industrialization was based upon import substitution behind high tariff barriers and the provision of tax incentives for new industries under the Pioneer Industries Ordinance of 1958 and the Investment Incentives Act of 1968. In the rural sector, special emphasis was placed upon the scientific improvement of export crop production and also upon large-scale land colonization schemes. The latter helped relieve rural poverty in overcrowded, essentially Malay, areas. However, in terms of the numbers affected, even relatively large-scale land colonization schemes could make only a very limited impact upon rural poverty, whilst the other major national planning initiatives had little relevance to all but a very small minority of the Malays. As Mazaffar has put it, the error of UMNO from the achievement of independence to 1969 was that it "saw itself as the protector of a community that lacked capital whilst encouraging the growth of an economy based on capital" (Mazaffar, 1979:82).

Overall, a significant result of the development policies of the 1960s was disappointingly little change in the economic profiles of the major ethnic groups within the country, even though in macro-growth terms

the national record was creditable. Unemployment increased generally, and income distribution deteriorated, with the bottom 40 per cent achieving only a 5 per cent share of the total income increase between 1957 and 1970 (Snodgrass, 1980:80). Malay farmers predominated in this lowest group, although also within it were the urban poor, dominated by immigrant groups. It was this general economic context that provided an important basis for the relative success of opposition parties during the general election of 1969.

An additional factor in the 1969 election was that more former immigrants than before were eligible to vote since one of the requirements for citizenship was ten years' residence in Malaya/Malaysia. There was no doubt from the outset that the Alliance government would retain its majority, but this fact did not prevent an increasingly bitter, and often ethnic, tone entering the national debate, particularly in respect of exchanges between the Alliance and the Democratic Action Party (DAP), the main Chinese opposition party. The result of the May election was that the DAP and another Chinese opposition party succeeded in capturing much support at the expense of the Malaysian Chinese Association (MCA), the Chinese component of the Alliance government, whilst UMNO lost seats to the religiously-based Pan Malayan Islamic Party. As Slimming has written, "Malaysia was closer than it had ever been to having an effective democratic government during the two days which followed the election. An articulate Opposition had emerged through a totally democratic process but the result shocked the Malays who felt that the whole political system had been severely jolted and that their own position was in danger. The Malays fear of Chinese domination increased sharply as the election results were announced" (Slimming, 1969:18). The result was three days of ethnic rioting in Kuala Lumpur with 196 killed (mainly Chinese), the declaration of a national state of emergency and the suspension of parliamentary government between May 1969 and February 1971.

Given that large proportions of Malays as well as Chinese and Indians had clearly voted against the government in the election, the riots had major political and economic consequences in the longer term. They effectively undermined the credibility of the "old guard" within UMNO — those who had largely been responsible for bringing the country to independence — and particularly the national leader Tunku Abdul Rahman. As a result, he lost the leadership almost immediately to

a group of Young Turks among the Malay politicians who wished to pursue much more interventionist and ethnically-assertive policies, a trend which culminated in the appointment to office of the present Prime Minister, Dr Mohamad Mahathir, in 1981, after an earlier career which had included his expulsion from UMNO at the behest of Tunku Abdul Rahman for what were considered extremist views, and the banning of his controversial book *The Malay Dilemma* (Mahathir, 1970). Within the context of a changed political leadership, the riots also prompted a fundamental reappraisal of the goals of the national development policy. Although there had been steady improvement in the nation's economic prospects since 1957, the overall course of development planning was now officially perceived as not to have been sufficiently beneficial to the Malays. There had, it was claimed, been little or no direct attention paid to the problems of rural poverty, which were very largely Malay problems, while in the urban sector not many positive results were apparent to Malays, the thrust of policy serving, according to Mahathir (1970:42), only to open up for Chinese businessmen "more and better opportunities for the acquisition of unlimited wealth."

Government policies to assist Malays were, therefore, changed dramatically through the introduction of what was called the New Economic Policy (NEP). As a coherent policy, this was promulgated first in a policy statement dated 18 March 1970 and issued by the (new) Department of National Unity to all government departments and agencies. This statement formed the basic guideline for the Second Malaysia Plan 1971-1975, which detailed the policy objectives, whilst the Mid-Term Review of that Plan, published in 1973, extended the framework into a twenty-year plan from 1970 to 1990 known officially as the Outline Perspective Plan (see Faaland et al., 1990). As Milne (1976:239) has observed,

> The New Economic Policy was in effect a restatement of the "bargain" between the races, placing emphasis on the underplayed nature of Malay economic advance. In the 1960s some younger radical Chinese were unhappy with the bargain and wanted it reversed so as to help the Chinese politically and culturally; in the 1970s restatement ironically took the form of the NEP, which disturbed those Chinese, mainly businessmen, who had been quite happy with the initial implementation of the bargain. The implications were considerable.

> Political power now rested so obviously on a Malay base that UMNO was compelled to produce an economic policy which would satisfy Malay aspirations. If it failed to do so, no plausible excuses were available.

Although national unity was repeatedly stressed as the overall objective in official pronouncements about the NEP, as was the expectation that gains for the Malays would come only from a steadily increasing national income and not from the extraction of wealth from other groups, in reality considerable emphasis has been given to the problems of the Malays in terms of reaching the two main goals of the NEP over the 1970-1990 period. The two main goals have been "... to reduce and eventually eradicate poverty, by raising income levels and increasing employment for all Malaysians irrespective of race; [and] ... accelerating the process of restructuring Malaysian society to correct imbalances so as to reduce and eventually eliminate the identification of race with economic function" (Government of Malaysia, 1971:1). Within these overall goals, however, the March 1970 policy statement of the Department of National Unity stated specifically that whilst during the 1960s spectacular growth rates of 20 per cent and more had been registered in the production of such commodities as palm oil and kernels, timber, poultry and eggs, pigs and pepper, Malay participation had been small or negligible; and, that it would, therefore, be a central feature of the NEP to accelerate the movement of Malay agricultural producers from low-productivity activities, largely concerning rice growing, into the fast-growing capital-intensive and high productivity areas of the agricultural sector (all details of the policy document from Faaland et al., 1990:305-318).

Similarly, it was observed that in manufacturing, out of a total of over 400 companies approved for pioneer status by March 1970, less than half a dozen were owned by Malay interests. Incentives to industry would, therefore, be made by priority to Malay interests, even though, to quote the policy statement: "This will mean in some cases better proposals by non-Malay interests will have to be rejected in order that new Malay entrepreneurs be given a chance." There were also to be special Malay preferences to ensure the development of new industries would be better balanced, while all national agencies providing assistance to manufacturing enterprises would be expected to "deliberately

practise clear preference for projects initiated by Malay interests." In addition, manufacturing enterprises would be required "to provide training programmes for Malays for absorption into skilled employment in the firms," and to accept that their employment structure must reflect the multi-racial composition of the population "from top to bottom." Numerically, the restructuring goals initiated in the Second Malaysia Plan and confirmed as the programme for 1970-1990 under the Outline Perspective Plan became that employment by sector should reflect the ethnic composition of the population, which in 1970 was Bumiputera 54 per cent, Chinese 35 per cent, Indians 10 per cent and "others" 1 per cent; and that by 1990 the Bumiputera group should own and manage at least 30 per cent of the total commercial and industrial activities at all scales of operation. Whilst figures for small scale operations are not available, in 1970 Malay corporate equity ownership was only 2.4 per cent, compared with a foreign ownership level of 63.3 per cent and that of "other Malaysians" (largely Chinese) of 32.2 per cent (Government of Malaysia, 1991:49). In the modern urban sector, Malay employment stood at 27 per cent of the total in 1967 (Faaland et al., 1990:41).

Evaluating the New Economic Policy

In the review of the NEP 1970-1990 published as part of the *Second Outline Perspective Plan, 1991-2000* (Government of Malaysia, 1991:46-48), it is officially stated that the incidence of poverty in Peninsular Malaysia declined from 49.3 per cent of the population in 1970 to 15 per cent in 1990 as against the target for 1990 of 16.7 per cent. In manufacturing, Bumiputera accounted for 49.1 per cent of total employment in 1990 as against 28.9 per cent in 1970 and their overall share of the population of the peninsula in 1990 which was 58.3 per cent. Bumiputera ownership of share capital increased from 2.4 per cent in 1970 to 20.3 per cent in 1990 compared with a 1990 target of 30 per cent. The share of foreign equity ownership decreased to 25.1 per cent in 1990 from 63.3 per cent in 1970, whilst non-Bumiputera Malaysians increased their corporate ownership from 32.3 per cent to 46.2 per cent, the Chinese share being 44.9 per cent.

On the face of it, and even though the original employment and corporate restructuring goals for the Malays were not reached during

the 1970-1990 period, these are large-scale changes pointing towards greater equity in economy and society. However, they have generated considerable controversy both within Malaysia and internationally, and a critique of the NEP has been mounted from many directions.

In the first instance, a great deal of doubt has been cast upon the claimed achievement in respect of poverty eradication, with Jomo (1983:72) going as far as to suggest that it might even be a case of "poverty eradication by statistical manipulation." The vagueness of the poverty criteria published by the government has been widely criticized, especially the virtually complete lack of information on the income level used as the poverty line. Additionally, the need for separate monetary levels to define rural and urban poverty has apparently never been officially acknowledged. Jomo (1990:6) has also criticized the inefficiency of the poverty eradication programme, pointing out that the government itself has admitted that only 40 per cent of the funds allocated has actually reached the target groups, the balance going to administration and infrastructure costs. He has also demonstrated that many beneficiaries from the programme were not necessarily poor. Finally, Jomo observes (1990:7) the obvious reduction in poverty in the country generally over the period may be at least as much due to economic growth and increased productivity as to specific programmes.

As far as restructuring is concerned, there has been very little in the way of multi-stream restructuring — a positive commitment to increasing substantially the Chinese participation in the Malay-dominated government services, for example — and in the view of many critics attention has been focused to an undue degree upon positive discrimination to advance the Malay position in the modern sector of the economy. Education is the largest single item in government expenditure, with about half the education budget being spent on tertiary education, but whilst the Bumiputera population in Malaysian universities has been pushed up to 67 per cent, over 70 per cent of what has become a substantial stream of students going abroad are non-Bumiputera (Wangel, 1991:10). There is no doubt that a sizeable proportion of inferior Bumiputera students have been admitted to Malaysian universities at the expense of Chinese and Indian students, particularly in professional courses, and, as a result, "the quality and performance of educated Bumiputera manpower leaves much to be desired" (Salih and Zainal, 1989:44). Educationally, over the period, it appears that mediocrity has become institutionalized, and at great expense in terms both of the transfers of foreign exchange required to finance the overseas students and their greater propensity to remain overseas thereafter.

As Jomo (1990:9) points out, in many ways the dominant concern of the NEP has been the 30 per cent corporate equity target for the Malays. The participation of individuals in such equity transfer has not been extensive, however, and various official organizations have had to be established to hold shares in trust for the Malays until such time as they can be bought individually, whilst Malay-dominated public enterprises have also entered substantially into commerce and industry. As Cho (1990:250) has observed, "This rise of an incipient Malay capitalism has given birth to a new Malay Dilemma. In moving in new directions, the nation is confronted with challenging new problems; corruption and financial mismanagement have become supreme examples of this malaise." There can be no doubt that, in contrast to the situation in colonial times and in the early years of independence, substantial corruption now exists even at the highest levels of government. Cho (1990:251-252) gives a sorry list of cases of large-scale official corruption and financial mismanagement in recent years. In addition to the widespread existence of so-called "Ali Baba" companies, in which Bumiputera function only as front men for non-Bumiputera financial interests, UMNO itself is known to have become closely involved in the business aspects of the NEP by using nominees to buy into companies and through its pre-eminent position in the government ensuring that its companies receive a steady flow of public works and other contracts (Tsuruoka, 1990).

Overall, according to a semi-official "think tank," the Malaysian Institute of Economic Research, the effect of restructuring under the NEP has been to produce a "rentier" class among the middle and upper class Malays rather than to foster true entrepreneurship; and, according to Kamal Salih, the Director of the Institute, the restructuring provisions have been "a definite failure," giving rise only to a narrow band of tycoons living off investments (Seaward, 1988:103). In addition, as controversy over restructuring policies has increased within the country, not only amongst the Chinese and Indians but also within UMNO itself as the split between Dr Mahathir and his deputy prime minister early in 1986 indicated, so civil liberties have been progressively curtailed, and the judiciary has come under attack from the ruling group. In October-November 1987, for example, the government ordered the arrest of 106

people under the internal security legislation on the grounds that they were contributing to racial tension. Among them was the leader of the Democratic Action Party.

Finally, and especially in the context of the succeeding parts of this chapter, it needs to be observed that, apparently during the period, despite the often-repeated national objective of creating a just society in which the wealth of the nation would be equitably shared, the long-term trend is one of growing income disparities, with overall income inequality being due much more to differences within ethnic groups rather than among them, and that Malaysia exhibits more overall income equality than most of its neighbours, including Thailand, the Philippines and Indonesia (Jomo and Ishak, 1982). The emphasis on industrialization in development planning has not served to moderate this, rather, as Mehmet (1980:220) has observed, the heavy reliance that has been placed since the mid-1960s upon a dynamic, industrializing private sector based heavily on foreign investment has led to the emergence of a secondary labour market in the formal, modern urban sector dominated by rural migrants, usually Malay and preponderantly female, a significant proportion of whom earn wages not much higher than the poverty level. The growth of the manufacturing sector during the period of the NEP has been heavily concentrated in a few low value-added export-oriented industries, principally electronics, textiles and clothing. By 1987, for example, the electronics industry alone contributed 18 per cent of the country's manufacturing output (which in total was 27 per cent of GDP in 1990), 21 per cent of the manufacturing workforce and 44 per cent of Malaysia's exports of manufactured goods (Young, 1987:15). Called into being at least in important part to serve restructuring needs in circumstances in which indigenous Chinese capital could not be wholly relied upon to respond, the electronics and similar foreign-capitalized factories are part of a classic branch plant structure within the new international division of labour, one in which the cost of labour is critical and, therefore, their role in the equalization of incomes can only be small. Further, in every year except one between 1979 and 1985, the direct foreign investment balance to Malaysia was negative, in other words the repatriation of profits and dividends exceeded the level of incoming direct foreign investment (Chandra, 1986:44)

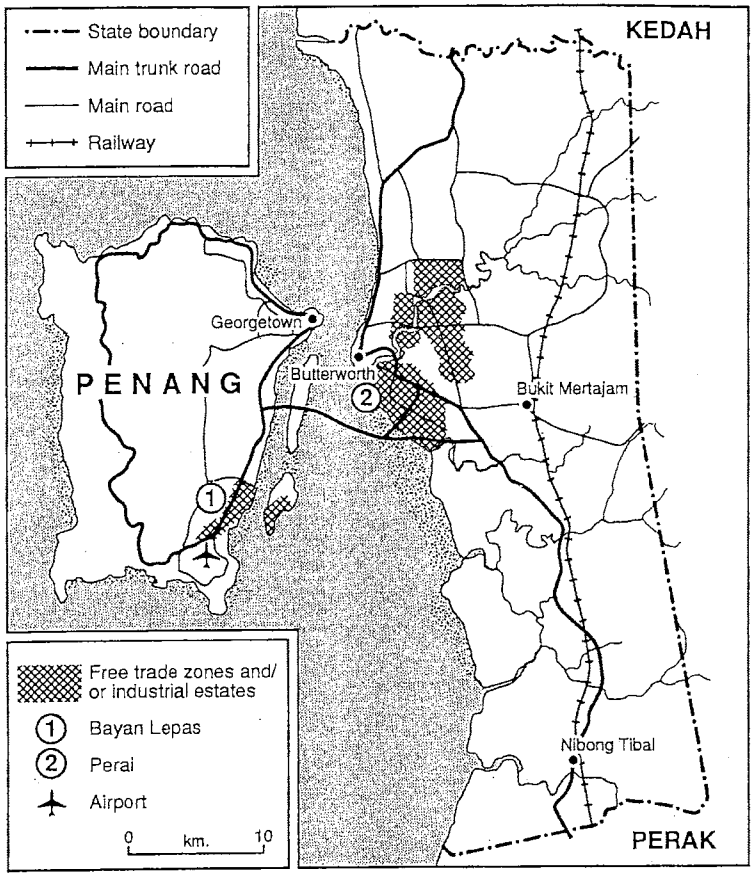
The Penang Study

Although there have been many general or sectoral studies of the NEP, from what has been published to date in the literature it appears that local studies have been generally neglected. The remainder of the present chapter, therefore, outlines some basic aspects of ongoing work in Penang which is examining the ethnic aspects of industrialization under the NEP (Eyre, in preparation).

Penang (Figure 13.1) is one of the smallest Malaysian states. It consists of two separate areas: Penang Island (Pulau Pinang) and Seberang Perai, a strip of mainland. The strategic and trade potential of Penang Island was recognized by Captain Francis Light who purchased it from the Sultan of Kedah in 1786 on behalf of the East India Company. In 1800 a small area of the mainland, originally known as Province Wellesley, was acquired from the Sultan of Kedah to form the state as it is today. By the beginning of the present century, Georgetown, the principal settlement on the Island, was the largest town in Peninsular Malaya, having developed as a port for the export of primary resources and as the general commercial centre for the north-west. In the period after independence, Georgetown was soon outstripped in growth and economic development by the national capital, Kuala Lumpur; today its population, including suburbs, is about 400,000. Georgetown's declining fortunes in the immediate post-independence period, in particular the removal of free port status by the Federal government in 1969, mirrored those of the state as a whole, which between 1957 and 1970 became a major out-migration state (Salih and Young, 1986:104).

A combination of two circumstances, one national the other local, was to change Penang's fortunes dramatically. By the late 1960s, the national import substitution programme had virtually run its course as far as the stimulation of industrial development was concerned. Attention turned to foreign investment and the generation of manufacturing exports, and in 1971 the Investment Incentives Act was amended to produce a system of tax exemptions related to the number of workers employed by each firm with the intention of attracting labour-intensive, internationally-footloose industries. The same year, a Free Trade Zone Act was passed which provided for the creation of free trade zones and export processing zones. In 1969, at least in part because of the declining fortunes of the state, Penang had been captured by a Chinese-based

Figure 13.1 Penang: Free Trade Zones, Industrial Estates, Communications and Urban Centres



opposition party, the Gerakan Party, at the general election. After parliamentary government resumed in 1971, the Gerakan Party was incorporated into the ruling Barisan Nasional but only at the price of greater attention being devoted by the central government to the state's problems. Penang remains ruled by the Gerakan Party to the present day. Benefits have continued to flow from the centre towards the state, and in fact the first free trade zone in the country was established at Bayan Lepas to the south of Georgetown in 1971. By the end of the 1980s, there were eight industrial estates in Penang state, four being free trade zones of which two are among the largest in Malaysia. The one at Bayan Lepas is very close to the airport and, thus, has proved particularly suitable for the electronics industry, while the second major free trade zone in the state, at Perai (Figure 13.1), is intended more for companies needing port facilities. By the end of the 1980s, Penang had become the second only to Selangor state in terms of state manufacturing contribution to the national GDP (Cho, 1990:204). The number of factories in the state grew from 36 to 243 in the period 1971-1983, with the electronics/electrical industry providing nearly half of the jobs in the industrial estate areas (Salih and Young, 1986:111-113). Whereas Penang's urban population had been overwhelmingly Chinese during the early years of independence, the major source of the workforce in the industrial estates under the NEP has become the Bumiputera, particularly young females arriving as in-migrants from the neighbouring states of Kedah and Perak.

The present study was focused on large manufacturing firms on Penang Island. These are defined by the Municipal Council of Penang as firms employing 200 or more workers. In 1990, at the time of the commencement of field work for the study, Penang Island had 49 such firms, all located in the free trade zone or industrial estate areas at Bayan Lepas, with a large majority of the firms concentrated in the electronics/electrical industry, and almost all foreign-owned (Table 13.1).

Information was collected on 30 of the 49 firms by interview with personnel managers during the period of October 1990 to March 1991, the total number of firms being determined by those that were willing to agree to be interviewed. The main thrust of the interviews was to judge how far each firm had responded to the objectives of the NEP, since every firm had been established no earlier than 1972.

Table 13.1 Penang Island: Large Manufacturing Firms, 1990

Industry	Number of firms	Number with majority foreign ownership
Electronics	21	20
Electrical goods	8	7
Instruments equipment, machine tools	7	5
Textiles and garments	5	4
Others	8	4
Total	49	40

Source: Penang Development Corporation.

Under the NEP, the government had set a general ownership and employment target for Bumiputera participation in commercial and industrial activities which related to all categories and scales of operation. Although the NEP as published did not specifically state that every individual firm had to comply with the national targets for restructuring society, the passing of the Industrial Coordination Act in 1975 made it clear that, apart from existing firms, individual compliance was essential for all but the smallest of firms if they wished to gain a licence to operate.

Of the firms surveyed, 76.7 per cent were foreign owned, none was Bumiputera owned, though four had some Malaysian public sector financial participation (through the state's Penang Development Corporation), one in a majority situation. (None of the original total of 49 large firms has 100 per cent Bumiputera ownership, in fact.) Most of the foreign owned firms were branch plants of international companies, with the ultimate control of the firm clearly lying overseas.

In terms of general employment, the manufacturing sector in Penang had traditionally been dominated by Chinese as a reflection of their preponderance in the urban population. The industrial structure was very largely one of relatively small Chinese-financed firms, but in the period since 1970 this has become supplemented, even dominated, by foreign branch plants, particularly on Penang Island. Whilst the NEP

established a general target that employment should come to reflect the national population composition by 1990, it should perhaps also be recognized that, because of its relatively large Chinese population, the population of Penang state is virtually a reverse image of that of the national population, so that as of 1980 whereas Bumiputera comprised 60 per cent and Chinese 30 per cent of the national population, in Penang state Bumiputera comprised 35 per cent and Chinese 55 per cent. It can be argued, therefore, that, in examining the employment record of the firms surveyed, realistically two sets of comparisons are necessary, one referring to the national population composition and the other to that of Penang state. In this respect, it can be seen from Table 13.2 that whereas only just over half of the firms surveyed reached the level of the equivalent national population composition (60 per cent) in respect of their employment of Bumiputera, just over 85 per cent of firms met the more local criterion (35 per cent). Employment of Indians well exceeded requirements in terms of both criteria, but in respect of their local population composition the Chinese were very poorly represented in the new firms as far as the total workforce was concerned.

Table 13.2 Penang Island: Employment Composition of Large Firms by Ethnicity, 1991 (%)

	Malaysian criterion		Penang criterion	
	National population composition	Large firms reaching or exceeding this level	Penang population composition	Large firms reaching or exceeding this level
Bumiputera	60	51.9	35	85.2
Chinese	30	40.9	55	14.8
Indian	10	74.1	10	74.1

Source: Field survey.

The absentee nature of ownership previously commented on clearly raises the question of management, since it was recognized as part of the NEP that Bumiputera were extremely under-represented at the managerial and professional levels in the country (7 per cent of such employ-

ment in 1970) and would need to be brought up to a share corresponding to their representation in the population at large. In the 30 firms surveyed, foreign presence in management was very small. Foreign personnel at most comprised one or two per firm, sometimes supplemented by visiting managers. The day-to-day management of virtually all the companies was, therefore, controlled by Malaysians. However, the survey showed (Table 13.3) that in respect of management employment, only 4.8 per cent of firms reached a level in Bumiputera employment comparable to that represented by the national population structure. The picture improved marginally in terms of the more local employment criterion (to 9.5 per cent), but, however judged, it was clear that despite the NEP the management of the foreign firms had become overwhelmingly dominated by Chinese and to a lesser extent Indians.

The same situation obtained with respect to skilled employment below management level, with no firms reaching the national criterion in this respect and less than a quarter of the total the lower local one (Table 13.4). Once again, Chinese and Indians dominated, with very much the reverse picture, of course, in terms of unskilled employment.

Table 13.3 Penang Island: Management Employment in Large Firms by Ethnicity, 1991 (%)

	Malaysian criterion		Penang criterion	
	National population composition	Large firms reaching or exceeding this level	Penang population composition	Large firms reaching or exceeding this level
Bumiputera	60	4.8	35	9.5
Chinese	30	90.5	55	71.4
Indian	10	42.9	10	42.9

Source: Field survey.

Table 13.4 Penang Island: Skilled Workers in Large Firms by Ethnicity, 1991 (%)

	Malaysian criterion		Penang criterion	
	National population composition	Large firms reaching or exceeding this level	Penang population composition	Large firms reaching or exceeding this level
Bumiputera	60	0.0	35	23.5
Chinese	30	100.0	55	82.4
Indian	10	70.6	10	70.6

Source: Field survey.

Conclusion

In the light of the Penang findings, there are good grounds for suspecting that by the end of the period of the NEP, Bumiputera in general were very far from playing their planned role in the modern sector of the Malaysian economy. In fact, given the still comparatively closed nature of much of Chinese capitalism in the country, especially in the smaller enterprises, which remain dominated by the Chinese, it is tempting to question fundamentally the optimistic official assessment of the results of the Policy that appears in the *Second Outline Perspective Plan 1991-2000* (Government of Malaysia, 1991:31-59) and to recall Salih's assertion, previously quoted, that in the modern economy what has been created among the Malays, apart from opportunities in government service of various kinds, some expansion within the professions and a certain amount of low-level, poorly-paid and possibly unstable industrial employment, is merely a small *rentier* class of tycoons, often benefiting from the NEP through political connections, and sometimes in corrupt ways. The findings also demonstrate the severe limitations of foreign branch firms not just in terms of indigenous capital accumulation and technology transfer but equally importantly in the present context in the building of a broad, modern social infrastructure on an ethnically-mixed basis. Yet, the indigenous alternatives to such a pattern of foreign-dom-

inated manufacturing development are as few and uncompromising for Malaysia as they are for so many other developing countries (Eyre and Dwyer, in press).

In June 1991, the Malaysian government tabled a New Development Policy designed to replace the NEP which ended in 1990 (Tsuruoka and Vatikiotis, 1991), and the new proposals were set out in detail in the *Second Outline Perspective Plan 1991-2000* (Government of Malaysia, 1991). The economic goal of the new Plan is to make Malaysia a fully developed nation by the year 2020 — what the Prime Minister has called his "20/20 vision" — with per capita GDP doubling between 1991 and the year 2000. This implies a growth rate of per capita income over the ten years in excess of 7 per cent per annum, but since the annual population growth rate under Malaysia's existing pro-natalist policies (see Dwyer, 1987) is likely to be about 2.6 per cent per annum, then the growth rate of real GDP has to be just under 10 per cent a year (Salih and Zainal, 1989:49). Available local capital is not likely to be available to finance such a rate of growth fully, and there will, therefore, need to be continuing reliance on foreign investment. This explains the constant official reassurances given in the run-up to the Plan that nothing would be done to frighten away foreign capital.

In general, there is discernably more emphasis placed upon wealth creation in comparison with redistribution in the new Plan than in the previous NEP. In part, this is because it is officially claimed in the *Second Outline Perspective Plan 1991-2000* (p. vi) that "absolute poverty is no longer a major problem" and that "what is more important in restructuring is not so much to achieve specific numerical targets as to improve the capacity of the Bumiputera to create wealth and manage it." To the *Far Eastern Economic Review*, however, this new emphasis "on the principle of growth with equity" implies official recognition that "Malaysia's already bullish performance... would have been even more robust had it not been for the constraints posed by the government's affirmative action programme for Bumiputeras" (Tsuruoka and Vatikiotis, 1991:16).

The new Plan now states that the government will look for the long range realization of the original 30 per cent objective for Bumiputera restructuring rather than set a specific date for its achievement, though progress will be reviewed in the year 2000. Stress is placed on the creation of a viable Bumiputera entrepreneurial community through human resource development programmes, training and "the inculcation of the right value system" (Government of Malaysia, 1991:vi). Given that the major impetus to growth is expected to continue to be manufacturing (with a projected 37.2 per cent of GDP by the end of the century compared with 27 per cent in 1990), and to a significant degree foreign-dominated manufacturing, it remains to be seen whether ethnic and industrial goals which this chapter has shown to be contradictory in certain significant aspects during the period of the NEP can in the future be more successfully harmonized.

NOTES

1. The idea that all the Peninsula Malays are Bumiputera (literally "sons of the soil," or the original inhabitants), an idea assiduously cultivated by Malaya/Malaysia's governments during the independence period, needs qualification. Quite apart from the Orang Asli, or aboriginal peoples, who were displaced to the mountainous interior over historical time by Malay immigration and today exist as relatively small groups, substantially fewer than half of the present Malay population is even of nineteenth century origins within the peninsula. Further, a significant proportion of those now considered indigenous has arrived only within the last three or four decades. Immigration from Indonesia, much of it illegal but largely officially condoned, is still continuing. In the late 1980s, the government officially acknowledged the presence of 150,000 such immigrants, but other sources have placed the figure much higher: the opposition Democratic Action Party at 400,000, for example, and the Malaysian Trades Union Congress at as many as 1.5 million (Dwyer, 1987:249).
2. By 1957, over three-quarters of the Chinese and two-thirds of the Indians in Peninsular Malaysia had been born locally (Fell, 1960, Vol. 14:15).

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CHAPTER FOURTEEN

Globalization and Trading Strategies in the South Pacific

Guy M. Robinson

Introduction

One of the most significant changes in both the economic development of Australia and New Zealand and their general external relations has been the diminution of trading links with the United Kingdom (UK) and the search for new markets in the Asia-Pacific region. This has brought about not only substantial trade with Japan but also rapidly expanding economic links with Southeast Asia, especially with the newly industrializing countries who form the seven-member Association of Southeast Asian Nations (ASEAN) (Brunei, Indonesia, Singapore, Malaysia, Philippines, Thailand and Vietnam). Throughout these developments, the United States has remained a significant trading partner, and closer ties have been forged between Australia and New Zealand via a bilateral trading agreement.

This chapter outlines some of the key changes affecting the trading policies pursued both by successive Labour governments in Australia over the past decade and by New Zealand governments since the election of Labour to power in 1984. It places these policies in the context of the conflict over trade liberalization that has produced such a protracted set of discussions in the Uruguay Round of the General Agreement on Tariffs and Trade (GATT). Within the growth of greater regional trading links, special attention is given to trade across the Tasman as one component of trade policy favouring regional and super-regional trade blocs.

Trade Liberalization and the Cairns Group

From the 1960s, the adoption of economic reforms in Australia to promote growth and greater inward investment was recommended by the Tariff Board and its successor, the Industries Assistance Commission. However, it was not until the Hawke and Keating governments from 1983 onwards that the pursuit of economic liberal policies in key areas of the economy brought about significant breaks with previous policy. Liberalization has included deregulation of the financial system, tariff cuts, limitations on taxing, spending and government deficits, but also a degree of interventionism to help industry cope with new economic conditions (Bell, 1993:127-166).

In the farming industry, for example, the reduction of federal aid to farmers has involved "the introduction of user-pays principles and the withdrawal of concessions, subsidies, price guarantees and stabilization policies" (Le Heron, 1993:169). This has helped the Federal government to legitimize its championing of freer trade as part of the Cairns Group of agro-exporting nations in the Uruguay Round of the GATT (Robinson, 1993). The then Federal Treasurer, Paul Keating, argued that, by dismantling the structures which contribute to high domestic prices for farm produce and removing restrictions on cheap imported products from abroad, trade could be stimulated to Australia's benefit (Roningen and Dixit, 1989).

This philosophy has been pursued in a two-pronged attack on the *status quo*, first, by deregulating production and the market within Australia itself and, second, by a high-profile foreign policy geared to helping Australian exporters to gain greater ease of access to overseas markets. This policy has had a number of concrete expressions via multilateral and bilateral agreements, including the establishment of the Cairns Group of agro-exporting nations.

New Zealand too has transformed its economy, from one even more regulated than its Australian counterpart to one in which there are fewer constraints than in most developed countries. The initial deregulation and removal of subsidies to domestic producers was known as Rogernomics, after the Finance Minister, Roger Douglas. His reforms were based on the premise that the high levels of protectionism and subsidy employed by the previous government simply could not be afforded any longer. Support for farmers was radically cut, and a programme of corporatization was launched whereby government departments became state-owned enterprises, with more business-like aims and private share holdings but retaining majority government ownership. Controls over banking and aviation were removed (as they were in Australia), the New Zealand dollar was floated and a service sector boom was created in the late-1980s (Sharp, 1994). Cuts in assistance to pastoral agriculture between 1984 and 1990 amounted to NZ$829 million (Tyler and Lattimore, 1990).

The economic reforms designed to foster greater competitiveness were accompanied by attempts to retain and increase access to overseas markets. In this, both countries' membership of the Cairns Group has been a major factor. Formed in August 1986 under a strong impetus from Australia (Higgott and Cooper, 1990), the Cairns Group[1] had the aim of bringing about reforms to international trade (especially in agricultural products), including reductions in export subsidies, and alienation of barriers to access and internal support measures. In November 1989, the Group agreed on a ten-year plan to press their claims for greater liberalization in trade in agro-commodities through the major forums of economic negotiation.

Australia's Minister of Trade and Overseas Development chairs the Group, and, through Australia's Department of Foreign Affairs and Trade, the Minister represents members' interests in the GATT negotiations (Blewett, 1991). The Group has consistently regarded reforms to export subsidies, market access and border protection as the keys to a successful conclusion to the Uruguay Round (DFAT, 1991).

In the Group, Australia has the lowest reliance on agriculture as a contributor to gross domestic product (GDP) and also a smaller reliance on agricultural exports as a percentage of all exports than the majority of the other 13 members (Table 14.1). However, if exports of minerals and raw materials are factored in, then Australia's position becomes more vulnerable to restrictions on trade affecting such primary exports. The export of both minerals and agricultural produce represents 62 per cent of Australia's merchandise exports by value — a comparable figure to New Zealand's reliance on farm produce exports, as highlighted in Table 14.1.

Table 14.1 Agriculture, Merchandise Trade and GDP in the Cairns Group and Selected Countries

	Agriculture's contribution to GDP (%)	Merchandise exports as a % of GDP	Merchandise imports as a % of GDP	Agricultural exports as a % of exports
The Cairns Group				
Australia	4.2	16.1	16.1	23.7
New Zealand	8.1	22.4	20.2	63.5
Argentina	14.9	18.0	5.4	46.4
Brazil	9.1	8.4	5.5	29.4
Canada	2.9	25.8	23.8	9.4
Chile	9.1	36.3	30.7	36.9
Colombia	16.7	18.4	13.2	34.6
Hungary	15.8	33.8	31.8	22.8
Indonesia	23.4	30.5	23.6	16.5
Fiji	22.7	40.6	48.5	52.4
Malaysia	20.2	67.1	56.5	31.5
Philippines	23.2	18.3	24.4	20.9
Thailand	16.9	30.8	35.3	42.0
Uruguay	11.8	19.8	16.9	53.2
Others				
European Union*	2.6	25.5	25.7	6.4
Japan	2.4	8.9	6.9	12.8
United Kingdom	1.4	11.1	14.0	18.5
United States	2.0	6.1	6.9	17.5

Note: * Includes exports and imports among European Community countries.
Source: *The Europa World Yearbook 1994.*

It is this reliance on exports of primary produce and unprocessed minerals that places Australia and New Zealand in the position that, in part, led the then Australian Treasurer, Paul Keating, to liken Australia to "a banana republic." Exports from the mineral sector now account for 42 per cent of all Australian exports compared with 26 per cent in 1970.

In contrast, exports of farm produce as a percentage of all exports have fallen from 44 per cent to 23 per cent. Such a high reliance on primary exports makes both Australia and New Zealand vulnerable to restrictions on trade affecting such exports. Protectionism, as threatened by failure to reach agreement in the Uruguay Round, would make it harder to export both agro-commodities and manufactured goods to the principal markets of the world. Also, transnational companies with interests in the two countries might pay greater attention to developing their business from locations deemed to be more favourable, for example, behind a protective tariff wall, thereby affecting their operations in Australasia. Given that 86 of the top 200 companies in New Zealand are foreign-owned, this may not be an unrealistic threat.

Furthermore, given declining terms of trade experienced through the development of their primary produce export profile, it is not surprising that both countries, but especially Australia, have been particularly concerned to secure greater openness in trading in the Asia-Pacific region, the main target for their largest exporters. In addition to their role on the global stage through GATT, the regional strategy has been pursued via APEC (the Asia-Pacific Economic Cooperation group) and bilateral trading agreements, the most wide-ranging of which has been trans-Tasman collaboration.

APEC and ASEAN

Throughout the post-war period, Australia has gradually developed new trading links with Southeast Asia and especially Japan. In certain respects, Japan has directly replaced the UK as a major trading partner and also as a large investor. By deregulating banking and other sectors of the economy, Australia has encouraged inward investment, and Asian money has flooded in (Scott-Kemmis and Darling, 1991) — notably Japanese financing of the service sector (Table 14.2) and, more recently, funds from Hong Kong. The Japanese are major recipients of Australian raw materials whilst the ASEAN countries also purchase Australian raw materials and agricultural produce, exporting manufactured goods in return (Table 14.3).

Table 14.2 Foreign Investment in Australia, 1991/1992

	% of total foreign investment
United States	19.4
United Kingdom	17.3
Japan	17.1
International capital markets	17.0

Note: 41% of Australian business equity is foreign-owned.
Source: Calculated from data in *Foreign Investment Review Board Report 1992-93.*

Table 14.3 Australia's Major Exports and Imports, 1991/1992

	Million A$	%	Major markets (% share)
Exports			
Coal	6,848	12.4	Japan 49, S. Korea 10, Taiwan 10
Gold	4,023	7.3	Singapore 40, Japan 25, S. Korea 16
Iron ore	2,850	5.2	Japan 49, China 14, S. Korea 13
Beef	2,777	5.0	USA 41, Japan 34, S. Korea 9
Greasy wool	2,571	4.7	Italy 15, Japan 15, China 10
Alumina	2,248	4.1	n.a.
Imports			
Cars	2,556	5.0	Japan 80, Germany 10
Aircraft and associated equipment	2,168	4.3	USA 83, UK 8
Automatic data processing machines	1,924	3.8	USA 46, Japan 15
Petroleum/Crude oil	1,577	3.1	Indonesia 26, United Arab Emirates 23

Source: *The Europa World Yearbook 1994.*

Australia has forged closer formal ties with Southeast Asia in several ways. One expression of this is their membership of APEC, which was launched in November 1989 after a meeting of national leaders in

Canberra.[2] This was part of the drive by former premier Bob Hawke for greater regional economic co-operation (Cooper et al., 1993; Higgott, 1994). Its forerunner, the Pacific Economic Co-operation Conference, held annual meetings from 1980 and was established as a Japanese-Australian initiative, as part of both countries' attempts to secure new markets in the region.

APEC has three goals: to help strengthen the multilateral free trade system and support a successful conclusion to the Uruguay Round of the GATT negotiations; to provide an opportunity to assess prospects for and obstacles to increased regional trade and investment flows within the Asia-Pacific region; and, to identify a range of practical common economic interests shared by APEC members.

In 1991, APEC was expanded to include the People's Republic of China, Chinese Taipei (Taiwan) and Hong Kong, and in 1993 a permanent secretariat was established in Singapore. The APEC members contain two billion people, account for 40 per cent of world trade and take 70 per cent of exports from both Australia and New Zealand. There is a strong conflict, though, within APEC over its future role. In particular, its ASEAN members are resisting Australia's proposals that APEC forms itself into an economic community more like the European Union. ASEAN members wish APEC to be a loose consultative forum, as a tighter APEC could undermine their individual sovereignty and allow the more powerful economies, notably the United States and Japan, to dominate.

ASEAN is a collaborative group of Southeast Asian countries established in 1967. It is moving towards a free trade area that might have major consequences for Australasia. For example, between 1986 and 1991 Australian imports from ASEAN grew from A$1.8 billion per annum to A$3.8 billion; exports rose from A$2.2 billion per annum to A$6.5 billion, though this represents less than 3 per cent of ASEAN's trade. In purely trading terms, ASEAN is four times more important to Australia than Australia is to ASEAN, and the possible presence of an ASEAN common market may threaten this trade. However, the ASEAN countries are also part of the Cairns Group and have worked closely with Australia in championing trade liberalization. Therefore, their closer integration may not pose such a threat as some may fear.

One of Australia's current responses to ASEAN's moves towards closer economic integration is to establish an ASEAN-Australia Eco-

nomic Co-operation Programme to foster joint ventures. Also, as a Dialogue Partner of ASEAN, Australia may seek to establish further special access to any newly-established ASEAN common market. Meanwhile, the New Zealand government is pursuing an "Asia 2000" initiative to attract investment from ASEAN and other Southeast Asian countries and to tap new technologies, market knowledge and management skills from Asian partners. For example, in early 1993 there were over 500 New Zealand-based companies trading in Malaysia. The share of New Zealand's export trade taken by Southeast Asia has trebled since 1970 whilst imports have increased by a similar factor.

One aspect of these evolving policies towards Southeast Asia has been expressed recently via Australia's particular stance within APEC. The APEC conference in Seattle in November 1993 was the first to have all the major Heads of State present. This was part of an Australian-supported American attempt to broaden the agenda of APEC from matters such as improved air links to a more extensive programme of trade liberalization, and perhaps to establish a PAFTA (Pacific-America Free Trade Area) to accompany the establishment of the North American Free Trade Area (NAFTA) between Canada, the United States and Mexico. At the APEC meeting in Indonesia in 1994, it was agreed (in the Bogor Declaration) that, by 2000, the members would all have begun to reduce trade barriers. Also, the four most developed members (the United States, Canada, Australia and New Zealand) consented to abolish all restrictions on imports from the rest of the membership by 2010. Other members will have until 2020 to follow suit. Promotion of these closer links can be seen as a twin strategy for the Clinton government, following its success in getting Congress to endorse NAFTA. It should be noted in passing that American trade across the Pacific has exceeded that across the Atlantic since 1984, and that Australia has a heavy balance-of-payments deficit in merchandise trade with the US.

In contrast, Australia enjoys a strong trading balance with Japan by virtue of its substantial exports of unprocessed minerals (Table 14.3). It is doubtful that this trade would be adversely affected by any general tendencies towards greater economic protectionism in the world, but such moves could certainly harm vital export trade with Japan in agro-commodities and manufactured goods. For example, a favourable conclusion of the Uruguay Round holds the prospect of greater revenues for worldwide exports of grain, meat and dairy produce from Australasia

whilst certain links with Japan could be accelerated, notably New Zealand's export of beef, wrought aluminium, fish, wool, kiwi fruit and dairy produce (Kennedy, 1992). The other growing link with Japan is through tourism, with both Australia and New Zealand deriving considerable revenue from Japanese tourists and from Japanese investment in the tourist industry. The latter has been particularly concentrated in resorts in Queensland. The rapid development of tourism and its fast growing economic significance are illustrated by the fact that tourism in New Zealand is now a bigger foreign exchange earner than former individual export staples such as meat, dairy produce and wool.

Closer Economic Relations

Whilst championing more open trade throughout the world, and especially in the Asia-Pacific region, both Australia and New Zealand have also sought to secure new markets for their own goods through various bilateral trading agreements. In particular, closer trade links and economic co-operation formalized in 1966 in the New Zealand-Australia Free Trade Agreement, were extended from 1983 in the Closer Economic Relations Agreement (CER).

When concluded, the CER had the express intention of removing all tariffs and quantitative restrictions on the passage of goods between the two countries by 1995 (Table 14.4) (Holmes, 1986). In 1988, a review of the CER brought forward to 1990 the date for full free trade in goods. It also extended the Agreement to the development of greater harmonization in areas such as industry assistance, government purchasing preferences, technical barriers to trade, business laws, quarantine and customs procedures, and included an agreement on trade in services (Holmes, 1989). The Agreement also included commitments to restrain dumping and countervailing actions, to monitor intermediate goods and to preserve conditions of fair trading by phasing out subsidies (bounties in Australia) and state governments' buy-Australia policies. There will be a phasing out of Australian retention of protection for broadcasting, domestic air services, banks and dairy products.

Table 14.4 The Objectives of the Closer Economic Relations Agreement (CER)

* To strengthen the broader relationship between Australia and New Zealand
* To develop closer economic relations between the Member States through a mutually beneficial expansion of free trade between Australia and New Zealand
* To eliminate barriers to trade between Australia and New Zealand under an agreed timetable and with a minimum of disruption; and
* To develop trade between New Zealand and Australia under conditions of fair competition.

Source: Article 1, CER Agreement.

One clear impact of the CER has been the growing volume of trans-Tasman trade in both absolute and real terms (Figure 14.1), and a shift in New Zealand's favour of the ratio of trade between the two countries. New Zealand's exports to Australia (by value) increased 19 per cent per annum in the 1980s compared with a 14 per cent increase in exports to other countries. Australia now accounts for 18.3 per cent of New Zealand's exports whilst supplying just over one-fifth of its imports. Yet, of the limitations on trade that remain between the two countries, Australian restrictions on imports of goods, services and capital flows are more comprehensive in extent than those on flows in the opposite direction. This reflects New Zealand's greater global trade liberalization programme, its removal of assistance for agricultural producers and manufacturers, and its deregulation of the service sector. In contrast, regulations on trade across Australian state borders, restrictions on capital flows and greater state aid to producers in Australia, though now much reduced, still have a limiting effect on agro-commodity imports from New Zealand (Bollard and Thompson, 1987).

As shown in Figure 14.1, Australia's share of New Zealand's imports has changed little since 1966, but New Zealand's share of the Australian market has more than doubled. Though still only representing just over 4 per cent of all Australian imports, Australia is now New Zealand's biggest trading partner in terms of value of goods traded. The balance of trade has moved in favour of New Zealand, though still with a positive balance for Australia.

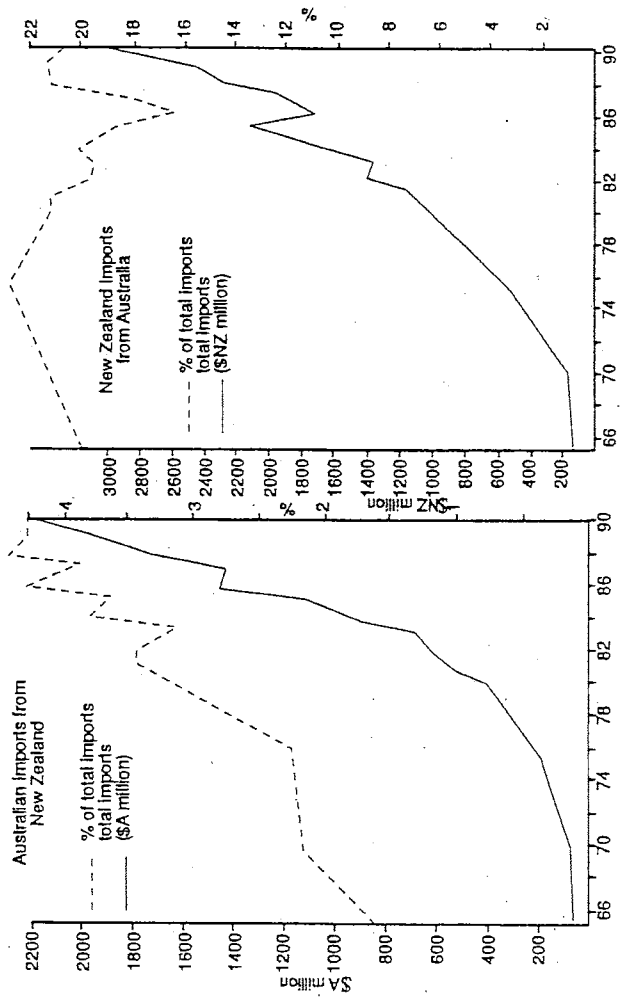


Figure 14.1 Merchandise Trade between Australia and New Zealand, 1965-1990, at Current Prices

Source: Based on data in Lloyd (1991a:4).

The CER has also brought increased mutual investment and the growth of trans-Tasman joint venture agreements. In the 1980s, the flow of investment tended to favour Australia, as investors from New Zealand sought advantage in the larger Australian market and from favourable currency exchange conditions. In the early-1990s, the relatively weaker performance of the Australian economy slowed this process, though around 7 per cent of Australia's overseas investment is now concentrated in New Zealand. In 1990, one-third of all overseas companies commencing business in New Zealand had their origins in Australia. This figure became greater still if New Zealand firms with 25 per cent or more Australian ownership were added. In addition, 27 per cent of overseas take-overs in New Zealand in 1990 were Australian based (Hoadley, 1992:91-92).

The significance of the CER is greater to New Zealand than Australia as it has the potential to expand New Zealand's "domestic" market from its own population base of 3.4 million consumers to a combined size of around 21 million. This type of expansion has underlain the long-established common market of the European Union and is a major attraction of the emerging economic integrations in NAFTA and ASEAN. For Australia, the advantages of the CER are less obvious, especially as New Zealand does not represent a complementary economic trading partner in the way that ASEAN does. Nevertheless, there are business opportunities for Australian companies in New Zealand that are being actively pursued, especially in the food processing and transport sectors (Lloyd, 1991a). Moreover, the greater strength of a slightly larger economic entity that trans-Tasman trade represents is one part of the broader foreign and trade policies pursued by the Hawke and Keating governments over the last decade.

To this can be added a greater strengthening of economic ties to the smaller countries of the South Pacific via the 1981 South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA) under which both Australia and New Zealand provide, on a non-reciprocal basis, duty-free and unrestricted access into their markets for most of the products exported by the Pacific Forum countries.[3] Initially, a small negative list was retained to exclude some textiles and foodstuffs entering Australia and New Zealand, but this has been gradually alienated for all items with 50 per cent South Pacific content by value. The Agreement also includes provisions for general economic, commercial and technical co-operation, safeguard provisions relating to dumped and subsidized goods, and special treatment for the smallest island countries. It encourages enhancement of the export capacities of the island countries and enjoins Australian and New Zealand consideration to island products. Although the arrangement has been significant for some of the small island nations, it has little overall effect on either imports or exports of their two large neighbours. Indeed, despite SPARTECA, both Australia and New Zealand enjoy positive trading balances with most of their South Pacific neighbours and have some significant investments there, for example Australian mining interests in Papua New Guinea. The chief limitation of SPARTECA is the disparity in the size of the economies represented (Sutherland, 1982).

Conclusion

This chapter has provided a very broad overview of trading strategies pursued by recent Australian and New Zealand governments. It has accepted a view that the key parameters of world trading patterns are set by national and supranational governments, whilst recognizing that government itself is frequently closely allied to major corporate business interests. However, a state's policy on trade can exert a vital influence on the overall nature of trading patterns, and hence the power of large trading nations, like the United States or Japan, or groups of nations such as the European Union, to affect the characteristics of world trade.

In Australasia's case, from the early 1980s successive governments have recognized the need for an economic climate in which overseas markets are more accessible. To further perceived economic needs, and hence of businesses operating in that economy, three main trading strategies have been followed: strong support for greater trade liberalization in the world, as expressed through support for tariff removals via the activities of the Cairns Group in the Uruguay Round of the GATT; a recognition of the significance of multilateral agreements within the Asia-Pacific region, the area identified as being vital as the chief target for exports; and the elimination of barriers to trade with other South Pacific countries, notably via the CER.

The support for trade liberalization has complemented domestic economic reforms that have exposed domestic manufacturing industry

to strong competition in certain sectors, in Australia, notably, the previously heavily protected clothing and textiles industries. The lower labour costs in ASEAN and newly-industrializing countries, such as South Korea, are undercutting Australasian producers. One response to this competition has been for manufacturers to target niche export markets for which quality rather than cheapness is the key (Lloyd, 1991b), as in the production of special high-grade steels by Broken Hill Proprietary. Another has been for Australian reliance on unprocessed mineral exports to grow. This has enabled Australia to develop a healthy balance of payments, most notably with Japan. However, there are obvious risks if this pattern of trading continues: firstly, the value-added component from processing of minerals benefits the importers of raw materials, not Australia; and secondly, many of the companies involved in mineral extraction are foreign-owned, so that profits might not all accrue to Australia.

The growing trade focus upon Southeast Asia continues the evolution of Australia and New Zealand from their colonial past when they were closely tied economically to the UK. Both sides of the Tasman are now increasingly locked into a trading focus in the Asia-Pacific region from their common base developed via the CER. Therefore, the future direction of APEC is highly significant to economic prosperity as is the possibility of closer integration between the ASEAN countries. Similarly, the prospects for trade in agricultural produce and minerals are critical, and so is the work of the Cairns Group. The final conclusion of the Uruguay Round holds the prospect not only of increased world trade by A$350 billion but also dramatic benefits to Australasian food exporters (Tyers and Anderson, 1992). Meanwhile the greater competition likely in manufactured goods could bring further attempts by government to make industry "leaner and fitter" for the battles ahead.

ACKNOWLEDGEMENTS

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NOTES

1. The members of the Cairns Group are Argentina, Australia, Brazil, Canada, Chile, Colombia, Hungary, Indonesia, Fiji, Malaysia, New Zealand, Philippines, Thailand and Uruguay.
2. The founder members of APEC were Australia, Brunei, Canada, Indonesia, Japan, South Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand and the United States. From 1991, China, Chinese Taipei (Taiwan) and Hong Kong were added, and, in 1993, Mexico and Chile.
3. The Forum's members are Australia, New Zealand, Fiji, Western Samoa, the Cook Islands, Nauru, Tonga, Tuvalu, Kiribati, Vanuatu, the Solomon Islands, New Caledonia, Papua New Guinea, the Marshall Islands and the Federated States of Micronesia.

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CHAPTER FIFTEEN

Britain's Farm to Global Seller: Food Regimes and New Zealand's Changing Links with the Commonwealth

Michael Roche

"Where Britain goes we go"
Michael Savage, 1939
Labour PM

"New Zealand is part of Asia"
Jim Bolger, 1994
National PM

Britain's Farm

Large-scale organized European settlement in New Zealand commenced in 1840. As a British colony, New Zealand achieved responsible government in 1852, and Dominion status followed in 1907. Although in 1931 the opportunity for full independence was offered by the Statute of Westminster, it was not until 1947 that this Act was ratified by the New Zealand government.

Apart from gold exports in the 1860s, the chief exports from the colonial economy was limited to "agricultural" products. In the 1850s, wool was produced on extensive leasehold sheep runs. As a durable commodity, it could stand the rigours of a voyage half-way around the world without being spoiled. It was a raw material for industrial Britain valuable enough to be profitably dispatched. Later growth and some diversification of the colonial economy took place in the 1880s when commercially viable seaborne refrigeration was developed. Large-scale

works for slaughtering and freezing stock were constructed from the early 1880s. It then became possible for New Zealand (along with Australia and Argentina), to solve its "surplus sheep problem" by selling frozen mutton, lamb (and later beef) to British consumers. The growth of an industrial economy in Britain had also led to a reduction in the ability of British farmers to supply domestic food needs while simultaneously enabling working class populations to increase their consumption of meat by buying imported frozen meat (Perren, 1978).

Refrigeration also opened the way for butter and cheese exports from New Zealand to Britain in 1882. The emerging dairy industry was increasingly based in the North Island and concentrated in Waikato and Taranaki. It was locally owned and organized on a co-operative basis. In contrast, the frozen meat trade contained a mix of British (and later US-owned) plants, as well as New Zealand merchant-gentry capital works, with only a few small farmer-funded operations.

The two world wars and the global depression of the 1930s only slowed the growth of New Zealand meat and dairy exports which remained predominantly bound for the British market. Two major changes did take place in the period up to the 1970s. Firstly, the New Zealand government passed producer board legislation in the 1920s for the dairy, meat and subsequently other agricultural sectors. Although this created a single-desk seller for the dairy industry, the meat industry, in part because of its ownership structure, exhibited lesser levels of co-operation and control. The second major change came with the Ottawa Conference in 1932 at which free trade principles gave way to an imperial preference, but with prescribed (reduced) levels of imports of frozen meat and dairy products to Great Britain.

The next shock to New Zealand's export specialization came in the 1960s when Great Britain indicated its intention to seek entry to the European Economic Community (EEC). After initial setbacks, entry was finally granted in 1972, and New Zealand's 90-year trading relationship was imperiled. Some efforts to diversify New Zealand's export base predated British efforts to enter the EEC, (for example, the Labour government's Industrial Development Conference in 1961 and the New Zealand Forest Service initiated the second afforestation boom of 1960-1983). A wider range of exports was evident from the 1960s as well as the implementation at various times of volume driven and value added

strategies. New Zealand's lengthy tenure as one of Britain's colonial farms is starkly shown in Tables 15.1, 15.2 and 15.3.

The main points to be drawn from these tables are:

1. The dominant position of the UK as an export market and a source of imports until the 1970s.
2. The increasing importance of Australia to both exports and imports over the last 20 years.
3. The level of diversification evident in 1990 ("other" is the largest category) and the increasing importance of the Pacific Rim.
4. Diversification of export items with traditional meat and dairy products remaining very important to the exports.

Table 15.1 New Zealand Exports by Percentage of Value to Principal Destinations

Year	Australia	Canada	France	Germany	Japan	UK	USA	Others
1885	18.3	–	–	<0.1	–	76.8	2.4	2.5
1910	5.5	0.8	0.2	1	<0.1	87.1	2.7	2.7
1930	3.2	5.7	1.2	0.9	0.4	81.0	4.7	2.9
1950	1.9	2.0	4.4	3.3	0.6	66.7	10.0	11.1
1970	8.3	4.3	2.7	2.8	10.0	34.8	16.4	20.7
1990	19.6	1.8	1.2	2.3	16.3	7.2	13.3	38.3

Note: Calendar Year 1885-1950, YE July 1970-1990.
Source: New Zealand Statistics, *New Zealand Overseas Trade Statistics*.

Table 15.2 New Zealand Imports by Percentage of Value from Principal Destinations

Year	Australia	Canada	France	Germany	Japan	UK	USA	Others
1885	14.5	<0.1	0.1	0.2	<0.1	71.8	5.5	7.8
1910	12.3	1.6	0.8	2.3	0.6	62.6	8.4	11.4
1930	7.6	9.0	0.9	1.7	1.3	49.5	17.4	12.6
1950	12.3	2.3	0.6	0.1	0.3	61.0	7.1	16.3
1970	23.2	3.8	0.7	3.7	8.1	31.8	13.0	15.7
1990	25.8	1.8	1.3	4.1	15.3	9.6	13.8	28.3

Note: Calendar Year 1885-1950, YE July 1970-1990.
Source: New Zealand Statistics, *New Zealand Overseas Trade Statistics*.

Table 15.3 New Zealand's Principal Export Items by Percentage of Value

	1885	1910	1930	1950	1970	1990
Meat (all)	6.4	19.0	24.6	15.7	34.5	15.2
Grass/Clover Seed	0.6	0.6	0.4	1.2	0.4	0.2
Dairy (all)	2.4	14.8	42.0	29.5	17.8	13.6
Casein	–	–	0.4	0.4	2.5	2.3
Apples	–	<0.1	1.5	0.4	0.9	1.4
Wool	54.8	41.0	17.3	40.9	19.3	8.6
Hides/Skins	3.6	5.6	5.0	5.5	4.6	3.3
Timber	2.7	2.0	<0.1	0.2	3.2	3.0
Wood pulp	–	–	–	–	7.8	3.7
Newsprint	–	–	–	–	1.5	1.2
Total	70.5	83.1	91.2	93.8	92.5	52.5
Others	29.5	16.9	8.8	6.2	7.5	47.5

Source: New Zealand Statistics, *New Zealand Overseas Trade Statistics*.

Economic Decolonization

By 1992, Britain took only 7 per cent of New Zealand exports by value whereas Japan and Korea had become more important trading partners. This transformation in New Zealand's trading relations was, on one hand, forced by Britain's entry to the EEC. On the other hand, it was accelerated by the deliberate decision of the Labour government (1984-90) to deregulate the economy and open New Zealand producers to global market forces. The subsequent social and economic turmoil of the 1980s has been documented by geographers (Britton et al., 1991). It is perhaps not a coincidence that the breakdown of traditional markets and the development of new export lines, both within and beyond agriculture, have been accompanied by signs of a more independent political spirit.

Maori activist, Awatere-Hutana, has labelled the deregulatory move in the 1980s as one of "economic decolonization" and sees it as enabling Maori to escape from the paternalist dependence of the Pakeha-dominated state. Whether she is right or not in regarding economic decolonization as foreshadowing cultural decolonization and an ongoing Maori renaissance, there have been some conspicuous episodes in the continuing decolonization of the New Zealand economy in the 1990s.

The most recent emblematic event in this respect was the sudden announcement by Union International Ltd (i.e. Vesteys) that it would no longer bank roll continuing losses from Weddel and Co. (NZ) Ltd, its New Zealand meat processing subsidiary. W Weddel and Co. (NZ) Ltd was set up by Vesteys in 1911, which built a works in Northland via another subsidiary W & R Fletcher. Vesteys acquired a larger stake in the New Zealand frozen meat industry in the 1920s and 1930s when it purchased five other plants including Nelson Brothers works at Tomoana (1920), Taruwheru (1920), Poverty Bay (1923), Kaiti (1931), and Patea (1934). In 1994, Weddel's New Zealand operations consisted of six meat processing plants (Figure 15.1), making the company the fourth and second largest sheep (23.5 million head p.a.) and beef (300,000+ head p.a.) processor respectively in the country (Table 15.4). Halal beef and sheep meat were also produced for export to Islamic markets. Weddel (NZ) advertized for stock in the 1992-1993 with the by-line of "Local knowledge... global clout," emphasizing not only its technology and hygiene standards but that it was "the world's largest international

Figure 15.1 W. Weddel & Co. (NZ) Plants, 1994

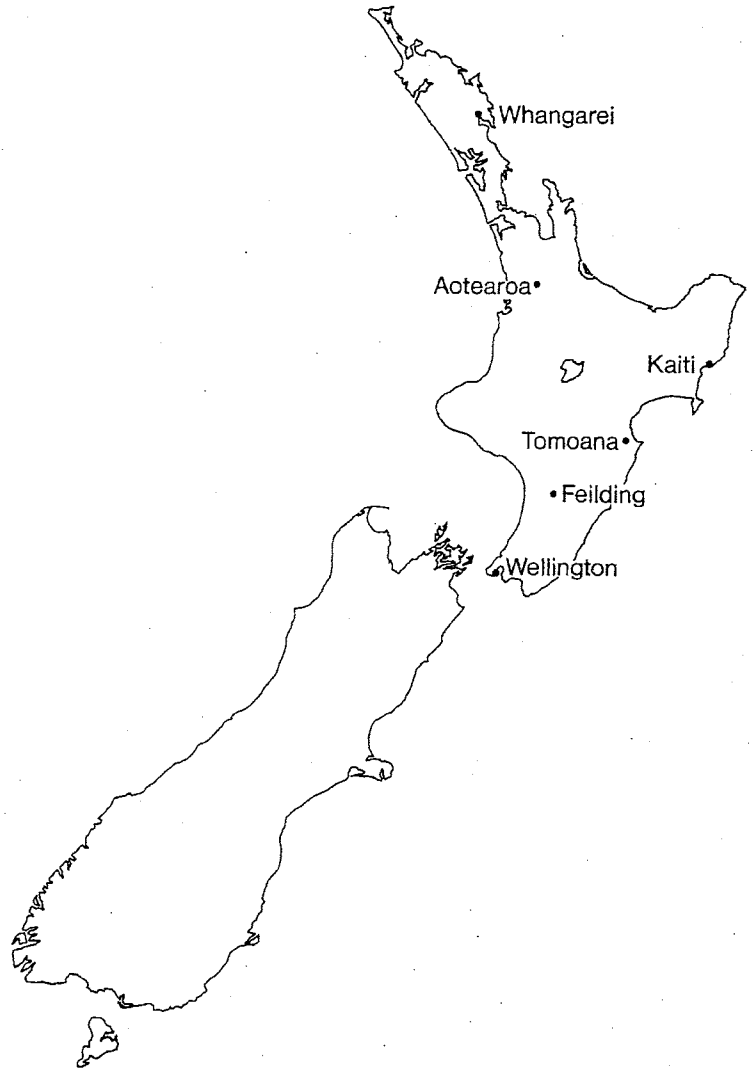


Table 15.4 Weddel New Zealand Ltd.

Plants	USDA & EC hygiene standards	Peak seasonal work force (1993)	Animal	Production (1990)	
				Beef (head)	Lamb (head)
Whangarei	✓	100	Beef	70,500	–
Cambridge (Aotearoa)	✓	500	Beef, sheep, bobby calves	75,000	540,000
Gisborne (Kaiti)	✓	410	Beef	60,000	760,000
Awapuni	✓		Beef	no data	no data
Hastings (Tomoana)	✓	1,500	Beef, sheep, bobby calves	93,000	1,700,000
Feilding	✓	50	Beef	25,000	–

Sources: MacDonald (1994); The Business of New Zealand Meat (1992); Weddel New Zealand, (n.d.) *The Facts*.

trade meat brand" being sold in over 80 countries (*Evening Standard*, 18 December 1992).

The pathway to receivership for Weddel's was neither straightforward nor expected. Its origins apparently lay in losses incurred by parent interest, Vesteys, on the London property market in 1990. Simultaneously, Union International was in financial trouble: from 1982 to 1992, Vesteys claimed to have poured £170 million into Union International (*Evening Post*, 13 January 1992). With the temporary respite of a "debt standstill" from the bankers, Union International set about divesting itself of non-core activities, such as cane farms in Brazil, some traditional stock raising operations (of 1.2 million ha) in Australia and others in Brazil as well as meat processing operations in Australia (*The Dominion*, 3 April 1993). A further round of reinvestment in core activities, such as Weddel, was proposed early in 1994 to try and return Union International to profits. Initially, a 50 per cent stake in Weddel's was offered to a strategic investor. US food and beverage giant ConAgra was identified by industry analysts as a likely partner (*The Dominion*, 17

February 1994). The extent of ConAgra's interest remains unclear, in all events the large strategic investor was not found — analysts claimed this was because the large old Tomoana and Kaiti plants were seen as unprofitable and a disincentive to investors. A 50 per cent share float was then proposed, but the unexpected collapse of Fortex (a modern multi-shift high tech, high skilled meat processor) ruined market interest.

By 1994, Vesteys indicated that it would set aside NZ$35 million from Union International restructuring to reinvest in Weddel (NZ) (Booker, 1994). The next development took the meat industry by surprise and created real anguish in Hawkes Bay where the Tomoana works was located — in August 1994, Weddel abruptly went into receivership. Weddel had debts of NZ$220 million and assets of NZ$230 million. The company receiver indicated the company had "simply run out of money" with the banks refusing to lend (Hall, 1994). The aftermath of the collapse has seen a consortium of New Zealand meat processors bid for the Weddel plant in order to ensure they remain shut in order to adjust over-killing which results in reduced stock numbers (this strategy echoes that of the mid 1980s — see Le Heron, 1991). The Weddel (NZ) collapse contributed £29.6 million to a Union International loss for the 1994 January-June accounts. Meanwhile, Union International announced further plans to sell food distribution and retail businesses in Australia, Asia and firms in Venezuela to the Vestey Trust for £100 million in order to reduce debts (*The Dominion*, 3 November 1994).

For the purposes of this discussion, it is pertinent to note that Weddel's collapse marks the sudden dramatic exit of British-owned companies from the New Zealand meat processing industry. Although, in 1993, Weddel (NZ) was still the fourth largest sheep meat processor in New Zealand, British plants had had a dominant share of the industry in earlier years.

Vestey's withdrawal from the meat industry in New Zealand (Borthwicks exited the industry in the 1980s) marks the end of a colonial era, leaving the industry in local hands along with some new joint ventures (e.g. a Japanese company has acquired Fortex's Seafield plant). The reasons behind the Weddel collapse may never be fully revealed. What is clear, however, is that the removal of domestic agricultural subsidies in 1984-1986 that led stock numbers to fall and stock prices to increase, the delicensing of the meat industry which encouraged new entrants, was only part of the cause for Weddel's collapse.

Economic Recolonization

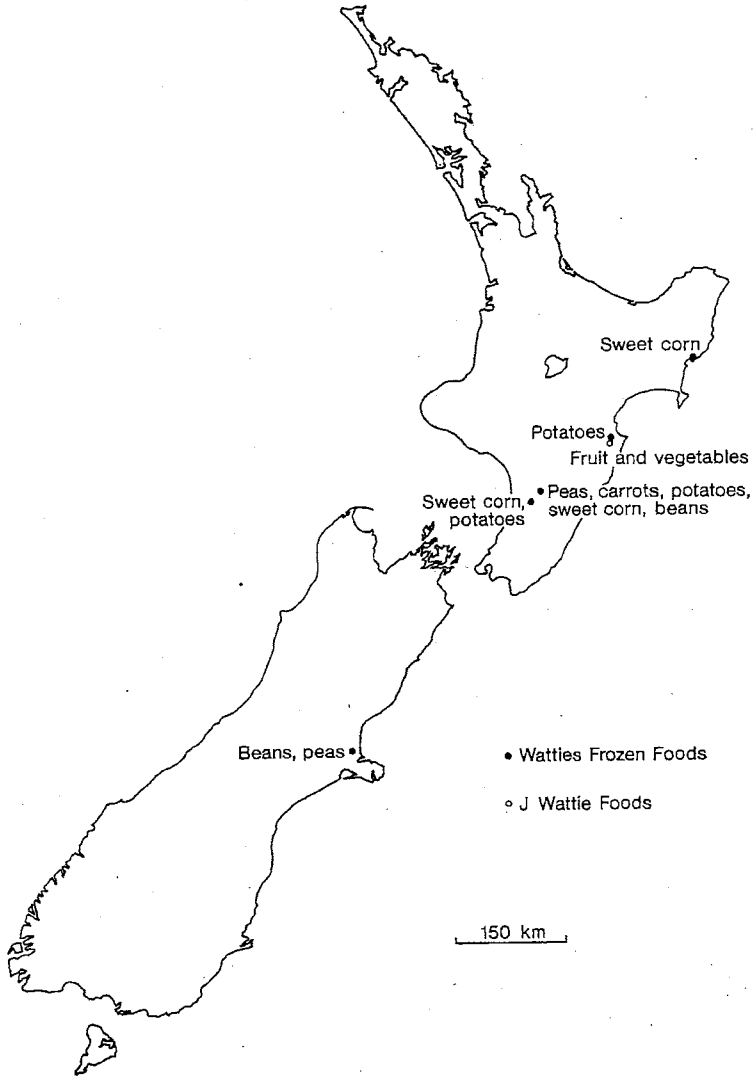
Deregulation of the New Zealand economy has greatly facilitated direct foreign investment, and the accompanying legislative changes have eased the conditions for overseas ownership of land. Strategic purchases have, therefore, been made in a number of existing industries, such as International Paper's stake in pulp and paper company Carter Holt Harvey. Considerable investments have also been made in a range of value-added processes, notably in areas where the privatization of state assets has taken place. For example, in forestry where $75 million foreign investment in processing plants has taken place in 1994 (New Zealand Forest Owners Association, 1994). Food processing companies have been targeted as well.

In 1992, H J Heinz purchased New Zealand's largest food processor, Watties, from Australian parent, Goodman Fielder Wattie. H J Heinz's Chief Executive Officer, Tony O'Reilly, reassured Watties that the purchase was a "win-win" situation for management, employees and Heinz (Paviell, 1992) and a "union of the best food company in the world with the second best" (Weir, 1992). A measure of his success was that the Heinz takeover attracted little antagonism, in sharp contrast to the sale of the Bank of New Zealand to overseas interests which occurred at the same time. Consistent features of Heinz's policy of cautious expansion were evident in the takeover. Founded in 1888 and specializing in sauces, pickles and tinned goods, Heinz extended its operations beyond the US in the 1950s and 1960s; with 48 subsidiaries in 23 countries, 48 per cent of profits were made outside of the US in 1991 (Stopford, 1992). The company has consistently positioned itself to enter emerging markets (e.g. Weight Watchers in the late 1970s); it has stressed operating efficiencies, sought to recognize the value of marketable brands and identified Asia as a growth area for the company. While the purchase of Watties was not surprising, it was, however, unexpected — Goodman Fielder Wattie was planning to make a public share offer of Watties, partly to offset operating difficulties within the group. Heinz made a surprise takeover offer, shutting out a rival bid by Australian firm Pacific Dunlop to buy Watties for NZ$566 million (Weir, 1992). Watties' management expressed satisfaction with the buy out, arguing that Heinz offered a good product match (*Commercial Grower*, 1993).

Overseas Investment Commission and Commerce Commission approvals for the purchase were granted late in 1992 (Martin, 1992; Weir, 1992). Business commentators lamented that New Zealand investors had lost the opportunity to buy into a profitable local enterprise. O'Reilly, instead, offered the comment that New Zealand's labour costs were 25 to 34 per cent lower than Australia's and implied that Heinz might relocate some of its Australian production operations to New Zealand (Duncan, 1992). Some Australian business commentators interpreted as a sign that the New Zealand economy was now the more competitive of the two (Duncan, 1992).

With plants in Hawkes Bay, Manawatu and Canterbury (Figure 15.2), Watties has retained its dominant share of the New Zealand frozen food market though prospects for growth in the volumes of domestic sales are limited. Heinz, however, was more interested in capitalizing on New Zealand's reputation as an "environmental oasis" and as an efficient producer to expand into the Australia and Asian markets with its marketable brands. In addition, Watties' various canning, freezing and food processing facilities all had the capacity to increase production (Draper, 1992). Watties' Hornby plant, for example, produced 35,000 tonnes of frozen vegetables from a single shift with 85 per cent being exported. Heinz proposed to run a double shift and double export volume as well as create an extra 1,000 jobs (Weir, 1993). This was consistent with Heinz's view that increased profits for the company were likely to be volume- rather than price-driven. Besides, as a "market garden of Asia," New Zealand was an ideal base from which to achieve growth (Weir, 1992a). Heinz's 1994 annual report gave showcase treatment to New Zealand under the heading "A Garden in the Pacific," although the beauty of the natural environment was paired with the competitive business environment. Heinz raised its Asia-Pacific sales from $350 million in 1992 to over $800 million by 1994. Watties' exports to Hong Kong and Singapore contributed to this growth (*The Dominion*, 13 July 1994). Watties' beans and spaghetti captured 10 and 12 per cent of the Australian market within six months (*Evening Post*, 17 September 1992). O'Reilly also claimed Watties could compete in Asia with potato growers from California and Idaho (Weir, 1992), while company strategists predicted that the Asian market would expand at three times that of America and Europe.

Figure 15.2 Watties Plants, 1994



Within New Zealand, Watties is positioning itself with respect to the globalization trends in convenience foods. Its products fall across all convenience food categories including soup, pasta, beans, pasta sauces, simmer meals, fruit, vegetable and baby food (*Supermarketing*, 1994). To keep pace with its production increase, the company has increased its network of contract growers. In 1994, 10,000 tonnes of peas were grown in Manawatu (one-third of company production); the target for 2000 is 15,000 tonnes in Manawatu and Horowhenua (Barton, 1994a). This also allowed the company to grow crops under more favourable climatic conditions. The major overseas market — Watties' frozen pea exports to Japan — totalled 10,000 tonnes, approximately a 65 per cent market share (Barton, 1994). Watties has also been creative in challenging what it regards as frozen food myths (*Hospitality and Catering*, 1993) and in exploring new products, particularly in the area of organic frozen vegetables. Organically grown peas, beans, squash and carrots have been grown in Canterbury, Manawatu and Hawkes Bay and exported to the US and Japan. Although only a small percentage of Watties sales are organic, vegetable exports command 50 per cent premiums over conventional produce. Further changes may yet occur — a takeover of Heinz by international food giant Unilever has been tipped.

The deregulation and resulting collapse of Weddel (NZ) created a space — not a vacuum — and allowed the internationalization of domestic companies. As a result, forestry companies, such as Fletcher Challenge Ltd and Carter Holt Harvey, spread to Australia, Latin America and North America (Roche, 1990a). However, deregulation is a two-way experience, and new entrants have invested in the New Zealand economy, an outcome positively accelerated by a programme of state asset sales (e.g. Britton et al., 1991; Roche, 1991). Some overseas MNCs now see New Zealand as being a strategic stepping stone to entering the Asian market.

Food Regimes: Making Sense of the History and Geography of Export Production in New Zealand

A number of explanatory frameworks which provide insights into New Zealand's trading relationships with Britain and the Commonwealth exists. An example is Armstrong's (1978) idea of Dominion capitalism,

but its application to specific commodity production chains presents some difficulties (Roche, 1990, 1992). The food regimes concept pioneered by Friedmann and McMichael (1989) appears to offer greater potential for exploring the development of food and fibre in New Zealand in the past as well as offering insights into the future.

The food regimes idea rests on the particular relationships amongst agricultural development, the capitalist world economy, and the emerging state system since the 1870s. Friedmann and McMichael (1989) seek to challenge orthodox interpretations of the experience in Europe where industrial specialization underpinned the economic basis of nation states by widening the scope to include white settler agriculture. They explain national economic development in terms of sectoral exchanges within and between nations via the emergence of a collection of independent liberal nation states and through the internationalization of agriculture, food production and consumption. Out of this nexus emerges a degree of agricultural specialization "in the relation of settler agriculture to the maturing of a State system centred on Europe" (Friedmann and McMichael, 1989:94). They argue that settler states were more important than is generally recognized to the formation of nation states [in Europe] during the late nineteenth century. Not only did they export competing temperate crops to provision the growing industrial working class in the nation states, but they also formed the basis of a new "international order" alongside colonial agricultural exports. Capital, however, has a power "to reorganize food production in ways which can undermine national agricultural activities" (Friedmann and McMichael, 1989:95). Friedmann and McMichael are concerned with demonstrating that conventional national development planning is implicitly founded on a historically specific US experience which, when being applied by world development agencies to LDCs, will fail.

Two distinctive food regimes are outlined by Friedmann and McMichael (1989). The salient characteristics are shown in Table 15.5. Meat and wheat were the key agricultural products of the first food regime, being produced under an extensive capital regime whereby increases in production were achieved through an expansion of the agricultural frontier. Central to the first food regime was family based farm production for export. In the case of meat, this took the form of transatlantic livestock shipments, meat rendering and meat preserving ventures (salting, tinning, concentrates). The second food regime also

featured wheat and meat, though the latter were processed into a more durable state (by freezing and chilling). The character of capital was concurrently altered so that production gains stemmed from the more efficient and enhanced performance of new and existing agricultural systems. The industrialization of agriculture occurred along with a transnational restructuring of agriculture. As always under capitalism, important contradictions existed during the first and second food regimes. Arguably, the second food regime is drawing to a close in New Zealand in the 1990s: some tentative suggestions about the nature of a third food regime are also included in Table 15.5. This helps structure recent developments in the meat industry in New Zealand where there has been a proliferation of small plants offering premiums for very specific stock types with deregulated labour forces working several daily shifts and employing more high technology in processing. Accordingly, McMichael has given closer attention to what he describes as the "contours" of a third food regime.

An emerging third food regime as interpreted by McMichael (1992:359) will be characterized by the reconstitution of food through industrial and bio-industrial processes via flexible global sourcing of generic crops and increasing importance of affluent foods (animal protein, processed foods, fruits and vegetables). Le Heron and Roche (1995) have suggested separately that there is evidence that a third food regime in the New Zealand context at least may become a conflation of globalization and sustainability tendencies.

Friedmann characterizes the products of the second food regime as "durable" foods — commodities such as wheat, frozen meat (and probably sugar — see Hollander, 1994). In contrast, the emerging third food regime is centred around other attributes. Friedland (1992) suggests the "fresh complex" while others use the term "natural" foods. The latter is perhaps a more useful term, not only because it is wider, but because it encapsulates other dimensions of the management of agro-industrial production which are not easy to identify in terms of "fresh."

Table 15.5 Agriculture, the State and Food Regimes

Character	1st food regime	2nd food regime	3rd food regime
Products	Wheat, meat	Wheat, meat durable food	Fresh? reconstituted?
Period	1870-1914c	1914-1973?	1990s?
Capital	Extensive	Intensive	Flexible
Food Systems	Settler agricultural exports produced by family labour conditions for growth of wage labour and formation of metropolitan nation states	Transnational restructuring of agriculture as a supplier of inputs and of consumption patterns. Incorporates the post colonial world	Global financial circuits linking production and consumption
Contradictions	Culmination of colonial organization of pre-capitalist regions	Completion of state systems through decolonization	Globalization of production and consumption
	Rise of nation state system	Weakening of state systems through transnational restructuring of agro-food capitals	Dis-integration of national agro-food capitals and state re-regulation

Source: 1st and 2nd food regimes derived from Friedmann and McMichael (1989).

It can be argued that the premium values placed on "natural" products such as fresh fruits under an emerging third food regime, are counter-balanced by increased vulnerability to the normal variations in environmental conditions, beyond the "quality" envelope, i.e. unseasonal temperature ranges insufficient to kill the trees but sufficient to damage and downgrade crops. In some ways, "naturalness" is actually highly dependant on a stable set of "optimal" conditions to produce the desired crop attributes. It is tempting to suggest that these environmental conditions (temperature, water requirements, etc.) are more tightly bunched and highly specific than for the durable foods of the second food regime. In that a single heavy hail storm can completely destroy the

fruit crop of major horticultural regions or render it suitable only for low value juicing, there is a degree of importance in this suggestion. For instance, a hail storm on 2 March 1994 caused an estimated $50 million of damage in Hawkes Bay as well as destroyed 3.7 million cartons of apples, approximately half the total export crop. Financial instruments such as crop insurance hence become important operational requirements since the difficulties of an affected orchard surviving until the next season on virtually no income are acute, especially in a deregulated environment where governmental relief is unlikely and the Apple and Pear Marketing Board's single overseas seller status faces renewed challenges. Nevertheless, the fact that only a minority of apple growers in Hawkes Bay were insured indicates that not all growers are positioning themselves to best counter the adverse aspects of environmental hazards under a third food regime.

Durable foods are well named in that they can be transported long distances and stored for considerable periods. They are also to a greater extent more resistant to normal environmental variations than the "fresh and natural complex." A cold snap will not kill all the stock in a herd except when it is very extreme and unseasonal. A flash flood might, but this is an event of some magnitude. However, it is perhaps an oversimplification to assume that second food regime products are more resistant and durable to environmental changes than "fresh and natural products" for this ignores the role of agro-chemistry which, in the twentieth century, has been heavily involved in providing scientific solutions to the durable foods equivalent of hail storms that mainly take the form of infectious diseases of various kinds to which plants and animals are susceptible. The success (for the moment anyway) of these agro-chemical initiatives (see Ward, 1994) constitutes a rather under-explored aspect of the "durable" food complex. Taking this connection between food regime commodities and crop protection forward to the third food regime, a number of propositions can be made.

1. The agro-chemical strategies serving the second food regime cannot be transferred without modification to the third food regime (especially where it is overlain with sustainability).
2. A third food regime centred on "fresh and natural" anchored in global circuits of capital is expanding ahead of the ability of (bio) technology to ensure maximum quality.

3. Appropriate agro-technologies and means of disease prevention and remedy will be increasingly contested by consumers, many of whom will reside far away from producing areas, i.e. the 20th century connection between farming and the agro-chemical complex established *circa* 1930s to 1980s will be contested.
4. The agro-chemical complex may emerge as a significant global industrial bloc which will endeavour to further entrench the second food regime food systems to maintain its own markets for chemical products (or will second food regime agriculture be deployed to new localities [perhaps in LDCs] albeit with new products?).

Each of these few points warrants closer attention. If nothing else the agro-chemical farming connection may be one very important underlying relationship which contributes to the continued production of second food regime "durable" foods persistent through the crisis in global agriculture which emerged in the 1980s. The current divergence of views about the third food regime as emerging, already in place or non existent may in itself be a diversion. Perhaps, second and third food regimes will co-exist (in an uneven fashion) in selected regions in a range of producing states. A clearer demarcation between second and third food regimes may not really occur until the third food regimes equivalent of chemical fertilizers, sprays and drenches are developed and adopted — this research is well under way and seems likely to take the form of biological controls and genetically engineered resistance and food qualities.

Conclusion

There is no simple and straightforward conclusion to this discussion. But, the main points of importance probably lie in the way in which recent developments in New Zealand can inform thinking about a third food regime. McMichael's (1992, 1992a) discussions of the "contours" of the emerging third food regime emphasize the importance of transnational finance capital at the expense of the national states in a regime of accumulation. The implication for transnational food systems is a reorientation from basic foods and export crops to the supply of inputs for elite consumption in the north (McMichael and Myhre, 1991:100). In

terms of the Asia-Pacific region, he has subsequently written of three phases in the internationalization of Pacific Rim food systems involving the reconstruction of East Asian diets, the reconstruction of agricultural production (centred around livestock) and thirdly, the internationalization of production leading to "the reconstruction of supply zones such as the United States, Australia and Thailand especially in the development of integrated animal protein-complexes sponsored by Japanese capital" (McMichael, 1992:113). The "contours" of a third food regime may be read off events in New Zealand since the mid-1980s — though not surprisingly there are localized conditions and circumstances which depart from the meso level conceptualization of food regimes and the Anglo-American axis along which most of the substantive work has been based.

In terms of New Zealand's changing trading situation, the first important point is that the country's major agro-commodity production chains remain price takers in spite of changes to work practices and opening to global market forces. Secondly, Australia, always a historically important market (though this has been overlooked by Dominion capital theorists) seems likely to become even more significant in the future. Thirdly, international circuits of capital remain important. Weddel (NZ), arguably a relict of the second food regime, has collapsed — though other "fordist" style second food regime meat processors exist (alongside a co-operatively organized dairy sector, so conceptually the situation is complex). However, the vacuum left by Weddel (NZ) in a general sense has been filled in other ways by the entry of US corporate capital exemplified by H J Heinz in the food sector and International Paper in the forestry sector (Roche, 1993). McMichael (1992a:111) offers another perspective:

> Just as Britain was supplied with foodstuffs from the New World more cheaply than from her own high-cost farm sector, so Japan (and to some extent, its South Korean imitator) has a growing Agricultural perimeter in the Pacific Rim.

New Zealand's image as a "green oasis" is important to these new entrants as is the belief that it will function as a forward base from which to enter the Asian markets where growth rates remain high.

What does this all mean for New Zealand in the context of the Commonwealth? Arguably, several things may now be taking place. At

one level, there is a move to more appropriate signs of political independence (e.g. a Mixed Member Proportional electoral system and a slow growth of republican sentiment) which mirrors the diversification of the export markets. However, the range of export markets should not obscure the essential reality New Zealand producers face as price takes in highly competitive agro-food markets (where there are major struggles between core states favouring subsidized agricultural producers, free traders, GATT and regional trading blocs such as APEC) (McMichael, 1992). Furthermore, New Zealand-sourced production in some key commodity lines may be controlled by decisions made in boardrooms elsewhere in the world.

Finally, to these essentially political economy oriented insights can be added the possibility that third food regime crops may be more delicately interwoven with and dependent upon a narrow range of optimal environmental conditions, i.e. new realities of risk and vulnerability may represent the producers' lot in trying to serve the precise requirements of Asian food markets. This adds a further complexity to what McMichael (1992:360) describes as a "growing tension between private international capitalist accumulation and national political legitimacy [which] frames the emerging food regime."

Postscript

The Weddel (NZ) Ltd collapse was shown as a £30 million book loss on Union International's accounts for 1994. Tim Vestey, 31, was replaced as Union's chief executive, but to no avail. The Dewhurst chain of butchers' shops in Britain, a subsidiary of Union International, has run at a loss in the face of competition from supermarkets, and bankers have not extended debt restructuring, forcing Union International into receivership in March 1995. From a food regime perspective, the failure of Dewhurst and the placing of Union International into receivership are consistent with the continuing difficulties faced by mass production second food regime enterprises.

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CHAPTER SIXTEEN

Privatization of State Entities and the Re-emergence of Multinationals in Guyana: New Trends and Conflicts in a Divided Society

Patrick E. Williams

Introduction

In many developing countries, governments have been seeking ways to offset the problems which have plagued their societies for several decades. These include low production and productivity levels, high and rising inflation, rapid urbanization, environmental degradation and, in general, widespread poverty. These countries have taken diverse development paths, but to date there seems to be no satisfactory solution to the problems. The attempts seem to be constrained by a number of socio-economic, political, demographic and technological considerations.

For some developing countries, the financial situation became so desperate that support had to be sought from Western institutions, such as the International Monetary Fund (IMF) and the World Bank among others, which were once considered then as capitalist networks and as such to be avoided. These institutions, however, were not prepared to offer support to these countries unless certain conditionalities were adhered to. For some of the countries, financial support required that they liberalize their economies, improve their human rights record and embrace democratic principles of government.

In Guyana, efforts were made to transform the socio-economic conditions with the assistance of the international financial institutions. As such, Guyana was forced to adopt the IMF's proposed structural adjust-

ment programme which suggested a greater involvement of the private sector in the national economy.

The attempt at liberalizing the Guyana economy in the late 1980s witnessed a new influx of foreign private capital especially in the forestry and mining sectors. The growth of these sectors had, for a long period, been stifled by a lack of investment. With the arrival of foreign capital and technology in these sectors, there were deep concerns within the society about a number of socio-economic, political and environmental issues. These led to furious debates which in some instances reflected the deep ethnic and political divisions that prevailed within the society.

The focus of this chapter is on private foreign investment in the mining and forestry sectors by two multinational companies, Omai, a Canadian based Company and Barama, a Korean-Malaysian financed company, respectively. The chapter is divided into five main sections. This first section attempts to put in context the scope of the study. Section two provides a background to the socio-economic and political framework within which the Barama and Omai projects will be analysed, while the third section gives a historical background of the companies. Section four attempts to analyse the controversies surrounding the operations of the companies, while section five focuses on the most recent public debate that has engaged the Guyanese public and a foreign private organization, the Bretton Woods Reform Organization (BWRO). Section six concludes the study by providing a summary of the main issues discussed as well as providing some guidelines for future private foreign investment in Guyana.

Background

The early 1960s witnessed a series of violent incidents which, until today, have had some very serious repercussions on the socio-economic, cultural and political development of Guyana. These incidents had their genesis in the colonial heritage of the country and have from time to time re-emerged to impact upon the post-colonial development process. In the early 1950s, the nationalist movement, a broad based anti-colonial coalition of all ethnic and class interests, threatened the colonial *status quo*. The colonial administration responded with vigour, fracturing the

nationalist coalition, thus spawning a fresh inter-racial, social and ethnic rivalry which polarized the population along the racial lines.

In 1966 when Guyana became an independent country, it was widely recognized by decision-makers and development planners that significant inflows of capital were needed to put the country along a development path. This belief was given credence when the first post independence development plan was prepared by Arthur Lewis. The essence of this plan was that agricultural expansion and development were to be the basis for industrialization and that private foreign capital was to play a pivotal role. However, the view among policy-makers was that this approach was incapable of achieving the development objectives of the country especially since large sections of the productive sector were still under foreign control.

By the 1970s, there was a major ideological shift in Guyana. The country was declared a Co-operative Socialist Republic and, as such, it was felt that the current private capital development trends were incompatible with the new socialist ideology. There was a general view also that nationalization was the way forward to garner the resources required to promote development. The early 1970s therefore witnessed the passing of a number of private industries into state control. These included sugar, bauxite and timber, the largest sectors of the Guyana economy.

Between 1970, the commencement of nationalization, and the mid-1980s, the industries that came under state control showed a dramatic decline. They were incurring hugh deficits, loss of technical personnel as well as recording low and declining productivity. Their performance was impeded by poor management, corrupt practices, poor industrial relations climate due to inter-ethnic and political rivalries as well as global market conditions for the output of the industries and the inputs they required.

Significantly, by embracing the socialist philosophy the decision-makers also employed development strategies that were inimical to growth and development of some of the nationalized industries. Revenues generated by these industries were used to finance welfare programmes, such as free health and education, without due consideration to the needs of the industries with respect to the replacement of machinery and spares as well as research and development. Thus, by the

mid-1980s, a number of these industries became run down and were experiencing declining production and productivity levels.

By 1985, the socio-economic situation in Guyana was desperate. The country found itself with huge international debts, with repayments schedules it could not meet, high and rising unemployment, rampant inflation and a steadily declining currency and low production and productivity levels. Everywhere there was evidence of massive deterioration of infrastructure, poor roads, dilapidated buildings, collapsing drainage and irrigation networks and infrequent supplies of electricity and pure water. To compound the problem, capital inflows into Guyana came only in trickles, and this meant that serious attention could not be given to the multiplicity of problems.

In 1985, President Burnham, the founder of the Socialist Republic of Guyana, died. His death gave the new political directorate, which took over the leadership of his party and government, an opportunity to take a fresh approach to confronting the development problems of Guyana. It was decided that help should be sought from the International Monetary Fund (IMF), the World Bank and other international financial institutions to rebuild Guyana.

With the assistance of the IMF in particular, a structural adjustment programme was drawn up for the country. It was a highly controversial programme which laid down some very stringent conditionalities before disbursement of funds could be made. These included the removal of subsidies, the reduction of the labour force in the public sector, the scaling down of the military and paramilitary organizations and, most importantly, the privatization of the major state owned entities. Further, new private investment should be encouraged by the removal of a number of bureaucratic procedures as well as state control mechanisms.

Throughout the 1970s and up to the mid-1980s, the country was ruled by President Burnham, who, partly because of his socialist philosophy and nationalization policy and partly because of the alleged undemocratic nature of his government, was not particularly popular among capitalist governments and their affiliated institutions. As such, it was exceedingly difficult for him to attract external funding from these sources. To circumvent this problem, he made new alliances which saw the development of new trading and investment patterns. These new links were aimed at promoting greater south-south co-operation and socialist links. This led to a number of Third World and socialist

countries developing trading links with Guyana. These included China, East Germany, Poland, Brazil, India, Venezuela and Cuba, among others. These links however, did not satisfy Guyana's needs for investment in economic infrastructure. Trading was in the form of barter where Guyana exchanged bauxite, sugar, rice and timber for consumer items rather than hard currency. In any case, these countries were themselves severely short of such capital and up-to-date technology.

By the end of the 1980s, the shift in ideology and development thrust brought renewed interest on the part of private international companies to investment in Guyana, particularly in the mining and forestry sectors. To the investors, these two sectors appeared to have the potential to yield the greatest return on investment mainly because they were vast and relatively unexploited and there had been rapid advancement in exploitation techniques. It was in this context, therefore, that the Omai Gold Mines Limited and the Barama Company Limited commenced operations in Guyana.

The Omai and Barama Projects

The Omai Project

Brief History of Omai

The Omai property is located off the Essequibo River about 100 miles south, south-west of Georgetown. It had been the subject of gold exploration and actual production for over a century. The first recorded production was between 1889 and 1896 when an estimated 61,000 ounces of gold were recovered by very simple hand methods, primarily from the creeks that dissected the mineralized area.

In 1896, the property was procured by a German syndicate. They produced 38,700 ounces of gold prior to selling it to a Chinese merchant, Evan Wong, in 1907. Between 1907 and 1911, a further 15,200 ounces of gold was produced by small-scale miners who sub-leased the property from Mr Wong. Thus by 1911, a total of 114,800 ounces of gold had been produced at Omai.

In 1937, Ventures Ltd. of Canada acquired the Omai property, but no record of their programme was available. The project was later abandoned, and it was not until 1947 when Anaconda British Guiana Mines

procured the property that full-scale drilling and exploration commenced. Anaconda's work outlined extensive gold mineralization in the Omai area, but the company felt that reserves were not significant enough to warrant full-scale mining operations. Thus, their programme was abandoned within three years.

In 1985, an Alberta based exploration company, Golden Star Resources, acquired the Omai property along with the data gathered by Anaconda. The company contracted SNC Inc., a geological and engineering consultant, to prepare a feasibility study between 1985 and 1987. The study estimated the Omai gold reserves to be in excess of 1,800,000 ounces. In 1987, Golden Star Resources joined with Placer Dome Inc. to develop the Omai property. At that time, Placer Dome Inc. concluded that reserves were in the vicinity of 2,296,000 ounces of gold but felt that it was insufficient for its continued involvement.

In May 1990, Placer Dome Inc. was replaced by Cambior Inc., a Quebec based gold mining company, in the Omai project. By December 1990, Cambior and Golden Star Resources submitted to the Geology and Mines Commission the feasibility study for the project with positive recommendations. Subsequently, three discussions were held with Cambior and Golden Star Resources, on the one hand, and the Guyana National Resource Agency (GNRA) and Guyana Geology and Mines Commission (GGMC), on the other. The Guyanese officials received assistance from the Commonwealth Secretariat who, in turn, sub-contracted Amdel, an Australian engineering firm, and Arthur Anderson, an international accounting firm. In August 1991, a mineral agreement was signed between the parties. It was estimated that proven mining reserves were sufficient for ten years.

The Omai Mineral Agreement

The Omai Mineral Agreement was signed in August 1991 between Omai Gold Mines Limited, Golden Star Resources Limited and Cambior Incorporated, on the one hand, and representatives of the government of Guyana and the Geology and Mines Commission, on the other. The financial details of the agreement are set out in Appendix 1. While the agreement was quite complex and detailed, there were six major aspects of the agreement that caused widespread negative reactions when they were made public.

(a) Investment Incentives

The fiscal regime the negotiators applied to the Omai investment had been in place since the 1950s. It had been put together under three different acts: The Income Tax Act (Aid to Industry); the Income Tax Act (Industry Encouragement); and the Income Tax Act (Gold and Diamond Mining Regulations).

These acts which were incorporated in the Omai Mineral Agreement did not allow for tax holidays in the gold and diamond mining industry but permitted Omai to benefit from exemptions of customs duties, consumptions tax and any other direct and indirect tax on all equipment, supplies and materials required for the project. The arrangements also allowed vehicles to be imported for the project without payment of any licenses, fees, duties or other charges relating to the importation of vehicles.

In addition to the tax incentives, the company, based on the amounts spent on exploration, were issued class I and class II preference shares, and the exploration expenses were to be fully deductible from income by the company for income and corporation tax purposes.

(b) Foreign Currency Accounts

Omai has been allowed to open foreign currency accounts for the purpose of conducting its business. It is also allowed to purchase local currency from authorized dealers.

(c) Local Employment

In terms of employment, the company is required to give preference to the employment of Guyanese at all levels of operations to the extent that such persons are available. At the end of each calendar year, the company is required within 90 days to indicate in a report the progress made in employing Guyanese on the project.

(d) Dispute Resolution

According to the agreement, if there are disputes, these should be examined by the chief executives representing both parties and the Minister responsible for Mining or the Chairman or Commissioner. Failing a settlement, the matter is to be referred to a tribunal under the rules of the London Court of Arbitration applicable to International Arbitration.

(e) Indigenous Rights

The agreement stipulates that the project should not unduly disturb and interfere with the indigenous populations within the mining area. Also, they are required to comply with the provisions of the Amerindian Act.

(f) Environmental Protection

As stipulated in the agreement, at the end of the closure of the mining operations, the company is required to restore the area to prevent soil erosion.

The Barama Project

Brief History of Barama

Unlike the Omai area which has a long history of gold mining, the Barama concessions in the north west and in the Mazaruni-Potaro districts are relatively new project areas with respect to large-scale logging operations. The Barama Company was incorporated in August 1991, and it has been granted an area of 4.1 million acres (1,670 million ha) of lowland forests for the purpose of logging.

Barama's investment represents the largest in the forestry sector of Guyana and perhaps in the Caribbean region (see Appendix IIa and IIb). It represents the first tangible interest of Pacific Rim investors in the Caribbean region. The major investors in the company are Sung Kyong Limited of South Korea (20 per cent) and the Samling Timbers Sdn. Bhd. of Malaysia (80 per cent).

The establishment of the Barama Company was the culmination of about five years of careful investigation and studies commissioned on special aspects of the proposed operations, leading to the conclusion of an investment contract and a timber sales agreement with the government of Guyana in October 1991.

While the investment capital has come from abroad, the Barama Company Ltd. is a local company incorporated in Guyana. All decisions regarding the project implementation are to be made in Guyana in keeping with the laws of Guyana and the policies of its government.

The Barama Investment Contract

The Barama investment contract was signed between the government of Guyana, on the one hand, and Sung Kyong Ltd. of Korea, Samling Timbers Sdn. Bhd. of Malaysia and Barama Company Ltd. of Guyana, on the other. This contract was signed on 16 October 1991.

There were five major areas of the company's contract that evoked widespread public reactions when they became known.

(a) The Timber Sales Agreement (TSA)

Under the TSA, Barama was granted exclusive rights under a 25-year license, automatically extended for a further 25 years to extract 1.69 million ha of forest covering predominantly flat or undulating lowlands without major topographic features with some more hilly areas in the west for carrying out timber, logging and related activities. In the initial phase, the company expects to export 300,000 cu m of timber, increasing to about 1.2 million cu m by the year 2001. This of course is far in excess of the 94,000 cu m exported by the entire country in 1989.

(b) Investment Incentives

This second aspect of the Barama investment contract has been widely criticized for its apparent generous nature. According to the agreement, Barama will enjoy a ten-year tax holiday which includes exemptions from income tax, corporation tax, withholding tax, consumption tax, property tax, a number of timber export taxes as well as import duties. In addition, the royalty payments have been fixed in local currency for the next 20 years. To most observers, this last condition seems quite benevolent since the value of the Guyana dollar has been steadily declining against most of the major currencies. Further, the agreement states:

> Any modifications(s) to the law(s) relating to the tax holidays as provided in section 7.1.1. above shall apply to the company if, and only if such modification(s) shall provide additional benefits to the company.

(c) Foreign Currency Accounts

Barama has been permitted to hold external accounts and foreign currency accounts in Guyana. In addition, it may employ 15 per cent of foreign workers, with the option of increasing that number if the local labour with the requisite skills is unavailable. This also means that a

proportion of the salaries of these foreign workers is also paid in foreign currency.

(d) Settlement of Disputes

Provision has been made in the contract agreement for the settlement of disputes between the company and the government. Accordingly, any disagreement between the two parties that cannot be settled by mutual agreement is subject to the arbitration of the "International Centre for Settlement of Investment Disputes" in Washington DC. In such a situation, the company will be considered a national of a state other than Guyana.

(e) Sustainable Forest Management

The contract between Barama and the Guyana government stipulates that the Company will attempt to extract timber according to the principles of sustained yield. To achieve this objective, the company employs the Edinburgh Centre for Tropical Forests (ECTF). The company invests in the project on the expectation of extracting an average of one cubic metre per hectare per year.

The Omai and Barama Controversies

The Omai and Barama contracts, like most other foreign private sector investments in Third World countries, have come under fire from allegations, rumours and speculations about the nature of the agreements.

In the initial stages, only excerpts of the Omai and Barama agreements were made public by the private media in Guyana (*The Stabroek News* and *The Catholic Standard*). At that time, the country was going through a change of government. As such, the new administration immediately seized upon the sketchy media information and began to publicize them. No in-depth analyses were made of the contracts at that point, but there were statements to the effect that Guyana's resources were being "given away on a platter" to foreigners. Some reports even alluded to negotiators on the former government's side having been involved in "deals." The general concern was that the companies received too many generous incentives and that these reduced considerably the returns to the country. At this early stage, it was politically expedient for the new government to attack the agreements. It was part of the campaign to discredit the former administration.

In considering the issue of inadequate returns from the projects, it is first necessary to point out that the Barama and Omai contracts were not identical and as such needed to be analysed separately. This was not done in the initial phase of the controversies. The issue was used to portray the former government as an inadequate guardian of the nation's resources.

With respect to the question of incentives in the case of Omai, there are three main issues to be identified. Firstly, as mentioned earlier, Omai's fiscal regime was governed by three separate income tax acts. These regulations made provisions for tax exemptions for the imported project inputs but did not make allowances for tax holidays.

Barama, on the other hand, was not subject to the same conditions of the Income Tax Act (Gold and Diamond Mining Regulations). Thus, in addition to the tax waivers for imported project inputs, Barama was allowed a generous ten-year tax exemption from income tax, corporation tax, withholding tax, property tax among others. Similarly, there was a controversy over the Omai agreement as the general view was that the income tax acts were created specifically for Omai.

Secondly, a group of UN specialists who were asked to look at the Omai contract were concerned about the debt equity ratio. It was felt that the company should have borrowed less and used more of its own money. There was, however, the argument of the "blacklisting" of Guyana caused by the international financial institutions because of its non-repayments of foreign debts. Pressure from the World Bank and the IMF meant that assets in Guyana could not be used to raise investment capital. In the case of the Omai agreement, Cambior had to use its North American assets to get loans and then transfer them to Omai for the project. This meant that there were two sets of expenses, and this explained the issue of the company borrowing at 9 per cent interest and lending to the Guyana project at 15 per cent interest.

Thirdly, on the question of "suspicious dealings" in the case of Omai, the Geology and Mines Commission sought and received assistance from the Commonwealth Secretariat which in turn sub-contracted to two reputable firms, Arthur Anderson and Australian firm Amdel. The main objective of retaining these agencies was to ensure that Guyana got the best advice under the circumstances and that the arrangements could withstand scrutiny.

In reviewing the fiscal and financial aspects of Omai's operations, it is apposite to mention that the UN consultants (TCMD/DESD) maintained that the project was undeniably a marginal commercial one due to low ore grades and that it was understandable that Cambior, the principal funding agency, would bargain for a tax regime and finance structure that would give it maximum access to early cash flow so as to recover its outlays and make a return on them. The consultant went on to state that this should be seen in the light of the project's inherent risk and Guyana's poor perceived investment climate.

In relation to Barama's fiscal regime, there was widespread concerns about the tax holidays granted to the company. Most observers felt that the granting of a ten-year concession meant an immense loss in revenue and that the contract should have resembled the Omai contract with respect to the granting of concessions. There were other aspects of the financial arrangements with the Barama contract that were criticized. As part of its agreement, Barama had also claimed that it had the right to export logs out of Guyana. This aspect of the agreement was also criticized on the grounds that it was not a way of getting maximum returns out of the resources, especially since it was felt that the company would be inclined to export the most valuable species.

One perception of Barama's claim was captured in *The Stabroek News* of December 1993 when one writer, in response to the claim that the company was allowed to export round logs, stated that he had two points to make. First, since the contract was not signed by the Minister of Finance, as the law required, it meant that the validity of it could be revisited. Secondly, he argued that for round logs the return was about US$300 but if the same log be processed into plywood it would be $900 and further still it would be as much as $2,400 if processed into furniture components. It was also argued that the company seemed to be exporting to the Far East prime hardwood species for which there would be handsome profits for Barama and not for the Guyana economy.

While there was a general concern about the apparently low returns Guyana was expected to receive from the Omai and Barama investments, both companies argued that their actual contributions to the nation had been highly underestimated. In the case of Barama, for example, it was pointed out that over the ten-year tax holiday period (1992-2001), which was one of the main sources of controversies, the company will have invested a total of $154 million in three phases.

The company estimated that this investment will have yielded a turnover of $640 million, of which about 62 per cent will have been retained in Guyana. It also argued that a considerable sum of money will have been donated to improve health, education and other services within Guyana and pointed to contributions, such as $203,000 for the Forestry Commission, $33,000 for the University of Guyana and $109,000 for upgrading and $150,000 per annum for running the Port Kaituma Hospital in the project region. The Omai company also identified contributions, such as the funding of the Geology programme at the University of Guyana.

However, the apparent benevolence of the companies was not viewed in a positive way by everyone within the Guyanese community. To some, these contributions were viewed as political patronage, a practice in which some multinationals have been quite knowledgeable. For example, there was widespread condemnation when it was discovered that Barama was totally responsible for the funding of President Jagan's East Asian trip in 1994 to encourage further direct foreign investment in Guyana.

The visit resulted in another contract with Malaysian company Leeling, in which 1.2 million ha of forest will be taken out of the state reserves and a visit by Malaysian billionaire Vincent Tan for the purpose of logging. It was felt that acceptance of such funding was in conflict with national interests since there was at the time a call among a wide cross-section of the society for the company's contract to be renegotiated. This facet of the multinationals' behaviour was pointed out by Colchester (1994) when he noted:

> The unprecedented scale of foreign investment under economic liberalization, particularly in the logging and mining sectors, has considerable influence on decision-making. The visible result in the timber industry is the replication of patterns of political patronage prevalent in Asia, which risk further undermining Guyana's hesitant steps towards a functioning democracy in which rulers are accountable to the ruled. (p. 47)

While there have been repeated calls for a renegotiation of the Barama contract, the Guyana government seems to be reluctant to move in this direction. In a *The Stabroek News* headline article dated 6 Novem-

ber 1994, it was reported that a high ranking government official pointed out that the administration had no intention of renegotiating the Omai and Barama contracts as it would serve to scare away potential investors. In June 1994, government officials met World Bank officials and expressed concern that the logging contracts may be environmentally and socially undesirable. In response, the Bank officials expressed the view that if the contracts did not meet internationally accepted standards the government may consider the need to renegotiate them.

These latest discussions continue to emphasize the dissatisfaction among government officials and technical experts with the Omai and Barama contracts. However, it is revealed here that the government has found itself in a dilemma. It is caught in a situation where it is being pressured to review the contracts, on the one hand, and at the same time adopting a policy to attract private foreign capital desperately needed to promote national development, on the other.

With respect to environmental considerations, both Omai and Barama have been under severe attacks from environmentalists, the indigenous people and politicians. In the case of Omai, the major concerns include the transportation and disposal of cyanide, the disposal of effluent and erosion due to the stripping of the vegetation. Environmentalists became quite aware of the dangers of transporting cyanide, for example, during the night of 5 June 1993, when in rainfall an Omai vehicle carrying cyanide to be used in its operations ran off the road. This led to some spillage of the chemical. This incident which caught the attention of a number of organizations, evoked widespread reactions.

There is also concern that sewerage from the Omai settlement which is allowed to flow into the Essequibo River is detrimental to downstream residents who use the river for domestic purposes. In addition, surveys by an NGO, the Guyana Environmental Monitoring and Conservation Organisation (GEMCO), indicated that there appeared to be no wildlife in the area and this may have been due to the presence of cyanide in the tailing pond. Concern was also expressed that it was necessary to protect the wildlife from exposure to cyanide and other polluting agents since it was a source of food for residents in surrounding areas.

Barama, like Omai, has also had to contend with its share of questions about environmental issues. There have been allegations from environmentalists that, despite claims by the company that its logging

and management practices are undertaken with sustainability in mind, the operations have given rise to a number of disturbing environmental consequences. These include increased soil erosion and the silting of rivers and creeks and the endangering of wildlife. These effects have very serious and long-term consequences for the Amerindian populations residing in the project area, especially since they depend on the wildlife and fish as a source of protein and income. There is also the question of the ecological balance in the project area once there is disruption of the biotic community.

The environmental issues raised against Barama are related to a much wider and contentious issue, that is the relationship between the company and the indigenous inhabitants within the project area. Claims have already been made by the Amerindians that Barama workers have been evicting them off their traditional homelands. In the light of this, calls have been made by two Amerindians organizations, the Amerindian People's Association (APA) and the Guyanese Organisation of Indigenous People (GOIP), for a review of the Barama contract. So far, they have held discussions with the Amerindian Affairs Minister, who himself is an Amerindian, to establish a broad-based Commission of Inquiry to review the contract.

Both Omai and Barama companies have clauses written into their contracts about ensuring protection of the environment as well as respecting the rights of the indigenous people within the project areas. They have in a way responded by contracting technical skills to provide expertise in dealing with the issues. The organizations employed are the Edinburgh Centre for Tropical Forests (ECTF) in the case of Barama and Rescan Environmental Services (RES) of Canada. Both organizations have prepared environmental impact assessment studies for the companies and have covered a wide range of issues. One of the main features of both reports is that the local environmental monitoring agency, the Guyana Agency for Health Environment and Food Policy (GAHEF), should acquaint itself with all the necessary issues so that it could properly undertake its task.

Currently, given the staffing capability and availability of equipment, serious doubts have been raised about the ability of GAHEF to undertake the responsibility of instituting a systematic and effective monitoring regime. Also, a survey of the Barama concession by ECTF has indicated that excessive timber harvesting could jeopardize the

company's sustainable forest management programme, and there are reports, from one disaffected worker at least, that the company's average extraction rate of one cubic metre per hectare per year is already being exceeded.

The Bretton Woods Reform Organization Debate

Recently, a private organization based in Grenada, called the Bretton Woods Reform Organization (BWRO) and headed by a former Guyanese World Bank economist, initiated a public debate on foreign investment in Guyana with the main focus being on the Omai and Barama projects. The debate attracted former government officials associated with the Omai and Barama negotiations as well as other interest groups.

At the meeting in Georgetown, the BWRO suggested that the Guyana government halt the granting of timber concessions for a period of three years in exchange for a 50 per cent liquidation of its multilateral debt. Should this proposal be found unacceptable, an alternative should be a 50-year repayment period on what is owed, without interest payable on 70 per cent of the debt. These proposals were put forward in the light of calls to halt expansion in the forestry and mining sectors in Guyana.

Another high point of the BWRO meeting was again a call for a reconsideration of the Barama contract. The group, consistent with other groups within Guyana, focused particularly on the duration of the lease, royalty, export tax, tax holiday and sustained yield management.

Regarding the same BWRO meeting, a report in *The Chronicle* of Saturday, 5 November 1994, quoted the Secretary of GOIP as reporting that Barama's plan to construct a lawn tennis court for Amerindians was tantamount to recolonization. The secretary supported his claim by observing that nobody thought it fit to find out what sports Amerindians enjoyed. In his view, they were good archers and swimmers, but that fact had escaped the Barama planners. In addition, the ration store Barama established to assist the people contained none of the traditional foods of the people. The GOIP secretary also noted that, while there were about 45,000 people of Amerindian origin in Guyana, no one had seen it fit to consult them when land was being parcelled off in large timber and mining concessions.

In another article in *The Stabroek News*, dated 5 November 1994 and in response to the BWRO debate, some details emerged about the contributions Barama and its affiliates had made to the government of Guyana. According to the report, an official from the Presidential Secretariat noted that a total of $140,000 had been donated to the government. This had comprised $60,000 from Barama, $30,000 from Sung Kyong Limited of South Korea and $50,000 from Samling Timbers Sdn. Bhd. The press release indicated that the donations were used to offset expenses incurred during the President's Asian trip, to rebuild the security fence around his residence and to train staff in forestry management. This disclosure raised again the questions of political patronage and conflict of interest. It has prompted some observers to suggest that the government can now only pay "lip service" to the idea of a Barama review.

One off-shoot of the BWRO Georgetown meeting was that the organization intended to convene, by January 1995, an International Rainforest Tribunal comprising eminent Guyanese, Caribbean and International personalities. The primary objective was to address issues pertaining to the destruction of Guyana's Amazon rainforest.

Conclusions and Recommendations

This chapter has focused on the controversies surrounding the operations of two expatriate firms, the Omai Gold Mines Limited and the Barama Company Limited, in the mining and forestry sectors, respectively, in Guyana. These firms arrived in Guyana at a time when the country was experiencing socio-economic and political instability and had to rely on the support of Western donor countries as well as international financial institutions to satisfy the basic needs of its population.

However, because of the poor performance of the national economy, the assistance sought was granted upon conditions that the country adopted a liberal economic policy as well as the establishment of the principles of democratic government. This approach included the opening up of domestic resources to foreign investors. Simultaneously, there were domestic conditions which did not allow for a smooth implementation of the liberalization policy in Guyana. There were inter-ethnic and political rivalries that injected differences in the way large

sections of the society perceived the investment profiles of the two companies.

In the main, there were arguments that suggested that the Guyanese people were receiving too little from the investment and that the exploitation of the nation's resources could be more beneficially undertaken. Additionally, there were suggestions that the environment as well as the people who depended on it were put in jeopardy. The latter concern was aimed mainly at the indigenous population. It was felt that they would be the group to pay the heaviest cost from the negative impact of the projects.

As expected, the companies did not take all the criticisms without venting their views. In the main, they felt that Guyanese were unaware of the true returns on the investment and that most of the controversies were politically motivated. In particular, they felt that the true value of the companies' contributions to the national economy were either ignored or otherwise misunderstood. Reference was also made to the unstable investment climate of the country as well as the companies commitment to the protection of the environment.

It is obvious from the issues raised on both sides (the companies and the Guyanese) that there is a number of concerns that should be given serious considerations when foreign investment is being pursued in Third World countries generally, and Guyana in particular. These can be stated as follows:

First, attempts should be made as far as possible to ensure the discussions are made known to various interest groups within the society, especially to those to be directly affected by the outcome of projects. At least two benefits are likely to emerge from this process: (a) there is likely to be a reduction of suspicion and allegations of corrupt transactions; and (b) the participation of the local population in the decision-making process can prevent negotiators from making decisions inimical to the interest of sections of the society.

Secondly, potential investors in developing countries should be thoroughly scrutinized to ensure that their records are unblemished. In this instance, repeated reference was made to the poor environmental record of the East Asian logging companies as well as their treatment of indigenous people. Some of these concerns are beginning to emerge in the case of the Barama Company in Guyana.

Thirdly, Third World countries should also take steps to ensure that they have the manpower and technical capability to monitor the operations of private foreign investment companies. There is a concern that this aspect is lacking in the case of Guyana.

Fourthly, in the case of Guyana, there should be clear guidelines/procedures set aside for the disposal of assets during divestment or private sector investment. In the current situation, there are unclear procedures which allow questions to be asked about propriety on the part of state officials.

Fifthly, in addressing the concern of environmental degradation resulting from the exploitation of forestry and other natural resources, it is recommended that Guyana should seek financial, technical and other forms of compensation/support from the international community if it is expected to forego the use of these resources and to plan its conservation and protection policies.

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Investment contract between government of Guyana and Sung Kyong Ltd. of Korea, Samling Timbers Sdn. Bhd. of Malaysia and Barama Company Limited of Guyana.

The Barama Timber Sales Agreement.

The OMAI Gold Project and Future Mineral Arrangements for Guyana, TCMD/DESD, May 1993.

The OMAI Mineral Agreement, 16 August, 1991.

Appendix I Financial Details of the Omai Mineral Agreement

I(a). Estimated Investment in Omai Gold Mines Limited

1.	Exploration — Golden Star	US$ 11,000,000
2.	Exploration — Cambior	2,919,000
3.	Construction and pre-production	144,952,000
4.	Working capital	9,800,000
5.	Financing, hedging, insurance fees	5,055,000
6.	Capitalized interest	7,443,000
		US$ 181,169,000

Source: Omai Project Document 1990.

I(b). Source of Investment

Debt

1.	Gold loan	US$ 120,000,000
2.	Equipment lease	4,733,000
3.	US Dollar loan	20,200,000
		US$ 144,933,000

Equity

1.	Class I preference shares	US$ 11,000,000
2.	Class II preference shares	2,919,000
3.	Class III preference shares	22,317,000
4.	Common shares	------
		US$ 36,236,000

I(c). Projected Income and Expenditure for Gold Production, 1990-2020

	1990-2000 US$/oz.	2000-2010 US$/oz.	2010-2020 US$/oz.
Price of gold	350.00	400.00	450.00
Royalty — Guyana	17.50	20.00	22.50
Cost of production	200.00	200.00	200.00
Net cash flow	132.50	180.00	227.50
Corporation and income tax — Guyana (35%)	46.37	63.00	79.63
Cash flow for dividends	86.13	117.00	147.87
Withholding tax — Guyana (6.25%)	5.38	7.31	9.24
Dividend — Cambior (60%)	48.45	65.82	83.18
Dividend — Golden Star (35%)	28.26	38.39	48.52
Dividend — Guyana (5%)	4.04	5.48	6.93
Summary	US$/%	US$/%	US$/%
Guyana	73.29/48.9%	95.79/47.9%	118.30/47.3%
Cambior	48.45/32.3%	65.82/32.9%	83.18/33.3%
Golden Star	28.26/18.8%	38.39/19.2%	48.52/19.4%
Total	150.00/100%	200.00/100%	250.00/100%

Note: The data in Appendix I(c) indicate that projections were made to determine the feasibility of gold production. Cost of production held constant and all other items are varied.

Source: Cambior, Guyana Geology and Mines Commission Project Document.

I(d). Description of the Various Types of Equity in Omai Gold Mines Limited

Preference shares class I	Non-voting shares corresponding to exploration expenditures incurred by Golden Star from 1985 to 1990 on the Omai project. Shares without dividend, redeemable at the rate of 10% of net cash flow and before any dividend on common shares.
Preference shares class II	Non-voting shares corresponding to exploration expenditures incurred by Cambior during 1990 on the Omai project. Shares without dividend, redeemable before any dividend on common shares.
Preference shares class III	Corresponding to portion of project financing supplied by Cambior and accounted for as equity to maintain debt-to-equity ratio of 4/1. Shares with dividend and redeemable with accumulated dividends before any dividend on common shares.
Common shares	Voting shares with nominal value. No dividend is payable on common shares until all debt is paid back with interest and all preferred shares are redeemed with accumulated dividends.

Appendix II Barama Investment

II(a). Investment Profile

Stage	Cashflow US$ (000)
Phase I 1991-1993 (4-line plywood factory)	54,000
Phase II 1995 (Additional 4 lines making a total of 8 lines)	50,000
Phase III 2000 (Additional 4 lines making a total of 12 lines)	50,000
Total 1991-2000	154,000

II(b). Breakdown of Phase I Expenditure (1991-1993)

Activities		US$ (000)
Plywood factory:	Construction	9,500
	Machinery	20,000
	Barges and tugs	4,000
Logging/Forestry division:	Construction	2,500
	Equipment	14,000
	Administration	4,000
Total		54,000

Appendix III Barama Company Limited: Estimated Revenue and Other Contributions during Tax Holiday Period

	US$ (000)
Royalties	7,610
Income tax on salaries and wages	23,905
Donations	4,396
Total payments	33,911

Source: Barama Company Limited, 1993.

PART V

Physical Change

CHAPTER SEVENTEEN

Global Change and Water Resources Management in Africa: Problems and Prospects for the 21st Century

Lekan Oyebande

Introduction

The British Commonwealth itself is global, being strongly represented in virtually all continents. The present contribution focuses on the African continent which is likely to be most disadvantaged by global change. Global environmental change (GEC) encompasses those changes that occur at the global level and affect the total global system, as well as those that occur at the local, national or regional level but have consequences for the whole earth system. The modification of the climate system as a result of the build up of greenhouse gases, the depletion of the ozone layer, accelerated sea-level rises, the loss of biodiversity, desertification, the loss of rainforests and the population explosion, especially in the Third world, are all aspects of the GEC.

The effects of climate change on hydrology are expressed in terms of the processes and storage which comprise the hydrological cycle. Climate is an important enabling environmental factor which influences water resources management in Africa. It affects sectors such as irrigated agriculture, water supply and energy, among others. The last two decades have produced intense and dramatic climatic fluctuations, including persistent desiccation in the sub-Saharan Africa, recurrent and alternating droughts and floods which have caused serious socio-economic disruptions. The Sahelian drought, for instance, precipitated the greatest famine of modern times (Riebsame, 1989; Oyebande, 1990).

Water resources management embraces all measures related to the rational development and use of water and water bodies, including survey, integrated water planning, design and construction of various water projects, as well as the appropriate operational control of the hydrologic regime and quality of the water bodies. Water resources management has become a more or less self-contained field concerned with seeking optimal solutions to problems arising from the demands of society on one hand, and the availability of water in nature on the other. In seeking a proper balance between these two sides, it is essential to view them as elements inseparable from the physical and social environment (Klemes, 1973). The present chapter focuses on the modality for achieving an acceptable balance in the light of the new dimension, global change.

Climate Change and Sensitivity of Africa's Hydrology and Water Resources

Climate Change Scenarios

Under the IPCC's (Intergovernmental Panel on Climate Change) business-as-usual (BaU) scenarios A, B, C and D emissions of greenhouse gases (GHG), the average rate of increase of global mean temperature during the next century is estimated to be about 0.3°C, 0.2°C, above 0.1°C and about 0.1°C per decade, respectively. Scenario A will result in a likely increase in global mean temperature of 1°C above the present value by 2025 and 3°C above today's value before the end of the next century. The accepted range of long-term change in surface temperature following a doubling of carbon dioxide (i.e. climate sensitivity) is 1.5 to 4.5°C. A mean value of 2.5°C has been chosen as the best estimate.

The corresponding sea-level rise expected from 1990-2000 averages globally about 6 cm per decade. The predicted "best estimate" rise is about 20 cm in global mean sea-level by 2030, and 65 cm by 2100, with significant regional variations.

Factors Influencing the Sensitivity of Africa's Water Systems and Management

Climate sensitivities of water resources can be separated into two components: the effects of climate factors on run-off and the effects of such changes in run-off on managed water supply systems. This section is, however, mainly concerned with the factors that influence such sensitivities. It is known that social and economic changes in some regions may make such regions even more vulnerable to climate change.

According to Kaczmarek (1992) Turc's formula

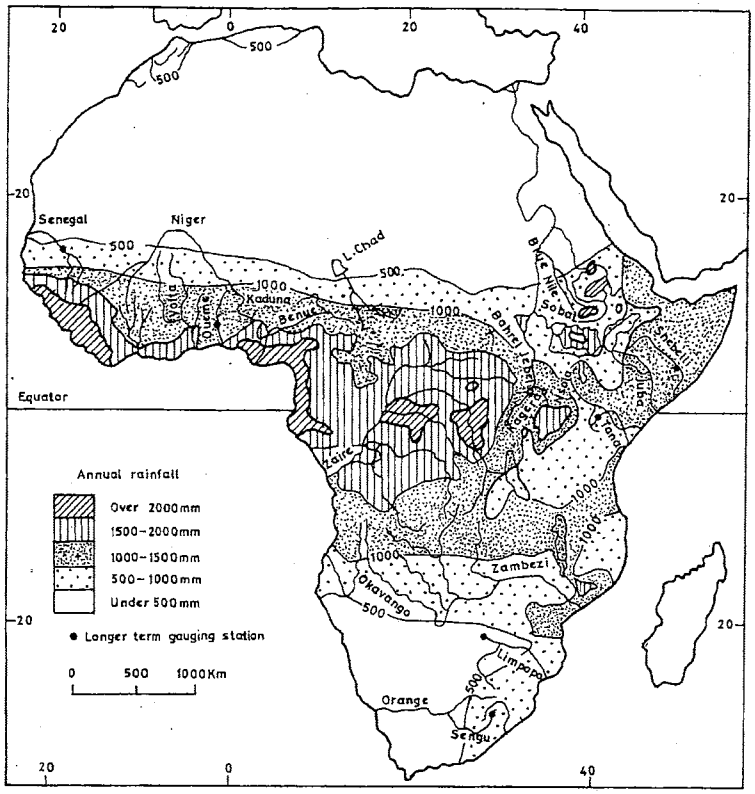
$$\Delta R = \frac{\partial R}{\partial T}\Delta T\left[1+\psi_0(P_1T)\frac{\alpha-1}{\lambda-1}\right]x\sqrt{y}$$

where $\alpha = P_1/P_o$, $\lambda = T_1/T_o$, P_o, P_1 = precipitation, T_o, T_1 = temperature, R = run-off, ψ = constant, ΔR may be profitably used to obtain an approximate, largely qualitative outlook of possible water availability impact of climate change. For the upper Zambezi River with basin area of 320,000 km^2, P_o = 1,120 mm and T_o = 20.9°C, Turc's formula gives

$$\Delta R = -39.4\Delta T\left[1-0.86\frac{\alpha-1}{\lambda-1}\right]$$

The change in run-off (water availability impact) results from changes in temperature and rainfall. A number of socio-economic and environmental problems, some related to the above factors, have predisposed much of Africa to a high level of vulnerability. First, the climate and hydrology of Africa itself is problematic as extremes abound, often co-existing in the same areas. About 42 per cent of Africa is arid or extremely arid, 22 per cent is semi-arid, leaving only 36 per cent as subhumid or humid (Figure 17.1). Even the latter proportion is under threat as persistent and severe droughts extend the desert frontiers southwards each year through the process of desertification. For example, Jensen (1990) using trend analysis noted that rainfall decreased sharply during 1960-1989 in the Sudan and northern Guinea savanna of Nigeria at an average rate of 10 mm per year. This rate of decrease has been interpreted to correspond to an average southward progression of the agroecological zones by about 33 km per decade while the start of the growing season in the central parts has been delayed by about 10 days per decade.

Figure 17.1 Mean Rainfall and Drainage in Africa



Sources: Sutcliffe and Knott (1987); Oyebande (1990).

In Africa, accumulation of water deficits over decades has predisposed the environment to a high level of vulnerability. The largest dry lands occur in Africa (and Asia), and represent 66 per cent of the total land of Africa (41 per cent of the world). The status of desertification in African drylands under agricultural use is worrisome. Altogether, 73 per cent of such lands has become moderately to very severely degraded. The most obvious symptoms of both the process and impact of desertification manifest themselves through a reduction of both biological and economic productivity, land value, and quality of water and air. These include: yield reduction or crop failure; the reduction of perennial biomass in rangelands, the reduction of available water in soil profile and/or water table; the encroachment of sand into productive land, etc; increasing flooding, sedimentation and salinization; the pollution of water and air; and the disruption of human life due to deterioration of life-support systems. The United Nations' plan of action to combat desertification recognized the need to strengthen science and technology at the national level.

Table 17.1 shows trends of "best-guess" estimations of drought, desiccation and dryland degradation for the Sudano-Sahelian countries of Africa between 1985 and 1991. In South Africa, the role of man in desertification is much clearer. The 1989 study, for instance, showed that overstocking on the natural veld of the country as a whole was 50-60 per cent. Such overstocking and overgrazing led to degradation of the natural veld. Long-term research results have shown that veld management can markedly influence the impacts of drought and desertification.

For instance, it is believed that the drought situation in West Africa and Ethiopia is part of a normal short-term climate cycle in which recurrence interval of drought is generally from 7 to 10 years (1972-1973, 1982-1983, 1987-1988 and 1991-1993 had devastating droughts). However, a close examination of the Nile flow records shows a much more serious long-term trend — that the four droughts are all part of a long-term drying period that started in the mid-1960s. With the exception of four years, the Nile flow has been below normal since 1965. The very lowest flow, and six of the seven lowest flows for the Nile since 1912, occurred within this dry period. It has been suggested that a quick recovery is unlikely.

Table 17.1 Tentative Estimates of Changes in Drylands Environments of the Sudano-Sahelian Countries, 1985-1991

Country	Drought	Desiccation	Soil erosion	Deforestation	Range degradation	Limits*
Benin	0	–	–	–	–	–
Burkina Faso	+	0	– –	–	– –	– –
Cameroon	+	0	–	0	–	0
Cape Verde	0	0	–	–	–	– –
Chad	–	–	–	–	0	0
Djibouti	0	0	0	–	0	–
Ethiopia	–	–	– –	– –	–	0
The Gambia	0	0	–	–	– –	– –
Ghana	0	0	–	–	–	–
Guinea	0	0	–	–	–	–
Guinea Bissau	0	0	–	–	–	0
Kenya	0	0	–	–	–	–
Mali	+	0	–	–	–	0
Mauritania	–	–	– –	– –	– –	– –
Niger	+	0	–	–	–	0
Nigeria	+	0	–	–	–	–
Senegal	–	–	–	– –	– –	– –
Somalia	–	0	–	–	–	0
Sudan	–	–	–	– –	–	–
Tanzania	–	0	–	–	– –	0
Togo	0	0	– –	–	–	–
Uganda	–	–	–	0	–	–

Notes: * Reaching limits of available land.
Key: – = worse; – – = much worse; 0 = much the same; + = better.

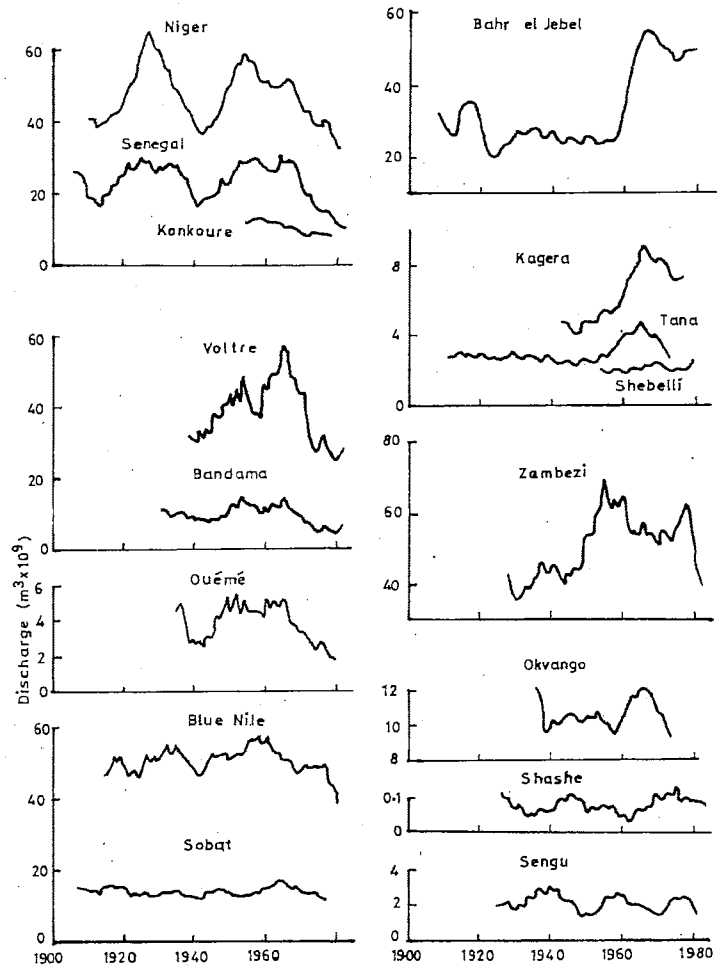
The pronounced dry season coupled with high annual potential evapotranspiration of 2,500 to 3,000 mm in the Sahara through 2,800 mm in Namibia, 1,200-1,500 mm on the West African coast, to nearly 1,250 mm on the higher plateaux and mountains of East Africa make irrigation demand burdensome. In Africa, evapotranspiration tends to be uniformly high through the year in most places. This implies that rainfall distribution is the major factor affecting the water availability in soil profiles and river regime, the latter being the pattern of seasonal variation of streamflow or run-off within the year which tends to be repeated from year to year. The river regime is of outstanding importance in engineering hydrology and water resources development, since the dates of extremes of flows within the year as well as the ratio of these extreme values are decisive in solving the problems relating to most water resources development projects. Both the seasonal regime and the annual flows vary significantly.

As may be expected, the river flow is sensitive to variations in rainfall, since the run-off is the residual after soil moisture replenishment and evaporation have been satisfied. The long-term flow records provide a good approximation of the water resources or yield of a basin. They also provide a valuable indication of climatic fluctuation. Figure 17.2 shows the variability of annual flows of the largest African rivers. The range of annual flows is very wide, even for these large rivers. Sutcliffe and Knott (1987) calculate the ratio between the highest and lowest annual flows as varying between about 3.5:1 to 10:1.

Figure 17.2 shows the seven-year moving averages of the flow series for 16 African rivers. The range of the seven-year mean flows too is very wide, varying by a ratio of 1:2 particularly for the Senegal and other West African Sahelian rivers (the Niger and Chari) where the recent drought has been much more severe than the previous ones of 1901-1915 and 1940-1945. The seasonal and long-term variations in the flow of most African rivers underline the importance of over-year storage as a means of making the optimum use of the water resources. Sutcliffe and Knott (1987) suggest that the seven-year moving average indicates a useful target for the yields that might be provided by the over-year storage. The fact that even the seven-year moving averages fluctuate widely in the continent is an indication of the challenges that climate poses for water resources management in Africa.

The persistence of the recent Sahelian drought has taken its toll on water availability and severely undermined the reliability of some of the rivers, such as the Niger, Senegal and the major sources of surface water in West Africa's Sudano-Sahelian zone (Oyebande, 1990). The total yield

Figure 17.2 Seven-year Moving Average Discharge at Long-term Gauging Station



Source: After Sutcliffe and Knott (1987).

of the River Niger into the Kainji Dam reservoir in Nigeria, for instance, steadily decreased from 51 x 10^9 m^3 in 1969-1970 through the all-time low of 24.3 x 10^9 m^3 at the height of the drought in 1973 to a new more or less stable level below 5 x 10^9 m^3 in 1989-1990. The downward trend has seriously undermined the envisaged potential of the hydro-electric project. In the same manner, the mean flow of the Nile at Aswan (Egypt) dropped steadily from 110.5 per cent of the normal (long-term mean) during the period 1871-1905 to 96.3 per cent (1906-1920), recovering to 96.7 per cent during 1920-1965 but decreasing again to 91.4 per cent during the 1977-1988 period. The story of the Kariba Dam on the Zambezi (in southern Africa) during the period and in the early 1990s was quite similar.

The seasonal fluctuation of unregulated flows are even more worrisome. In particular, the low levels of the River Niger at Niamey have caused great concern over the last 15 years in Niger Republic. During the drought in 1974, the river had an absolute low flow of less than 1 m^3s^{-1} at Niamey. The capital's water supply was in trouble, and, in 1984, the low water mark went down again to 3 m^3s^{-1} causing disturbances in Niamey's water supply and in the floodplain wetland farming projects along the river. However, the worst was yet to come in 1985 when the river's flow fell practically to zero on 15 June and for over a fortnight (Beidou, 1987). The paradox of water resources problems of the Niger Republic during the period 1974-1986 more or less typifies that of Africa. While Niger was threatened by drought and water shortages, very high and rare rainfall events occurred from time to time causing serious damages. In 1984, for example, a daily maximum fall of 206 mm occurred in Tilabery, some 120 km north of Niamey where annual average rainfall is 450 mm. It generated flows which caused severe erosion and soil loss, damaged several hydraulic installations, particularly in irrigated areas.

Another problem of water resources management is that, especially in the near future and particularly in less humid environments, a much greater percentage of the total water resources will be exploited as the storage and diversion of water increases in response to population explosion and rising standards of living. The exploited quantities will account for substantial, and in a number of cases, for a very high proportion of the total available water resources.

In much of northern and eastern Africa, expanding population is on a collision course with scarce water resources. Falkenmark (1988) notes that societies typically experience "water stress" when annual renewable supplies approach 2,000 m^3 per person. By the end of the 1990s, six of the seven East and North-eastern African countries (Burundi, Ethiopia, Kenya, Rwanda, Somalia and Tanzania), and all five North African countries bordering the Mediterranean Sea (Algeria, Egypt, Libya, Morocco and Tunisia) will be below this measure of water scarcity, unless something drastic can be done to reverse the trend. At least six of these countries will have less than 1,000 m^3 per person. Indeed, all North African countries, except Morocco, already import half or more of their grain as water is inadequate for irrigation. Thus, under such condition of severe water scarcity, boosting food self-sufficiency and security, and meeting the domestic needs of populations which grow on the average at about 3 per cent a year could be well impossible.

The picture of competition for water in these and often other African countries in terms of the number of persons per flow unit of 10^6 m^3 per year is not pleasant. Countries like Libya, as we have noted, depend on tapping fossil or non-renewable water, while some use unconventional water resources, such as water recycling, re-usage or desalination. In Africa as a whole, some 240 million people (i.e. more than 40 per cent of the total population) live in countries where per capita water availability is fast approaching, or is already below, a reasonable human-support level.

What more then can Africa expect from climate change in the next century or so? Perhaps much more can happen if any of the predicted scenarios, even the lowest, holds true.

Climate Change Impacts on Hydrology and Water Resources Management

The effects of climate change on hydrology are expressed in terms of hydrological variables or processes and storage which comprise the hydrological cycle. Table 17.2 provides a summary of the impacts of climate change on air and sea surface temperatures, precipitation, and soil water, with some indications of regional patterns. We also know that, for the Sahel (10°-20°N, 20°W-40°E), area mean precipitation is

Table 17.2 Summary of the Impacts of Climate Change for Selected Variables

Quantity/Distribution	Climate*	Change
Sea surface temperature		
Global mean	AM	Warming of 2.47°C.
	AC	Negligible.
Zonal mean	AM	Warming everywhere with a minimum in tropics and increasing towards both poles.
	AC	Negligible.
Geographical distribution	AM	Pattern not greatly changed. Warming everywhere which is statistically significant everywhere. Minimum warming of 2°C in tropical Indian and western Pacific Ocean, off the tropical east coast of South America, in the Arctic and in the Ross and Weddell seas. Maximum warming of 3°C in regions at 60°N, 30°S and 60°S.
	AC	Negligible.
Surface air temperature		
Global mean	AM	Warming of 2.84°C.
	AC	Negligible.
Zonal mean	AM	Warming everywhere with a minimum in tropics and increasing towards both poles.
	AC	Amplitude of annual cycle decreased in polar latitudes of both hemispheres, elsewhere negligible.
Geographical distribution	AM	Pattern not greatly changed. Warming everywhere which is statistically significant everywhere. Minimum warming of about 3°C in tropics and midlatitudes of both hemispheres over ocean. Maximum warming of 5°C over North Pole and seas bordering West America.
	AC	Amplitude of the annual cycle reduced in the polar regions by as much as 5°C in winter and 3°C in summer in both hemispheres.

Table 17.2 Summary of the Impacts of Climate Change for Selected Variables (Cont'd)

Precipitation rate		
Global mean	AM	Increase of 0.2 mm day^{-1}, i.e. 7.8%.
	AC	Negligible.
Zonal mean	AM	Increase in high latitudes of both hemispheres, increase almost everywhere in low latitudes but with large variation in latitude.
	AC	Small and not statistically significant.
Geographical distribution	AM	Pattern not greatly changed. Increase over land everywhere except in western United States, region of the Caspian Sea and from southern Peru to northern Argentina. Increases and decreases over ocean between 30°S and 30°N. Magnitude of maximum change 0.5 mm day^{-1}.
	AC	Regional changes between 30°S and 30°N.
Soil water		
Global mean	AM	Decrease of 0.04 cm.
	AC	Small increase in amplitude of annual cycle.
Zonal mean	AM	Increase in tropics and between 50° and 60°N, decrease between 30° and 50° latitude in both hemispheres.
	AC	Onset of annual drying and annual moistening in Northern Hemisphere mid-latitudes occurs earlier.
Geographical distribution	AM	Pattern not greatly changed. Drying in latitude bands centred near 30° in both hemispheres, moistening elsewhere. Changes are not statistically significant everywhere.
	AC	Drying within 20°-40°N and moistening northward in winter. Desiccation in summer everywhere in Northern Hemisphere except in India and Southeast Asia.

Note: * AM and AC represent the annual mean and annual cycle, respectively.
Source: Schlesinger and Zhao (1989).

expected to increase and area mean soil moisture decreases marginally in summer.

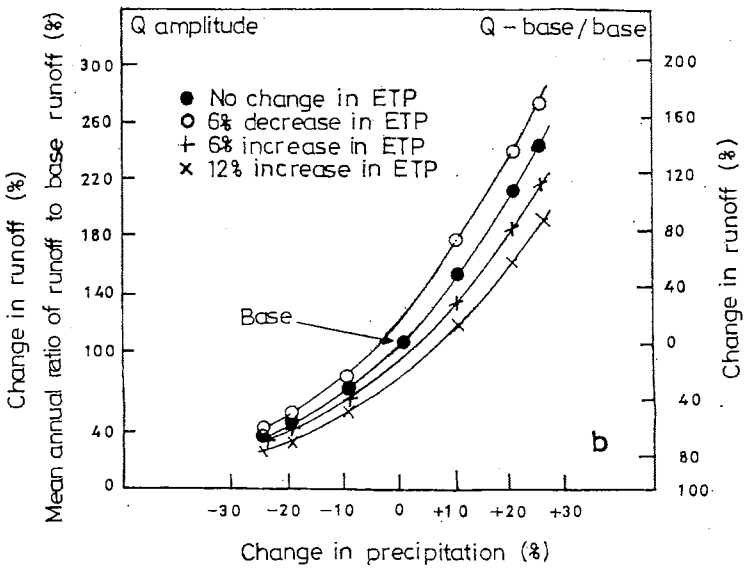
Hydrological Magnification of Climate Change

The crude manner in which land-surface processes are parameterized in general climate models (GCMs) tends to make hydrologists sceptical of the estimates by modellers of run-off and soil moisture changes induced by increased CO_2 and other GHGs. This has led to a number of attempts (case studies) to estimate the effect on streamflow of changes in precipitation and evapotranspiration (Dooge, 1987). In all these case studies, the magnification of the effect on the run-off of precipitation is evident. This is because the run-off, being treated as a residual, is very sensitive to climate, especially in arid and semi-arid areas.

Nemec and Schaake (1982) use a deterministic model to study a relatively humid Nzoia River in western Kenya near Lake Victoria. The results show that an increase of 25 per cent in precipitation combined with a 6 per cent decrease in potential evapotranspiration (ETP) produces an increase in run-off, of about 170 per cent (Figure 17.3). Conversely, a 12 per cent increase in ETP combined with a 25 per cent decrease in precipitation (a drought condition) produces a decrease of 75 per cent in run-off. Such changes could produce a fall of up to 1 metre below the minimum recorded level of Lake Victoria in case of maximum reduction in precipitation.

As already stated, the climate change brings about changes in mean run-off, but also in variability, such as intra- and inter-annual fluctuations, as well as a frequency of extremes — floods and droughts — and in the seasonality of run-off. The impact of future climate changes may far exceed any fluctuations occurring now or even having occurred in the past, including the droughty post-1967 period of the African Sahel. And as Nemec (1990) notes, such changes may have important cumulative effects on storage systems: reservoirs of both surface and groundwater, particularly in tropical Africa whose present capacities may be approaching the limits of their use.

Figure 17.3 Nzoia River Changes in Streamflow as a Function of Changes in Precipitation and Potential Evapotranspiration

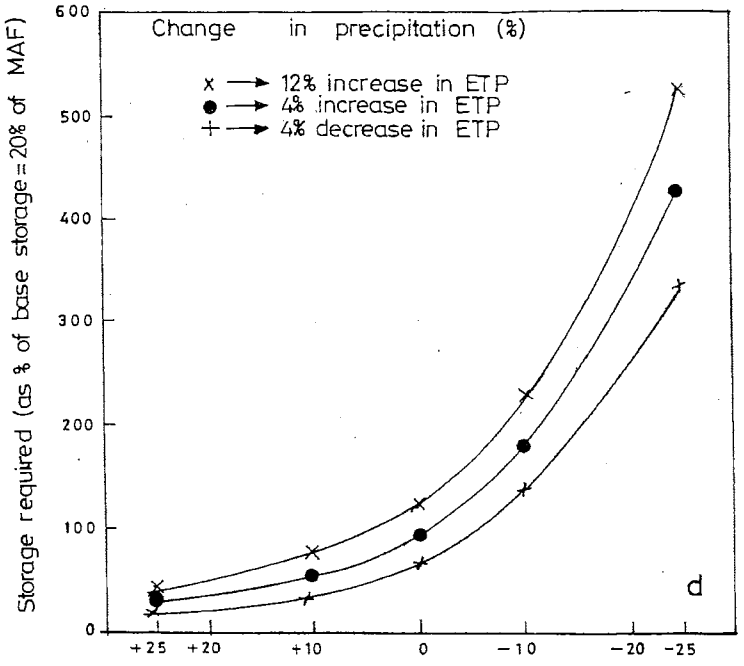


Impacts on Water Resources Management

The impacts of climate change through the hydrological cycle on water resources management is illustrated in Figure 17.4. Novaky et al. (1988) point out that different water management activities are sensitive to particular time scales of climate variations (Table 17.3). These sensitivities are said to reflect four system characteristics, namely, reliability, resilience, flexibility and vulnerability.

The need for storage structures to control the regime of many of Africa's rivers and, thus, increase the reliability of supply for the various water management projects has been emphasized. In such circumstances, the effect of climate change on the operation of a system depends largely on the degree of development of the water-resource

Figure 17.4 Peace River — Change in Storage Required to Produce Guaranteed Draft or Yield (20% MAF)



systems, specifically, the ratio of the guaranteed draft of water supply to the mean annual flow (MAF). According to Dooge (1987), a common basis for the design of water-storage reservoirs is to provide storage for such an amount that the guaranteed draft of water will be available for 90 per cent of the time. Klemes (1985) concludes that, the standard reliability requirement can be met by increasing the relative water-storage capacity in cases where the target draft does not exceed about one-third of the long-term mean. For target drafts of two-thirds and above, reliability will fall below 40 per cent, no matter how much they can be increased. This underlines the fact that a storage reservoir is not

Table 17.3 Sensitivity of Water Resources Management to Climate Variations

Management methods and techniques	Sensitivity to climatic events			
	Within-year	Annual	Multiyear	Century
Protection against floods	x	x		
River training		x	x	
Drainage		x	x	x
Water quality management	x	x	x	
Waste water renovation		x	x	
Water supply		x	x	x
River canalization (dams)		x	x	
Storage reservoirs	x	x	x	
Groundwater utilization		x	x	x
Water transfer		x	x	x
Soil water management	x			
Erosion control	x			

Source: After Novaky et al. (1988).

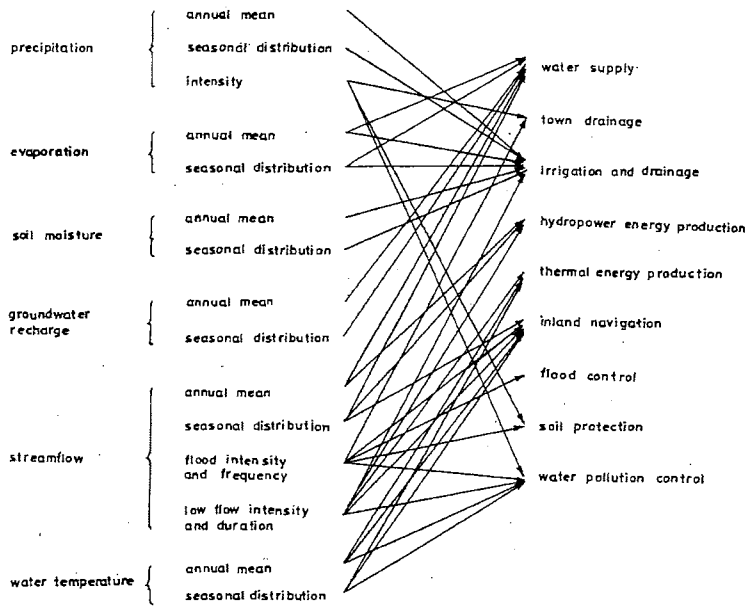
meant to create water but to distribute, over a time, water that is already available.

An analysis of the effect of climate variations on the yield which can be taken from a given storage reservoir shows that a 1 per cent change in precipitation will produce about a 2 per cent change in reliable yield, a greatly magnified effect, while the effect of similar changes in ETP is 0.5 per cent change in yield for a very dry climate and 1 per cent for a moist climate (Nemec and Schaake, 1982). It has also been demonstrated that the effects of precipitation change are much greater than those of ETP on the storage required to produce a given yield (Figure 17.4). In the dry basin (Peace River), a decrease of 25 per cent in precipitation gave a more than 400 per cent increase in the required storage. This was double the required storage in the humid climate.

The above are useful results, but there is still a need to conduct both deterministic and stochastic simulations with longer series of observations in different climatic regions of Africa. Furthermore, as Klemes (1985) argued, compensation for the hypothesized dryness by increased storage may not be possible or feasible under the dry scenario as its maximum reliability may be less than that obtainable without any reservoir.

We now discuss briefly the impact on the various water management components listed in Figure 17.5 and Table 17.2.

Figure 17.5 Impacts of Climate Changes through the Hydrological Cycle on Water Resources Management



Water supply: Water supply systems range from a shallow well or direct stream intake point serving a small settlement to large management systems that integrate large areas and several watersheds. Climate variations may acutely affect people relying on small scale water systems. Some integrated systems include diversions, storage reservoirs, treatment plants, distribution networks, etc. Such systems may be for irrigation, domestic consumption, industry or managed water flows to maintain environmental quality (Riebsame, 1989).

In addition, we may distinguish between two types of surface water supply systems which are of interest in climate impact assessment. One is the run-of-the-river operations that do not store a significant amount of water: they bear the full impact of climate change in run-off as discussed above. The other is that of reservoir-based systems that smooth out intra- and inter-annual variations in run-off by storing excess water for later release. In some sub-humid basins of Africa, particularly in densely settled or industrial zones, where demand closely matches reliable river discharge, storage reservoirs and inter-basin diversions or even desalination and long-distance transfers have been or may have to be developed to minimize the impact of dry spells and to provide flood control, hydropower, navigation and recreation. All these stages, however, involve increasing costs at exponential rates in that order from run-of-the-river intake through storage, inter-basin transfer to new sources of desalination and long-distance transfer.

Water authorities in areas suffering increasing shortages (including from groundwater due to reduced groundwater recharge because of rainfall decreases and poor landuse practices), should also develop new methods for conservation and recycling of water, including water storage alternatives and new irrigation techniques. The other measures discussed by Oyebande (1991) as part of a management strategy include watershed management, agroforestry practices (for soil and water conservation), tariffs as policy instrument for moderating demands and the efficiency of water use, small scale irrigation, the utilization of wetlands, and rainwater harvesting.

River navigation and flood control: Lower flow rates lead to a decrease in the allowable drafts for ships in the dry season and other negative effects for navigation. To guarantee the operation of shipping, river bed deepening or multipurpose water projects, such as dam construction with navigation locks, may be necessary. In the case of flood frequency

and flood peaks, an increase in flood frequency might produce negative effects for navigation without compensating benefits. In addition, people and goods in settlements along the water courses will be at greater risk than today. Additional flood control projects might be required, including designing new disposal works.

Hydropower and energy supply: Most of the existing energy systems in Africa will be further affected by changes in temperature, precipitation, river flows and increasingly sensitive energy demands. Owing to lower discharges in the river channels, the energy production of hydropower stations will be lower in the dry season. The only remedy where additional capacity cannot be provided will be to change over to other energy production methods (Lemmela et al., 1990).

An analysis of the impact of climate change on the efficiency of the Kariba energy system (Kaczmarek, 1992) is indicative of the sensitivity of the system. He assumes that, for the states of failure, the flow release Q_o is less than the target turbines' discharge of 1,100 m^3s^{-1}. The loss of energy production due to insufficient flow through the hydropower plant is 7.704 kwh. This is a negative impact of climate change on the efficiency of the Kariba energy system (see parameters of inflow to the reservoir in Table 17.4).

Table 17.4 Parameters of Inflow, Kariba Reservoir

Time period	January-June	July-December
Mean inflow (m^3s^{-1})	2,540	435
Standard deviation (m^3s^{-1})	1,029	206
Coefficient of correlation	0.559	—

Water pollution control: The pollution load of African rivers will increase as a result of lower discharges during the dry season, but also during flood peaks and from land degrading practices which produce more sediment, unless environmentally sound land use practices are adopted widely by the turn of the century. Nitrate pollution problems which are already evident in agricultural lands which receive much

inputs would increase, as would water pollution in urban areas as population pressure and industrial production increase.

Water management of low-lying coastal areas: Global warming is expected to result in a sea-level rise (SLR) of between 20 and 65 cm, but possibly up to 130 cm by the year 2100. There are many elements of climate that could change and in turn cause physical changes in the coastal zone, as well as in the natural system and human activities affected. The aspects most closely related to water management are tidal ranges, frequency and intensity of storm surges, flooding, increase in water depth in rivers and estuaries, salt water intrusion into rivers and aquifers, and the possible increase in water table. Already there are reports of intensifying storm surges, flooding and erosion of low-lying coastal areas, including river deltas, in Africa: disappearing islands and receding beaches off the coast of Tanzania (e.g. Maziwi Islands), in Kenya, Zanzibar (Ngufa Island), Madagascar (Morondana), and Nigeria (Lagos Island, Victoria Beach and Niger Delta).

Water supply plants in such trans-boundary zone will be affected. The intrusion of saltwater into estuaries from the sea and lagoons, especially of West Africa, could become more pronounced and will render the water unsuitable for drinking. This is most severe during the dry season when the need for freshwater is the greatest. Such intrusion affected the Lagos water supply intake in 1980, and a weir had to be built to check its upstream movement. An extreme case is the Gambia River, where at minimum flow the saline effect is felt at a distance of not less than 235 km upstream from the sea (Volker, 1990). The case of the River Senegal is still severe, but thanks to the Diama dam constructed in 1985, the primary function of restricting the saltwater intrusion has limited the ill effect to the Lower Senegal within 50 km of the ocean. The salinization of this lower reach has been reported to have intensified in recent years.

A further shift of saline reach will affect the intake of water for irrigation and water supply and the ecological conditions of the channels and adjacent lands, as well as upset the existing agricultural systems. A feature of urbanization in Africa which aggravates the above impacts is the coastal concentration of large urban centres. Of the 80 urban centres housing more than 100,000 persons, 21 are located in the coastal zone, although the massive continent has a very short coastline

relative to its area (Oyebande, 1992). Three possible strategies can be chosen in areas severely affected:

- A planned and phased abandonment of the low-lying areas.
- A gradual adaptation as the new hydrologic conditions develop: embankments are gradually heightened, new pumping stations constructed, new drainage canals dredged, and intake points shifted for freshwater in the upstream direction.
- The building of a new or an additional infrastructure for flood protection and water management requires a broad vision of future requirements which involves the closing of estuaries, the transformation of embayments into freshwater reservoirs, among others.

Conclusions and Recommendations

It is obvious from the foregoing discussion that the future climate will be different, though we cannot predict by how much. Part of the adjustment that is required is to limit GHG emissions to the level that will sustain the health of the African economies. We also need to recognize that the non climate-forced changes (population and land use, etc.) will continue to be important factors influencing the vulnerability of the African environment, water resources and their management. Such other changes must be addressed. The new problems forced by the climate add to the existing water problems faced by all, especially by the developing countries of Africa. It is, therefore, imperative for the African communities to reduce their environment's sensitivity to current and potential future climate variations, particularly those affecting the water sector.

The policy implications of the above considerations are grave for the developing countries of the African continent. Their governments, professional associations, non-governmental organizations (NGOs) and the external support agencies (ESAs) need to work in close collaboration and take proactive measures to increase the capacity of African communities to cope with the problems that would arise. At present, projections of future regional hydrology are too uncertain to be used as justification for new water schemes or for amending existing ones, but it is not too early to contemplate the consequences of predicted changes. Also, flexi-

bility must be built into water projects so that they can be upgraded through their life span.

The range of adjustment for integrated water supply systems increases water availability. However, any adjustment is sensitive to cost. The principle of "small is beautiful and big is not always helpful" should, hence, guide the choice of policy options. In particular, cost-effective and environmentally-sound small-scale projects, conservation methods and demand management measures should be pursued vigourously to complement the existing and proposed large-scale water projects.

The following actions are recommended as immediate, medium and long-term measures to make the African environment more robust and to alleviate any water problems that the future climate may bring:

1. African governments should urgently strengthen their capacity to collect, store and process water-related data in order to better manage water projects, predict water resources impacts, detect changes and improve hydrologic parameterization in global process models.
2. Increase the cooperation between climatological, meteorological and hydrological communities in developing predictions of climate change for individual seasons and for specific regions, including the assessment of the potential impact of sea-level rise on freshwater resources and flood risks in the coastal zone of Africa.
3. Develop research programmes at the national level, and increase international collaboration and experiments directed towards an understanding of the role of water in the climate system and GHG production, with a view of using the knowledge to prevent or adapt to climate change.
4. Re-evaluate existing scientific methods of analyzing hydrological processes in the light of human-induced changes with their problem of non-stationarity in hydrologic series.
5. Incorporate the possible effects of climate variations in the design and operation of water resources systems to make them more flexible and more robust to anticipated changes.
6. Re-evaluate international water laws and treaties in the light of future climate variations; undertake effective monitoring of water projects in international basins and expedite action on the establishment of equitable water sharing agreements among riparian countries.
7. African governments should actively support and strengthen national and regional agencies established to deal with extremes of climate and hydrology — floods and droughts — whose risks are expected to increase with climate variations of the future.

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CHAPTER EIGHTEEN

Socio-economic and Socio-cultural Impacts of Climate Change and Sea-level Rise in West and Central Africa

O. Ojo

Introduction

The impacts of global warming and climate change and their implications on the socio-economic and socio-cultural activities have been of great concern to many nations. In West and Central Africa, for instance, such concerns have been generated by the consequences of recent climatic variations antd climate change which have also created considerable awareness and demonstrated the sensitivity of human welfare and a nation's socio-economic planning and development to environmental consequences. With floods and droughts, with desertification, soil erosion, and such other consequences of climatic variations and climate change, there has been considerable and disturbing concern among the government and people of the region. Indeed, they have led to the issues of sustainable development and sustainability of the environment and resources futures becoming topic of inquiry and of scientific evaluation in the region.

The climatic environment in general, and climate change in particular, have thus become aspects of environmental issues which have considerably attracted world-wide attention and led to the realization that there is a growing vulnerability of the society to climatic fluctuations and climate changes. Particularly with the variations and changes in climate since the 1960s and early 1970s, a great deal of impact has been manifested in various environmental processes and human activities in

West and Central Africa. To a large extent, these variations and changes have been critical factors influencing natural resources planning and management, and socio-economic resources and activities, such as agriculture and food production, water resources and energy systems, forestry, marine resources development, transportation and tourism.

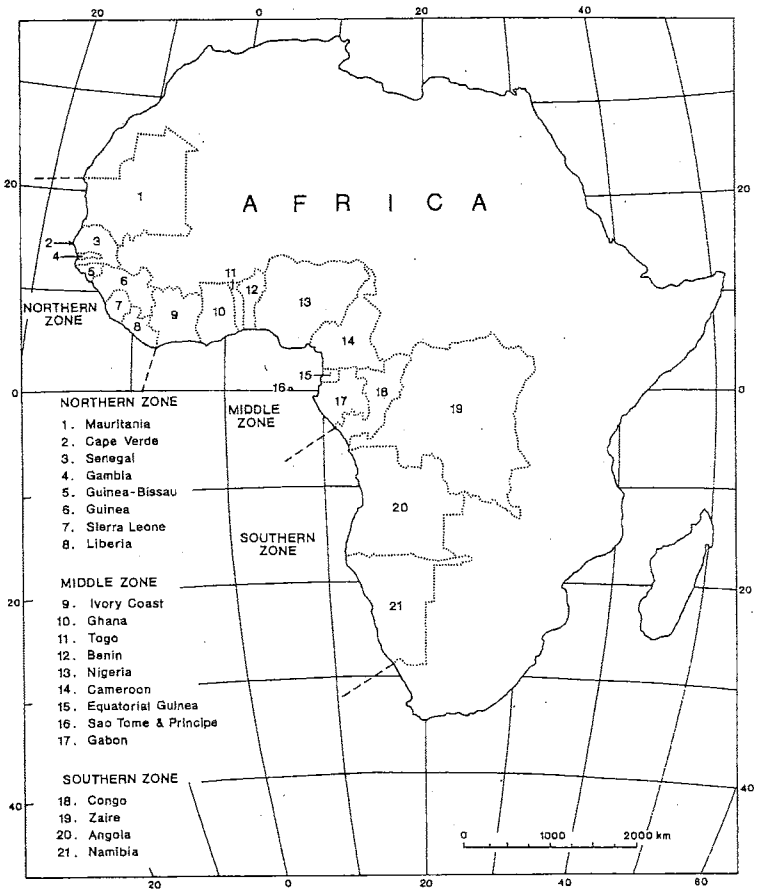
Increasing scientific evidence has shown that the characteristics of the variabilities and changes which have been known to occur in weather and climate will continue in the future and that these changes will continue to have implications for resources planning and management. In particular, such evidence shows that there is an urgent need to be concerned with the future of the environment and resources management and to examine the consequences of environmental change on socio-economic and socio-cultural activities. For example, such evidence shows that there is an urgent need to examine the impacts of global warming and climate change (including the impacts of sea-level rise) on resources futures and sustainable development, particularly with reference to the impacts of climate change and sea-level rise on socio-economic and socio-cultural activities. It is the purpose of the present chapter to examine these impacts with reference to activities such as agriculture and livestock production, water resources and water resources management, fishing, energy resources, transportation, manufacturing and construction.

The chapter begins by examining what is presently known about the characteristics of climate and climatic variations in the region before examining the possible physical and ecological impacts of climate change and variabilities. The chapter then examines the consequences of the physical and ecological impacts on the socio-economic and socio-cultural activities. The chapter finally discusses the challenges posed by the impacts of climate change and sea-level rise on socio-economic and socio-cultural activities, with particular reference to the response measures and their implications for West and Central Africa.

West and Central African Climate and Climatic Variabilities

West and Central Africa (Figure 18.1) is only a part of the globe affected by climate change and sea-level rise. This region which spans over a belt

Figure 18.1 Countries and Zones of the WACAF Region



of the low latitude areas between approximately 30°N and 30°S is generally characterized by precipitation which varies from less than 200 mm to the north and south to over 2,000 mm in the central equatorial regions. A large portion of West and Central Africa, however, consists of areas with rainfall between approximately 200 mm and 1,000 mm of annual rainfall, generally concentrated in the rainy season, in which about 75 per cent or more of the rain falls, and which lasts between six and 12 months in the central parts, and less than four months in the extreme northern and southern parts of the region.

The rainy season in West and Central Africa is linked to the northward and southward migratory patterns of the intertropical convergence (ITC) sometimes called the Intertropical Discontinuity (ITD). The ITC is associated with the apparent migratory patterns of the sun, although with some time lag of about a month or two. In general, the characteristics of the rainfall patterns which result from the influence of the movement of the ITC and the weather and climate systems, consist of two equinoctial maxima in the equatorial regions and one single maximum in the north and south. Rainfall over the equatorial regions tends to be spread over many months while, towards the north and south, rainfall becomes more concentrated within three to four months. In addition to the short rainy season to the north and south, the rainfall characteristics also include relatively low annual rainfall and high to very high variability and unreliability in rainfall.

The climate of West Africa is also influenced by factors other than the ITC. Such factors include atmospheric disturbances and medium to large scale fluctuations in the atmospheric and oceanic circulations, land and sea breezes and relief. These factors are especially significant for sustainable development and the resources management's future because of their impacts of regional and local space scales. In particular, the different parts are impacted locally and regionally by the variations and changes in climate resulting in hazards, such as floods and erosion as well as drought and desertification.

Recently, and especially over the past decades, the issue of global climate change due to the greenhouse effects, including global warming and sea-level rise, has been a subject of scientific discussions and public debate. Indeed, it is now well recognized that the human factor has become very significant in the balance of forces that determine the earth's climate. In particular, it is generally the consensus of opinion that

the atmospheric concentration of a number of gases is known to be increasing and that some of these gases have important effects in causing greenhouse warming and keeping the earth warmer than it would otherwise be. Among the greenhouse gases, carbon dioxide has potentially been the most influential in changing the earth's climate and has been responsible for over 50 per cent of the enhanced greenhouse effects in the past and is likely to remain so in the future. Other greenhouse gases include nitrous oxide (N_2O), methane (CH_4) and chlorofluoro-carbons (CFCs).

In addition, it has been established with confidence that continued emissions of these greenhouse gases at the present rates could commit the world to increased concentrations for centuries ahead. Following the Second World Climate Conference, the conclusion was made that without actions to reduce the emissions, global warming would reach 2°C - 5°C over the next century, a rate of change unprecedented in the past 10,000 years. The warming is also expected to be accompanied by sea-level rise of about 65 cm ± 35 cm by the end of the next century, although there remain uncertainties in the predictions, particularly in regard to timing, magnitude and regional patterns of climate change (WCC, 1990a, 1990b), due to the incomplete knowledge of (a) sources of sinks of greenhouse gases which affect the prediction of future concentrations, (b) clouds which strongly influence the magnitude of climate change, (c) oceans which influence the timing and patterns of climate change, and (d) polar ice sheets which affect predictions of sea-level rise. The Second World Climate Conference also recognized (a) that climate change is a global problem of unique character that could affect every aspects of life on the planet, (b) that its issues reach far beyond atmospheric and ocean sciences, and (c) that these issues are increasingly pivotal in determining environmental and economic well-being.

Climate change and sea-level rise will thus have significant impacts creating problems for a sustainable environment and resources management. In particular, climate change and sea-level rise will threaten the coastal zones and low-lying islands, while there would be serious consequences on agriculture and livestock production and management, water resources management, forests and forestry, fisheries, and other economic activities in West Africa. Indeed, climate change and sea-level rise would compound the existing serious problems of the sustainability of the environment and the management of the resources, as well as the

currently serious problems in population and consumption patterns and characteristics in the region. In many cases, the impacts would be most severely felt in regions, such as the Sahel, which are already under serious stress. The following discussion analyses some details of possible impacts of climate change and sea-level rise for West and Central Africa, based on the present knowledge of scientific predictions.

Physical and Ecological Impacts of Climate Change

The physical and the ecological characteristics of West and Central Africa would no doubt be affected by climate change and sea-level rise. For example, it is expected that in humid tropical areas of the continent, which are already too hot and too wet, there would be an increase in both precipitation and temperature. Already, temperature increases have been observed in the various ecological zones of West and Central Africa, while drought persistence has characterized the Sahel and arid regions, particularly over the last three decades. For tropically humid zones, precipitation increase of about 2-3 per cent for each degree of global warming may be expected. Thus, it is reasonable to expect that precipitation would possibly increase by approximately 5-20 per cent. The increase in temperature would also possibly increase evaporation, reducing the effectiveness of the increase in precipitation.

The increase in rainfall in the humid regions may be accompanied by an increase in cloudiness and an increase in rainfall intensity resulting in an increase in the amount of rainfall per hour during severe storms. It would also result in shifts in geographical patterns of precipitation and changes in the sustainability of the environment and management of resources. For example, since the increase in temperature would increase evaporation and potential evapotranspiration, there would be a tendency towards droughts in many, if not most of these humid tropical areas. With the increase in ocean temperatures, areas with critical values of more than 26°C required for development of tropical storms, such as hurricanes and typhoons, are also likely to increase such that the storms are likely to extend into some coastal areas of West and Central Africa, where they are currently less common.

In contrast to the tropically humid areas of West and Central Africa, the savanna and semi-arid areas would probably have less rainfall,

which, coupled with temperature increases, would reduce soil moisture availability (WMO/TD 225, 1988). Already, these savanna and semi-arid areas suffer from seasonal and inter-annual climatic variabilities, and there have been droughts and active desertification processes, particularly since the 1960s. The impacts of the climatic characteristics have generally been negative on the sustainability of the environment and the management of these resources, and the situation could be worsened by the expected decrease in rainfall with greater drought probabilities and more rainfall variabilities and unreliabilities. All these may result in reduced soil water availability for food and livestock production, water resources supply and fuel availability which, in turn, would affect the characteristics of human settlements.

The rise in sea level which would accompany the global climate change would significantly result in submergence and inundation of the coastal lowland areas. It would also lead to increased salinity in the estuarine areas and an increase in coastal erosion and storm drainage.

The forest ecology and the ecosystems would also be adversely affected. For example, changes in the ecological conditions might be less favourable to the existing biota, and ecosystems would respond by gradually invading the neighbouring areas where the climate is more favourable. Thus, climate change and sea-level rise would affect the boundaries of the ecosystems and the mix of the species that compose them, such that the distribution of the plant and animal communities would be a reflection of how different ecosystems have been able to adapt to the expected climates.

Table 18.1 shows the projection of some physical changes that would occur in the Niger Delta based on existing data and information. The table shows an example of what may be expected, particularly in the very critical or vulnerable areas along the coast of West and Central Africa. Assuming no accelerated sea-level rise (ASLR), erosion rates are likely to average between 10 and 15 m annually. With an ASLR of 1.0 m, erosion rates could be as high as between 20 to 25 m along the most vulnerable areas of the coast (Table 18.1). Similarly, areas of land which may be inundated and eroded by the 21st century given an expected ASLR of 0.3 m and 1.0 m could be more than 7,000 sq km and 15,000 sq km, respectively. These figures which constitute about 35 per cent and 75 per cent of the Niger Delta would lead to the decimation of the mangrove swamps, forests and farmlands in the Niger Delta. The popu-

lation that would be displaced would vary between 1-2 million and 2-3 million, respectively, for a ASLR of about 0.3 m and 1.0 m. Rise in sea level would also cause an increase in salinization of the surface and groundwater and the estuarine areas resulting in losses of animal, fish and plant species that cannot tolerate high salinity. This would lead to the loss of mangrove trees and the spawning grounds of a wide variety of fishery resources. Table 18.2 also shows an example of the projections of land losses along the coast of Senegal (Niang et al., 1992).

Table 18.1 Physical Effects and Natural System Projection to 21st Century in the Niger Delta

S/N		Units	Presently no ASLR	ASLR I (0.3 m)	ASLR II (1.0 m)
1.	Erosion	m/year	10-15	16-19	20-25
2.	Erosion area lost	km^2	26-45	55-120	130-330
3.	Inundation and erosion	km^2	3,000	7,000	15,000
4.	% of total area lost due to inundation and erosion	%	15	35	75
5.	Natural system responses (i) Agriculture (7.940 km^2)	km^2	794	2,779	5,955
6.	No. of villages impacted	no.	50	200	350
7.	No. of people displaced	no.	150,000	1-2 m	2-3 m

Note: ASLR = accelerated sea-level rise.
Source: Awosika et al. (1994).

Table 18.2 Land Loss Projection to 21st Century along the Coast of Senegal

Sea-level rise (m)	Erosion	Inundation	Total
0.2	11-18	338	349-356
0.5	28-44	1,919	1,947-1,963
1.0	55-86	5,987	6,092-6,073
2.0	105-157	6,389	6,494-6,546

Source: Niang et al. (1992).

Implications for Agriculture and Livestock Production and Management

Agriculture and livestock production are the centre of life for the majority of the people in Africa. The climate and soil characteristics determine the characteristics and types of land use for agriculture and livestock production, including which crops to grow and where and when to grow them.

The impact of climate change and sea-level rise on agricultural production would no doubt be significant, as for example, decreased rainfall would reduce the production potential of the crops presently grown in the various ecological zones increasing poverty and hunger in the region and reducing the income of the farmers and others whose occupation depend on farming. In the extreme, unemployment, starvation and death could result. There might also be increased migration to urban centres for alternative employment opportunities, and livestock farmers could migrate to other areas in search of water for their cattle.

In particular, six implications of climate change for agriculture may be noted. These include the implications resulting from (a) increased rainfall and rising air temperatures, (b) increased rainfall intensities and variability in rainfall, (c) changes in agroclimatic and agroecological zones, (d) impacts on agricultural systems, (e) indirect effects, and (f) the implications of the rise in sea level for agriculture. For example, increased temperatures which would increase evaporation would reduce the effectiveness of any increase in precipitation and cause crop yield to be lowered. Also, climate change in West and Central Africa is expected to be accompanied by greater variability in rainfall and temperatures, which would result in more frequent floods and droughts and larger runs of wet and dry years. This would give rise to frequent changes in agroclimatic characteristics and increased variability in yield of crops in the different ecological zones. Climate change would also have considerable impacts on agricultural systems, thus affecting crop calendar and lengths of growing periods.

Decreased rainfall and drought impacts would affect livestock production in three major ways. First, it would reduce the primary productivity of the grassland areas in which livestock production is currently important. Secondly, because climate change would have significant effects on the ecosystems, a new ecoclimatic environment for livestock

production would be created; thus, new grazing lands for livestock would emerge, possibly shifting towards the coast. Finally, as for reduced crop production, the income of livestock farmers would decline, leading to greater financial stress which would threaten economic survival. There would also be significant impacts on the characteristics of labour, employment and population processes and their characteristics.

As already noted, sea-level rise may lead to submergence of the lowlands (e.g. along the coasts of Senegal, The Gambia, the Niger Delta), and much of the land currently used for agriculture and livestock practices would be lost and lead to socio-economic and socio-cultural problems. There would be mass migration out of the areas and substantial losses of income, and great financial stress and unemployment would result. In some cases, farmers may be forced to change their practices. Because most of the coastal environment would be characterized by water surfaces and their associated ecological systems, converting to aquaculture may be a viable response (Everett and Pastula, 1990).

Impacts on Water Resources and Water Resources Management

The implications of climate change and sea-level rise for water resources in West and Central Africa would be significant for a number of reasons. For example, the changes in magnitude and timing of water resources would necessitate changes in management strategies and greater conversion efforts in order to balance water supplies and demands. Moreover, most of the water resources along the coast would become polluted by the intrusion of salt water, and water resources management would place greater emphasis on desalinization. Because there would be an increased variability in precipitation resulting in floods in the humid areas, and a decrease in precipitation resulting in droughts in the savanna and semi-arid areas, the characteristics of the components of the hydroclimatological systems in the different ecological zones would be altered, with their consequences on the availability of water resources. These conditions would also lead to changes in management strategies in order to balance water supply and demand through conservation efforts.

In general, five types of water supply systems would be significant for West and Central Africa. The first category includes areas which depend mainly upon precipitation that are strongly concentrated in the wet seasons of six months or less. For this type, water supplies would be available only in the wet season unless there is provision for storage systems. The second category includes water supply systems based on river flows which do not store significant amounts of water for use during periods of deficiency. The variations in the regimes of these types of water supply systems also depend upon rainfall, and, with decreased precipitation, there would be greater water stress, with its accompanying socio-economic and socio-cultural consequences, as already noted for agriculture and livestock.

The third category of water supply systems includes those located in areas where precipitation occurs during most months of the year. The impact of decreased precipitation in any part of these areas may be less than in other ecological areas of West and Central Africa because there would be a general tendency for the humid coastal areas to receive more precipitation which may negate the consequences of decreased precipitation in parts of the areas.

The fourth category of water supply systems, which may be impacted by climate change, includes those based upon man-made reservoir systems, in which water is released when it is required for agriculture and other purposes. Examples of this category include such man-made lakes as the Kainji and Akosombo dams in West Africa. If the climate becomes drier, it would be necessary to curtail the releases of water to maintain needed storage capacity for later releases. With water shortages in these reservoirs, there could be considerable financial implications and socio-economic consequences.

The fifth category of water systems consists of those based on groundwater resources. In this case, decreased precipitation would lead to lower water tables, and this could increase the difficulty of obtaining water. Thus, there would be considerable water stress and problems of environmental sustainability and water resources management futures.

Impacts on Other Socio-economic and Socio-cultural Sectors

Although the implications of climate change on agriculture and water resources are likely to be the most important, other sectors would also be affected, including fishing, energy resources, transportation, manufacturing and construction. In particular, the impacts of climate change and sea-level rise on the socio-economic systems would include damage and losses due to erosion, inundation, devegetation, the increased salinization of surface and ground water. The low-lying and the subsiding areas of the coast would lose more land and infrastructure in comparison with other coastal areas. With sea-level rise of 1 m, for example, inundation in the Niger Delta alone may render more than 15,000 sq km of land at risk, while soil erosion may claim more than 300 sq km. With sea-level rise of 0.3 m, the land loss due to inundation may exceed 7,000 sq km, while that due to soil erosion may be up to 120 sq km (Table 18.1) (Awosika et al., 1994). Indeed, the entire municipality of Port Harcourt (about 70 sq km) may be inundated. Other significant localities that could be inundated in the Niger Delta area include Warri, Okrika, Nichia, Ahoada, Bori, Bonny, Brass, Degema and Yenogoa, all of which are local government headquarters. In these localities about 1-2 million people may be displaced with ASLR of 0.3 m, while another 1-2 million people, who remain because of cultural attachment to their ancestral homes could be adversely affected. With ASLR of 1.0 m, about 2-3 million people could be displaced in the Niger Delta (Awosika et al., 1994).

Both inland and ocean fisheries are very sensitive in varying degrees to climate fluctuations. In particular, upwelling fisheries which predominate off the southwest coast may be affected by increased ocean temperatures because the ocean waters may become unsuitable for fisheries, causing a reduction in and possible collapse of upwelling fishing activities. Tropical warm water fisheries would also be hurt because a rise in temperature would cause a change in the characteristics of the ocean waters and, consequently, in the habitat of the fish currently found in the area. Any significant reduction in the fish catch would upset both the economy and the culture of the coastal zone. In addition, wetland loss and increased salinity would reduce estuarine fishing. An increase in the depth of the present coastal waters would also possibly lead to increased deep-sea fishing and ocean fisheries in the estuarine area.

Mining represents a major socio-economic sector in West and Central Africa. In the Niger Delta alone, values of investment in mining amount to over $13 million (Awosika et al., 1992), most of which will be impacted by sea-level rise. Considerable losses will thus be incurred in terms of investments and developments of the Niger Delta, particularly with respect to government revenue in oil and oil-based industries, such as oil refineries in Port Harcourt and Warri, together with kilometres of pipelines linking the refineries to the jetties. In addition, many social services and infrastructures with many capital investments in the large cities, like Port Harcourt and Warri, could be adversely impacted.

Energy supply and demand would also be affected by climate change and sea-level rise. For example, Critchfield (1966) noted that construction of power lines must always take into account a great number of climate effects on equipment. Strong, gusty winds, for example, could cause considerable damage to power poles and lines or cause trees or other debris to fall onto the lines. An increase in the number of thunderstorms would bring more lightning which may cause, at least, temporary failure, if it strikes a power line. Temperature fluctuations could also affect the operation of switches transformers and other equipment. In warmer weather, lines tend to expand and sag, and become susceptible to more damage from strong winds.

Climate change could also have significant impacts on solar energy and wind, two significant sources of energy that still remain untapped in Africa. However, of more immediate concern are the possible impacts on the supply and demand of the hydroelectric power and fuel wood which are the most widely used sources of energy in Africa. For example, reduced precipitation would adversely affect the supply of hydroelectric power which is sensitive to river flows. There might also be problems related to the seasonal aspect of riverflows, as well as to the unreliability of rainfall as a source of water supply in many parts of Africa. Reduced hydroelectric power production would also impose economic hardships.

The impacts on the supply of fuel wood could also be important. For example, with a decrease in precipitation, some sources of the fuel wood would be eliminated. Also, more frequent thunderstorms and erosion could cause more damage to forests. The situation would be worsened by the growing energy demand due to an increase in population.

With a rising sea level and the increased landward penetration of salt water, coastal tree species, except the salt tolerant ones, could be hurt, and, thus, the forests as sources of wood could decrease. If climate change results in migration of people to particular areas, there would be an increase in the demand for fuel wood in these areas, and these could aggravate environmental problems commonly associated with deforestation, thus reducing the sustainability of the environment and increasing the difficulties for resources management.

There could also be significant impacts on energy demand due to higher temperatures and humidity consequences, which would raise the demand for air-conditioning during the day. At night, on the other hand, there could be less demand for space heating, particularly during the dry seasons, and on highland areas and consequently less energy consumption.

Response Measures

The impacts of the expected climate change and sea-level rise no doubt warrant urgent action and policy responses. In particular, the potential impacts show that it is very necessary to ensure that there is preparedness through the development of adequate policies and by ensuring that the adverse impacts on the environment and socio-economic and socio-cultural systems are minimized and if possible prevented. Thus, the implications of climate change and sea-level rise imply the need for response measures for (a) averting or reducing the magnitude of climate change, and (b) mitigating the consequences of climate change and sea-level rise. Such response measures that could be used for averting or reducing the magnitude of climate change include (a) reducing demands for fossil fuels, (b) adopting technical solutions to collect or control carbon dioxide, and (c) increasing biomass production, which includes the reforestation of deforested areas.

Strategies for reducing demand for fossil fuels involve the use of conservation measures and alternative sources of energy. This measure is particularly important for developing countries, such as those along the coasts of West and Central Africa, because the relative contributions of these areas to the atmospheric gases has been increasing since 1950. Reducing their energy demand will reduce the burning of fossil fuels.

Technical solutions which include the use of mechanisms to control atmospheric concentrations of carbon dioxide and other greenhouse gases are linked to global, regional and national energy policies, forest management and personal and society values. Such solutions include measures to control the production and use of coal and petroleum and measures to control emissions from power plants and those occurring at the point of combustion. For example, technical solutions could be achieved in the transportation sector, the electricity power generating sector, the building sector and the industrial sector. For example, in the building sector, improved efficiency in production could be achieved through the improved energy efficiency of air-conditioning, improved burner efficiency and improved energy management control. In the transportation sector, improved fuel efficiency could be achieved through better engine management and transmission control systems, improved vehicle design, regular vehicle maintenance and improved efficiency in transport facilities (IPCC, 1990).

Increasing biomass production through afforestation will provide a natural sink that will absorb carbon dioxide. Cooper (1978), for example, noted that an increase of only 1 per cent in the plant life on earth, especially forests, would be sufficient to absorb one year's release of carbon dioxide at the present rate (Kellog and Schware, 1982). Particularly in West and Central Africa, there is an urgent need for a sustainable management of forests for the welfare of the people and the benefits of future generations. In particular, there is an urgent need to reduce deforestation and to reforest the deforested areas.

Strategies for mitigating the consequences of climate change include those that would help to increase human resilience to the effects. Such strategies include protecting arable soil, improved water resources management, applying agrotechnology, improved land-use policies, maintaining food reserves and adopting disaster response strategies. Other strategies include those which involve access to information and technology which can lead to better decision-making regarding how best to respond to potential climate change. Examples of such strategies include the use of environmental monitoring and warning systems, the collection and use of improved data, public information and education, and the transfer of technology. Environmental monitoring is for example essential, not only for national planning for sustainable environment and management of resources, but also for improving the capacity of

global and regional climate models, which in turn would be useful to predict climate change. Currently, forecasting is hampered by the inadequacy or the lack of data and information. Public information and education are particularly essential; it is desirable to have a well informed population on an issue as complex as climate change. The dissemination of information thus represents a very powerful instrument for (a) promoting awareness and knowledge of climate issues and (b) providing guidance for possible practices to limit and/or adapt to climate change and for promoting wider participation of all sectors of the population in addressing climate change issues and developing appropriate responses.

The development and transfer of technologies are also vital to any efforts at addressing climate change issues. Such technologies transferred must, however, be low cost and effective and, in some cases, must be adapted to suit the local environment and take the socio-economic background of the local communities into consideration. In some cases, it may be necessary to develop local technologies. It may, however, be noted that, for the transfer or adaptation of technology as well as the development of local technology, problems which may hinder the effects (e.g. the lack of financial resources, necessary institutions and trained human resources) must be solved. Existing institutions must be strengthened, or new mechanism established, to operate the technologies. It is also important to ensure that financial resources are channelled to African countries, especially in respect of activities which contribute to limiting greenhouse gas emission and promoting activities which encourage a sustainable environment and the prudent management of resources.

Conclusion

Climate change and sea-level rise would no doubt have considerable implications for society-environment systems in West and Central Africa. While uncertainties surround what would be the characteristics of climate change and their impacts, these uncertainties do not justify a lack of action. It is, therefore, necessary to plan and take reasonable steps to avoid the risks of catastrophic consequences, which could result from the changes that would occur. For West and Central Africa, it is prudent

to plan and implement measures necessary to either avert or mitigate the consequences. Considerable parts of West and Central Africa are expected to be vulnerable to climate change and sea-level rise. In particular, the deltas and estuarine areas and the built-up areas with large capital investments require the development of adequate strategies that would prevent or minimize the adverse impacts of climate change and sea-level rise. In some of these areas protection of lives and property as well as socio-economic activities would be necessary. In addition, the effectiveness of adequate strategies requires effective management policies for the coastal areas, with adequate legislation to enforce coastal management policies. Effective management policies would also evolve monitoring policies which would monitor (a) changes and variations of climatic elements, (b) sea-level rise and the characteristics of ocean dynamics, (c) changes and variations of river regimes, and (d) the characteristics of environmental hazards, including erosion and flooding, and their impacts on the environment and society. Effective management policies would also be needed to assess the potential impacts of climate change and sea-level rise and analyse possible cost-effective response measures. No doubt, effective management policies should embrace the concept of national management committees which should be interdisciplinary and extend beyond academic and government circles into the community and the professionals interested in the issues related to climate change and sea-level rise. Such national management committees would increase the potential for effective planning and implementation of the programmes on the coastal management of West and Central Africa.

It is also important to realize that climate change would no doubt affect humanity as a whole, without prejudice to the sovereignty of states as recognized in international law. It is, therefore, important to recognize the need to balance sovereign rights of states to exploit their natural resources against their concomitant duty to protect and conserve the climate for the benefit of mankind in a manner that neither would be diminished.

The need to ensure that solutions are carried out on global, regional, national and local scales cannot be overemphasized. For West and Central Africa, in particular, it is important that co-operative, collaborative and co-ordinative efforts occur at regional and local levels, as well as at national and international levels. To this end, national governments

must be ready to take appropriate measures within their competence, for example, by ensuring that their national observance and communication systems function efficiently. Co-operation by means of research, systematic observations and information exchange would no doubt help in tackling the problems that may arise from the implications of climate change.

Scientists, planners and policy-makers must no doubt promote research, provide improved access to data and information necessary for effective planning and the implementation of measures to avert or mitigate the consequences of climate change and sea-level rise. They must recognize the need for an environment of a quality that permits a life of dignity and the well-being for the present and future generations. We must all recognize the need to accept the sustainability of the environment and the management of resources as challenges, and that finding solutions to the problems of the climate and climate change are basic to bequeathing a sustainable environment and prudent resources management to future generations.

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CHAPTER NINETEEN

Snow Melting Variation and Regional Environmental Change: A Micro-level Study of Himalayan Rivers

B.W. Pandey
R.B. Singh

Introduction

Containing about 1,500 glaciers, the Himalayas and their adjacent areas are among the most extensively glacierized areas outside the polar regions. These glaciers play a paramount role in providing potential water to the Indus, the Ganga and the Brahmaputra systems in India, Pakistan and Bangladesh, covering an area of more than 20 million sq km. Economically important areas are affected, more or less every year, particularly in northern India, Nepal, Bangladesh, Pakistan and Bhutan. The changing landscape of the catchment areas of the big rivers in the region is also affected by the potential background of the snow cover melting and, consequently, increasing the water potentiality of these rivers.

Research on Mountain Glacier

The literature contains examples of several glaciated mountain regions of the world. Interest in the snow and glaciers of the Himalayas began with observations regarding the snow line in the 1840s (Humboldt, 1945; Cunninham, 1849). The Pindari glacier was the first one to be reported upon — by E. Madden (1847) — and has been a very popular subject since then. The Himalayas have seen a concentration of scientists from

around the world for the occasional and incidental observations of research phenomena. The more scientific and comprehensive study of glaciers was made by an international body, the International Hydrological Decade (IHD), 1965-1974, which finally became a permanent International Hydrological Programme (IHP). Currently, many researchers are carrying out their research in many parts of the Himalayas. The spatio-temporal dimensions of snow accumulation on the Himalayan ranges are studied by Bhandari and Nijumpurkar (1988), Negi (1990), while the snow melting variation as the major reason of flow of water and the situation of the dams and lakes has been considered by Sahni (1988). The distribution of glaciers, the amount of ice-cover, the ultimate water potentiality and run-off were analyzed by Vohra (1981) and Souchez and Lorrain (1991). Snow avalanche hazards have been a focus of concern in the Kaghan Valley, Pakistan, by Gardner and Scally (1991). Mass wasting on valley side and the hazard to the ecosystem in the Canadian Rockies have been studied by Mattson and Gardner (1991). Flash floods debris flow and debris torrent area processes which have created serious hazards in the mountain environment in the Himalayas have been considered by Bhandari and Gupta (1985). These processes have been specially problematic with the expansion of road systems into the south-central ranges of the Himalayas where the maintenance of traffic flow is a constant battle against debris flow, debris torrent, rockfall and heavy snowfall in different seasons.

Studies of snow and ice in the Himalayas have generally been made under international auspices. The need for snow surveys and glacier studies for the purpose of water resources management was clearly revived in India as early as 1945. But, no institution was either charged with the task or created to carry out this arduous interdisciplinary task. Consequently, barring occasional studies, no long range and comprehensive programme concerning snow and ice could be executed in India. Finally, in glaciated mountainous areas a set of processes associated with glacier, ice and its melting have been identified as hazardous by Tufnell (1984).

Historical Background and Reconstruction of Change

Little was known about Himalayan glaciers and their dynamics until recently. Because of the craze for more fashionable research, little work was done to investigate how much water Indian rivers got from snow, rain, groundwater or glacier melt in different seasons. However, some signs of a growing interest in this direction have been shown by the Geological Survey of India, mainly its Glaciology Division in Lucknow and Calcutta since the mid-1970s. The Snow and Avalanche Study Establishment (SASE), in Manali, and the Physical Research Laboratory, in Ahmedabad, have taken up a systematic study of glaciers. The National Remote Sensing Agency is also reviewing historical data and monitoring change by using satellite imageries. Glaciers have been shrinking for many years in all over the Himalayan region. In fact, the recession of glaciers began a few centuries ago. The Gangotri glaciers, the source of the holy Ganga, have retreated by 600 m between 1935 and 1976; the Pindari glacier has retreated by about three km during the past 120 years (Table 19.1).

Table 19.1 Glacier Retreat in the Himalayas

Glacier	Period	Years	Retreat (m)	Average retreat (m/year)
Zemu	1909-1965	56	440	7.9
Millam	1849-1957	108	1,350	12.5
Pindari	1845-1966	121	2,840	23.5
Shankalpa	1881-1957	76	518	6.8
Poting	1906-1957	57	262	4.6
Arwa	1932-1956	24	198	8.2
Gangotri	1935-1976	41	600	14.6

Source: Bhandari and Nijumpurkar (1988).

Existing Status of the Himalayan Glaciers

The Himalayas, which have nearly 1,500 glaciers, are one of the largest continental areas under ice. It is estimated that about a 33,000 sq km area constituting about 17 per cent of the Himalayas and 16,000 sq km amounting to nearly 37 per cent of the Karakoram are ice-clad (Bhandari and Nijumpurkar, 1988). The areas of higher concentration of glaciers in the Himalayas lie in the tracts having the highest mountain peaks. According to the height of the peaks, the average length of the glaciers varies (Table 19.2; Figure 19.1).

The Himalayan glaciers descend according to the elevation. Smaller glaciers are found on the middle ranges, such as the Pir Panjal and Dhauladhar, and the larger glaciers occur on the slopes of the main and Trans-Himalayan ranges. Himalayan glaciers descend to lower elevations in Kashmir compared to those occurring in Sikkim or Arunachal Pradesh (Table 19.3).

Table 19.2 Average Length of the Glaciers

Glacier	Average length (km)
Siachin (Kashmir)	72
Bafio (Kashmir)	62
Hispor (Kashmir)	61
Baltoro (Kashmir)	58
Gangotri (Garhwal)	26
Zemu (Sikkim)	26
Millam (Kumaun)	19
Kedarnath (Garhwal)	14

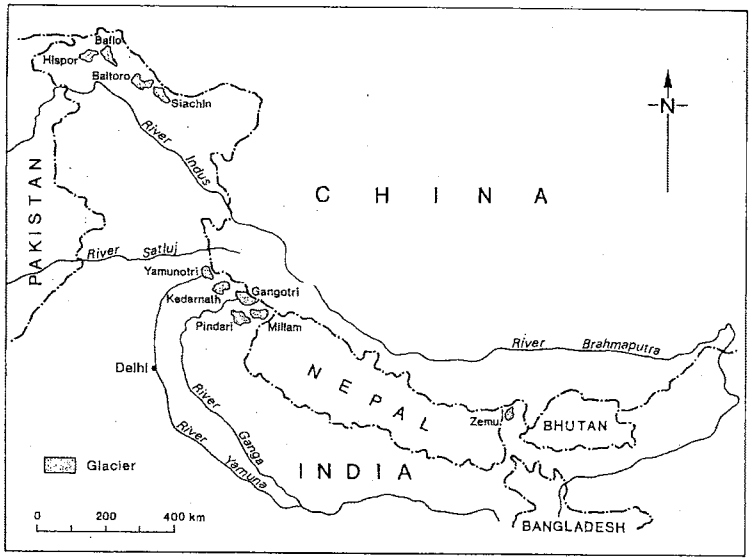
Source: Negi (1990).

Table 19.3 Average Height of Glaciers in the Indian Sub-continent

Region	Average lowest elevation (m)
Kashmir	3,700
Himachal Pradesh	3,900
Garhwal and Kumaun	4,000
Nepal	4,200
Sikkim	4,300
Bhutan	4,300
Arunachal Pradesh	4,350

Source: Negi (1990).

Figure 19.1 Major Himalayan Glaciers in India



Snow Melt Contribution to River Hydrology

The fresh water from the Himalayan glaciers has a special significance for India. Glaciers are an important source of water for the northern rivers, most of which have large catchment areas having extensive glaciers. During the monsoon, the rains feed these rivers, and in the winter groundwater sustains them, but, in the lean period of the summer, most of their water comes from the melting of snow from glaciers, so the northern Indian rivers are perennial, unlike peninsular rivers.

It is evident that the melting period of glaciers coincides with monsoon precipitation. In river basins where the monsoon is weak, the glaciers act as a substitute for it. But, in those river basins where the monsoon is intense and widespread, the situation is more complex, and there is the real danger of a worsening flood situation.

An average Himalayan glacier has a capacity of about a tenth of a cubic kilometre, but even a medium glacier can provide enough water to fill a large dam like the Bhakara which has a capacity of about 8 cu km; a large glacier like the Gangotri can fill it three times. The snow melting variation of the glaciers affects the total flow of water in the rivers. It is difficult to examine all the rivers of the Himalayas; therefore, three river systems, namely the Indus river system, the Ganga and the Brahmaputra river systems, along with their tributaries, have been selected for the analysis of this study. River Jhelum provides maximum run-off to the Indus river system (Table 19.4).

Agriculture is the main source of livelihood in the entire Indian sub-continent. Water resources generated within the Himalayas and the Trans-Himalayas are, therefore, their greatest gift to the sub-continent. According to an estimate, about 60 per cent of surface water resources in India are met by the three major northern river systems of India. Among them, the Brahmaputra constitutes 30 per cent while the Ganga and the Indus 15 per cent, each.

Table 19.4 Snow Melt Contribution to Major River Systems

Name of basin	Name of the tributary	Snow melt area sq km	Total average snow fall cu km	Computed snow melt run-off
Indus	Jhelum	16,562	2.762	2.486
	Beas	3,128	0.405	0.365
	Satluj	46,882	1.083	0.975
Ganga-Brahmaputra Meghna System	Jamuna	1,980	0.161	0.145
	Ganga	7,965	0.480	0.432
	Karnali	8,049	0.123	0.111
	Gandak	4,421	0.092	0.083
	Tista	2,617	0.046	0.042

Source: Central Water Commission (1988).

Environmental Effects, Inter-regional and Global Changes

Glaciers are extremely sensitive to climate; deep-ice covers thus trap palaeoclimatic information in the form of deviations of unstable-isotope ratios; for example, an increasing value of oxygen-18 deviations in a vertical ice core reflects a warmer trend of climate causing a mass of ice to melt, leading to heavy discharge of water in the rivers. In high altitude areas of glaciation or areas prone to severe ice erosion and avalanches, weathering is due to frost or insolation and the production of scree. The glaciers play a vital role in abroading and scratching the slopes and soils. The loose debris which slips down along the slopes of the hills under the action of gravity changes regional morphological scenarios. The Lahaul and Spiti areas of Himachal Himalaya are good examples of such type of denudation.

The higher glaciated regions of the basin receive only solid precipitation from the monsoon, and there is evidence now to prove two further points. Firstly, there are certain areas in the Himalayas where glaciers are fed mainly by the monsoon, and the winter precipitation is

not significant; and secondly, the precipitation increases with height (within the glaciated region). Thus, in the river basin with a dominant monsoon, the glacier melt water period coincides with the main snow input period, and the glacier mass balance indicates the quantum of run-off in its relation to the actual precipitation which, in turn, is generally high on the ridges in comparison to the valleys. In years of balanced glacier budget, the monsoon precipitation will roughly equal the run-off. The effect of a positive glacier budget will be a reduced run-off, and of a negative glacier budget an increased run-off. The areas of dominant monsoon precipitation are found in eastern Nepal and Sikkim (Vohra, 1981), creating heavy inter-regional landscape changes by erosion and other mass wasting processes.

In the river basins where monsoon intensities and winter precipitation are equal to sub-equal, the glacier melt water discharge will generally be in excess of the monsoon precipitation. The run-off due to the monsoon will increase, developing upon the vagaries of monsoon intensities and aerial spread. Also, increased humidity in the glacier basin causes the glacier to melt faster, for humidity controls condensation and the condensation of water vapour releases enough energy to melt roughly about seven times its volume of ice. This is an escalating situation which may lead to the worsening of a potential flood situation. The alarming flood condition is changing the morphometric scenario of landscape in the sub-continent affecting India, Bangladesh, Bhutan, Nepal and Pakistan.

Mass wasting on valley sides in the glaciated areas creates changes in the physical environment, basically in the field of geohydrology. The spatial and temporal distribution of mass wasting events suggests that the accumulation of water at the over-burden/ice-core boundary contributes to the mass wasting and physiographical changes (Gardner and Scally, 1991). This occurs more frequently during the periods of warm, sunny weather when ice ablution is at a maximum. Also, the glacier imbalance may result in changes from above- or sub-normal snowfall or above- or sub-normal summer temperature or any other possible combinations. The trapping of terrestrial waves and, consequently, global warming may prove an accelerating factor in the intensity of snow melting over the mountain tracts. Since the Himalayas are the most extensive in terms of horizontal as well as vertical extent, they may be more affected by these factors in avalanche than other mountain systems because of their continental location.

The mass wasting invariably exposes the surface of the ice-core which acts as the failure and sliding plane. This, in turn, accelerates ice-core degradation through the sequence of ice-core melt, mass wasting, further ice-core melt and possibly more mass wasting. The moraine evolves to a veneer-liked landform over the pre-existing valley-side topography and, thus, brings changes in the topography of the mountain up to a large extent. The continuous sedimentation leads the further aggradation of the river-bed in the lower regions. The frequent occurrence of floods is also accelerated by the snow-melt of the mountainous regions. In the lower basins of the Ganga, the Brahmaputra and the Indus river systems, floods are very common in almost every year, leading to changes in the physiographic characteristics. The situation may become more pronounced, with high magnitude, in the next few decades if the increasing quantity of snow-melt continues.

Glaciers do respond to long-term changes in climate. Many mountain areas of the world have witnessed general glaciers shrinkage during the twentieth century in response to climatic amelioration. However, the mechanisms of responses are complex and by no means completely understood. The rates of responses are certainly linked to the size and configuration of glaciers as well as to climatic variables such that within a mountain systems some glaciers may be advancing while others are in retreat. A better understanding of glacier-climate relationships, with implications for reliability of water supply, is clearly relevant to the manager of water resources (Young, 1990).

Apart from the above geomorphological impacts of the spatial and temporal variation in snow melting on the environment, there are several other long-term environmental effects which may create vulnerable geosystems causing irreparable ecological degradation. Variable snow melt may also interrupt the high land-low land ecological symbiotic complexity, threatening the environmental sustainability of the mountain geosystem. The coinciding impacts can be perceived from many angles. Since the glaciers are reducing gradually in their size and amount, there may be a decrease in the quantity of water-flow after a few decades, leading to a severe scarcity in surface water resources (Figure 19.2). It may not only disturb the terrestrial ecosystem, but also the marine ecosystem because some of the marine species need a mix of

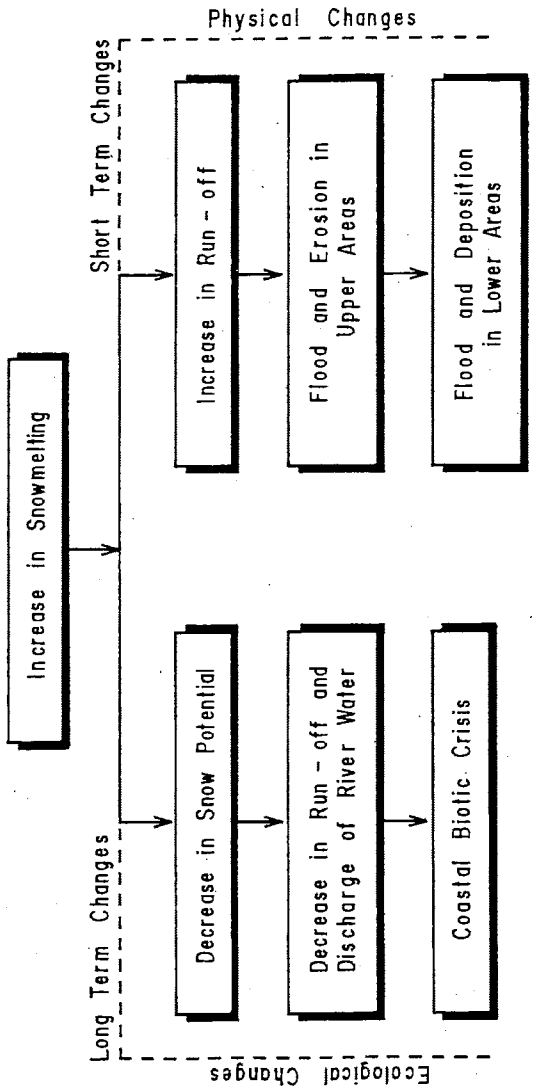


Figure 19.2 Highland-lowland Geo-ecological Changes: A Hypothetical Presentation

fresh and saline water for their livelihood. Basically, the Bay of Bengal and the Arabian Sea, which are fed by the Ganga, the Brahmaputra and the Indus river systems, may be considered as the most ecologically sensitive zone in the Indian sub-continent in the wake of the retreat of the glaciers.

Conclusion

The changing nature of snow melting may also cause flooding in Indo-Gangetic-Brahmaputra systems. This has further implications in coastal inundations and flooding in estuary ecosystems. Such changes, having global implications, require a comprehensive study of deforestation, soil erosion, siltation and sediment transport processes in the upland catchment areas, the Ganga and Brahmaputra basins lying in Nepal, India and China.

Each land unit has its own unique carrying capacity in relation to anthropogenic activities such as production (agriculture, horticulture), construction (roads and buildings), tourism, etc. (Singh and Pirazizy, 1992). The situation is more pronounced in the mountainous regions where a delicate balance exists and the carrying capacity of the system is not optimal. The increasing intensity of anthropogenic activities may contribute to the fragility and the vulnerability of the glacio-ecological system (Chaudhari and Singh, 1991). The most serious problem of the region today is the gradual upward withdrawal and, therefore, shrinking of glaciers and the recession of the treeline. The zone of glaciation is being contracted and that of ablution being enlarged leading to enhanced glacio-gravitational actions causing landslides and floods (Verma, 1992). It is, therefore, of vital importance to study the recession patterns of the glaciers, using geomorphological techniques further supplemented by emerging monitoring technologies of remote sensing and geographical information systems (GIS).

It is also pointed out that increased global temperature and subsequent ice-sheet melting will be affected by the earth's rotation because the moment of inertia of the total earth system has to be conserved. Such uncertainty should be monitored by the VLBI technique which is being set up in India.

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Contributors

A.J. Christopher
Professor of Geography, University of Port Elizabeth, South Africa

Graham M.S. Dann
Reader in Sociology, University of the West Indies, Barbados

M.B.K. Darkoh
Professor and Chair of Geography, University of Papua New Guinea, Papua New Guinea

Sandra M. Davenport
Department of Human Geography, Australian National University, Australia

Denis Dwyer
Research Professor of Geography, Keele University, UK

Michael J. Eden
Department of Geography, Royal Holloway, University of London, UK

Jill Eyre
Lecturer in Geography, University of Derby, UK

Edwin A. Gyasi
Associate Professor of Geography, University of Ghana, Legon, Ghana

J.P. Msangi
Professor of Geography, Egerton University, Kenya

O. Ojo
Professor of Geography, University of Lagos, Nigeria

John Overton
Professor, Institute of Development Studies, Massey University, New Zealand

Lekan Oyebande
Professor of Geography, University of Largos, Nigeria

B.W. Pandey
Department of Geography, University of Delhi, India

J.T. Parry
Professor of Geography, McGill University, Canada

J. Douglas Porteous
Professor of Geography, University of Victoria, Canada

Robert B. Potter
Professor and Head of Geography, Royal Holloway, University of London, UK

Peter J. Rimmer
Head, Department of Human Geography, Australian National University, Australia

Guy M. Robinson
Professor of Geography, Kingston University, Surrey, UK

Michael Roche
Senior Lecturer in Geography, Massey University, New Zealand

R.B. Singh
Associate Professor of Geography, University of Delhi, India

Robert W. Steel
Emeritus Professor of Geography and former Vice-Chancellor, University of Wales, UK

Patrick E. Williams
Associate Professor of Geography, University of Guyana, Guyana

Yue-man Yeung
Professor of Geography and Director of the Hong Kong Institute of Asia-Pacific Studies, The Chinese University of Hong Kong, Hong Kong

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