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Environment and Development

THE EUROPEAN COMMUNITY

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of States

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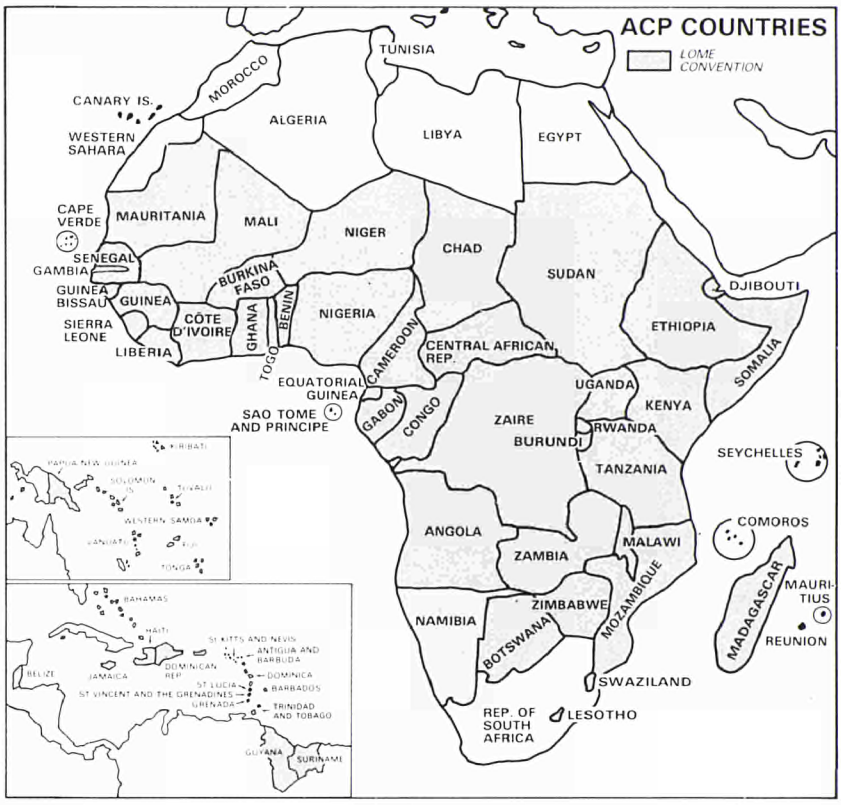

FRANCE

(Territorial collectivities)
Mayotte
St Pierre and Miquelon

(Overseas territories)
New Caledonia and dependencies
French Polynesia
French Southern and Antarctic Territories
Wallis and Futuna Islands

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(Bonaire, Curaçao, St Martin, Saba, St Eustache)
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(Country having special relations with Denmark)
Greenland

UNITED KINGDOM

(Overseas countries and territories)
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British Indian Ocean Territory
British Virgin Islands
Cayman Islands
Falkland Islands
Southern Sandwich Islands and dependencies
Montserrat
Pitcairn Island
St Helena and dependencies
Turks and Caicos Islands

This list does not prejudice the status of these countries and territories now or in the future.

The *Courier* uses maps from a variety of sources. Their use does not imply recognition of any particular boundaries nor prejudice the status of any state or territory.

Cover page: *The Gathering Storm*
(The ACP-EEC Courier and 'Graphic Design' – Sami Alouf)

MEETING POINT: Daniel Assoumou Mba

An agricultural economist from Cameroon, Daniel Assoumou Mba has been running the Technical Centre for Agricultural Cooperation, CTA, since it was set up under Lomé II. The most recent of the specialist ACP-EEC institutions to see the light of day, the CTA is now well known to its ACP users. It is ready to help take up the challenges facing agronomics researchers in Africa in the 1990s. **Pages 2 to 4.**

COUNTRY REPORTS

COTE D'IVOIRE: For a long time, the Republic of Côte d'Ivoire was regarded as a showcase of West Africa, and in fact it remains so to a considerable extent. But, like most other African states, it has been shaken by a crisis on two levels — economic and political. Democracy needs to be built on a foundation which has now been weakened by serious economic problems. What is to be done to surmount these difficulties? *The Courier* investigates and speaks to Prime Minister Ouattara. **Pages 5 to 25.**

PAPUA NEW GUINEA: According to the publicity, Papua New Guinea is 'The Eldorado of the South Pacific' about to be discovered by the rest of the world. It is certainly a land which is rich in resources still to be exploited and with a history of liberal economic management, but it also has unique social and cultural traditions which do not always lie comfortably with modern development concepts. *The Courier* examines this dichotomy more closely. **Pages 26 to 40.**

DOSSIER: Environment and Development

The deterioration of the environment caused by various forms of pollution threatens the very survival of humanity — whether one looks at it in the health context or from the point of view of economic development. With this in mind, an 'Earth Summit', which will bring together the majority of the world's states, will shortly convene in Rio de Janeiro. The Dossier analyses the important issues at stake in the discussion over the environment and development. **Pages 43 to 101.**

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AFRICA-CARIBBEAN-PACIFIC - EUROPEAN COMMUNITY

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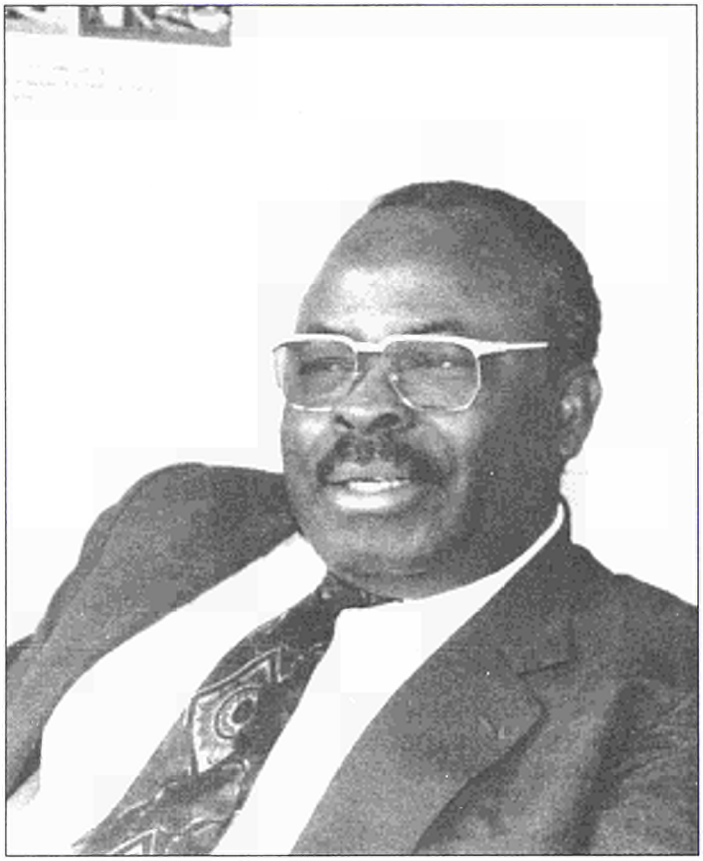
CONTENTS

Daniel Assoumou MBA,
Director of the CTA

More than 36 000 questions answered in 1991



Cameroonian agronomist Daniel Assoumou Mba is Head of the Technical Centre for Agricultural and Rural Cooperation (CTA), the last-born of the Lomé specialised institutions.

► *The CTA is the most recent of the ACP-EC joint institutions. How long has it been working?*

— It has been operational since February 1985. It was set up by Lomé II and I was appointed in June 1983. When I started, I knew nothing about the CTA or where it was or anything and it was when I got to Brussels that they told me that it was to be based at Ede-Wageningen for the time being. I found that out in Brussels. I had to try and set it up and recruit the first staff and that took the rest of 1983 and the whole of 1984.

► *The Centre has become operational since then... How big is the staff now?*

— All in all — from the chauffeur to the porter and the director — 35.

► *How big is your operating budget?*

— Currently ECU 5 million.

► *The negotiators of the Convention hesitated a lot over the Centre's duties. Are they clear now?*

— Their hesitation was not due to any lack of a specific mandate. What they were worried about was whether the Centre should deal directly with the problems of exploiting agricultural projects or stick to one or two specific aspects of agricultural development. What the Centre has to do, precisely, is to help the ACP countries get the scientific and technical data they need to help them develop their farming and rural sectors. We have had an independent consultants' study and that is the best way of describing what we do, with the idea of the transfer of technology and scientific and technical know-how being used for the development of ACP agriculture firmly in our sights. And added to this, to target our work better, there are things such as literacy campaigns in rural areas.

► *Do all the potential users in the ACP countries know about your Centre now?*

— The target groups, as you know, are people in agricultural extension work, agricultural research and training, specialists in resource materials and planners. At the moment, they are in the picture, individually and nationally. But when it comes to exact knowledge by everyone involved in rural development, well, there we have some work to put in, which is why we are concentrating on opening up regional offices, focal points at national level — as indeed the ACP-EC subcommittee on agricultural cooperation has recommended — so that all the countries know what the Centre is doing.

► *That means that you are going to send people to all the ACP countries, does it?*

— No it does not! The CTA's mandate says that the Centre has to use existing structures and that is what we are going to do. We shall encourage the running of CTA activities within these structures, using the CTA's means and the structures and personnel of the ACP States.

► *And presumably it is cooperation with these local structures which enables you to avoid duplication...*

— Exactly!

► *Which of your activities is most popular with the users?*

— The publications, I think, and more specifically our bulletin, which is called 'Spore'. In fact, it has got to the point where, if I go to a place where we are not known, all I have to do is say that the CTA is the organisation which publishes Spore for them to recognise us. So Spore is familiar to our users, and indeed well known. We print 30 000 copies in French and in English. Our publications in general are well received and highly-regarded.

► *How many titles have you brought out since the Centre opened?*

— Thirty eight.

► *And how many seminars have you organised?*

— We have meetings which are entirely financed and organised by the CTA. Until 1986, we had six meetings a year on our programme — two in Africa, two in Europe, one in the Caribbean and one in the Pacific.

In 1987, we changed, because we had opened a regional office in the Pacific, at IRETA, an agricultural extension institute. Organisation in the Pacific region is based on meetings of heads of agriculture and these people asked the CTA to specify its method of assistance. It is they who meet and they who identify the weak spots and the shortcomings of extension work and the research and give the CTA a list of subjects which we can then get IRETA to deal with in workshops. The Pacific can ask for a series of four of these workshops every year.

For the past two years, the same has happened in the Caribbean, where we work in the same way and organise two or three workshops a year.

What we have to do now is organise Africa along the same lines. So, all in all, there were six meetings a year until 1986 and there have been six meetings plus four workshops plus three workshops a year since. That is not the whole story either, because our aim is to mobilise ACP expertise and make it available to the whole world. For example, we finance ACP experts' attendance at meetings of the FAO and the WMO and so on.

Agricultural research in ACP countries

Demographic, environmental and economic factors dictate that enormous challenges will face agricultural research workers in sub-Saharan Africa in the next decade. FAO estimates that the region's population will reach 700 million by 2000 AD, that 29 countries will not be able to feed their people and that exports will only amount to some 50% of imports. The resources available for research, including manpower, are unlikely to expand in proportion to the challenge thus presenting the research community with a Herculean task.

Researchers in Africa will also have to propose ways of overcoming major constraints on resources, such as soil erosion, an increase in cropping intensity, the destruction of woodland and an apparent trend towards more frequent shortages of water.

By comparison with Africa, the outlook for the Caribbean and the Pacific seems less daunting. Whilst the huge scale and diversity of the African problem will demand special solutions, the needs of the Caribbean and Pacific regions should largely be met by a continuation of the activities that form the core of CTA's services and support programmes (see below).

CTA's activities and the research community

CTA supports agricultural research by helping to ensure that problems relevant to ACP priorities are taken into consideration by specialised national and international institutes, and by assisting research scientists in ACP national agricultural research centres to improve the effectiveness of their research and by providing, within the limits of its mandate, information that will help train a successor generation of scientists. CTA also provides substantial support to the research community by facilitating the exchange of information.

ACP research workers benefit from most of the activities that form the core of CTA's support services and programmes: participation at meetings, the preparation of studies and reports, the Question-and-Answer Service, the selective dissemination of information, the production and distribution of publications (including 'Spore'), the provision of references and bibliographies and support to networks and certain training activities.

CTA will therefore continue to:
— assist scientists in ACP countries to gain access to information they require;
— help publicise the work of ACP scientists as well as that of others which bears relevance to the priorities expressed by ACP States; and
— contribute towards the dissemination of the results of research programmes financed by DGVIII and DGXII of the EC.

In future CTA will give more emphasis to:
— promotion of research linked to the concerns of extension particularly taking account of the problems of small producers through participatory approaches;
— establishment of programmes to facilitate the interchange of ACP research workers, for example, through study visits;
— encouragement of regional collaborative research initiatives and regional information programmes;
— undertaking an in-depth study to determine the measures to be taken so that ACP research scientists could be assisted in publishing the results of their work. This study would review the steps to be taken to facilitate the acceptance of articles written by ACP scientists for international journals, the maintenance of existing regional journals and the possible creation, with CTA's support, of an agricultural journal devoted exclusively to publishing articles by ACP research scientists;
— intensification of the programme of training courses for scientific editors and publishers; CTA's modest initiatives in this field have been highly acclaimed;
— support to programmes designed to maximise the benefits for ACP countries from resources available via the international agricultural research centres, and,
— support for the development of voluntary societies in ACP States which aim to promote the application of science to the improvement of agriculture. ○

'We have to consolidate our achievements in the matter of technical meetings, documentation and extension work'

► *How does the CTA differ from its sister organisation, the CDI?*

— I can't really talk about the CDI because I don't know enough about it. But the CTA doesn't finance projects or launch them. That is something we feel should be set up between the ACP countries and the Commission. All the CTA does is provide the intellectual input in the transfer of technology and find the scientific and technical information which agricultural projects or individuals or research specialists or target-groups need to develop their agriculture.

► *Would you have liked to be involved in setting up projects?*

— We would have to multiply our material and human resources by a factor of perhaps five or ten to do that. The question does not come up in those terms. The important thing is for the CTA to do its present job properly.

► *How do you see CTA activity developing?*

— We have produced a document, an indicative plan, for the five years until the end of the first financial protocol of the present Convention. It is all there — we have to consolidate our achievements in the matter of technical meetings, documentation and extension work and then we have to extend our activity out to the countries so they can make use of the possibilities and achievements of the CTA. As Lomé II set out, the job of the CTA is to help the ACP States develop their capacity to use and master scientific and technical information with a view to achieving their aims and the CTA had this in its sights when it laid the foundations of its annual programme. In defining the main lines of our policy, we adopted the idea of prior studies, so we call an annual meeting, as we were asked, of a joint consultative committee of 24 experts, 12 ACPs and 12 Europeans, to help the Director finalise the programme. This, we feel, keeps the Centre's activity in line with the member countries' wishes. Because the question is how can we in one place respond to ACP queries about agricultural development in others, at the four corners of the earth — particularly when, as they say, agriculture is a local science. So we have to go out there. And we do. We take the opportunity of the trips we make to meetings of the Council of Ministers and the Joint Assembly and the tours we go on to hold technical meetings. That is when we see what is happening with the agricultural development programmes. The CTA has also started to ask ACP members who come to consultative committee meetings to describe the problems they are currently experiencing in their regions. The ACPs' difficulty is that the 69 countries are not represented — unlike the Member States of the Community, which all are. But fortunately, the ACP representatives tend to have an overall view of their regions' problems.

► *These are the contacts which make your programme something on which everyone agrees...*

— Yes indeed!

► *Do your plans include making greater use of information?*

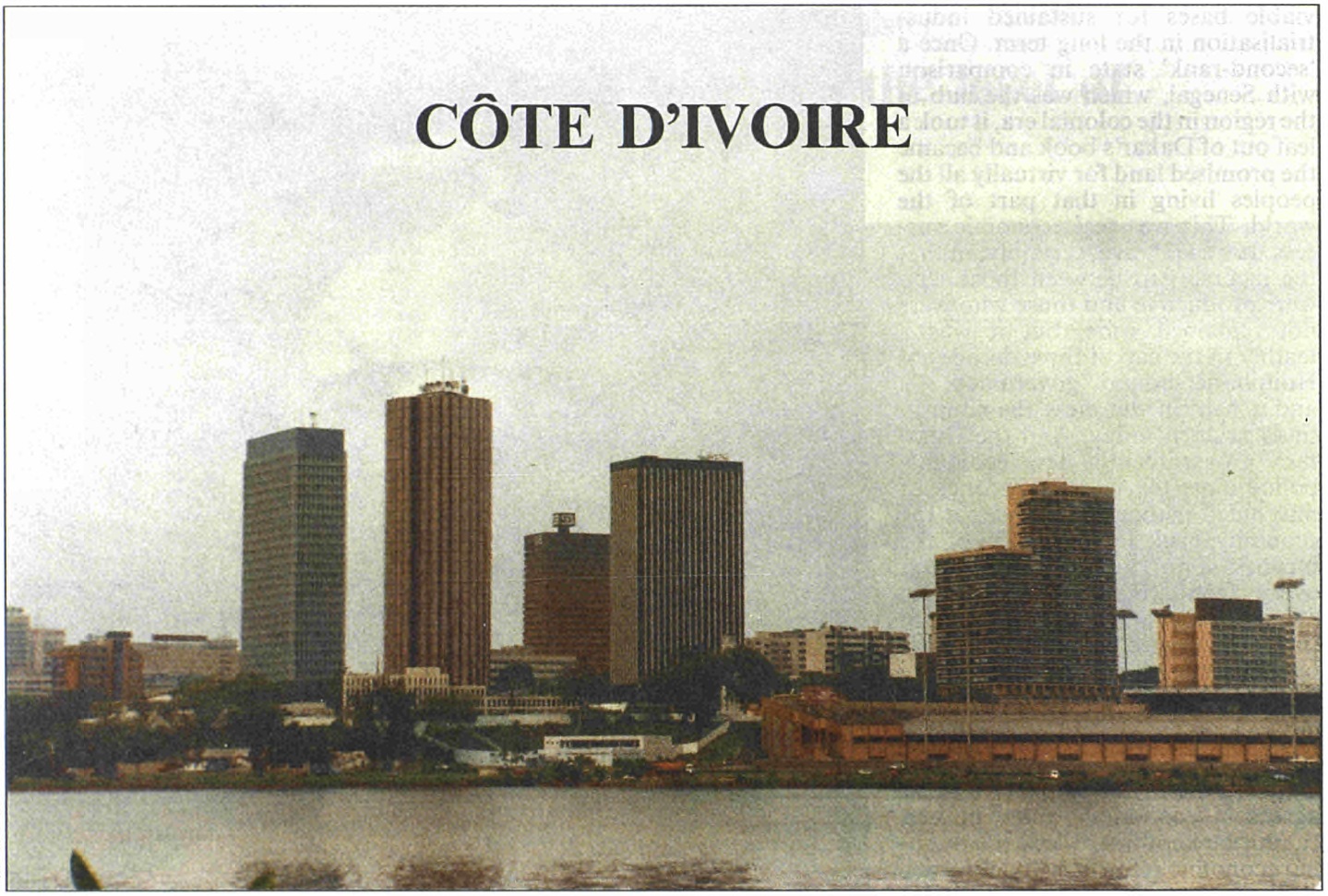
— That is what we are doing. The CTA is connected to data bases all over the world, to the US library, the FAO, the Commonwealth Agricultural Bureau and the research institutes. It has developed a network of expertise which it can consult at any time, whenever it gets questions. That is a very important side of our work. In 1991, we received more than 21 000 letters from ACP countries, from individuals and institutions, and each one contained between three and five questions. Our question-answer service sent out no fewer 36 000 publications.

► *You mentioned that the Centre was provisionally located at Ede-Wageningen. Have there been any drawbacks to being in the Netherlands, away from the institutional centres of the Convention?*

— Not at all! The Centre is at Wageningen provisionally — and the Convention says that the CTA has to be in one of the ACP States, by the way. This is after a study, financed by the Commission, on its current results and achievements. Now it is up to the ACP Committee of Ambassadors and the Commission. There is no problem about being out of Brussels, because I am invited to all the meetings concerning the CTA and the people in charge and anyone interested in what the CTA is doing in Wageningen should come and visit us here. It's only 200 km from Brussels, after all.○

Interview by
Amadou TRAORÉ

CÔTE D'IVOIRE



The Courier

Abidjan, capital city and a symbol of success in West Africa

Democracy
Putting principles into practice

Democracy is emerging in the countries of Africa rather as independence did. Whereas some states in the 1950s and 1960s had to fight hard for their international sovereignty, others were proffered it, as de Gaulle put it, like a poisoned chalice. This to a very large extent falsified the meaning of independence inside these newly independent countries and led them into making national and international political choices which, even on matters of general agreement such as the anti-apartheid campaign or just the aims and means of economic development, went down different paths.

Democracy has arrived in much the same way. After vainly resisting the 'injunctions' delivered at La Baule, the African States ended up in mourning, with the multiparty system seen as an 'external vision' of democracy and a 'luxury which the African countries could not afford'!

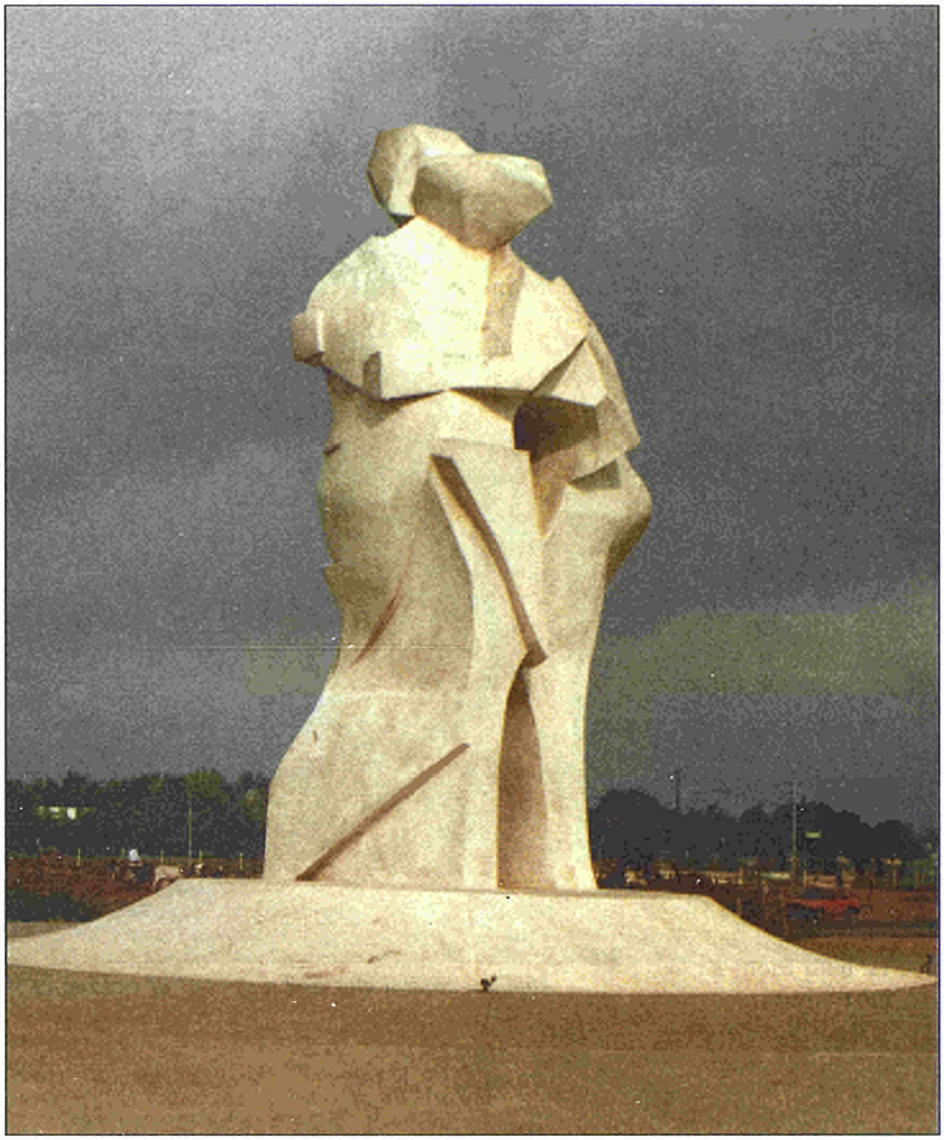
But realism lives on, of course, and the choice between two evils had to be made. It was democracy with aid or the status quo without. They opted for the principles, not always a painless process... and now they have to be put into practice.

Côte d'Ivoire was not just standing on the sidelines while all this went on. Despite one or two national and international options which have been major talking points, in the space of 30 years it has contrived to build up a solid, food-producing farm sector and a communications infrastructure network, both en-

viable bases for sustained industrialisation in the long term. Once a 'second-rank' state in comparison with Senegal, which was the hub of the region in the colonial era, it took a leaf out of Dakar's book and became the promised land for virtually all the peoples living in that part of the world. This was real economic success. It was relative, certainly, in that the income gap between those who were productive and those who were not remained wide, but it was a feather in the cap of three decades of Houphouët-Boigny government — and a help in the mess the country finds itself in today. And the Ouattara Government's new economic policy aims to right the wrongs of misguided management and put the economy back in the hands of the business sector, with privatisation on every front (in banking, energy, farming etc) and clear confidence in private management (see statements by Alessane Ouattara, the Prime Minister, Lambert Konan, the Minister of Agriculture, and Professor Ekra, the Minister of Health).

But as the Prime Minister himself agrees, economics and politics cannot be kept apart, and the ongoing economic reforms will only work if there are the proper political structures to go with them. As far as principles are concerned, the single party system is a thing of the past and the big question now is the day-to-day running of democracy and the real role of the political parties, the administrative bodies and the trade unions which contribute to that democracy. The democratic good faith of Dr Ouattara cannot and should not be doubted. But how much room does he in fact have for a proper State of law when both the (albeit changing) administration and the (solidly established) army are the product of a régime which put itself above all criticism? How much room does he have with the clumsy manœuvres of ill-structured opposition parties armed with no credible programmes reflecting the profound frustrations of years devoid of democracy?

The recent troubles in Côte d'Ivoire, the Government's questionable way of dealing with them and the irresponsible reactions of the press and the General Secretary of the Party, which have only made things worse, show that there is still a huge gap between the principles of democracy, which have been adopted, and the practice of it — for practical democracy means the separation of powers and the drawing of a firm line between the work of the Government and action by the forces which support it. No doubt the sudden switch to a process accelerated by the international political climate and the nation's very serious economic problems has something to do with this straying from the path. The cost of living in Abidjan and the country in general is very high and, as all over Africa, there are clouds on the horizon, particularly for young people.



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The statue of Peace on the way into Abidjan. In everything he has done since 1960, President Houphouët-Boigny has been timeless in his quest for peace

However, these economic and political difficulties must be seen in relative terms. This is an enviable situation in comparison with other African States with similar resources, or indeed some with wonderful mineral wealth and oil and apparently brighter futures in store. And when it comes to the basic freedom of ordinary people within its frontiers, this is a country which has a lot to teach others — and not just in Africa either.

Côte d'Ivoire's big problem today, over and above the crucial management issue, is how to build a thriving democracy which will safeguard and develop fundamental freedoms and give the nation an economy which creates employment and brings hope to the most vulnerable members of its population, the young people. ○

LUCIEN PAGNI

Alassane Ouattara, Prime Minister

'It will take work to reach the level of other countries'

In this interview with the *Courier*, the Prime Minister of Côte d'Ivoire explains the actions of the Government, during the current period of political and economic uncertainty.

► *Prime Minister, I should like to start with current events, if I may. I should like to ask you to look beyond any judgments made in the heat of the moment about those events, and beyond the violence, open or latent, affecting Côte d'Ivoire at the moment and say what you see as the root cause of this trouble. Some analyses, for example, suggest that no-one has put any blame on State powers based on a single-party system, particularly when it comes to the administration, the State media, the army and the police force.*

— I am deeply sorry about the violence in February. But I should like to make clear once again that Côte d'Ivoire has always been a State of law, that it has had a Constitution providing for a multiparty system since 1960, that it has had pluralist elections, albeit in the framework of a single party, since 1980 and that a multiparty system was actually set up in April 1990. So as far as we are concerned, your general analyses don't apply to this country.

'The State is working better and more efficiently'

We completely overhauled the administration a year ago. People now feel younger, the authorities are more dynamic and the private investors who come to see us here agree that the State is working better and more efficiently. Violence is something we deplore, because we set great store by a State of law. We wish to continue to nurture and develop the pluralist democracy — set up, as I said, in April 1990 — and we shall give it all we've got. But it is also the authorities' duty to protect people and property so the Government will do whatever is required here too.

The Courier

Dr Alassane Ouattara

Can the financier called upon by the 'old-timers' to head the Government succeed in restoring the economy and establishing the political climate which is needed for genuine democracy?

► *What about the other things — the army and the police and the State media? Have you completely liberalised in these areas too?*

— When it comes to the media, Côte d'Ivoire is one of the rare countries in Africa south of the Sahara to have two public TV channels without any State interference in programme management.

The army is a professional body whose job is to protect our borders and ensure that the citizens feel safe from the problems which some of our neighbours have had for many years and which have led to a large influx of refugees coming here. So as far as we are concerned, when it comes to the army and the press, the problems you mentioned don't apply to this country.

Relaunching the economy

► *What major reforms have there been since you became Prime Minister two years ago?*

— The answer to that could take a very long time, but I shall do my best to summarise. First of all, I was made Chairman of an Inter-Ministerial Committee on Economic Affairs in April 1990 and Prime Minister in November of that year, so I have indeed been coordinating the nation's economic management for nearly two years now.

The guidelines of our economic policy are very simple — to get our production apparatus off the ground again despite an international economic and financial crisis which of course has repercussions at national level too. We all know what caused the crisis. The terms of trade declined suddenly. In particular, cocoa and coffee prices dropped by two thirds in three years, depriving us of important export revenue. In spite of that, I think our policy has contrived to stop the decline in public finances and even stabilise them, because, in 1990, we cut the public sector deficit by 5% of GDP. I don't know any other country in the world which has managed that. If the industrialised countries manage a point or half a point of GDP, the Group of Seven congratulates them. And we managed five points in 1990 and we think we

made almost two or two and a half points in 1991 ... We had to do it too, so that we could strike a fresh macro-economic balance in our budget and our finances.

While applying this policy, we also ran sectoral programmes to make the economy more efficient. We had financing and loans from the African Development Bank and the World Bank to help us here, particularly with farming and energy and other schemes. These programmes went well and recently we overhauled the administration and developed human resources, with technical and financial support from our external partners too. We got one of the loans to improve competitiveness in the financial sector, because the banking system had also been hard hit by dwindling cash flow. It was impossible to cash a cheque at one stage because the banks had no liquid assets and several of them had to close down. But all that is more or less behind us now.

The stabilisation of sectoral restructuring is going to mean we can start moving along the path to strong, lasting growth. That is one of the aims of our current privatisation policy, whereby we can release new, extra resources both to maintain our infrastructure — some of the best on the continent — and go in for new, productive investments. We are now in the active phase of privatisation, a committee is working on a range of dossiers and 1992 will see a series of former State and semi-public firms go private. All that will help get the Ivorian economy off the ground again.

► *Boosting export trade is one of the keys to economic revival and growth. What outlets are you aiming for with a strong export policy?*

— As you know, cocoa and coffee were more than half the country's export trade until very recently, but they only brought in just over a third of our export revenue in 1991.

We have gone into diversification in a big way with cotton, palm oil and bananas — products also destined for markets in the North, if you like — but at the same time, industry has developed a great deal and we are starting to try and capture regional markets. The countries around us like Ivorian products. We now have an aggressive policy here and the drive for regional integration is a help.

'Competitive with everybody'

► *The policy of growth and competitiveness which you want to apply is taking place against a background of poor domestic demand and heavy competition from abroad and particularly from the countries of South East Asia. How are you going to cope with these two handicaps?*

— Competition from South East Asia is everybody's problem, not just Côte d'Ivoire's. We want to be competitive with everybody, on regional markets and international markets alike. Our idea is to be universally competitive — which is why we have a structural adjustment and competition plan which has gone a long way to freeing trade and distribution. Things are going well here and the figures bear this out, because our exports are still going up in spite of the crisis.

It is growth which will make domestic demand grow. I do not share the view of economists who think demand has to be created by injecting money, because, ultimately, all that leads to is inflation or a deficit in the balance of payments. That is obvious from one or two of our neighbours and countries a little further afield which have an annual inflation rate of 1 000% or 2 000%. I do not know what benefit people with modest incomes may derive from recovery based on demand. As we see it, recovery has to be based on investments and exports.

► *Are you counting on national investments first and foremost or on investments from abroad?*

— Savings can be national savings or foreign savings. It doesn't matter. What we want is maximum savings so the investment rate can go up.

Surprise

► *But they still say that Ivorians don't invest enough at home, so perhaps they have no confidence in their own economic situation. You know better than anyone that foreign investors will only invest their money if they think nationals believe in their own Government's investment policy. What do you think about that?*

— I'm surprised to hear it, because, while there are foreigners coming here to invest, I can see no reason for Ivorians not to believe in their country. I don't have the exact figures, but we have plenty of small and medium-sized firms, young Ivorians using their savings and running up debts with the local banks to make a go of their businesses.

► *So what about the report that the Ivorians have a lot of money abroad and, if only they could spend some of it on investments in their country, the economic situation would improve far more quickly?*

— You hear so many stories. I should like to see the statistics on the Ivorians' assets abroad. I heard that tale in 1990 when I arrived at the head of the Government and asked people to make an effort. 'Listen', they said, 'get them to bring the capital back'. I don't know where all this capital was. But what I do see is that activity is getting going again now and that the privatisation programmes are generating enthusiasm among foreigners and Ivorians alike and I think we should continue along these lines. If by chance there were a mass of resources abroad, I think the economic policy we are following at the moment should provide adequate assurance for all and sundry.

Exports halved in two years

► *Where does the Government stand on the coffee and cocoa negotiations which have now reached stalemate?*

— We hope to see an agreement, of course, and we hope to see the work and the efforts of the peasants in the producing countries taken into proper account. But these are negotiations and the producers have to get on with each other. Our position is one of several among the producers and we are trying to find as much common ground as possible so as to improve our chances of success. Fluctuation is behind some of the current problems I have already mentioned. I cannot think of any developed nation which could have had its exports cut in half in two years without experiencing very serious social upheaval.

► *Are you for an agreement with or without a quota?*

— These are under negotiation and the important thing is that we have specialists discussing in London. A great deal of open-mindedness is needed to reach agreement and the sooner we reach it the better.

Delays in disbursement

► *Have you any criticism of your cooperation with the European Community?*

— We hope people will notice the efforts being made in this country and that the procedures are speeded up so the payments come in time to relieve our problems and back up the drive we are making. I have no special criticism of the Community. Overall, ours is a relationship of a developing country with an industrialised country, in which each is trying to take account of the constraints of the other. Implementation should perhaps be faster. Our experience leads me to say that payments are sometimes very, very slow.

► *Is this the Community's fault, do you think?*

— Of course it is, because we ourselves have tried to be up to date with our dossiers for some time now. You can check it with the World Bank and the International Monetary Fund, where there isn't the same slowness and difficulty we have with the Community.

► *So how do you account for the fact that implementation of the 5th Fund is only now coming to an end although the 7th Fund started up nearly two years ago?*

— Things may well have been slow in the past, but I think we have done something about it.

► *Parity of the CFAF, and the Ivorian CFAF especially, is a handicap for some of your exports. Do you think that, from the Community policy angle, you will eventually have to review where the CFAF stands in relation to the French franc and perhaps to the ECU, the forthcoming European currency?*

— The CFAF is a sound currency. It is the only convertible currency on this continent and even in the developing world as a whole and having a strong currency isn't a weakness, you know, it's the opposite.

► *A strong currency in a weak economy?*

— We haven't got a weak economy. With declining terms of trade and in times of soaring prices, we should perhaps have adjusted the parity of our currency. But we didn't. We opted for stability. The terms of trade are deteriorating further at the moment, but we are maintaining the stability of our currency because it means we can contain and even stabilise our prices. That is essential for us here in the poor countries.

We are in a monetary union and the monetary policy is not the business of just one State — even Côte d'Ivoire.

As I said, we are restructuring the economy and it is going well. France and the international institutions are backing

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Graffiti (above) on a public building in Abidjan demanding the release of student union leader Martial Ahipeaud. The lower photograph shows the burning of the car of Laurent Gbagbo, Secretary General of the 'Front Populaire Ivoirien' (FPI). This burning took place during the disturbances in February when various acts of damage were committed

our competition programme geared to improving exports, so things are going well. The matter of parity of the CFAF is a matter for France and the French treasury too and as long as all the parties think the present arrangements are in their interest, I think things will continue as they are. I don't find your questions on the CFAF difficult. I am a banker, as you know, and sometimes it is right to manipulate the exchange rate and at other times it is pointless. Furthermore, in the case in point, it would take a joint decision by France and the 14 African countries making up the franc zone.

► *How do you see the present broader political situation in the African countries and, more generally, what do you think about the way they are developing?*

— I think it is true that the countries of Africa are coming up against all kinds of problems and I persist in thinking that economic constraints are behind many of them in many places. As you said, economic problems and political problems go together. In our case, if we had not lost between a third and a half of our export revenue and a third to a half of our budget revenue as a result, we would not have had so many problems and would have had better conditions in which to implement our political reforms. So they go hand in hand. The economy has to look up before the political reforms can go any further.

The Courier

The headquarters of the Central Bank of the West African States in Abidjan. Does the value of the CFA franc reflect the true economic position of the countries in the zone?

'Reforms will never be successful in a poverty situation'

► *Political problems are currently overshadowing economic reform, aren't they? What is the answer? Tackle the economic issues first or find a political basis on which to tackle the economic reform?*

— In running a State, I think, there is no such thing as an isolated subject. Politics cannot be separated from economics and those who have tried to separate them have soon realised it doesn't work. There are countries which have set up what are called national conferences in the mistaken belief that this would solve all their problems, only to find six months later that they couldn't pay their civil servants or their students' grants and that the people who claimed to be going for democracy were on strike. So economic issues too are central to all this and I think it is wise to continue with both together. I am not a partisan of aid. I prefer to see things achieved through savings and trade. Yet the more the industrialised countries realise that they have to give economic and financial support to the poor ones, the better the political reforms will be, because we cannot convince people who are living in poverty if they do not believe in what we are doing and reforms will never be successful in a poverty situation. Many African countries are in total poverty at the present time, alas, but they really have to get it behind them.

► *Do you agree with those who claim that the collapse of communism in Eastern Europe will lead to the African countries being marginalised on the international scene because Africa's partners will be looking more to the countries of Central and Eastern Europe than they have done so far?*

— We never joined the communist world, as you know. Politically and economically speaking, Côte d'Ivoire has always been a liberal country and we believe that we need a competitive economy and that we should go on exporting and developing our trade and be sufficient unto ourselves. What is all this about the marginalisation of Africa? I don't know what it means. Does it mean that we want no more aid?

► *It's something I have heard plenty of African Ministers say...*

— Yes, and I should like to know what it means. Why marginalise? Because there's someone's cake to share? That is not the way we see our national policy. We want to do without other people, like any country which has its self-respect. We want to live from our own national resources and manage our own affairs so as to be self-sufficient in food and trade. Our trade balance is showing a surplus, so, one or two products apart, we do actually produce enough food and we have programmes going to develop the sectors with deficits so we can compete at international level and sell things like everybody else. Talking about marginalisation is always tantamount to holding your hand out. That is no policy of ours.

When it comes to Eastern Europe, perhaps you know that Côte d'Ivoire is one of the four or five countries where Russia has kept an embassy. I see these new countries as an opportunity to develop trade rather than something that will marginalise Africa. It will take work to reach the level of the other countries of the world. ○

Interview by L.P.

Tax imported meat and rice and boost national output

An important programme of development launched by Lambert Konan, Minister of Agriculture

Interview

► *Côte d'Ivoire has a problem with coffee and cocoa, its two main agricultural exports, Minister, hasn't it? How is the big decline in the price of these commodities — and they are the country's most important ones — affecting production?*

— Coffee and cocoa are indeed the keys to our agriculture, as you say, and they are still the main export products despite all our diversification into palm oil, rubber and cotton. We have industrial plantations and we are developing various food products, but it has to be admitted that coffee and cocoa are still very much to the fore and, obviously, the effect of dwindling prices on a country like ours is dramatic. To be more precise, the drop in prices has affected coffee production badly. Output dropped from 284 000 tonnes in 1990 down to only 200 000 t in 1991. When we were forced to make drastic cuts in the prices paid to the producers, it slumped immediately by almost a third, because the farmers could no longer afford to pay the labourers. There was a complete loss of interest and processing was slack, which affected quality. So, since last year, we have been raising the farmers' morale, telling them that it is quality products from them that will get us back to the top and that we must pull ourselves together.

Cocoa is less of a problem because the purchasing price has stayed a little bit above the price the farmers get for coffee.

► *The negotiations for another International Coffee and Cocoa Agreement have come up against the demands of some countries which want quotas and others which don't. Where does Côte d'Ivoire stand on this?*

— Listen — I think it is fair to say that some countries are ideologically opposed to the very idea of an agreement. But we here in Côte d'Ivoire believe that we need an agreement and we do not wish to discourage the people who produce. We believe that we need an agreement and that, ultimately, a bad agreement is better than no agreement at all, which is why we support the drive to produce one. The Minister responsible for these issues, Alain Gauze, has consulted a lot of producing countries, friends of ours, and he has been in contact with consumer countries too and I think we are seeing a reversal of the trend at the moment. Some of the countries which are ideologically opposed to agreements are shifting their ground a little bit. But what changes things a little bit today, of course, is, as you say, the arrangements for the forthcoming agreement. Some countries have been looking for purely administrative agreements with no economic clauses, but we in Côte d'Ivoire do not believe that to be efficient. It is something we have tried out in the past. We, like most producing countries, believe we have to regulate the quantities put on the market — which is why the countries in the cocoa producers' alliance went to Abidjan and made proposals involving setting up a system of buffer stocks rather than quotas. That is what the producers suggest. Some of us think the quota system is too much of a constraint and not more efficient, as I have already mentioned. This is where the discussion has stuck for the moment, but I have every hope that we will find grounds for agreement.

One of the shortcomings of our agriculture...

► *Isn't export-oriented agricultural diversification having an effect on food production in this country?*

— One of the shortcomings of our agricultural system at the moment, I have to say, is the poor performance we are putting up with our food crops. Although we have no famine as such, it has to be admitted that something like rice, now a staple and widely consumed, is a major weakness. For example, we consume more than 600 000 t of rice every year, but we only produce about half of it. We cover 51% of consumption with the 330 000 t we produce and we can see that, with the towns expanding and pushing up rice consumption, because rice is good and it keeps, we have to make a firm, deliberate move to increase our rice output to self-sufficiency level if we want to avoid import bills of almost CFAF 65 billion (at today's rates) for the almost million tonnes of white rice we shall need come the year 2000.

A rice development plan has been put on the Government's desk and the Government is looking at the finance and everything else involved and we shall soon be giving all it takes to re-establish the country's food balance. There will be two sorts of production — rainfed rice accounting for 80% of output and irrigated lowland rice for the other 20%. This is a deliberate choice because, as you know, although you get a better yield from irrigated rice, it costs a lot more in terms of infrastructure. The year 2000 is only eight years away and we want to be self-sufficient and produce a million tonnes of white rice, the equivalent of 2 million tonnes of paddy, by then. We

shall be developing 34 000 ha of lowlands, which will account for 20%, and the other 80% will be improved rainfed rice. We have developed 25 000 ha of lowland plots over the past 25 years, let me tell you, and it may not be easy, but we want to manage 34 000 ha more over the next eight or ten years.

► *And your imported rice, I imagine, comes mainly from Asia. Do you import any from any African countries?*

— I haven't finished answering your previous question on the measures we are going to take yet. I only dealt with production...

Well, we want the decisions on production and importation to be coordinated. Imports have been the business of the Ministry of Trade so far and production has been in the hands of the Agriculture Ministry and there is a certain dichotomy as a result. The statistics aren't harmonised. You might even say there is competition, harmful competition between cheaper, imported rice and the local rice we produce here, which costs more. We want to put a stop to that and we want to see imported products — because make no mistake about the fact that other countries produce rice more cheaply than we can — taxed and part of that tax go straight into financing local production. Those are the main lines of our policy. The tax added to bring the price of foreign products up would go straight into national production. That is a new and fundamental option.

► *That's rather like what happens in Europe with the common agricultural policy. The tax on anything produced in the Community is low to encourage producers to trade within the common market and the tax on anything brought in from outside is higher...*

— That's exactly what we want to do here. It will cost quite a lot to finance too — an estimated CFAF 112 billion to set it up and provide the infrastructure, the storage silos, the industrial processing units and so on — and we plan to cover a good percentage of this outlay with domestic revenue, i.e. tax. The rest will be multilateral aid. The European Community, for example, is giving us a lot of help with this.

The Courier

Lambert Konan

A Minister with a firm belief in the success of a far-reaching agricultural policy in Côte d'Ivoire, especially in the food production sector

► *Where do your imports come from? As you know, other African countries produce rice but don't manage to sell it at home or anywhere else in Africa. What do you think?*

— The bulk of our imported rice does indeed come from Asia, mainly from Thailand, Pakistan and Vietnam more recently. But you have to realise that very little of the world rice output, barely 5% in fact, is actually marketed and that the biggest producers — China, India, Indonesia and the Philippines — eat almost all they produce and let only a very tiny amount go on the international market. The FAO has come up with some very reliable statistics showing that there could well be a huge shortfall in rice on the international market by the year 2000, which is one of the things behind our decision to produce rice ourselves. If our rice cannot be made competitive price-wise and quality-wise, we could well see ourselves with supplies that are both unreliable and very expensive by the year 2000. And I should add that we import a small amount of rice from the USA, which gives us the benefit of what they call PL480. It comes as aid, in a way, from the States and we sell it and use the money to develop local production. We are talking to the USA at the moment with a view to increasing the amount of PL480 rice we receive and we want to be able to process it ourselves in order to get our considerable industrial facilities working. Our industrial processing potential is now up past the 400 000 t-mark, but we don't use it all.

Is Côte d'Ivoire cooperating with other African countries on this?

— There are two kinds of cooperation with African countries. First of all, on the research front, we have an inter-African organisation called WARDA, the West African Rice Development Association, which has its headquarters here in Bouaké in Côte d'Ivoire and concentrates on different strains and growing methods. We also have working relations with Nigeria in the very high-powered Research Institute in Ibadan. Then all the Agriculture Ministers of West and Central Africa recently met in Dakar and then in Brussels to try and lay the foundations for an economic area in which a cereal market would be prominent. I know that Cameroon, for example, is making a success of growing rice at reasonable cost in the northern part of the country with the SEMRY programme in Yagoua and I am planning to send technicians from my department over to Cameroon to see what they are doing there and how we can develop our cooperation in the rice sector.

► *Citrus fruit don't get such a good deal from the agricultural programme, do they...?*

— You are absolutely right. It has been neglected a bit, and wrongly, and the development plan we have just set up will be reviewing all that and we shall be running a major citrus growing and processing operation in central and northern Côte d'Ivoire. We want to develop all this in conjunction with other things such as rice or livestock. We want modules for the savannah regions combining trees, food crops and fish farming and herding, with small processing units on the spot.

But you are right. Take pineapples. We set up local processing units which can handle something like 120 000 t — and there we made the mistake of thinking too big.

Livestock and competition from imports

▶ *The European Community is financing livestock programmes here, but they either don't work properly or could easily fail because there are people who apparently import second-grade meat from all over the world and Ivorian meat can't compete. So the livestock industry does badly. What can be done to protect your emergent animal industry?*

— Briefly, the country has developed the animal sector in three stages. During the first phase, from independence to about 1980, we deliberately reduced our production potential under agreements we had with other countries in the sub-region, especially those in the Sahel with no resources other than livestock. Côte d'Ivoire voluntarily decided not to push up its production here, but to import from the other countries instead as proof of South-South cooperation. But when the climate changed in these countries and they had disaster on their hands and their herds were destroyed, we had to launch a programme to develop our own national production. Our herds increased a lot, by more than 4% p.a., between 1980 and 1986. But at this very moment, as we are moving into phase three, we are still a long way from self sufficiency, as we can cover barely 35-40% of the people's meat consumption. So we still import meat from the Sahel nations, but as you will remember, we have had unfair competition to cope with from meat from other countries — including, alas, the EEC. This has spoiled our production drive. One of the first things I did when I took over as head of this department was to slap compensatory levies on imported meat and use the revenue to develop national production. It seemed a bit Utopian to begin with, but it has had good results — we made almost CFAF 1 million in the first year, which isn't bad, and we are going to be able to do a lot for animal production with that. One of the big problems today is that we do not seem able to market large quantities even though we are not self-sufficient. This is because the marketing circuits are badly organised. Some of the people running them prefer imports despite the fact that we produce meat of our own. The money we make on the levies is being used to study the marketing system with a view to getting a better deal for the meat we and our sister countries produce.

▶ *You are a long way behind in your implementation of Community cooperation, aren't you, Minister? What is the position in agriculture?*

— I think it is fair to say that we get a great deal of help from the Community and that the aid comes through various channels. A few months ago, Mr Frisch came out here and we signed our indicative programme with the Community for the next five years. It comes to ECU 105 million and we have agreed that 50% of it should go into developing the rural sector. We need an enormous amount for rural development and there is no question of the funds not being put to full use. Quite the contrary — we are asking for funds.

Where things are lagging a little is in the schemes financed from EIB lines of credit. These resources are not always used, we have discovered, because there is a shortage of viable projects, but we are going to put this right by submitting proper schemes, particularly timber and agro-industrial ones.

▶ *One last question — Stabex. What do you think about it? Does it get used properly?*

— Thank you for asking. As you know, Stabex, alas, does not cover all the losses we incur, because it only helps with those made on export earnings. The amounts we obtain from it are very helpful and we have always made good use of them in the agricultural sector. But this year, unfortunately, we are faced with problems which our countries fail to understand — and I think I can speak for more than Côte d'Ivoire here. I go to Brussels for ACP-EEC meetings every year and I hear my colleagues saying how surprised they are at the problems of getting the Stabex funds moving this year. These delayed payments cause great losses in the cocoa and coffee industries. We lost almost CFAF 600 million on consignments we should have made in October-December 1991 and if we don't get our consignments going in February and March 1992, it will be another CFAF 2 billion. There are clauses which surprise us, because if you read Lomé, it doesn't lay down all the conditions we are forced to abide by today. This year, let me tell you, the conditions are far tighter than those of other funders, the World Bank and so on. It came as a great surprise and I hope that explanations will be given at the next ACP-EEC meetings. ○

Interview by L.P.

The Courier

Slow trading in a cattle market south of Abidjan. Business for Côte d'Ivoire's stockbreeders is poor, through a lack of competitiveness or because of huge meat imports, not necessarily of better quality, especially from Argentina

Interview with Professor Alain Ekra, Minister of Health

'The real problem in the health sector in this country is organising the service and motivating the staff'

Alain Ekra is a doctor and Professor of Cardiology. Before becoming a Minister, he was Head of the Haemodynamics and Echocardiography Department and Deputy Director of the Institute of Cardiology in Abidjan. So he knew all about medicine before he took over the political management of the Ivorians' health. In this interview, he answered questions from *The Courier*, starting with the poor financial situation of medicine in Côte d'Ivoire.

The Courier

Professor Alain Ekra
'To be honest, things have been handled badly, and now we seem to be lagging behind with our health system'

— When you hear about medicine being the poor relation of government policy, it is all relative, I think. In comparison with what goes on in the countries around us, I have to say, we have made real progress here in Côte d'Ivoire. It is all a question of organisation. Côte d'Ivoire has indeed built a lot of health infrastructure, but to be honest, things have been handled badly, alas, and now we seem to be lagging behind with our health system. It remains only a relative lag, however, given the percentage of the national budget spent on health — which goes down every year because of the economic crisis, although it is currently still CFAF 40 billion out of a general budget of CFAF 400 billion or so. That is worth remembering.

► *What are the best things about the Ivorian health service and where does it fall short?*

— I said just now that the most successful things, nevertheless, are the health and hospital infrastructure in general. You won't find facilities like them anywhere else in Africa.

► *But what about the medicine itself?*

— I shall come to that. I am talking about the health infrastructure because I want to emphasise the fact that, even if you go into the most out-of-the-way village in this country today, you will find a health post, whereas just after independence, there was nothing outside Abidjan and one or two towns in the interior, Bonaké for instance.

'The real problem is that there are not enough means'

But what are we doing in the health service? Training staff, first of all. Just after independence, there were barely 20 African doctors in this country, because colonial doctors did most of the work. But now we have 100 Ivorian doctors practising all over Côte d'Ivoire and the same goes for ancillary staff, for nurses and midwives too. We have about 2345 nurses and 1500 midwives. All these staff are available to the various health centres and they do their job well — fortunately for the Ministry of Health. The Ivorian health service enables the staff to be efficient and keep up with progress in modern medicine. The real problem today is that there are not nearly enough means available to the Ministry of Health to make the infrastructure work better. Two years ago, it was disastrous. The hospitals had no medicines and no medicines means no treatment. It is unthinkable to be treated in a hospital with no medicines. But we are putting all that behind us now, I think, and the staff are now less casual and more motivated.

Weakness of the public sector

► *Nevertheless, I heard from people directly involved with health problems that medicine costs a great deal in this country, which keeps down the numbers who can afford treatment, even for small things.*

— That is partly true. I think it comes from the fact that Ivorians got used to free medical treatment as soon as the country became independent. That is the plain fact of the matter and now it is very

difficult to make a distinction between those who can pay and those who really can't. Habits are such that no-one wants to pay for health. So it is not quite right to say that treatment is very expensive in this country, because there are plenty of private clinics here and people go to them. Maybe they are insured? Well, no. It isn't always those who have health insurance who go into private clinics. The real problem in the health sector in this country is organising the service and motivating the staff — and I know what I am talking about, because, as I said at the beginning of our talk, I have practised medicine myself, here in the Institute of Cardiology. With the health service as it is today, I should say that plenty of patients might prefer to go to a private clinic and pay and see a doctor — which they are by no means sure of doing in the public service. That is the real problem.

'People have to know what happens to the money they give for their health'

► *Bearing in mind all you have just said, what is the current health policy?*

— It is a simple policy. As I said, we found a catastrophic situation, staff who had lost interest, a severe shortage of medicines in the hospitals and other health places and — most important — we found that infrastructure and equipment had been neglected. We wondered about a different approach. But what? Well, we think we have to try to set up a health policy which costs the State less. And that, we think, means starting with the primary structures and taking a greater interest in basic health care. So our policy is geared far more to primary health facilities — but not forgetting curative medicine of a high standard. If we are to make a start on a lasting solution to this country's health problems, then health service users have to be able to contribute to the costs. We are trying to get this idea of responsibility over to the users. They are coming round gradually — but, of course, they have to know what happens to the money they give for their health.

► *What might make the people want to make an active contribution to health financing?*

— In Côte d'Ivoire, you know, they have always contributed to it through the rural development fund, the system whereby the people pay a third of the costs of building health posts in their villages. Now we have a crisis on our hands, we make sure that these building schemes are done properly and then the Government — and this is the authorities' duty — have to fit them out and provide the staff. We also maintain that the population absolutely must be involved in managing the health posts, by setting up village committees, and soon, with the decentralisation we are organising, they will be able to take an active part in running much bigger structures, such as regional hospital centres and departmental and general hospitals, too. It is vital for the people to participate.

The Courier

Blood analysis. In looking for HIV, other sexually-transmissible diseases are sometimes found

A rapid spread of HIV

► *The experts, even national sources, say that the AIDS situation is fairly critical, as the virus has spread fairly rapidly in this country. Why has HIV spread rapidly here? Do Ivorian men and women have any specific behaviour patterns which might explain it?*

— First of all, if it has been found that AIDS has spread rapidly in this country, then this country must be congratulated for recognising the fact and saying so. Many countries fail to say what the exact situation is and issue entirely misleading figures. We have set up an AIDS epidemiological system which is very good at detecting the disease and we are now able to say exactly how many cases we have.

Why has the incidence of AIDS rocketed in this country? For very much the same reasons as in the other countries of Africa or anywhere else. There are traditional problems and there is individual behaviour. Africans have always said that AIDS isn't an illness and that it is being used to prevent them from living their lives... Condoms aren't really accepted yet either. All that has something to do with it. Then, if you look closely, there is the drug problem which has started to affect Africa, especially a crossroads like Côte d'Ivoire. All these things explain why HIV has spread so fast here.

► *So you do not just have the classic AIDS victims who have caught it through sexual contact or blood transfusions, but just as many who have been contaminated through drug abuse as there are in Europe?*

— Absolutely. We are aware of the phenomenon. It cannot be explained otherwise. There is also the fact that Côte d'Ivoire is known to welcome visitors. Everyone can come and go and that has something to do with it too and it is difficult to control. But it would be wrong to hide the fact that most of the many

cases recorded here are Ivorians and not foreigners.

► *A very high percentage of your AIDS victims are very young, which could well undermine the country's economic future — and not just its economic future...*

— Indeed, the age bracket with the highest incidence in both sexes is the 5-39s. This is a disaster and there is no doubt that it could seriously undermine the country's future. We are aware of the fact and we are trying to do something about it with prevention and information. There are regular awareness sessions for young people in Abidjan to try to wake them up to the fact that AIDS is a grave danger.

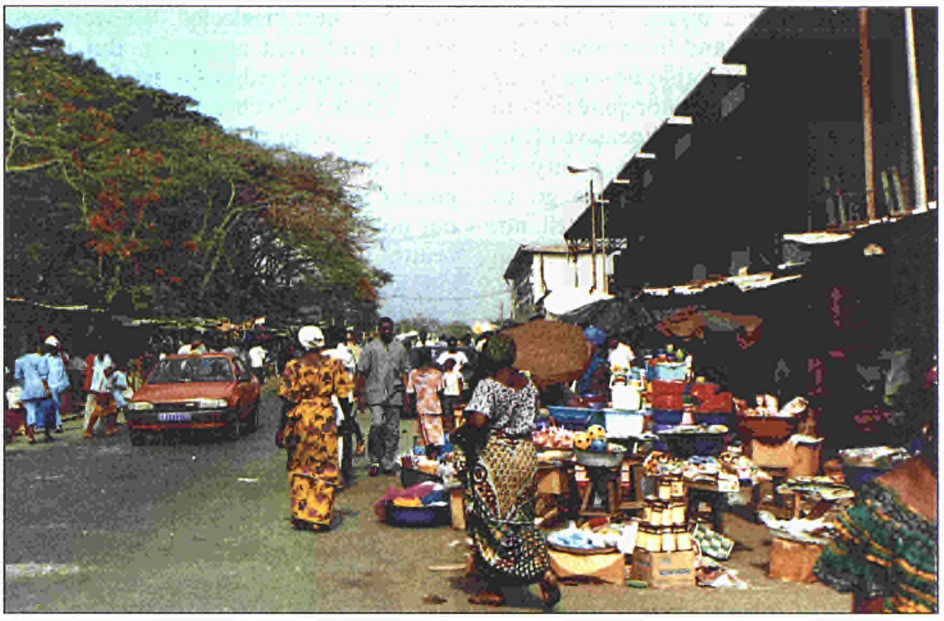
► *Does this campaign include anything in the schools, for example, and, if so, what? I am thing particularly about sex education in schools here...*

— I have to say no. Sex education is not on the syllabus very early on, but we do bring the parents into it. It is up to the parents in the early stages, I think, and we carry on the good work with the older pupils and in the advanced classes in high schools and colleges. That is the age at which they are made aware of it all. There have been a lot of seminars for practically all the high schools and colleges in the economic capital (Abidjan, Yamoussoukro, where President Houphouët-Boigny was born, being the administrative capital) and in the interior. The job is done, although it has to be admitted that, for various reasons, it is done modestly.

► *Minister, what criticism do you have of the various forms of cooperation, starting with Community cooperation, in the health sector?*

— To be honest, there is very little to criticise in our relations with the Community. We ask for aid and our partners and friends give us what they can.

As to cooperation in general, all I can say is that the people who assist us do not force their opinions on us. They would be open to criticism if they did. We get on, but imposing a policy on us I would find rather humiliating — and I have to say that it is a problem I have never come up against in my job here as head of the Ministry. So, as far as cooperation is concerned, I am satisfied — particularly with cooperation with the EEC.



The Courier

Good health facilities are not always evenly distributed, taking account of the population densities in the cities, such as here in the Abidjan suburb of Tréichville

'No threat...'

► *The Community does a lot for public health in this country, doesn't it? Can you summarise the main areas concerned?*

— Overall, I think, we are satisfied with the fields of Community assistance and particularly with the medicines supply operation where Community aid is very effective. As I said just now, when I took over here, there were no medicines in the hospitals, but things are far better now. I have just done a grand tour of western Côte d'Ivoire and realised that the people are happy because they have basic medicines. That is thanks to EEC cooperation. The Community is also helping us with the AIDS campaign by improving the blood transfusion facilities — go to the transfusion centre and you can see just what has been done — and with staff training, as you said. It has been efficient in this cooperation and I have to say that we are hoping it will do a lot more, particularly in the health sector. The EEC could also help with our policy of rehabilitating infrastructure. It's more a question of rehabilitating than building these days, for there is no point in putting up vast complexes which are difficult to manage. To sum up, what I should say is that, when it comes to cooperation in the health sector, the biggest and the best comes from the EEC.

► *Unlike other African leaders, you in the health sector here do not seem worried about the Community cutting its aid to Africa in general and its health services in particular so it can concentrate on the countries of Eastern Europe...*

— I don't think it will. In the beginning, I did think about it, I have to say, but I do not think that the European Community, with the great union soon to be formed, can drop Africa. It would be a shame. My belief is, as the President of the Republic said, that the raw materials are in Africa and the countries of Europe will always need them. They will be forced to help us develop. In my opinion, the Twelve's commitments to Eastern Europe are no threat to the future of relations between Africa and the Community. ○ L.P.

The National Blood Transfusion Centre

Blood donations and AIDS control

The Courier

The National Blood Transfusion Centre in Abidjan; blood analysis being carried out in its laboratory. Detection makes for better prevention

As Professor Alain Ekra, Minister of Health and Social Security points out, HIV has spread across Abidjan (2.5 million people) and the rest of the country like wildfire. One of the many reasons for this, says Dr Alain Bondurand, Head of the National Blood Transfusion Centre, is the fact that 'the danger of AIDS has not got home to the people'. It is not that they are unaware, he says, but that they just do not take it seriously.

What makes the inhabitants of the capital behave like this towards what is, after all, an unprecedented threat to human life and the continuation of the human race? AIDS is the commonest of the sexually transmitted diseases (14%) and one explanation for what Dr Bondurand has found could well be that, with all the serious economic problems they face, the underprivileged have simply laid down their arms and surrendered to despair.

The health authorities are tackling the disturbing spread of HIV in Côte d'Ivoire with more and more nationwide campaigns to inform, prevent and, of course, detect the disease. HIV is being traced through the blood donations at three transfusion centres, two of which are in Korhogo and Bouaké.

Blood donors are not paid, but the National Transfusion Centre still has many volunteers and their numbers have increased, particularly since reception facilities for visitors improved and the Centre began paying for their transport (CFAF 500) and offering snacks after taking blood.

We have the authorities and the National Blood Transfusion Centre to thank for the fact that we can pinpoint the AIDS situation in Côte d'Ivoire exactly.

Aid from the European Community helps equip the Centre with all the technical resources it needs to perform its tasks. In the course of the year, the Centre will be made a National Public Establishment with its own budget and considerable leeway in its operation — a move intended to make for greater efficiency and better yield, particularly when it comes to the country's new general prices policy.

The change in status should mean that income can be generated through sales — of bags of blood and not blood itself, as organ-trading is to be avoided. ○ L.P.

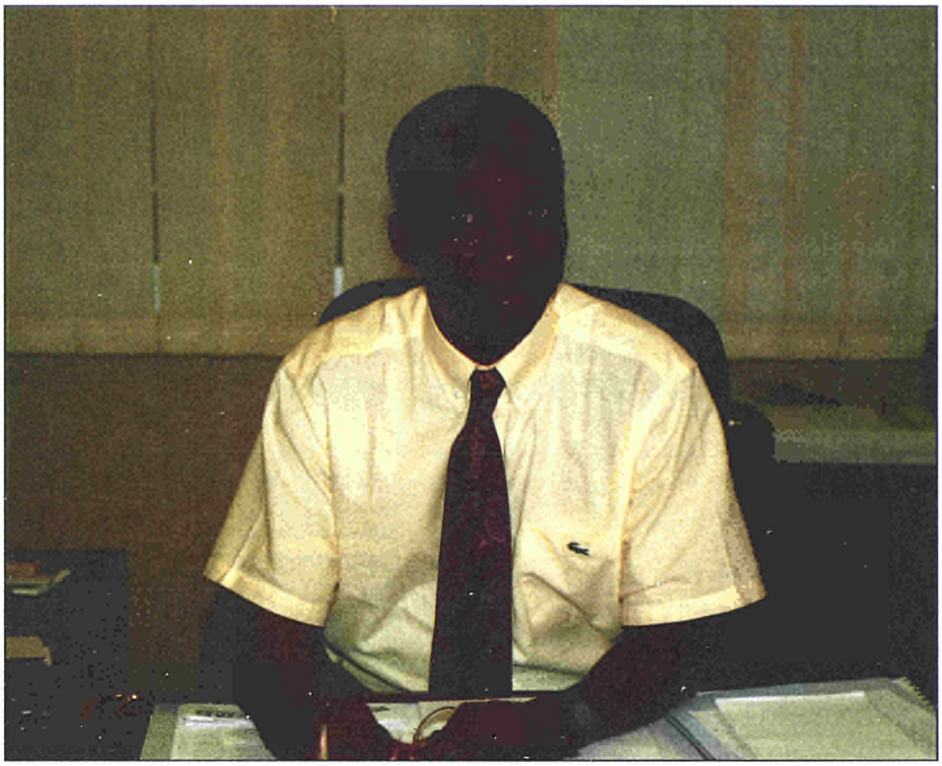
Seydou DIARRA, Head of SACO

From diplomat to industrialist

Development is everybody's problem and economic policies, however perfect, mean nothing until they are put into practice and there are results to judge them by.

In the Ivorian battle to reshape the economy, there are few lines to draw now between the administrators and the operatives — an example embodied, possibly unintentionally, by Seydou Diarra, Côte d'Ivoire's former Ambassador to Brussels, London and Rio de Janeiro, whom many in the Commission and, of course, the ACP Group have had the opportunity to know and appreciate.

Seydou Diarra went home in 1985, keen to leave the diplomatic corps and move into industry, to 'get some actual hands-on experience of development'. It was his desire to get to grips with fundamentals and improve effectiveness which prompted this agricultural engineer and chemist to spend five months on the shop floor, on the chocolate production lines in Melun (Paris), before he took over SACO, the African Cocoa Company, in the Chocolatiers Barry group.



The Courier

Seydou Diarra, Managing Director of SACO, taking up the business challenge

The Courier

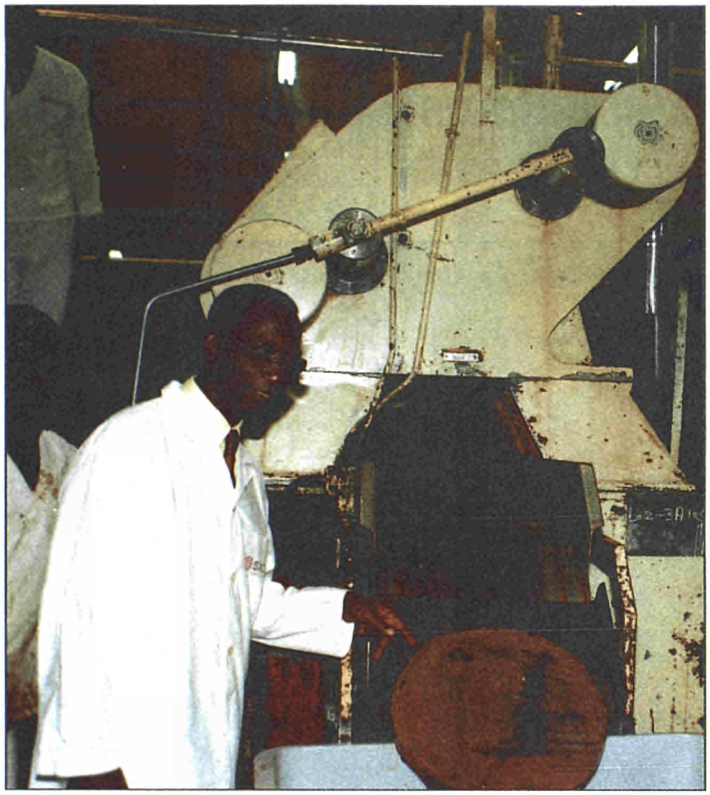
Tons of cocoa in the SACO warehouse, in the Abidjan Zone 4, which will be processed and exported

When *The Courier* met Seydou Diarra, now Managing Director of Côte d'Ivoire's major cocoa-processing industry, at SACO headquarters, he grabbed an overall and ushered us off round the plant to explain the various stages in the chocolate-making process.

The first task he set himself was to reorganise and modernise. This has been done.

The output of all three units has gone up and SACO is now handling 85 000 t of liquor equivalent, 45 000 t of it in the Abidjan Zone 4 plant.

SACO turns out semi-finished products (butter and oilcake), which are exported to the USA, one or two States in the CIS and, of course, Europe (where the Netherlands, France, Italy and Switzerland are the main customers). It also makes finished products, such as choco-



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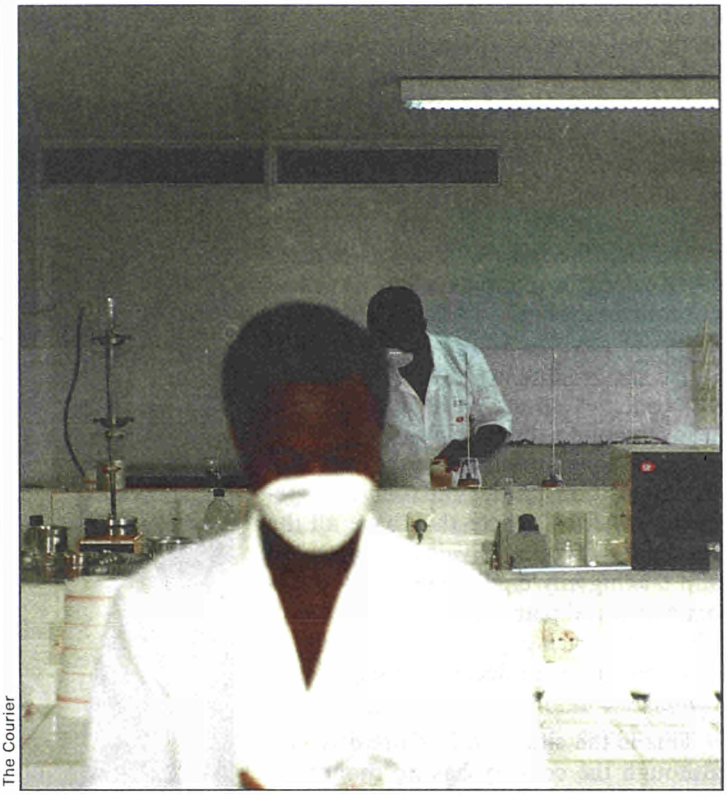

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Above, Seydou Diarra in a white overall stands before the production line explaining how cocoa is processed. Above right, the SACO hygiene laboratory where the nutritional value of its products is scrupulously analysed and checked. Below: samples of finished packaged products

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Cases of finished SACO products ready for export

late (800 t p.a.), much of which goes to other countries in Africa and to Europe and the USA, as well as groundnut paste, which is consumed locally.

The 670-strong staff includes 37 senior employees (technicians and engineers), five of whom are European. The company has a turnover of nearly CFAF 40 billion (1).

The managing director's conviction that he has taken the right turning is very strong. His chosen career is a difficult one, no doubt, but it enables him to fulfil himself in a different way from before.

As Seydou Diarra puts it, 'the challenge of business is highly stimulating'. ○

L.P.

(1) CFAF 1 = FF 0.02 or Ecu 1 = CFAF 346.30.

Opposition

Running for government means building a credible force

Holding the reins of power is no easy task, which is perhaps why, in many countries, especially in Africa, the holders of power have opted for an unassailable single party. But now the hour of democracy has struck, it is no easy task being in opposition either. One of the many reasons for this lies in the nature of the opposition parties themselves, especially in Africa, where they have all the handicaps of being divided, fragmented and lacking any credible political, economic or social plans or programmes with which to back up their criticism of governments with decades of experience behind them.

This is the situation in Côte d'Ivoire, although the country has no monopoly on it. Beyond all the judicial and other impediments which, with its political advantage and its control of the State machinery, the Government can put in the way of the opposition, the opposition parties are failing properly to gauge the full weight of opinion they have to shift, nor do they suspect how seriously they are handicapped by having no experience of power.

There may well be a genuine, deep-seated desire for change in Côte d'Ivoire, but the plain fact of the matter is that the people want to know just who their would-be rulers are. Whatever the courage and charisma of the leader of the *de facto* opposition, Laurent Gbagbo, the FPI (Ivorian Popular Front) Secretary-General who once ran against Houphouët-Boigny in the presidential elections, he has never had the plans or arguments to win people over. Indeed, one or two of his tactical errors gave the Government a golden opportunity to reduce his chances drastically.

But there is variety in the Ivorian opposition. Take Professor Bernard Zadi, Secretary-General of the USD (Union of Social Democrats), a democracy activist for more than 20 years, first in France, with the FEANF (French Federation of Black and African Students), and then in Côte d'Ivoire, where he has been arrested on a number of occasions. How does he see politics in his country now that the multi-party system has been recognised?

The Courier

Bernard Zadi Zaourou, Secretary-General of the USD. 'The Government's contempt for those who question its running of affairs will not help strengthen our emerging democracy' (Téré - Express)

'This is the first ray of sunshine in politics here', he says. His big concern is the difficulty of organising the forces of democratic change in Côte d'Ivoire. 'Once the parties were recognised, the FPI came straight in with its opposition coordination initiative,' the Professor told me. But, as he made clear, there was no organic basis to it and it only served to underline the inconsistencies between the opposition parties, particularly after presidential elections were announced in October 1990. 'People were confident in the opposition while it was united, by and large, but the crack which the FPI created sowed doubt' — and enabled President Houphouët-Boigny to be elected again. 'The FPI is a populist party based on the charismatic image of Laurent Gbagbo and it takes a hot-headed, slapdash approach to serious, complex economic issues and the running of the State. The crowds which attend meetings and demonstrations are not always militants. Most of them are people with nothing to do, whose enthusiasm is no sorner kindled than it dies down again'. Professor Zadi added. The personal reputation of the leader of the FPI was not high enough to win him the presidential elections. That was something he had failed to understand.

The opposition must be credible if it wants to govern

What the USD wants now is to build up the opposition forces so they are credible and can win the elections and govern the country democratically, Bernard Zadi says. They must learn from what has gone before. They must try to get joint opposition party schemes off the ground again with such things as flexible coordination and proposals embracing every aspect of the economic, political and social life of the nation. They must think about how democracy should function, for, he maintains, the conditions for it are not right at the moment. 'There is no separation of State bodies and ruling party at the moment', Professor Zadi says. 'The Government does

The Courier

Destruction in front of the Palace of Justice in February 1992 — Violence must be condemned

not yet see the opposition as essential to democracy. Equally, the President of the Republic is not yet seen as the President of all the Ivorians but as the President of his supporters and his party. The opposition does not get invited to the ceremonies of the Republic as it would in any proper democracy'. And then of course there is the problem of financing the political parties in such a way as to avoid any confusion between public monies and spending by the ruling party.

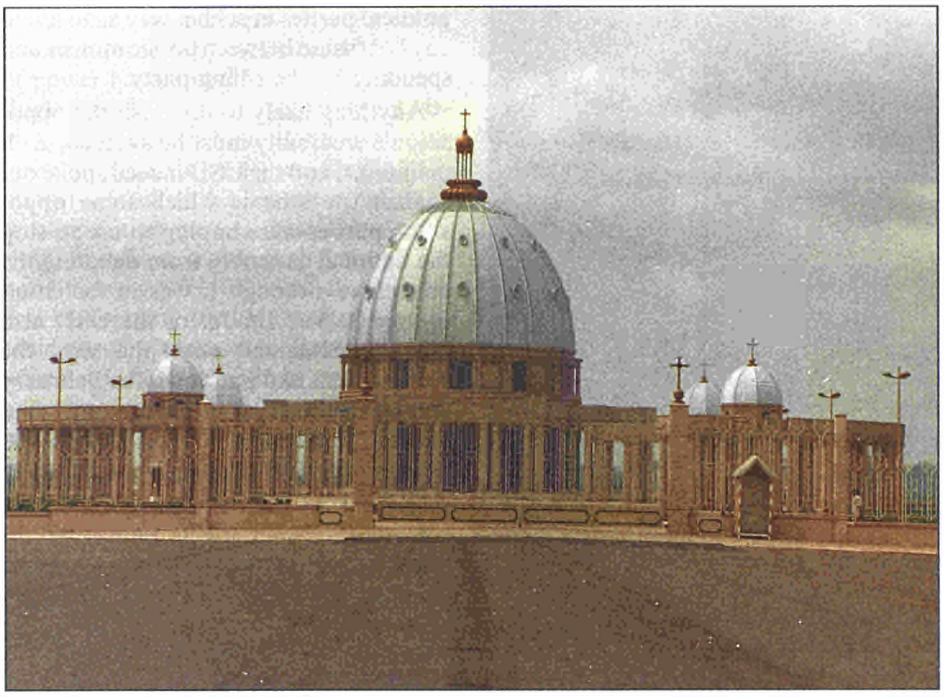
Anything likely to diminish the opposition's credibility must be avoided, Zadi maintains, and the USD indeed spoke out against the scheme which some opposition parties were hoping to use to stop the national assembly from debating the press law, although it was in fact itself against it. The Leader of the USD also said he disagreed with the way the Government had put down the February demonstration in Abidjan and had treated the MPs and political leaders who were, rightly or wrongly, caught up in it.○ L.P.

The Courier

How to win the trust of ordinary people like these at Treichville, whom the opposition parties believe they can best represent?

The Basilica at Yamoussoukro

The Work of an unfathomable conscience



The Courier

The Basilica of Our Lady of Peace at Yamoussoukro

The Courier

A stained-glass window showing President Félix Houphouët-Boigny among the saints of the Catholic Church

Everyone has heard, or seen pictures, of the Basilica of Our Lady of Peace in Yamoussoukro. This is the building whose consecration by Pope John Paul II on 10 September 1990 prompted a major controversy between supporters and opponents of the Church. Without wishing to join in the debate, which in any case is now largely over, *The Courier* decided nevertheless to have a look at the edifice which had provoked such strong feelings on either side.

Travelling along one of Africa's most attractive roads, between Abidjan and Yamoussoukro, one reaches the village where President Houphouët-Boigny was born. At the entrance to the village, which is actually a major regional centre, the road suddenly widens and turns into a huge avenue. At the far end stands what is now the most celebrated building in Côte d'Ivoire — the Basilica of Our Lady of Peace. Impressive even at a distance, the Basilica at Yamoussoukro compels admiration and wonder. Both outside and inside, it is beautiful. One feels one must slacken one's pace so that the eyes have time to take in the perfection of a monument whose very reason for existing is to be found only in the unfathomable conscience of its creator. But to that, of course, we have no access ... At any rate, be it the pillars, the altar, the baptismal font, the dome, the seats or the stained-glass windows where the President and Servant of God, Félix Houphouët-Boigny, is to be seen amid all the company of heaven, the immediate effect of everything in the church is one which surpasses rational thought.

As soon as one comes out, reality quickly takes hold again, and it is difficult — unless one is moved by the spirit of the place or by God — not to wonder, at the very least, how strong the religious convictions of a man who somehow found the resources to put up such a colossal monument can really be. It is undeniably an architectural triumph.

Perhaps the answer is contained in a sentence to be found in the introductory booklet to Our Lady of Peace. 'God is mad with love for each one of us,' it reads. Could it be that man, too, is mad with love of the godhead or, indeed, of a history which has for so long forged that other, black consciousness? It is not for us to say.

Whether you are for or against Our Lady of Peace, though, is now beside the point. The Basilica has become a place where large numbers of visitors, believers and non-believers alike, come together. So, in fact, has the town of Yamoussoukro, with its fine avenues, prettier in parts than those of Abidjan, its schools, its five-star hotel, its African Library, its street souvenir sellers and its high prices, which are in inverse proportion to the incomes of Côte d'Ivoire's people ... And not forgetting the crocodile pool!○

L.P.

EC-Côte d'Ivoire cooperation

by Francisco da CAMARA S.C. GOMES (*)

Côte d'Ivoire and the Community have been cooperating for many years, ever since the pioneering era of independence and the establishment of the European Development Fund.

Great mutual understanding over three decades of combined effort has made these privileged relations what they are today.

Côte d'Ivoire has been closely involved in the gradual extension of Community cooperation and its range of instruments under the Yaoundé and then the Lomé Conventions, both as an active negotiator in the AASM and the ACP Group and as a partner in the application of successive policies, and it is clearly aware of the full potential of these varied and complementary instruments, although it is also realistic about the fact that this exemplary cooperation has its limits. The constructive, permanent dialogue which has been firmly established reflects peaceful acceptance of the level of interdependence reached, great mutual frankness... and the occasional impatience.

The fact that agricultural exports are decisive to the Ivorian economy and exports are the driving force of the development model adopted in the first 10 to 20 years of independence (and even before) could have made the importance of financial and technical cooperation merely relative, because everything hinged on the terms of access of the output to the Community market, the workings of international commodity agreements and the use of financial machinery to stabilise export earnings. In fact — notwithstanding the substantial benefit which Côte d'Ivoire has had from the trade arrangements, product agreements and Stabex — financial and technical cooperation has never been neglected.

Community development aid has had a solid impact, largely because the successive focal sectors have been chosen in the light of the needs of the moment. Initially, the (first) European Development Fund concentrated on social infrastructure (50%) and economic infrastructure (38%), with the building of schools, health facilities, water supplies, roads, railways and so on.

With Yaoundé II and the 2nd EDF, priority went on rural modernisation (72%), diversifying cash crops being the main idea behind the oil palm plan. This move towards rural production gained ground with Yaoundé II (3rd EDF), when 66% went into rice development and other agricultural schemes. Lomé I (4th EDF) saw economic infrastructure projects disappear completely from EC-Côte d'Ivoire cooperation, to the benefit of rural development (44%) and social development (40.5%), with diversification catered for by rubber plantations and food security by rice and livestock.

The priority on rural development was clearer still under Lomé II (5th EDF), when 57% went on agricultural projects, with 22% for social infrastructure and 9% for microprojects. Diversification was still there with oil palms and fruit growing, while food security was catered for by further extensions to the rice crops, plus marketing support for the cooperative movement. Lomé III (6th EDF) would have developed along the same lines had it not been for the serious economic and financial crisis which struck the country in the 1980s, forcing it to run an adjustment plan and ask for Community aid to be reoriented to provide direct support for the stabilisation policy.

Côte d'Ivoire handled this unprecedented crisis, which had a great deal to with the drop in its export prices, with corrective measures on a large scale. The 6th EDF national indicative programme (ECU 82 million) had rural development in the broadest meaning of the term as its focal sector, with special priority on self sufficiency in food, settling young people in rural areas and developing the savannah region. It was 46% committed when the National Authorising Officer asked the Commission to reorient the aid to provide a sectoral import programme as backing for the stabilisation and economic recovery policy.

So 50% of the 6th EDF indicative programme — ECU 41 million — was switched and used to finance oil imports, which yielded counterpart funds to cover budget spending targeted on farming and public health. In agriculture, Côte d'Ivoire's contributions could be paid to projects cofinanced with the Member States and the World Bank.

In public health, all health posts, centres etc were resupplied with basic medicines under a health policy reform which put priority on primary health care, rationalised hospital management and a reduction in the cost of medicines.

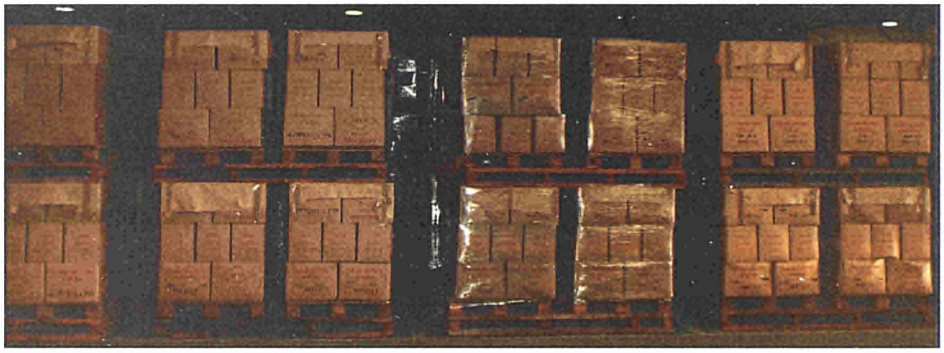
The other half of the 6th EDF programme was spent on the original priorities, which were, mainly, village oil palm plantations (ECU 20.85 million), the cattle and sheep development support programme (ECU 11 million) and the three micro-project programmes (ECU 3.76 million). Commitments from the

(*) Commission Delegate in Abidjan.

CÔTE D'IVOIRE

Total Community resources to Côte d'Ivoire, ECU million — Situation as of 6 March 1992

	TREATY OF ROME 1st EDF 1959-64	YAOUNDE I 2nd EDF 1964-69	YAOUNDE II 3rd EDF 1970-74	LOME I 4th EDF 1975-79	LOME II 5th EDF 1980-84	LOME III 6th EDF 1985-90	LOME IV 7th EDF 1991-95	Provisional Total (March 1992)
1. Commission-managed resources (EDF)	39.7	57.1	58.8	75.0	158.6	467.6	197.0	1053.8
indicative programme	39.7	57.1	58.8	40.0	54.0	82.0	90.0	421.6
structural adjustment	—	—	—	—	—	—	15.5	15.5
non-programme:	—	—	—	35.0	104.6	385.6	91.5	616.7
Stabex	—	—	—	15.0	93.4	365.1	91.5	565.0
other	—	—	—	20.0	11.2	20.5	—	51.7
2. EIB-managed resources	—	14.2	40.3	62.3	50.2	87.1	—	254.1
3. Total Convention financing (1+2)	39.7	71.3	99.1	137.3	208.8	554.7	197.0	1307.9
4. Non-Convention financing:	—	—	—	0.8	1.5	0.9	0.3	3.5
4.1. NGO cofinancing	—	—	–	0.8	1.5	0.7	0.2	3.2
4.2. other	—	—	—	—	—	0.2	0.1	0.3
5. TOTAL (3+4)	39.7	71.3	99.1	138.1	210.3	555.6	197.3	1311.4



The Courier

'Agriculture exports are decisive to the Ivorian economy'. This is semi-processed cocoa stacked ready for export

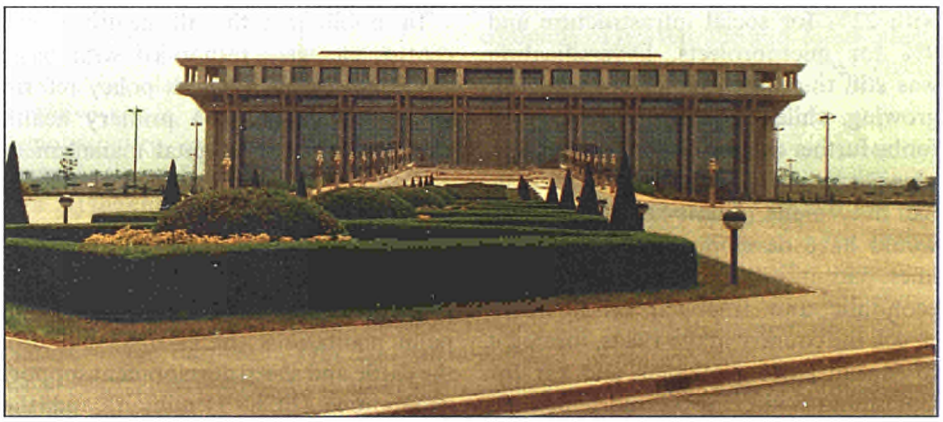
6th EDF programme totalled more than ECU 80 million in March 1992.

The national indicative programme for the period of the first financial protocol of Lomé IV (7th EDF) was signed on 11 July 1991. The Government produced a summary of the stabilisation programme designed in 1989 (this was positive overall, with a large cut in the primary budget deficit and reforms running in various sectors) and set up a medium-term economic programme in that year too. The 7th EDF indicative programme reflects a desire to overcome the structural and cyclical problems of the economy. The focal sectors are:

a) rural development (50% of programme resources), with schemes to step up productivity, augment and diversify production and improve the marketing of food and cash crops, the protection of the environment, improvements to sectoral policy programming and support for the cooperative movement and the professional organisations;

b) the urban sector (30%), with decentralised management schemes to improve urban centres of economic and social development. These will be mainly on the coast, as a complement to other funders' operations, as part of the development programme devised in conjunction with the municipal councils. They will provide support for the drive to improve the management potential and boost the resources of the local authorities, improve the urban standard of living and environment and develop economic activity;

c) human resources (10%), with particular reference to health. Community



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The African Library at Yamoussoukro, which has received support from the European Community

aid will offer support for the human resource development programme, the programme to improve national planning and programming potential (Ministry of Health and Welfare), the basic medicines and cost recovery programme and the setting up of permanent training and information facilities for nurses;

d) a 10% reserve not specifically allocated can be used to finance schemes to back up the regional programmes and provide support for priority schemes following implementation of the indicative programme.

ECU 105.5 million is available for this 7th EDF programme. ECU 90 million of it is in the form of grants and a first allocation of ECU 15.5 million as specific resources from the structural adjustment support facility — to which will no doubt be added a significant amount in non-programme aid, in particular for Stabex. Lomé non-programme resources are large — far in excess of the amounts of the indicative programmes (see table) — and the biggest single instrument is, of course, Stabex, accounting for transfers of more than ECU 0.5 billion to date.

With Lomé IV, Stabex now helps in two ways — by supporting various sectors which have suffered losses in export earnings and, macroeconomically, by neatly fitting into the series of resources which can be mobilised to support structural adjustment. In Côte d'Ivoire's case, there is a mutual framework for obligations (signed on 21 December 1991) fixing the uses involved in this new approach. The Stabex 1990 transfer was intended to help run the country's structural adjustment policy (supported by Bretton Woods and the main funders), back up its reorganisation of the coffee and cocoa sector and support diversification, in particular into cotton and rubber.

This short account of trends in EC-Côte d'Ivoire cooperation, from its origins down to the present day, clearly reveals a constant concern with helping the drive to develop the country and revive its economy in the right way at the right time. The current priorities

The Courier

Oil palm is an important crop in Côte d'Ivoire. This sector featured strongly in the 6th EDF programme

— export competitivity, agricultural diversification, environmental, protection, decentralisation and improvement of local authorities, structural adjustment (particularly the social aspects), health service reform and reorganisation of the cocoa-coffee sector — have coherent backing from all the instruments of Community aid.

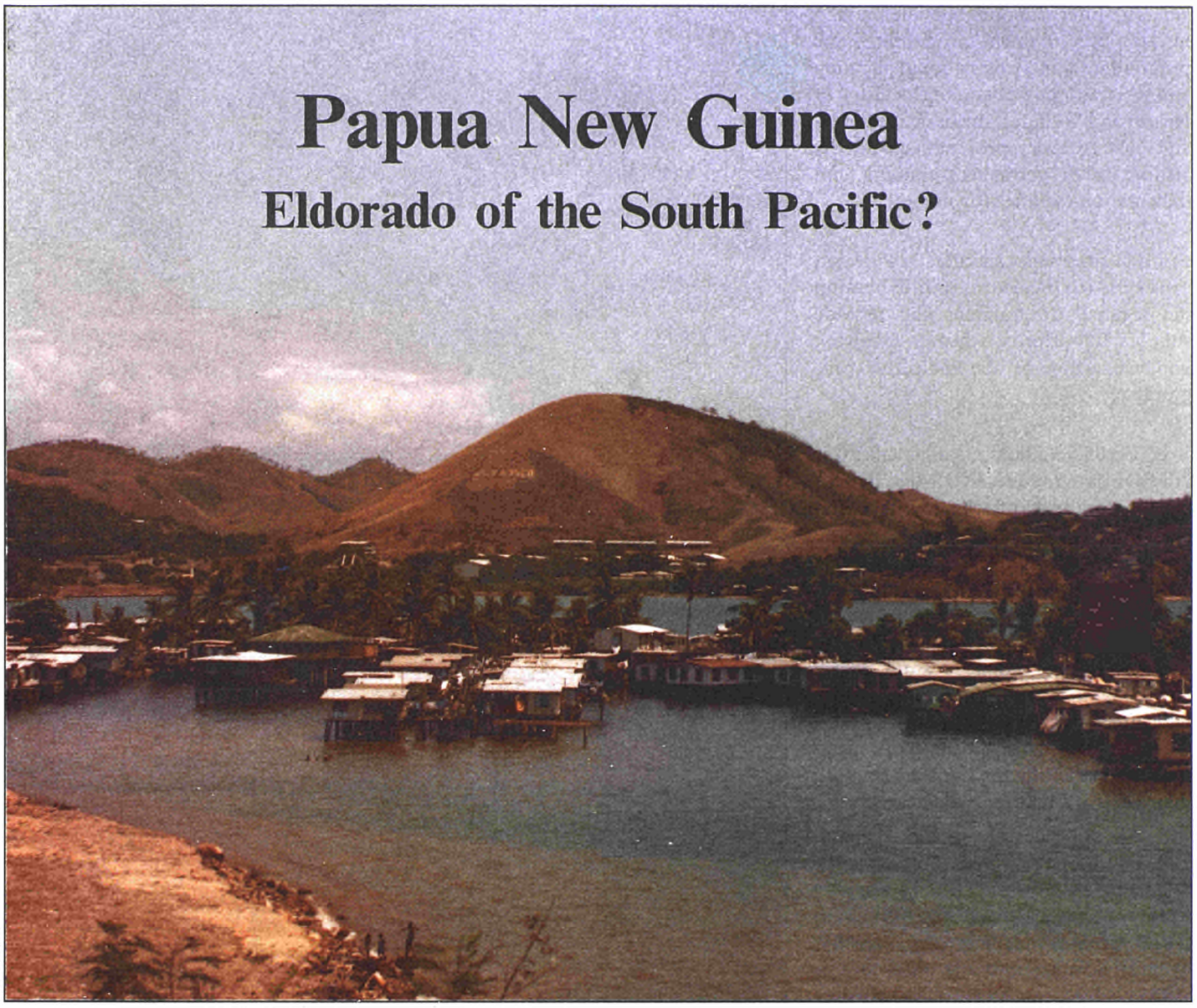
Nevertheless, these instruments can only help the country correct the endogenous causes of its serious economic and financial crisis. They cannot replace the national effort.

Côte d'Ivoire is also working on an international plan to get better terms for debt and commodity prices, the two big external causes of crisis. It has a great deal of faith in what the Community can do to help here, particularly when it comes to getting the International Cocoa and Coffee Agreements going again.○

F. da C.G.

Papua New Guinea

Eldorado of the South Pacific?



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'Papua New Guinea — the Eldorado of the South Pacific is about to be discovered by the rest of the world'. This is the message of those responsible for organising the country's pavilion at Expo '92 in Seville, and is to be found in a full-page advertisement in the November 1991 edition of Pacific Monthly. The publicity goes on to describe the country's participation in the Universal Exposition as a 'bold new initiative' which 'will displace the image of Papua New Guinea as a land of traditional outlooks, projecting a fresh new perception of potential and opportunity in a country with an enormous scope and depth of natural resources. No nation, it concludes, 'is better suited to the Expo theme, *The Age of Discovery*, than Papua New Guinea'.

Of course, publicity material of this kind is expected to paint the 'product' in as rosy a light as possible. A country's Expo pavilion is its showcase to the world where strengths and not weaknesses are emphasised. In this Country Report, we look at the claims made above for Papua New Guinea and examine the main political and economic issues affecting the country today.

Papua New Guinea, which gained its independence from Australia in September 1975, lies to the north of the former metropolitan power, between the Solomon Islands and Indonesia. It is a large, mountainous country (465 000 square km) with a relatively small population (approximately 3.7 million inhabitants) and an astonishing range of local cultures. While English is the language of administration and business, Pidgin and Hiri Motu are also widely spoken in the north and south of the country respectively. However, there are also more than 700 other languages, which give PNG the distinction of being the most linguistically diverse country in the world.

The bulk of PNG's land area (85%) is on the main island, the western half of which belongs to Indonesia. Six hundred other islands make up the remaining 15%, the principal ones being New Britain, New Ireland, Bougainville and Manus. Port Moresby, the capital, is also the largest population centre, while the other principal towns are Lae, Madang, Wewak, Goroka and Rabaul.

The country is a constitutional monarchy within the Commonwealth, with Queen Elizabeth II as Head of State. Political power is vested in the unicameral Parliament, which has 109 members elected by the simple majority system in individual constituencies. The Prime Minister and Cabinet are chosen from among their number.

The people of Papua New Guinea are principally of Melanesian origin. Until recently, contact with the outside world, and indeed among some tribes within the country, was very limited. As one might expect in these circumstances, traditional lifestyles are still very important, although the effects of so-called 'modernisation' are increasingly widely felt, even in the remoter Highland areas.

The country's formal economy relies heavily on a relatively small number of mining ventures. The principal mineral resources are gold and copper. On the energy side, PNG has considerable hydro electric potential, much of which is undeveloped, while oil will be exploited commercially for the first time during 1992. The forestry and fisheries sectors are also important and the main agricultural products — coffee, cocoa and palm oil — are significant contributors to the economy. In contrast to many ACP states, Papua New Guinea is therefore rich in resources. Its main concern is how they should be exploited in the best interests of its own people.

Contrasts

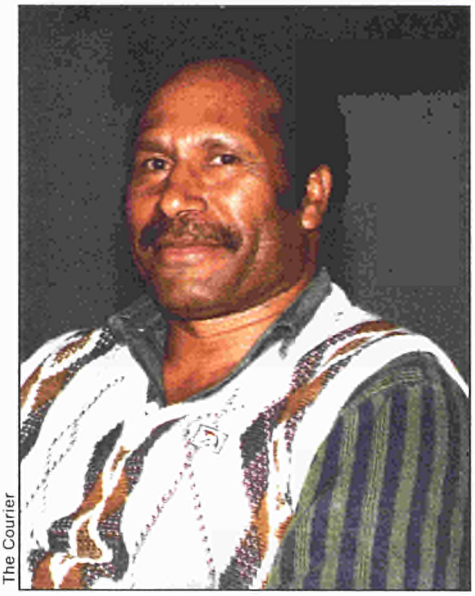
Among the first impressions one gains of Papua New Guinea, perhaps the most striking are the contrasts. Port Moresby is a modern city with high-rise blocks yet a journey of only a few kilometres takes one to villages where the traditional lifestyle prevails. The capital's road network is extensive and relatively well-maintained but the highways which emanate from it do not connect to other parts of the country and it is not long before the bitumen surface is left behind. People from all backgrounds get around the country by ship or aeroplane and one of the most surprising features is the scope of the scheduled air transport network. With numerous airports, and hundreds of airstrips, PNG has one of the most extensive domestic airline services in the world. Indeed, demand is beginning to outstrip the capacity of the passenger terminal at Port Moresby (where new facilities are soon to be built) and the scene there on an average day would certainly be familiar to the European air traveller.

Of course, in one general sense, Papua New Guinea is not unique in the ACP world. The pattern of local culture and European influence blending together (and from time to time conflicting) is one which has been repeated wherever colonisation of already inhabited territories occurred. What makes PNG different is that in many parts western influences were late in coming and the geography of the area meant that indigenous society was highly fragmented. Indeed, it is inappropriate to talk of a single 'society' — the population of the country belongs to hundreds of different societies (1), many of which had, until this century, little or no contact with the next valley, far less the world beyond.

John Gihenu, who is PNG's Minister for Trade and Industry and comes from the Highlands, stressed in an interview with *The Courier* the importance of 'nation-building'. The more one discovers the diversity of this country, the more one appreciates the scale of the challenge. On the positive side, the fact that so many groups exist may help to prevent dominance by any single one, and the shifting alliances which characterise national politics would certainly tend to bear this out.

Politics

The governmental system of PNG provides a fascinating case study for students of political science. Modelled on Westminster (although there is only one legislative chamber), the focal point of political power is the 109-member Parliament. It would be a mistake, however, to assume that politics have followed the same route as in the original metropolitan power (the UK). The most significant difference is the weakness of the party system. There are a number of parties but the allegiance of voters tends to be more personal (or familial) than ideological. Until recently, elected Members have 'crossed the floor' with monotonous regularity, undermining government majorities and generally contributing to an atmosphere of instability. Parliamentary motions of no-confidence hang, like a Sword of Damocles, over the head of



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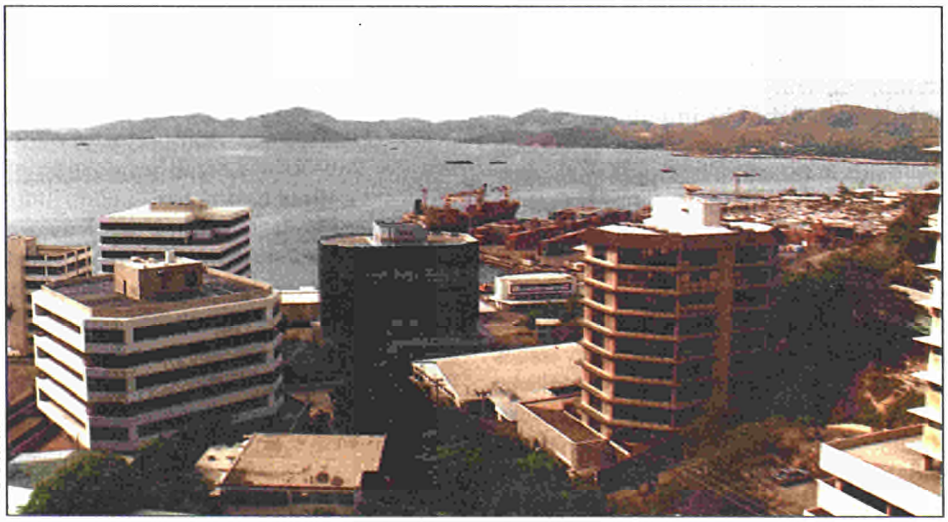
John Gihenu, Minister of Trade and Industry

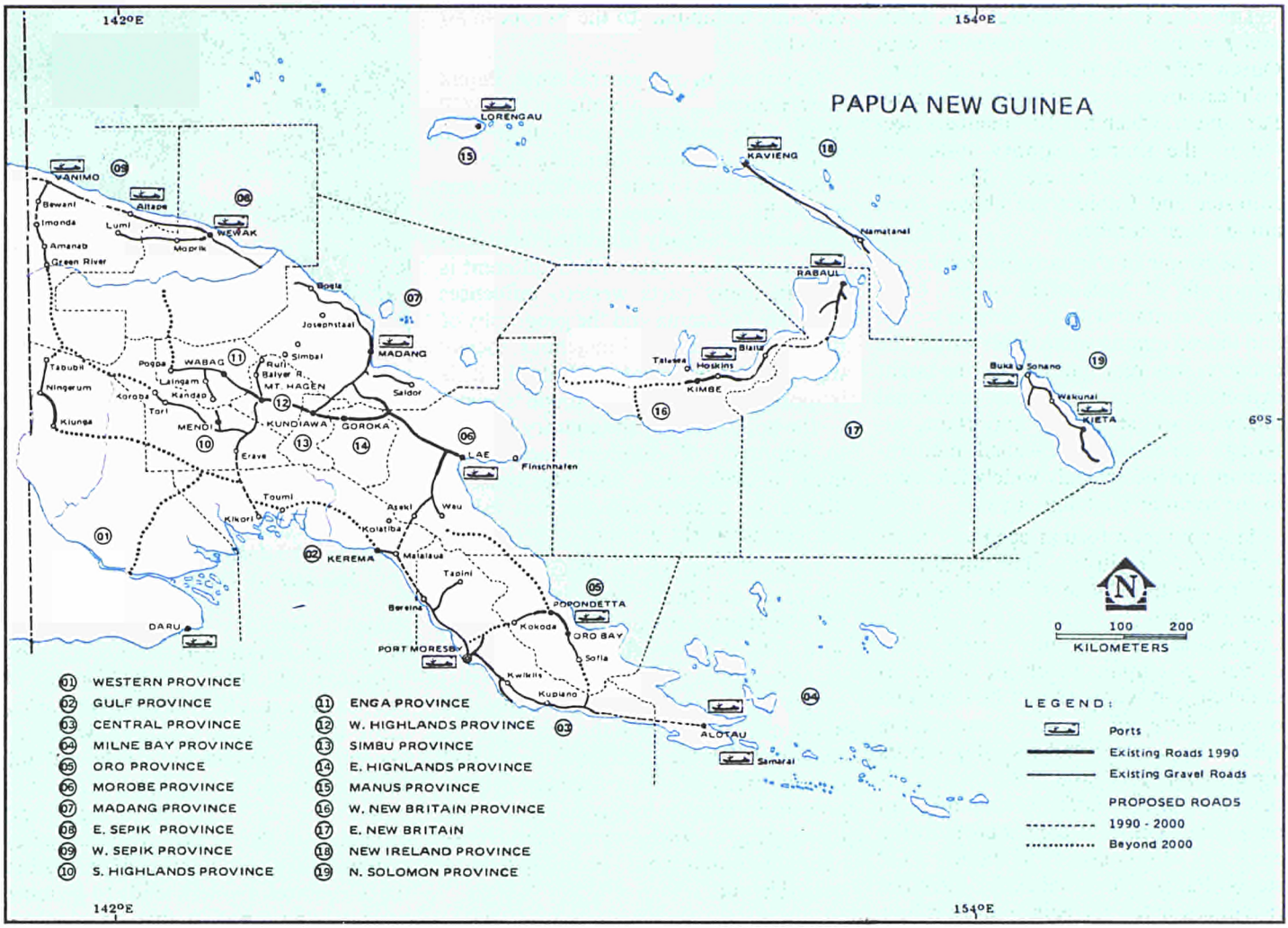
(1) These are often called 'wontoks' (one-talk) because they group together people who speak the same local language. The same term is used in the Solomon Islands.



The Courier

Port Moresby is a modern city, but it is only a short journey to villages where the traditional lifestyle still prevails

PAPUA NEW GUINEA



every Prime Minister. From time to time, the sword descends, dispatching the hapless incumbent to the opposition benches. There, in all likelihood, planning for the counterstroke will immediately begin.

On the positive side, this situation ensures that Parliament is no rubber stamp, but truly a sovereign institution, as it is intended to be in political theory. The disadvantage is in the effect on political stability and, perhaps more seriously, in the amount of effort required to put together and sustain a working majority. A Prime Minister who has to spend a large amount of time keeping his supporters on board will have less time for the economic and social policy issues which must also be tackled. It should be noted that the current Prime Minister, Rabbie Namaliu, whose astuteness is widely recognised in PNG, has successfully stayed in office for three years (although an election is due in May/June 1992).

One further aspect of the PNG political set-up is worth noting. In the absence of strong parties, and given that the job of Member of Parliament is highly sought after, each constituency contest attracts large numbers of candidates. The author Sean Dorney (2) records, for example, that in the 1987 election 45 hopefuls presented themselves to the electorate at Kerowagi in Simbu province. The winning candidate was an independent who polled 7.9% of the valid votes! Countrywide, only a very small proportion of the total ballots cast actually contribute to someone's election, and this leaves a large pool of potentially disgruntled electors whose votes have no real value. Perhaps the task of nation building would be made easier if Papua New Guinea moved to a preferential system of voting.

(2) Author of 'Papua New Guinea – People, Politics and History since 1975'. Random House, Australia.

In any election, about half of the incumbents are defeated and the importance of retaining the support of one's own electorate certainly leads to some extreme manifestations of 'pork-barrel politics'. (The expression is peculiarly appropriate to PNG, since the pig features highly as a peace-offering or gift in ceremonial exchanges, particularly in the Highlands).

For many years, reforms to the political system have been promised, aimed at strengthening the parties, reducing the number of candidates and generally stabilising the system of government. In the 1992 election, several such reforms are due to be implemented, including one which requires each candidate to lodge a deposit of K1000 (ECU 1200). Only the winning candidate will have the deposit repaid. It is hoped that this will discourage 'frivolous' candidates with little chance of election.

While most of the political power in Papua New Guinea rests with Parliament in Port Moresby, mention should also be

made of the system of regional government which has been set up. Although the country has under four million inhabitants, there are no fewer than 19 provincial governments as well as a devolved authority to look after the capital territory. This has led to suggestions that PNG is overgoverned. It is certainly true to say that they have a large number of legislators but, on the other hand, with so many different cultures and groups to accomodate, it is difficult to see how a centralised unitary structure could work effectively without creating tensions in the provinces. This is particularly the case when one considers that Port Moresby has no overland links with the majority of the population living in the highland, northern and island provinces. The strife in Bougainville, where a secessionist movement (the BRA) has been fighting a guerilla war against Government forces, is evidence enough of the centrifugal forces which could threaten the unity of the country. Decentralisation is an acknowledged strategy for defusing problems of this kind.

Within the Department of Provincial Affairs in Port Moresby, the official view is that the system of provincial government works quite well. The Department is involved in training for both provincial officials and Assembly members and it provides advice and assistance in a variety of other areas. On the other hand, the powers of various provinces have had to be suspended from time to time because of mismanagement, and doubts remain in some quarters about the effectiveness of this layer of government.

Constitutional crisis averted

In any contemporary discussion of PNG's political system, mention must be made of recent events which tested the robustness of the country's constitution. The situation arose out of a scandal involving the Deputy Prime Minister, Ted Diro. Mr Diro was an important political figure as the leader of the People's Action Party (whose main power base was among the Papuans in the south of the country). In such a diverse nation, preserving a regional balance in the administration is considered to be important. In 1987, the Barnett Commission of Inquiry into Aspects of the Timber Industry issued a damning report on alleged corruption and mismanagement in the forestry sector. Mr Diro was one of the principal figures identified in this process and, although various attempts were apparently made to prevent charges being brought, the legal system ultimately prevailed. Thus it was that in September 1991, Mr Diro was found guilty by the country's leadership tribunal on 81 charges of corruption, bribery and misuse of office.

The constitutional problem arose when Governor-General Sir Serei Eri, a fellow Papuan, refused to sign the dismissal instruments. As the monarch's representative in Commonwealth countries which maintain their allegiance to the Crown, the Governor-General should play only a formal role in the political process. By convention, he will 'follow the advice' of his Ministers and avoid becoming embroiled in political controversy. In the case of PNG, recommendations of a leadership tribunal are actually binding on the Governor-General and his refusal prompted the Cabinet to take drastic action. They agreed to recommend to Queen Elizabeth that the Governor-General be dismissed and it was only at this point that Sir Serei and Mr Diro tendered their resignations. For some time, there was concern that the imbroglio might provoke a backlash among the Papuan population, but in the event this did not happen. For Papua New Guinea, the outcome was particularly significant because it demonstrated the robustness of their constitutional system. Unlike many countries in Africa, the country's political arrangements have not been substantially altered since independence, and this element of stability, notwithstanding the rough and tumble of day-to-day politics, is seen by outsiders as important for investment purposes. Accordingly, there is quiet satisfaction in official circles in Port Moresby that the Constitution has survived this test.

Stability

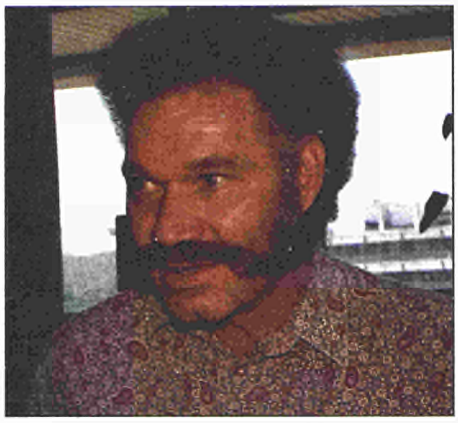
Although Papua New Guinea has never been tempted to experiment with socialist or one-party systems of government, it would be exaggerating somewhat to describe it as a paradise for the investor, whether domestic or overseas. The two most significant impediments, in this regard, are the lack of infrastructure and the security situation. The first is a problem which PNG shares with many developing countries, although in some regards it is more acute. There must be few mainland capitals in the world which are so isolated from the rest of country in terms of overland links. Electricity supplies and other services are limited to a few urban centres and a lot more progress is also needed on the educational front. It would be unfair to be too critical of this situation, however, since in all these areas PNG has moved forward very substantially since independence.

The security situation is rather different. Although high and increasing crime rates are the scourge of urban areas in industrial and developing countries alike, the problem appears to be particularly acute in Papua New Guinea. Many inhabitants of Port Moresby have taken to living behind high security fences as robbery and violent crime have grown. Even in rural areas, violence is relatively commonplace, although here it is more often due to traditional rivalries or feuds between neighbouring 'wontoks'.

The situation is exacerbated by tensions over land rights. The traditional system of land tenure, with its emphasis on community ownership and its complex pattern of rights and obligations, may have certain attractions, but it does not lend itself readily to economic development. In the past, large-scale projects by overseas companies have had a major impact on the land, with local owners not necessarily seeing much benefit — this is particularly true of mining and forestry exploitation. Tensions have built up and violent acts have been carried out. Indeed, it has been argued that the catalyst for the secessionist movement in Bougainville, whose guerilla activities led to the closure of the Panguna Mine, was resentment over the despoliation of traditional tribal lands (opencast mines inevitably change the landscape) combined with a belief that the local people most affected had not received a fair share of the financial benefits.

More recently, an arson attack on the Mount Kare gold mine in mainland Papua New Guinea, which has closed the operation altogether, has raised further worries, particularly among foreign investors. Finance Minister Paul Pora plays down the significance of this attack. Speaking to *The Courier*, he suggested that it was an isolated criminal act and he pledged that those who were responsible would be brought to justice. He was also keen to underline the Government's commitment to overseas investors revealed in their recent decision to join a multilateral, international insurance guarantee scheme.

Also on the plus side, it must be acknowledged that the Government has



The Courier

Paul Pora, Minister of Finance

pursued extremely prudent economic policies and this is reflected in the strength of the Kina and the relatively healthy state of the foreign reserves and government finances. The traditional images conjured up by the term 'structural adjustment' — radical restructuring of the civil service, large scale rationalisation and privatisation of parastatals, huge cuts in government expenditure and so on, are inappropriate here. The measures which had to be taken in PNG involved some inevitable discomfort but the underlying position was sound.

Notwithstanding the problems of infrastructure and security, there is no doubt that many entrepreneurs do see it as a country of opportunity. There have been successful ventures, particularly in the mining sector (the Porgera Gold Mine is thought to be one of the largest and most productive in the world) and there is clearly a great deal of untapped potential.

The social dimension

What of the people of Papua New Guinea? In talking of investment opportunities and of opening up the country to foreign investors, there is a danger of failing to take account of local people's feelings. It may seem perilously close to sacrilege, in a world where the free market has triumphed, but could it be that local people would prefer some of the untapped potential to remain untapped, at least for the present?

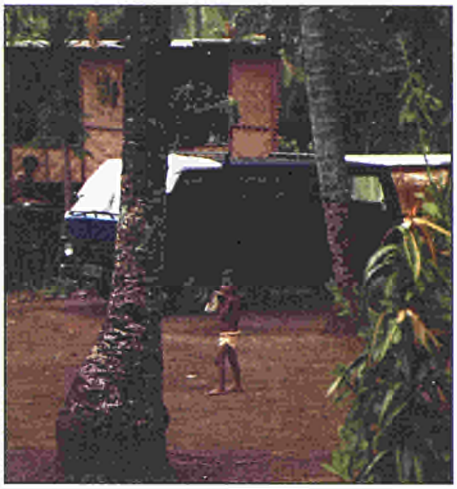
It would not be surprising if PNG's experience in the forestry sector gave rise to this attitude. The country's forestry resources have been heavily exploited by overseas logging companies and inquiries (notably the Barnett Commission whose report was mentioned above in the context of the Diro scandal) have shown that through a variety of corrupt practices and massive transfer pricing, the financial benefits to PNG have been minimised. The Government is committed to remedying this situation with a variety of environmental measures, firmer controls on the activities of logging companies and the adoption of a tropical forestry action plan.

Despite worries over the effects of resource exploitation on the natural environment, the problems and challenges which face the majority of the population are likely to be more prosaic. Unemployment appears to be on the increase although it is impossible to come up with a meaningful figure for those out of work since, in common with many other developing countries, PNG has a very large informal sector. According to the most recent complete figures available (for 1983) only 10 to 15% of the economically active population were in formal employment (although a marked increase has been recorded in some individual sectors since then). The bulk of the remainder are engaged in agriculture either as smallholders or on a subsistence level but a significant proportion will certainly be underemployed, if not wholly without means of support.

The 'duality' of the economic system is reflected in the education system. From a very low base at the time of independence, education in Papua New Guinea has made enormous strides and this should be acknowledged. However, it still fails to reach a substantial proportion of the population and there is clearly a lot still to be achieved. Primary enrolment is currently estimated at 70% of the eligible age group (60% twelve years ago). Wastage (ie dropping out) between grades 1 and 6 amounts to 30-35%. Owing to limited resources, a selection process in grade 6 is necessary and only 35% of those who complete primary education can be offered a secondary place. The haemorrhaging of young people from the education system continues at the tertiary level and only a very small number have the opportunity to go on to degree studies. The Government is well aware of the need to improve and expand educational opportunities. Trade Minister John Gihenu sees this as the most important factor hindering economic development and strongly emphasises the need for practical instruction. His views are echoed by many others in the government services.

The Courier

Education in PNG has made enormous strides but there is still a long way to go. This is the University of PNG campus in Port Moresby



The Courier

'More than merely a wealth generator for entrepreneurial outsiders'

Potential and opportunity?

So has the image of Papua New Guinea as the 'land of traditional outlooks' been replaced — as the Expo publicity would have us believe — by the 'land of potential and opportunity'? Is such an image change in fact desirable? It is clear that there is potential and opportunity in PNG which is expressed in the vibrant private sector. Overseas investors have always been welcome and those willing to take risks can reap big rewards. But Papua New Guinea is more than merely a wealth-generator for entrepreneurial outsiders. Its people have their own concerns and interests as well as their own unique cultures. If the traditional and modern aspects clash, as they have done from time to time, then the future development of PNG will always be constrained. If, on the other hand, ways are found to reconcile existing cultural values and the modern world which laps at its shores, the people of this fascinating country should be able to look forward to a brighter future.○

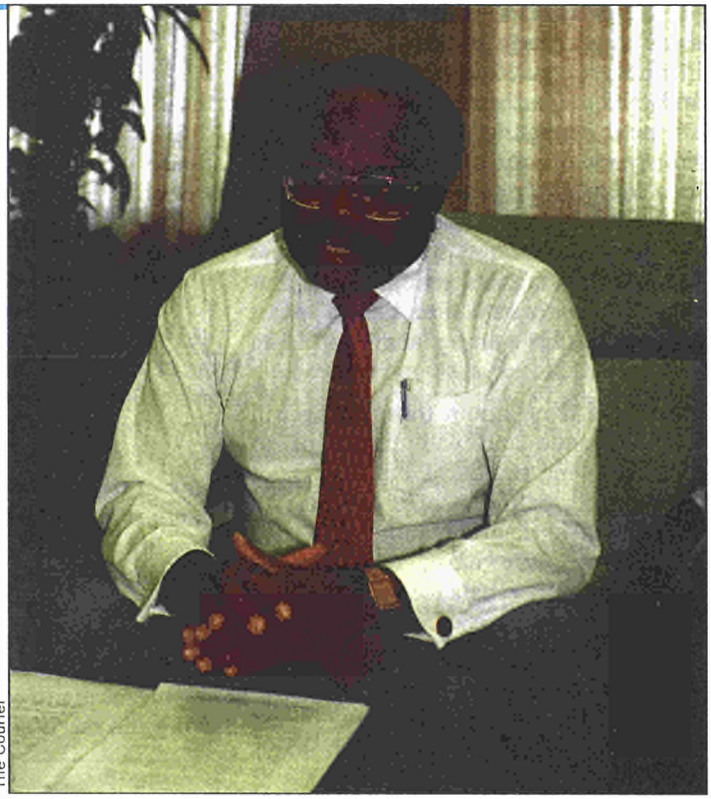
Simon HORNER

'Tough but necessary policies' underpin economic recovery, says Prime Minister Rabbie Namaliu

Rabbie Namaliu is a man who is well-known in ACP circles. It was he who signed the Lomé III Convention in December 1984 on behalf of the ACP Group in his capacity as President of the ACP Council of Ministers. (He was the Foreign Minister of Papua New Guinea at the time).

'Meteoric' is perhaps the most appropriate adjective to describe Mr Namaliu's rise to his country's top political position. Still only in his mid-forties, he entered national politics in 1982, winning the seat of Kokopo in the elections of that year. He speedily became Foreign Minister under Michael Somare (now Sir Michael who, in an interesting role reversal, currently holds the Foreign Affairs portfolio in the Namaliu Cabinet).

In the shifting sands of PNG's parliamentary system Rabbie Namaliu is increasingly recognised as a survivor. He became Prime Minister in July 1988, a mere seven days after becoming leader of the Pangu Pati (Party) which was then in opposition. Initially, there were few who expected his premiership to last very long but he is still in power almost four years later — a continuous term of office which is unprecedented in the country's short post-independence history. Despite the ever-present threat of a parliamentary motion of no-confidence, which is one of the principal characteristics of the PNG political process, he has succeeded in leading his country through an economic minefield. The general problem of low commodity prices, and the hammer-blow delivered to the economy by the closure of the Panguna Mine in Bougainville, could together have prompted an economic collapse. Yet in 1991, PNG had not just bounced back, but was recording one of the highest growth rates in the world.



The Courier

In this interview, Prime Minister Namaliu explains why. He also speaks frankly about the conflict in Bougainville which led to the mine closure, and about some of the vagaries of the democratic system which put him into power.

► *Prime Minister, how would you assess Papua New Guinea's current state of economic development. In particular, what have been the development achievements since independence in 1975 and where would you hope to go from here?*

— Our current state of economic development is very satisfactory given our recent history. The Bougainville mine closure and low commodity prices have been the major problems in the last few years and they are ones that would have threatened any economy. But we have come out of these difficulties in good shape and that was only possible because of the tough but necessary economic policies and structural adjustment programmes that we introduced. We have, for example, maintained the value of the kina and have implemented prudent fiscal and monetary policies designed to ensure that things did not get out of hand. As a result, we have managed to come through a very tough situation.

Last year, we saw a considerable improvement on the economic front. Projects like the Porgera and Ok Tedi mines have made a big impact. The estimates for 1991 are that we achieved a positive growth rate of some 9%, after two successive years of recession. This year, it should level out at about 5-6%. Our reserves continue to be strong — in fact in recent times they have been at record levels. In the last three and a half years alone, we approved major investment projects amounting to about two billion dollars, mainly in the mining sector. So, as I said, the current state of the economy in my view is very good despite the problems we have experienced.

► *May I ask you more specifically about mineral exploitation, for which PNG clearly has a great deal of scope. Do you think this sector can form the basis for future economic prosperity?*

— I see mineral and oil resource development in this country as underpinning economic prosperity but we obviously need more than that to make it lasting and beneficial. We need to have a strong, efficient rural sector because that is clearly where the majority of our people are and will continue to be. The next stage is investment and this is something we are emphasising a lot more, not just in terms

of the policy statements we make, but also as regards actual structural changes. We have abolished the National Development Authority and are replacing it with an Investment Promotion Authority. And, as part of the package, we have also introduced a set of changes that will encourage more investment from overseas, not just in the mining and petroleum sectors, which are obviously significant already, but more particularly in other areas such as agriculture, forestry and fishing. Tourism is also something we are now beginning to address very seriously and of course there is manufacturing. We want, in particular to add value 'downstream' through the processing of resources that we have here. This applies to timber and agricultural products, but obviously we would also like to see it happen in the mining and petroleum sectors.

There is no doubt that mining will boost revenue and will enable us to improve living standards but, as I said, the majority of our people continue to depend on agriculture and fishing for their future. We have, therefore, to achieve a proper balance and to learn from the experience of other countries that have mining and petroleum resources. In particular, we must make sure that we do not squander our wealth in ways that would not help the majority of our people. The only way to do this is to make sure that the benefits from mining and petroleum are used wisely in developing the non-mining sectors. We also have to take steps to ensure that more of our people are literate, educated and skilled.

► *Concerns have been expressed that the country's forestry resources are being over-exploited and perhaps even 'pirated'. Indeed there was the Barnett Report on this which criticised the lack of regard to environmental sustainability. What policies is the Government currently pursuing in this area?*

— What we have done — partly because of the Barnett Enquiry — is to take some very drastic decisions. Firstly, we abolished the Private Dealings Act. This previously enabled landowners, with minimal government input, to negotiate directly with developers that approached them for the purpose of exploiting their timber resources. That is why, in a number of those projects that were subject to the enquiry, it was found that the developers in fact had very little regard for environmental questions such as reafforestation. The government was not involved in any significant way, other than to rubber-stamp the agreement reached between the landowner and the developer. We have also amended the national forestry legislation completely. We now have in place a new National Forestry Bill which is being implemented and which will result in the establishment of a National Forestry Service. This will be responsible for coordination as well as the development of forestry resources throughout Papua New Guinea. The Board will be comprised of representatives of both government and industry, as well as of the provincial governments and landowners.

Another measure is the Tropical Action Plan. We had a conference here on this to which bilateral and international agency donors were invited. The plan was basically approved and we got a commitment from quite a number of donors to assist us in its implementation. We have now got some help from a number of donors but for the most part we have been very disappointed. We have not received the kind of assistance that donors, particularly from some of the developed countries, indicated they would give. Forestry is seen by people in this country as a means of improving their standard of living and this is often forgotten. In order for them to agree not to have their forests logged — so that, for instance, they can be reserved as some sort of 'world heritage' — you have to have something to offer them. These are the sort of things that are being addressed as part of this Tropical Action Plan and that is why we were hoping that the pledges and commitments that were made at that meeting would have by now resulted in a lot more support than we have got so far. We hope that our critics will understand this and also talk to either their own governments or the international agencies to press for more support to be provided — professional and technical as well as financial. This is a particularly sensitive issue for us but we are prepared to follow the principle of sustainability enshrined in the legislation we have introduced.

As far as the new legislation is concerned, we are now insisting on proper environmental plans as part of a development proposal before it is approved. Under the legislation, there will now be proper mechanisms to monitor that and ensure that steps are taken where a developer is not performing.

► *PNG has a very particular cultural history and a way of life which appears not to be based purely on materialism. How can you reconcile the usual development*

The Courier

Concerns have been expressed over the exploitation of Papua New Guinea's forests

notions of donors with the maintenance of your current cultural values?

— I think that by and large in this country, traditions and customs are still very strong. Even when people have gone into the cash economy, like for example in my area or up in the Highlands, they still have a very rich culture of their own and they would like to preserve this as much as possible. Our task is obviously to ensure that our policies assist them to do this. We have a Ministry of Culture and Tourism and, although in some ways the two areas could conflict, we see no reason why they should not complement each other. Promoting tourism can be a way of strengthening our culture and traditions as long as the people are not manipulated in such a way that commercialisation diminishes their value. That is something that we have to be aware of and it is something that our people are aware of anyway.

As far as government policy is concerned it is very clear that we want to preserve our culture and traditions as much as possible. Where we introduce modern technology and modern instruments of development, we try to ensure that it is done in a way which does not adversely affect our traditional way of life. Having said this, it must be admitted that with the growth of urbanisation things are changing, but I don't think that even in the towns and cities people have necessarily lost their sense of belonging to their own traditions and culture.

► *How would you characterise Papua New Guinea's relations with the European Community under the Lomé Convention?*

— I think they are excellent. Of course, the relationship has been to our great benefit, but also I think to the benefit of the EC. We have obviously been an active member of the ACP group of States and have taken part in the various negotiations. There is no doubt that the EC has been very supportive in PNG's development efforts since we joined and we are very grateful for that. In particular, we acknowledge very strongly the help that we have had from the EC these last couple of difficult years. Our structural adjustment programme has been supported very significantly by the EC and through Stabex we have been able to maintain our prices for all of our major commodities — coffee, copra and cocoa. The European Community enjoys a high priority as far as our foreign policy is concerned.

► *You recently faced a potential constitutional crisis involving the Deputy Prime Minister and the Governor-General. What do you think the resolution of this crisis reveals about PNG's democratic system?* (1)

— For a start there was no crisis over the Deputy Prime Ministership. The charges against the Deputy Prime Minister were brought against him personally and did not involve the office which he held except, of course, in so far as his conduct obliged him to resign. The constitutional question obviously arose, however, in respect of the conduct of the Governor-General. He failed to — or refused to act in accordance with — the recommendations of the tribunal and basically left us in a situation where there was no option but to seek his dismissal — which was preempted by his resignation. The whole situation was a sad one, of course, but democracy in this country emerged stronger as a result. So I suppose from an objective viewpoint the outcome was beneficial.

► *The Bougainville rebellion continues to pose problems for your Government. What is the current state of play and is there any realistic solution in sight?*

— I think so. I think that there will eventually be a solution which will resolve the situation once and for all. It is taking time, but meanwhile we have restored most of the services in the island of Buka and on the smaller atolls. On the northern part of mainland Bougainville we have, during the past few months, been restoring services in close conjunction with the chiefs from those areas. Our security forces have also been there, assisting with that programme, and you might have heard that last weekend there was a major ceremony where the BRA leaders and followers surrendered. They came to make peace with our security forces and made a commitment to give up their arms. So they are working together now and that is very encouraging. I might also add that that part of the mainland actually includes parts of Central Bougainville. I am relatively pleased with the progress that has been made there.

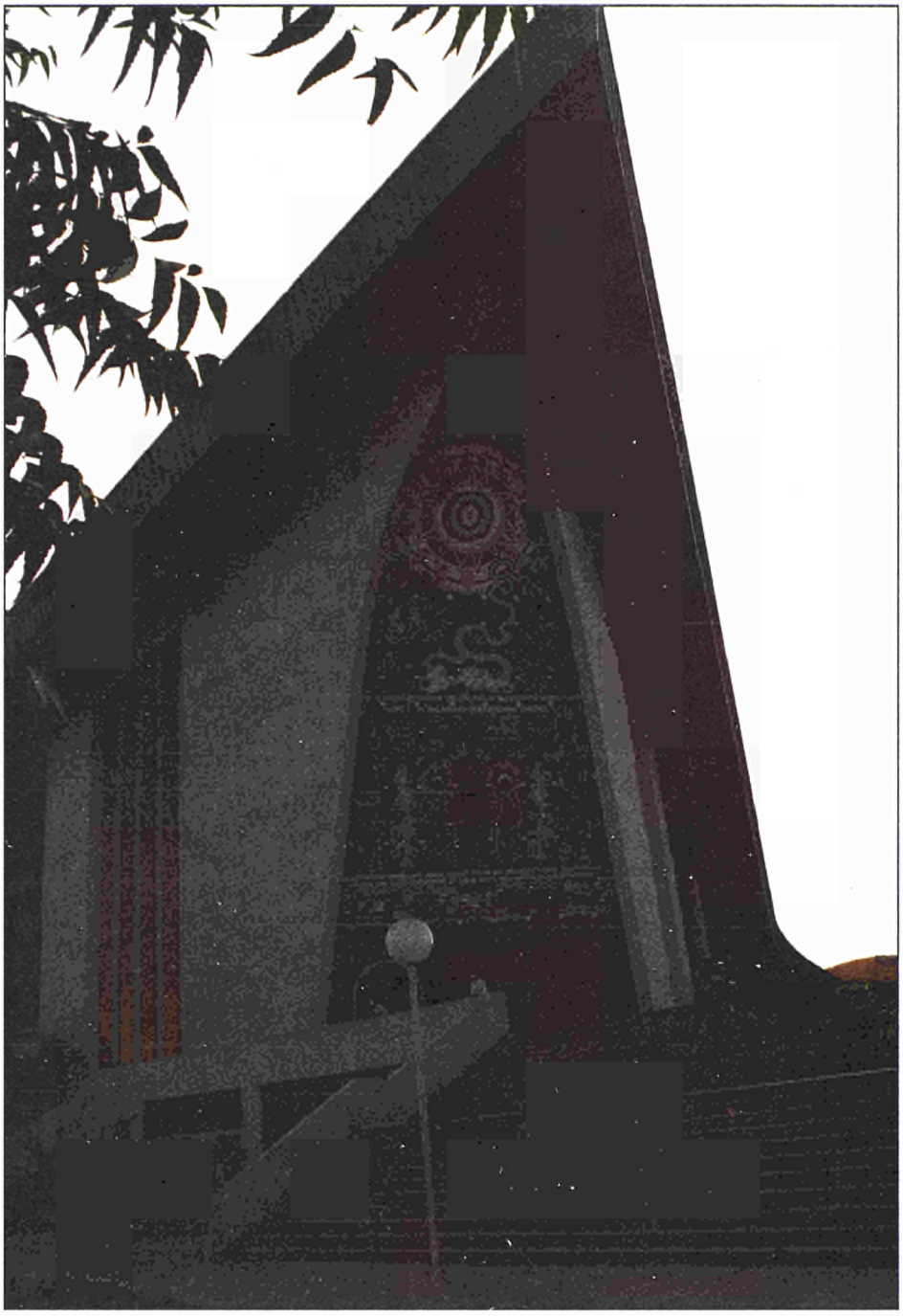
Regarding South Bougainville — and again it includes certain parts of Central Bougainville as well — the leaders have been here in Port Moresby for the last few weeks. The delegation is led by the newly-elected chairman of the interim authority and they have been talking to us about a package which we hope to agree before they go back. Quite clearly, what they want is for us to assist with restoration, but even before that, they have actually got the public servants — over three hundred of them — back to work. Teachers, health workers, agricultural extension workers and so on are actually back on the payroll, and are working with the interim authority in South Bougainville. The difference between them and the north east is that they have, for now, expressed the view that they don't want our security forces to be involved in the programme. They would prefer to undertake the restoration programme themselves at present. They wanted to have their own police but we have told them clearly that under the present constitutional arrangements that won't be possible. But it will be possible for those they have identified to be involved in police work, to work together with our police either as reserve police or as special constables.

So, the only area in the province where we still have a big problem is in Kieta and Arawa where they are holding the *Cosmaris* (2). We are not only disappointed about this but very concerned because the understanding on which the ship went in was that they were taking goods and services provided by neutral organisations — NGOs who have been committed to assisting us with medical and other supplies. We are very disappointed that they have reneged on that and are now holding a ship as a means to negotiate for other things which were not part of the initial arrangement. This will affect the willingness of outside organisations such as the Red Cross to arrange ships in the future.

However, I can say that as far as most of the province is concerned we are now gradually restoring the situation. It is becoming clear that the majority of the people just want to go back to leading a normal life and the sooner that is done the better. They cannot say that in public because of the people in the centre who

(1) For the background to this question, see the introductory article of this Country Report.

(2) This was a ship containing relief supplies which was seized by the rebels on its arrival in Kieta, just before *The Courier* visited Papua New Guinea. Since this interview took place, events have taken a turn for the worse. Although the crew was flown out and the cargo unloaded, the vessel itself was subsequently blown up.



The Courier

'We are trying to improve our democracy with a view to achieving greater political stability'. This is the Parliament building in Port Moresby

are in control of the guns. If they do speak out, they could be subject to torture and other forms of mistreatment — we know this has already happened and people who have come out have verified it.

But I hope that the approach we have taken, whereby we are not prepared to have any more confrontations or violence, and want to restore peace and services, will ultimately lead to us sitting down with the BRA in the centre of Bougainville. My hope is that these people will see sense enough, like the others have, to sit down with us and resolve this in a peaceful manner.

► *What do you think are your prospects for remaining Prime Minister after the General Election in June?*

— Very good. But, having said that, you may have gathered that in PNG we have a political milieu in which the parties are not as well entrenched as they are in Europe. They are becoming more developed as time goes by, though. In the present Parliament, we have had to make some changes to the electoral law with a view to introducing greater stability in the system. We have amended the provisions relating to votes of no-confidence — previously any government was given a six-month grace period after it took office and we have changed that to 18 months. So, at least that will give the new government a longer period of time to govern before any vote of no-confidence can be moved. Secondly, we have made some changes which hopefully will reduce the incidence of malpractice in the voting procedure. Also, nomination fees have been increased, and will be non-refundable except for those of the winning candidate in each constituency.

► *Presumably, this last measure is related to the fact that each constituency contest normally attracts a large number of hopefuls. Do you think it will reduce the number of candidates?*

— Yes, and I also think it will bring out the ones who are committed and serious about standing. Previously a lot of candidates stood simply so that they could split votes — not necessarily because they wanted to win.

► *I imagine it will also help to consolidate the party system?*

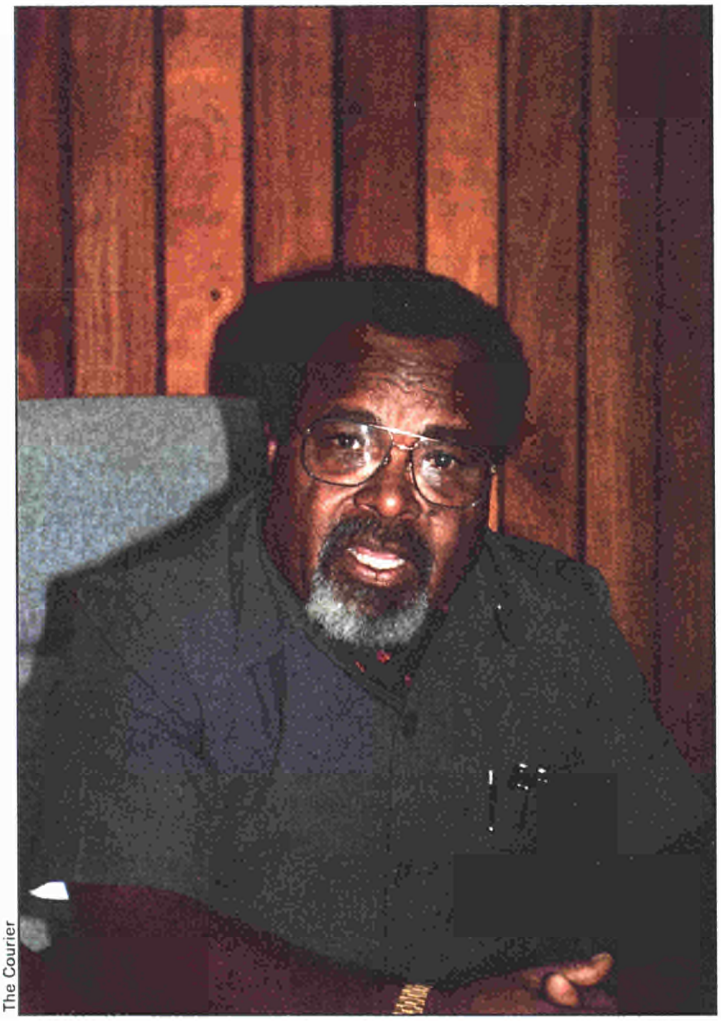
— It should do that as well. We have another proposal which we will be debating next month ([3]) which relates to what we call the 'Integrity of Political Parties'. One of the situations it will address is what happens if you decide to switch parties. That has been a problem in the past. Members without a sense of obligation have decided that the grass was greener on the other side. Under the new proposal, they will have to go back and face the people, who can then decide if they approve of the change. That should help the proper development of political parties in this country. So, overall, we are trying to improve our democracy with a view to achieving political stability and prosperity for the future. I am fairly confident that we will get back, and if it happens we should be in a much better position to govern.○

Interview by Simon HORNER

([3]) This interview took place on 22 January 1992.

Bougainville – a 'sensitive and difficult issue'

In this interview, the Foreign Minister (and former Prime Minister) of Papua New Guinea, Sir Michael Somare, outlines how PNG has benefited under successive Lomé Conventions. He also describes the current state of relations between his country and its three closest neighbours (Indonesia, Australia and Solomon Islands). On the Bougainville crisis — a running sore for the Government in Port Moresby — he has some sharp things to say.



The Courier

Sir Michael Somare

► *Sir Michael, how would you characterise the European Community's current relations with PNG?*

— Well I should say that we in PNG enjoy and are keen to maintain the relationship that we have established. Since we acceded to the Lomé Convention in 1977, we have benefited very substantially from provisions relating to financial and technical cooperation, trade and investment, regional cooperation and emergency and humanitarian aid.

Through the EDF, we have had grants for development projects in a wide range of sectors, notably directed towards infrastructure, agriculture and training. We have also enjoyed duty-free access to the EC market for our export commodities, such as copra, gold, coffee and agricultural products. This has helped our trading position with the Community a great deal. I should also mention the European Investment Bank, which has provided loans to PNG for the funding of various projects.

In addition we have received aid for the refugees on the border, structural adjustment support, Stabex and Sysmin funds, assistance for our national AIDS programme and help through the South Pacific Regional programmes. All in all, it adds up to a substantial package and obviously it is a relationship which we are pleased to have.

► *Turning to your bilateral relations with other countries in the region, I know that there have been some difficulties in the past with Indonesia, particularly on the Irian Jaya border. What is the current state of play?*

— It is true that there were some difficulties in the past involving Indonesia. Soon after PNG became independent, we encountered problems of people crossing. In particular, supporters of the OPM (1) were coming over to our side and this created an awkward situation for us.

I am glad to say that our relationship with Indonesia today is much more mature. The focus is less on the border and instead we are concentrating on other more positive aspects of the relationship. As far as we are concerned, Irian Jaya is an integral part of the Indonesian Republic. How they manage it is entirely up to them. We respect the sovereignty of their territory.

This is a standing policy which has been adopted by successive Governments. Irrespective of who comes to power, they follow the basic agreement on the border which we signed in 1979. The agreement has been reviewed on three occasions, the most recent one being in 1990. These reviews are intended to reflect new

(1) Irian Jaya's independence movement.

developments and new understandings on border matters, particularly with regard to trade. A lot more trade is now taking place between people all along the border. We issue week-end visas for people to go across and they come over on visits as well. It is really going extremely well, apart from the OPM trying to stir problems but I think they now recognise that we have a better rapport on the border.

On this subject, there is one other important instrument which I should mention. This is the Treaty of Mutual Respect, Cooperation and Friendship between ourselves and Indonesia which was concluded in 1986. It gave a new dimension to our bilateral relations and is based on openness and respect for each other's sovereignty. Our common desire to provide solutions to the border issue has in fact led to an expansion of relations between us. We have now, for example, an exchange of military and technical personnel. Some of our soldiers are trained in one of their military colleges and we are hoping to promote further cooperation between our two defence forces.

Now both governments are about to conclude a further, more substantial agreement on border arrangements. We have already opened a consular office in Jaipur and others may follow. As I have said, we may have had some difficulties in the past, but today the differences have been put aside and we are working together to achieve our common goals.

► *What are your relations like with Australia as the former colonial power, on the one hand, and with the ASEAN Organisation on the other?*

— We have permanent observer status with ASEAN which I believe is useful. I have attended four ASEAN Foreign Ministers Conferences and through that relationship we have built up very good links with most of the member countries. We receive technical assistance and aid from Malaysia, and are trading with Singapore. Trade with Indonesia has also increased and we have established a relationship with Thailand.

As regards Australia, our relations have always been very good. Our colonial experience was not like that of others and our rapport with Australia is, therefore, completely different. Our links with Australia are also quite unique in the sense that, since granting us independence, they have continued to support our development programmes and to give us grant in aid to subsidise our budget. While, of course, most of the people in our public service are local, we still have Australians helping us out. We also have good defence cooperation as well as cooperation in civil aviation when it is needed. If we need technical assistance, we can always rely on their support.

People might well wonder why it is that we have such a close relationship — perhaps it is something to do with the physical closeness of our two countries, but it is also I think because of the respect that they have shown us as a sovereign nation. Of course, we have had our disagreements, but overall our relationship has been very close.

► *May I ask about the Bougainville situation and specifically the effect that it has had on your relations with Solomon Islands? It was reported in the newspapers that there was some controversy over alleged hospitality offered in Honiara to BRA (2) leaders.*

— Bougainville has been a very sensitive and difficult issue for us and we have always asked neighbouring countries for their cooperation. Solomon Islands and ourselves are members of the Spearhead Group. We hoped that we could cooperate and do things in a Melanesian way, but it does not work like that. The problem of course is that there is a small split between the thinking of the people here and the people of Solomon Islands. I have known the Prime Minister as a personal friend for a long time, and indeed the new Foreign Minister, but I suppose they have their own reasons for not wanting to cooperate. A recent example was when we were seeking an extradition treaty with them. There was a blunt refusal and we don't know the reasons why. They have given us an undertaking that they will not entertain the rebel element on the Islands. Perhaps it is because of the ethnic ties and the closeness of their people. People on our side have relatives on their side. This is not to say that we want to give up with the Solomon Islands Government. We are doing everything we can to get them to understand our difficulties. Of course, they also have to be careful because, if we left the area, there would be a lot of problems for them in South Bougainville.

I believe the Bougainvillians are causing trouble by using Honiara as a base. They are asking us to go to meetings there but our people are not stupid. Nor will we do anything to harm the rebels. If the meeting is held in Rabaul, for instance, they can all go back afterwards. We have given them an undertaking that we will not arrest them if they come to the conference table.

We have been criticised by humanitarian organisations who say we are not being fair, but they should also see it from our viewpoint and appreciate the difficulties that we have. It has been reported in newspapers that we are inhumane but, if you look at what they have done to their own people, you see that the rebels are more inhumane than the PNG Government. I would like you to get the message across to people in Europe that we are very sincere about how we treat human beings. It is their people who are not treated well. They can blame our soldiers, but our soldiers have done their very best. It is exactly the same situation as in Ireland or in parts of Eastern Europe at the moment. So, I hope that people in Europe will appreciate the difficulties we are going through.

► *As a former Prime Minister, you obviously have a view on more general issues affecting PNG. What are the next steps in the development process?*

— The country has a lot to offer. We obviously have to gear ourselves for mineral development, and this means that the government has to take initiatives to set the pace. We must continue to encourage investment from abroad. We then must ensure that the income derived from that source is used for the benefit of the majority of the people in our country. In particular, we need to provide employment and manpower training, with the resources to back it. Finally, we need to tackle the land problem, which is admittedly a sensitive area. If we do all these things, I think that our prospects will be good. ○

Interview by S.H.

(2) Bougainville Revolutionary Army.

Cooperation between Papua New Guinea and the European Community

by John LOFTUS (*)

Papua New Guinea, the largest Pacific ACP State in land area and population, is also the most diverse in character. Development plans have therefore to overcome the problems presented not only by separation by sea and rugged terrain but also by the heterogeneity of its peoples, speaking over 700 identifiable languages and living in 20 mainland and island provinces.

Since May 1977, Papua New Guinea has been linked to the European Community, initially through a special arrangement for the application of the Lomé I trade provisions. It became a full partner in cooperation following accession to Lomé I on 1 November 1978.

Through successive Conventions, the cooperation relationship has been significantly strengthened, to such an extent that the European Community is now one of the most important of Papua New Guinea's development partners.

Programmed cooperation

The various instruments of cooperation available under the Lomé Conventions have been called upon and utilised in accordance with the country's needs. The technical and financing programmable allocations for funding projects have seen significant growth from Lomé I (ECU 10m) through Lomé II (ECU 23m) and Lomé III (ECU 34.5m) to Lomé IV (ECU 40m).

The content of the programmes under which the sums have been spent reflects the major obstacles to be overcome in development of the nation. The major thrusts in the first two Lomé Conventions were accordingly in road improvements (53%) and education and training, as may be seen from Table 1.

Apart from the road network on the New Guinea side of the mountainous divide, which links Lae to the Highlands provinces, there is no usable road link between provincial capitals and other main centres. Nonetheless, Lomé cooperation has prudently concentrated on the phased improvement to full bitumen surfaced standard of the existing roads, particularly those radiating from Port Moresby. This policy continued under Lomé III, where a more noticeable sectoral focus was introduced.

Not unexpectedly, the concentration was on rural development, in which opening up rural access by all-weather roads again figured prominently.

Upon completion of the Lomé III, Sysmin-funded Road and Bridge Rehabilitation Programme, some 148 km of roads will have been upgraded to bituminous surfaced standard: 51 km from Laloki-Brown River-Veimauri, north-west of Port Moresby (Lomé I & III); 38 km from Tubuseria-Vailala-Rigo, south-east of Port Moresby (Lomé II & III), both in the Central Province; 29 km of the Kimbe-Talasea road in West New Britain (Lomé II) and 30 km of the East Sepik road from Passam-Tuanumbu (Lomé III Sysmin).

The importance of improving the life of ordinary villagers, who make up some 85% of the population, was given emphasis in the Lomé III micro-project programmes.

Twenty-three microprojects were completed under the successful Lomé III programme, all emanating from local community initiatives meeting recognised social, economic, health or infrastructural needs. Projects ranged from building school classrooms and health centres to upgrading a boat-building yard, fish farming, commercial guest houses and agricultural production and water supplies.

A microproject programme devoted entirely to providing water supplies to village communities in five provinces is also in progress.

Training in the rural development context was also a feature of the Lomé III programme, with added stress on courses in agriculture and the petroleum industry conducted in Papua New Guinea by specialists from Europe.

Training awards for academic courses overseas also continued, bringing to over 300 the number of Papua New Guinea nationals who have undergone tertiary training at post-graduate level in the European Community.

A major departure from previous ACP/EC cooperation practice was the agreement that Lomé IV should be valid for 10 years instead of the usual five, with

Table 1: EC assistance through the Lomé I – Lomé III national indicative programmes (by sector)

Sector	Lomé I ECU	Lomé II ECU	Lomé III ECU	Total ECU	Percentage share
Rural roads	3,182,000	13,272,334	19,446,529	35,900,863	53.2
Airports		920,212		920,212	1.4
Training	1,430,000	3,795,000	1,850,000	7,075,000	10.5
Microprojects	515,000		6,263,000	6,778,000	10.0
Livestock	1,940,936	1,460,000	180,000	3,580,936	5.3
Minihydros		2,649,213		2,649,213	3.9
Other TA		100,000	1,057,988	1,157,988	1.7
Trade and tourism		691,313		691,313	1.0
SIP			5,500,000	5,500,000	8.1
Fisheries	2,371,955			2,374,955	3.5
Other	560,109	111,928	202,142	874,179	1.4
Total	10,000,000	23,000,000	34,499,659	67,499,659	

* NIP approvals.

(*) Acting EC delegate in Port Moresby.

Table 2: Lomé IV — National Indicative Programme

	ECU
Rural Development Rural energy, microprojects, development of conservation areas (National Parks), tourism and culture.	14,880,000
Human Resources Development Training, rehabilitation of University of Papua New Guinea and other tertiary institutions.	12,840,000
Structural Adjustment To complement the ECU 7 m grant from the structural adjustment facility (see below).	4,000,000
Other Environmental monitoring of mining, trade and investment, technical assistance for project preparation.	5,040,000
Reserve	3,240,000
	40,000,000
Non-programmable grants linked to NIP	
Structural Adjustment (General Import Programme for balance of payments support) The ECU 11 m (including ECU 4 m NIP) will generate counterpart funds for support of the human resources sector.	7,000,000

The Courier

'Roads upgraded to bituminous surface standard'
This is on the Brown River — Veimauri road near Port Moresby

the exception that the financial protocol should run for five years. The first Lomé IV National Indicative Programme was signed in March 1991 and concentrates on two focal sectors; human resources and rural development. The former, expected to utilise about 50%, covers possible support for the University of Papua New Guinea in Port Moresby and the University of Technology (UNITECH) in Lae, tertiary and other secondary institutions as well as teacher-training and other training courses (see Table 2).

Rural development is expected to embrace a further micro-projects programme and provision of rural electrical energy in the form of mini-hydro and solar power facilities. The mini-hydro power plants will generally be on a smaller scale than the one at Tari in Southern Highlands Province, successfully completed in 1989 under Lomé II, which supplies energy for 24 hours a day compared to the four to six hours of the diesel generator it replaced. There is also provision for a major scheme to conserve Papua New Guinea's tropical forests.

Other, non-focal sectoral measures include a project to develop a capacity for monitoring the environmental effects of mining and a trade and investment promotion programme.

Structural Adjustment and Sysmin

A most important innovation in the Conventions is structural adjustment. The Government was forced to accelerate an adjustment programme following the closure of the Panguna copper mine in North Solomons Province (Bougainville Island) in 1989 which resulted in a loss of more than 30% of the nation's export income and of considerable revenue in taxes and royalties.

The adaptability of the Lomé Conventions was demonstrated in the response to the need for balance of payments support by the approval of ECU 5.5m under Lomé III to fund a sectoral import programme. Here the Bank of Papua New Guinea, the central bank, played a prominent role in facilitating the purchase of foreign exchange by Papua New Guinea importers, there being no restrictive import licensing system in Papua New Guinea. The counterpart fund was used to narrow the national road maintenance budget deficit worsened by the Bougainville mine closure.

The Government was also obliged to seek the assistance of the Lomé III Sysmin facility, to which a further positive response was forthcoming in the approval of ECU 18m for support of the economy outside North Solomons Province because of the impossibility of implementing projects under the conditions prevailing there. A further sum may be made available for projects in the province when conditions permit.

The amount of ECU 18m was allocated to road infrastructure to permit rehabilitation of roads where the budget deficit has prevented long term maintenance being undertaken. Unspent Lomé II balances totalling up to ECU 3.5m were added to this sum to fund the Roads and Bridges Rehabilitation programme. This

involves upgrading 30 km of road in East Sepik Province, resurfacing 500 km of the major national roads and replacing six bridges in various provinces. Up to ECU 3.5m are for spending on country-wide rural road drainage by labour-intensive methods to help alleviate the effects of unemployment, a consequence of structural adjustment.

The introduction of the adjustment process in Lomé III has been continued and magnified in Lomé IV. Papua New Guinea automatically qualified for Lomé Structural Adjustment support since it already has an agreed World Bank/IMF plan in operation. A Lomé IV Structural Adjustment facility allocation of ECU 7m was agreed by the European Community and this has been augmented by 10% of the NIP (ECU 4m). These funds are financing a 'General Import Programme' with the counterpart funds generated making up the education sector deficit in the 1992 National Budget.

Stabex

Stabex has proved to be another vital instrument in balance of payments support by helping to make up for the reduction in foreign exchange earnings from agricultural commodities, ie coffee, cocoa, palm oil and coconut products, caused mainly by lower world market prices in recent years.

Papua New Guinea has to date received ECU 153m from the Stabex provisions of the four Lomé Conventions (Table 3), making it one of the biggest Stabex beneficiaries. The transfers have been used for crop improvement, for agricultural diversification or to support producer prices in the four crops.

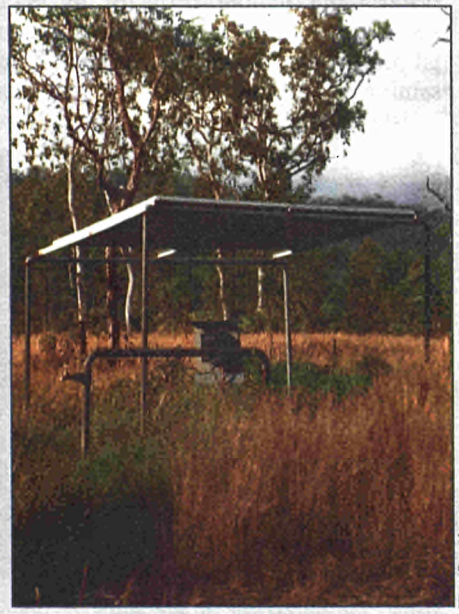
The most recent transfer, in respect of 1990, is being used to finance government price support on a reducing scale planned to reach zero within three to five years in accordance with an agricultural plan conforming to the structural adjustment process. An important step was taken by the Commission in 1991 in the conversion to grants of all existing Stabex transfers. All future Stabex transfers will be grants, as are all NIP allocations from Lomé IV.

These measures are aimed at maintaining and improving Papua New Guinea's trading position. The country has consistently experienced a strong balance in

Project spotlight – Rural water

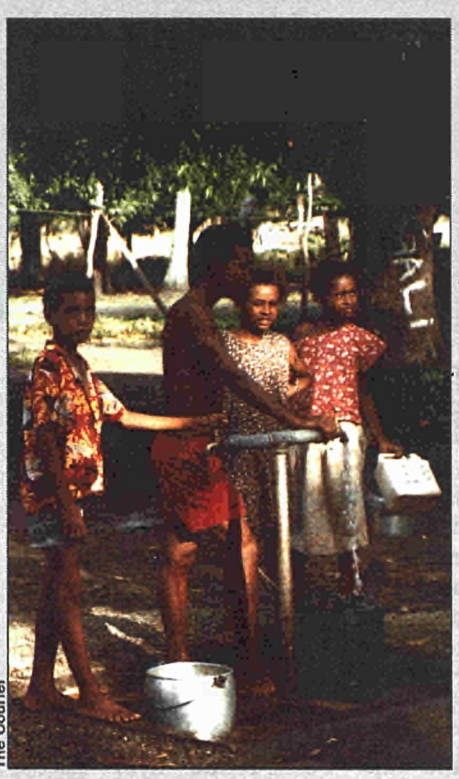
The EEC rural water project in Central Province is an integral part of a continuing battle to bring clean and plentiful supplies of water to rural villages in the area. In a tripartite agreement involving the European Community, the Provincial Government and individual villages, the EC is supplying equipment to the value of K453 000 to assist in the installation of solar powered pumping systems. Thirty selected villages benefit from the scheme. Similar projects are being carried out in Sepik and East New Britain.

The project is managed by a provincial manager who coordinates a small workforce of five men. It is the manager's responsibility to liaise with village councillors in order to pick work teams of village people who will carry out the bulk of the manual labour involved. This may mean hand-digging six-metre-deep wells or trenching out for up to seven or eight kilometres of pipework! Once this establishment work has been completed, the provincial work team moves in with PVC and polythene pipes (made in Papua New Guinea), solar panels and pumps and fits all the pieces together to allow water to be pumped to tanks. These tanks, supplied by the EC, are also made in PNG. In most cases, the water tanks then gravity-feed pipes which run to supply tap-stands in the village. The village women come to these



The Courier

A solar pump supplied by the project



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A village tap-stand in use

with their plastic containers to collect their water for the day.

The water which flows from the new systems is usually crystal-clear and more pleasant to drink than city water. For the women, the time saved during their working days must run to many hours — an average round-trip for water before the new system was introduced was two kilometres and in some cases it was as much as eight kilometres. Now, the average distance to the water supply is only 50 *metres*.

The number of people benefiting from the project is approximately 30 000, although more accurate figures are hard to establish as all the villages have fluctuating populations.

Central Province has a number of other water supply projects which do not involve solar power. Mainly rain-catchment and handpump schemes, they are coordinated by the Provincial Health Inspector. Similar projects are being carried out in East Sepik, East New Britain, Madang and Milne Bay Provinces. ○

David NEWTON, Provincial Project Coordinator, Central Province

Table 3	
Stabex transfers to Papua New Guinea	ECU thousands
Road projects (1983-1984)	3 870
Transfers – Lomé II (1981-1985) (coffee, cocoa, coconut, oil and copra)	46 818
Transfers – Lomé III (1986-1989) (oil palm products, coconut oil, copra, cocoa and coffee)	77 617
Transfers to date – Lomé IV (1990) (coffee, oil palm products, cocoa products and copra products)	24 949
Total	153 254

its favour as far as trade with the European Community is concerned. (Exports ECU 256m, imports ECU 97m in 1989).

European Investment Bank

Valuable loan funding for appropriately viable projects has been made available through the European Investment Bank (EIB). Concessional loans totalling ECU 113m receiving an interest rate subsidy have been agreed for support to projects such as palm oil production (Higaturu and Poliamba), Ok Tedi mine and the Yonki-Ramu hydro-electric scheme.

An indicative amount of ECU 30m was agreed for inclusion in the Lomé IV National Indicative Programme by the EIB.

The most recent EIB intervention and the first contribution from Lomé IV provides a total of ECU 8m (Lomé III — ECU 4m, Lomé IV — ECU 4m) own resources loans and ECU 2m (Lomé IV) risk capital as a global loan facility in support of small and medium-sized commercial enterprises. The scheme is managed by the Bank of Papua New Guinea through the agency of the local commercial banks.

Other notable forms of assistance provided were for an AIDS prevention programme and aid to refugees at the camp at East Awin in the Western Province. Food aid totalling ECU 0.8m was provided under Lomé II in the form of 1200 tonnes of rice, 160 t of canned fish, 30 t of milk powder and 12 t of vegetable oil.

A further 400 t of rice was provided under Lomé III. ECU 730 000 was made available under Lomé III for road construction and maintenance, supply of transport equipment and building of five schools with emergency water tanks. A telecommunications link from this rather remote location has also been installed.

Papua New Guinea received assistance valued at ECU 800 000 from the ECU 35m European Community global AIDS programme in the form of an STD specialist technical assistant, provision of laboratory equipment and funding of seminars and surveys. The technical assistant helped to prepare Papua New Guinea's current medium-term AIDS prevention programme.

Outside the scope of the Conventions, support has been given by the European Community to many small projects through non-governmental organisations. Up to 50% of the value of such projects may be financed.

Regional Cooperation

Allocations of funds have been reserved under the Lomé Conventions to finance regional programmes. The eight ACP States in the Pacific have benefited from the Lomé II (ECU 34m) and Lomé III (ECU 39m) programmes. The Lomé IV regional allocation has been set at ECU 35m. The Regional Indicative Programme was signed in Suva on 28 February 1992 by the Commission and the eight Pacific ACP States.

In Lomé III, the major projects which are of particular interest to Papua New Guinea are the Pacific Agricultural Programme (ECU 6.8m including sweet potato cultivar research), the Pacific Marine Resources Development Programme (ECU 10.7m — determination of mineral and fishery resources including a tuna tagging programme) and the Pacific Tourism Development Programme (ECU 7.4m).

Summary

Through the four Lomé Conventions, assistance valued at more than ECU 400m (Table 4) has been made available to Papua New Guinea in various forms as major and valuable contributions to overcoming the natural and economic obstacles in its path to developing a better future for its growing population.

Taking account of these difficulties and the brief length of time of its very existence as a unified and independent state, Papua New Guinea has achieved much, managing its affairs in the interests of its people. To its great credit it has done so whilst continuing to embrace the cherished principles of multi-party democracy enshrined in its constitution.

This gives added justification for the cooperation bond between Papua New Guinea and the EC, a bond which continues to strengthen and mature, as reflected in the agreement in 1991 establishing the European Community as a full diplomatic partner under the Vienna Convention.○ J.L.

Table 4: Summary of EC assistance to Papua New Guinea*	
	ECU × million
Lomé I to Lomé III	67.5
Lomé IV	40.0
Structural adjustment	7.0
Stabex	153.2
Sysmin	18.0
EIB	113.2
Assistance to refugees	1.0
AIDS prevention	0.8
Total	400.7

* Not including regional programmes.

The Courier

'Helping to develop a better future for Papua New Guinea's growing population'

Picture of young Europeans

by Jeanne REMACLE (*)

Those who do not have the time to read the Eurobarometer report on young Europeans in 1990 — and it runs to 191 pages, plus annexes — can obtain a 14-page summary for the press, (1) outlining the results of the survey run for the Commission of the European Communities (Task Force on human resources, education, training and youth).

It was run on a representative sample of 15-24-year olds in the 12 countries of the Community simultaneously in December 1990. The size of the sample was 7600.

The idea was to take stock of the situation of young people in Europe today by extending a similar study, (2) run in 1987, which itself was based on a first survey run in 1982. (3)

The May 1991 report on the December 1990 survey contains a comparative analysis of the three previous studies.

Young Europeans were asked about six things and, although there was no question of producing a close synthesis of the replies, the write-up does contain an outline of those people who are to be the Europeans of the 21st century.

The first battery of questions in the survey dealt with **everyday life** — background, personal relations, satisfaction with life in general, interests and financial resources.

It shows that many young Europeans (75%) today live with their parents and that only 12% live alone or share accomodation with one or more other people. Since 1987, couples have tended to be living with, rather than married to, their partners.

On a scale of satisfaction going from 1 (very bad) to 5 (very good), romantic attachments scored 3.8 and optimism about personal future 3.7, while relations with parents and friends were deemed to be very satisfactory.

Contrary to what might be expected from the pervading gloom, satisfaction with life in general is increasing in all the countries of the Community (although it declines with age) and young people say they are better off financially than in 1987.

Interests have remained the same since 1982 — the environment, sport, major problems of society, the arts and entertainment — although the order varies.

There are, of course, differences according to nationality, age, sex and so on. Young women of all ages are more aware of the major problems facing society, development, the environment and pacifism than young men — who are keener on sport, science and technology and politics.

The second topic which the study dealt with was **social attitudes** — to the great causes, the values to be inculcated in children, the main problems facing young people, their social life and what they feel about discrimination against certain categories of people of their age.

The leading concerns in young people's relations with society are, very reassuringly, world peace, the protection of the environment and human rights — regardless of nationality.

Environmental protection has gained ground spectacularly, with 19 points more than in 1982.

Support for the European cause, which stagnated between 1982 and 1987, picked up again in 1990.

The values which children should be encouraged to espouse are, despite one or two divergences, given (in order) as responsibility, politeness, tolerance and an ability to communicate.

Young people have apparently fewer problems than in 1987. The things which worry them are, in order of importance, unemployment, drugs, AIDS and the relatively poor extent to which education prepares for the demands of a job.

One European out of every two belongs to some kind of association (club, young people's organisation, religious organisation, trade union, professional association etc), but the percentage varies from North — where the score is high — to South, where more traditional (family, local etc) structures still thrive.

Young people think, as they did in 1987, that some categories of people of their age are discriminated against. These are, in order, the disabled and the ethnic minorities.

Then comes the section on how **open** young Europeans are **to things foreign,** travelling, and learning and using foreign languages.

Three out of 10 have never been abroad, but the tendency to do so increases with age and education.

France, Spain and Italy are still the most popular destinations in Europe.

Only 34% of subjects who have already been abroad did so on a trip organised by the school, university etc., but the percentage increases in the 15-19s, particularly those who belong to clubs or youth or other organisations. Girls go abroad more than boys.

Despite 1993 being on the horizon, mobility for the purposes of either work or study remains low — 8% of those who

(*) Directorate-General for Development.

(1) Both the Report and the summar are obtainable from: Task Force on human resources, education, training and youth, Commission of the European Communities, 200, rue de la Loi, B-1049 Brussels. (Mrs C. Viollier-Mogensen, tel. 32 2 235 5360 or Mr K. Reif, DGX/B-SRA, Eurobarometer, tel. 32 2 299 94 41).

(2) Report on young Europeans in 1987, Commission of the European Communities, September 1988.

(3) Report on young Europeans, Commission of the European Communities, 1982.

have already been abroad worked there and 7% studied.

Language is the major obstacle. It is to be hoped that mobility will increase with a mastery of foreign languages — which is more common among young people because of the sort of education they have had and the fact that they stay at school longer.

It is impossible to over-emphasise the effect of level of education on the various topics covered by the report.

In the Twelve, the languages currently learnt (other than mother tongue) are, in decreasing order, English, French, German and Spanish. But those the young people actually want to learn are, in order, German, Italian, Spanish and English — apparently to improve their personal culture or their job prospects or to settle in the country where the language is spoken.

The survey attempted to outline **what young people think and know about the European Community** by investigating their education, their objective and subjective knowledge, the Commission's reputation and the trends in their thinking about the Community.

More subjects than in 1987 had been taught about the European Community — information which aroused the curiosity of almost three quarters of them.

But although teaching about the Community is improving, young people's objective knowledge is poor. For example, only 4% can list the 12 Member States accurately.

Relatively few have heard about the Commission, although a great many of them know about the big internal market, one of its major projects.

The percentage of positive attitudes to Europe is high, overall, and almost 50% of subjects see an improvement in understanding between countries of the EC, although the figure was only 30% in 1987.

In the section on **studies**, all 15-24-year olds were asked what they knew about computers and then how satisfied they were with their studies, what they wanted and what their motivation was.

First of all, the percentage of young people who know nothing about computers has declined considerably in comparison with 1987. Computer studies are more and more common at school and university, although the basics are also learnt at home and from friends, with work and vocational training in third and fourth places.

When it comes to education being up to expectations, 88% of interviewees said they were studying what they wanted and 50% that they had chosen their course because of the job they wanted to do.

Sophie PATIGNY

'... the percentage of young people who know nothing about computers has declined considerably in comparison with 1987'

Those who stayed in education past the minimum leaving age did so mainly because of the personal advantages attached to it and, in second place, because they liked the subjects they had chosen.

The last batch of questions, on getting a job, investigated vocational guidance, experience of vocational training courses and any experience of work and unemployment.

Young people tend to take advice from their families and friends, above all, for vocational guidance and go to job centres, employment offices, teachers etc less than they did in 1987.

However, those who went against the trend and applied to the official services said they felt they got a better hearing than in 1987, although they were disappointed with the advice. In 1987, by contrast, the biggest complaint was the shortage of job opportunities.

Almost 50% of young Europeans with jobs and 30% of unemployed say they are taking or have taken vocational training courses — which are deemed to be satisfactory overall and a big help in getting a job. This positive opinion is declining slightly.

As in 1987, young Europeans get their first jobs, most commonly, through people they know. In second place, but diminishing in importance, is direct contact with the employer and in third, but coming up amongst boys and falling back amongst girls, is reading job advertisements.

For those respondents in employment, four out of 10 were still in their first jobs and 10% were already in their fifth.

There is a clear increase in those who have never worked (56%, as against 49% in 1987). Of those working, 72% are in permanent jobs. Skills are being used less.

Four workers out of 10 are taking in-service training. Note that computer skills are always a plus point (when it comes to pay, using knowledge, promotion etc).

Young Europeans of both sexes are happy with their present jobs, overall, and less pessimistic than they seemed in 1987.

Unemployment, of course, is reason for pessimism and it is the first cause of concern amongst the subjects. Periods of unemployment of over a year are more common among young women. Periods of unemployment of more than two years are half as common as they were in 1987.

Young people see the cause of unemployment as being the lack of jobs to suit the qualifications. One out of five complained about the absence of jobs in his/her region.

So? Are the Europeans of the 21st century happy? Are they responsible? Are they educated? Do they perhaps show solidarity with each other? It is impossible to say, even with a survey. But they are certainly free to become all these things.○ J.R.

Environment and development

An economic good, one learns in faculties of economic science, is defined as a scarce good which can be acquired through exchange. Professors used to cite water and air as examples of non-economic goods. These two elements, which are basic to life, existed in abundance in nature, and one could use them freely.

Today, no economist would take such an approach in his teaching, for in the space of a few decades, some of the major and fundamental concepts of economics have changed. It seems that air and water have also become economic goods, directly or indirectly tradeable. What are the reasons for this change?

Doubtless, development models themselves have had something to do with it. The purpose of these has long been to find ways of maximising production without looking at the quantity of resources available and how or whether they can be renewed. More significantly, the two principal philosophies which dominated economic thinking up to the end of 1989 have both contributed to the growing deterioration of the environment, notwithstanding their very different approaches and objectives in development terms. There are also significant climatic variations which, in certain regions, have exacerbated human despoliation of the ecosystem. Then there are a great many other causes, associated with the remarkable pace of scientific change. This has played an immense role in the development of humankind, but it has also had its drawbacks — Bhopal, Chernobyl, toxic wastes and holes in the ozone layer.

Faced with these genuine and serious threats at global level, the international community has always responded. The scale of the danger on this occasion has prompted it to call an 'Earth Summit' which will take place in Rio de Janeiro in June of this year. This international conference is intended to bring together all the nations of the world for, according to the United Nations, the fate of the world is 'in our hands'. Will it be one of these talking-shops for which the UN is renowned? Or will it be a quantum leap by politicians, scientists, economists and philosophers which will open the door for the ecology to become one of the basic parameters of development? It is the conference participants, who include the main decision-makers of the world, who must decide the stakes.

As a contribution to the information and thinking on this vital subject, particularly in the post-Rio period. The Courier has put together a special Dossier. This contains a series of articles which include scientific analyses on a range of subjects, as well as the views of people working in the development policy and environmental fields.

The European Community, in many respects a pioneer in its development policy with the Third World, has, for a number of years, incorporated 'protection of nature and the environment' into its programmes. It has also devoted considerable financial resources to this end, as one can see from the following article by Dieter Frisch, Director-General for Development at the European Commission.

Much is expected of the Rio meeting, even if some authoritative voices are already beginning to be raised, in doubt and even in scepticism, about its likely outcome. But whatever the sentiment before or after the meeting in Brazil, it is now certain that the defence of nature and the environment is simultaneously a question of survival and a motor for development.○

LUCIEN PAGNI

'We have not inherited the land from our parents, we are borrowing it from our children'

by Dieter FRISCH (*)

In the 20 years since the Stockholm Conference, there have been radical changes in the scale, scope and character of the Community's cooperation work, a transformation which mirrors the changes in its partners' requirements and reflects a better understanding of the complexity of the development process. Nowadays, the protection of the environment is one of the key elements in our development action.

Dieter Frisch

Lomé and the ACP countries

The first two Lomé Conventions did not focus specifically on the environment, which the world community did not at the time see as a priority. Lomé II nevertheless contained a large number of initiatives to conserve natural resources and protect the environment.

When Lomé III was signed in 1984, the dramatic effects of desertification in the Sahel region of Africa on food supply security and the survival of the people living there were matters of common knowledge. The wording of the treaty reflects that new priority and lays particular stress on ways of securing sustainable agricultural production and on combating deforestation and soil erosion.

Four years later, when the negotiators for the Community and the ACP countries began drafting Lomé IV, environmental concerns had moved into the front rank. That is why the environment appears among the areas for cooperation in Title I, before agriculture, secure food supplies and rural development — proof of how serious the concern had become at that stage.

There are three considerations underlying the importance attached to the environment:

— The quest for sustainable development not only means that there should be no direct contradiction between environmental protection and economic development but is also an acknowledgement of the fact that poverty is in itself one of the chief causes of the deterioration of the environment — and that, in its turn, creates further poverty.

— If the rate of population growth and man's attitude to nature do not change, there is no guarantee that science and technology will be able to prevent irreversible degradation of the environment and continuing poverty for even more of the world's population.

— All economic decision-makers, whether in the public or the private sphere, must give thought to the effect of their actions on the environment before, not after, they act.

That is why the Lomé IV Convention lays down the following as the basis for action:

— a preventive approach motivated by a concern to counteract the adverse environmental effects of any programme or measure;

— a systematic approach which ensures ecological viability at every stage in a development project from identification to completion;

— a cross-sectoral approach which looks at both the direct and the indirect consequences of any measures taken;

— an across-the-board attitude to development which encompasses the social and cultural dimensions.

The aim is to improve living conditions for people in the ACP countries in the immediate term and safeguard living standards for future generations by:

— protecting and enhancing the environment and natural resources;

— putting a stop to the degradation of land and forestry assets;

— restoring the ecological balance;

— safeguarding and making sensible use of natural resources.

The Convention also provides for a ban on exports of toxic waste from the

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Community to the ACP countries and a ban by the ACP countries themselves on imports of such waste from the Community or any other country.

In the case of the *Asian and Latin-American countries,* environmental protection has become one of the main components of cooperation and features in the new agreements as a matter of course. ECU 275 million are to be spent on environmental projects between 1991 and 1995, with the emphasis on the tropical rain forests.

Besides increased cooperation in schemes for the environment, the agreements stress the need to incorporate environmental assessment into the development process as a whole, with protection of the natural resources base and sustainable development as the long-term aims.

A dialogue on local, national and global environment policies needs to be set in motion to provide a basis for effective action to solve local problems and to ensure local involvement in solving regional and global problems. Once again, the priority will go to the problems of the tropical rain forests.

In the case of the *Mediterranean countries,* the Community's decision to overhaul its cooperation policy was taken at the end of 1990. The decision puts special emphasis on regional cooperation, which must be strengthened, especially in the environmental field, where there is growing concern over the requirements in terms of protection and management of the Mediterranean and its coastal regions.

The new policy set out in the five-year (1992-96) action programme includes a priority sector for the environment designed to protect the natural resources base, which is under constant threat from growing population numbers. Part of the ECU 230m allocated to the Mediterranean programme will go towards demonstration and training projects on the environment. The EIB will also have an important part to play. It should be earmarking some ECU 1800m for loans to regional environmental projects, which will attract a 3% interest rate subsidy from the Community budget.

Progress so far

If we try to identify the results of the steps taken so far, a number of priority areas emerge.

'Priority to tropical forests'
This picture shows the effects of logging in Solomon Islands

Firstly, there is *protection for the forest cover:* at the present rate of progress, this will have virtually disappeared by 2020. The diagnosis is a familiar one: the main cause is the destruction of forests for purposes of farming or to obtain energy supplies in the form of firewood. The problem is especially acute in arid areas close to urban centres. The consequences, too, are well known: deforestation contributes to the greenhouse effect (though less so than fossil fuel consumption in the industrialised countries) but also does the greatest harm to the local population.

Over the past ten years the European Community has funded more than 250 forestry schemes in the developing countries; these have cost nearly ECU 400m, with 54% in Africa, 35% in Asia and the Pacific and 11% in Latin America and the Caribbean.

Following the Resolution of the European Community's Council of Ministers on the tropical rain forests and development, and the European Council in Dublin in 1990, fresh measures have been taken, particularly in Brazil, where there has been action to protect the tropical rain forests in the Amazon. In June 1991 it was decided to make an initial grant of some ECU 12m to the pilot programme.

In the ACP area, a decision was taken in Brussels in 1990 to set up a conservation programme, worth ECU 24m, for the tropical rain forests in Central Africa. The programme involves seven countries and is designed to promote and reconcile long-term protection of the forest ecosystem and sensible management of resources by local populations.

Attention has also gone to *combating desertification,* the aim being to prevent 20 millions hectares of land, an area the size of the United Kingdom, being reduced to lower or zero productivity every year.

As early as the Lomé III Convention, priority was given to combating desertification in conjunction with food supply security and rural development.

In 1986, the Council of Ministers adopted a Resolution on conserving natural resources and combating desertification in Africa. The Resolution was put into practice in the form of a European action programme which laid particular stress on involving local populations directly.

From 1986 to 1989, 230 new projects were set up in the developing countries and given funding of ECU 1.7 billion under the Lomé Convention.

When it comes to *safeguarding natural resources,* there are three particularly important programmes, covering:
— Sissili Province in Burkina Faso (ECU 31.5m);
— Bateke Plateau in Zaïre (ECU 10m);
— Katsina in Kaduna State, northern Nigeria (ECU 34.5m).

There are other areas, too, which deserve mention, such as remote sensing and protection of flora and fauna (particularly the Elephant Programme).

Besides the Lomé Convention and other cooperation agreements, a Resolution of the Council of Environment and Development Ministers, in May 1990, laid down a number of measures concerning particular issues, the purpose of which was to encourage initiatives in relation to the tropical rain forests, curbing desertification, basic assistance for NGOs and other organisations and greater use of the budget entry for ecology in the developing countries.

The Community and Rio

In June this year, 20 years after the Stockholm Conference on the Human Environment, all the world's countries are meeting again in Rio to launch mankind along the path to sustainable development.

As far as Europe is concerned, concern for the environment has become a fully fledged policy of the Community, both internally and in its relations with the developing world. ○

D. F.

'The practical implications of the Earth Summit'

by Joseph C. WHEELER (*)

Each of us engaged in development and environment activities is looking ahead to the United Nations Conference on Environment and Development to be convened June 1-12 in Rio de Janeiro. It is often called the 'Earth Summit' because the United Nations General Assembly has asked that delegations be led by heads of state or government. It promises to be the most important of the series of United Nations sponsored conferences on global issues held since the United Nations' inception 47 years ago. But what can such a gathering of nations accomplish in practical terms?

There is a prior question which I will address first: what *needs* to be accomplished?

As we come to the end of this century and millennium we quite naturally find ourselves taking stock. Today's older generation — of which I am a part — thinks back over the past four decades and considers with what degree of success and failure the challenges of the period have been met. We now see this period as one of enormous and rapid change. Without citing all the statistics one can sum up what has happened in terms of a more than doubling in world population coupled with an increase in life expectancy in industrial countries of ten years and in developing countries of twenty years. We all know what this means in terms of agricultural and industrial production, expansion of education, building of infrastructure, urbanisation, and changes in governance.

Looking to the future we can at least glimpse the challenge for the next half century in terms of completing the demographic transition (with another near doubling of population), tripling agricultural production, eliminating poverty, and creating jobs. With all the success of the past decades, a billion people still live in dire poverty and we must raise the priority for programmes which will reach the poor. But we also know that the development process itself has revealed limiting factors which will require much more careful management in many areas. Development is doing damage to the natural resource base on which human life depends.

In this context, the first outcome of the UNCED process needs to be increased awareness of the relationships between development and environmental processes — an appreciation of the need to adjust goals and methods to a new understanding of limits. In a manner of speaking, UNCED has already achieved a major success since we know of the myriad ways in which the prospect of the Earth Summit has been used as a vehicle for reconsidering development strategies.

With the emergence of the global issues — ozone layer, climate change, biodiversity and ocean management — the development debate has moved from a concentration on how developing countries can catch up with industrial countries to a reconsideration of the basic goals of development as they apply to both groups of nations. Industrial countries now know that their own production and consumption goals must be revised to be sustainable and that a process of redevelopment must now be pursued. An awareness of environmental limits is also forcing a rearticulation of development strategies in developing countries. UNCED negotiations have forced government ministries to talk to each other about development and environment issues, seeking new balances in policy and actions.

But of course, UNCED is not simply a vehicle for education. It is a negotiation on a wide range of issues. The products of the UNCED process will be an Earth Charter or Rio Declaration articulating basic values and principles, an Agenda 21 constituting an action programme for the twenty-first century, National Reports of member governments, an agreement on institutional arrangements for follow-up, understandings on technology transfer and financing and, finally, conventions to be signed on climate change and biodiversity. The conventions follow separate negotiating processes; the Summit provides a political deadline for their completion.

The UNCED negotiations on Agenda 21 range widely, involving many subjects. The draft Agenda 21 contains 39 chapters covering *inter alia*, poverty, consumption patterns, demographic dynamics, health, human settlements, atmosphere, fragile ecosystems (mountains, forests, dry lands), agriculture, biodiversity, biotechnology, oceans, freshwater, toxic chemicals, hazardous wastes, sanitation, solid wastes, radioactive wastes, technology, science, education and capacity building. UNCED will not have either the first or last word on any of these. Yet in each area it can be hoped that earlier resolve can be strengthened or extended or new initiatives can be decided upon. In evaluating UNCED it will be fair to ask, for each programme area, did the Conference accelerate action at all levels in society?

As just one practical example, I will cite the subject of toxic chemicals. It is widely recognised that more needs to be done to assure safer use of toxic chemicals and that this will require better information about chemicals in international trade, adoption of prior informed consent procedures and the building of developing country capacities in chemical management.

Work on toxic chemicals has been undertaken in the United Nations by a number of agencies. In order to develop international strategies to control toxic chemicals, the International Programme on Chemical Safety (IPCS) was launched in 1980. This is a cooperative programme set up by WHO, UNEP and ILO specifically to provide assessments of the risks of chemicals to human health and the environment and to provide guidance on their use. WHO is the executing agency for the programme. Within UNEP the International Register of Potentially Toxic Chemicals (IRPTC) has played the lead role on this subject. The work of OECD and the EEC on chemicals is well known and is coordinated with IPCS, as is that of the FAO. But new chemicals are being produced at a rapid rate and most chemicals have not been thoroughly studied and characterised in terms of risks and management recommendations. The characterisation of chemical properties is expensive, so priorities need to be set and risk assessment accelerated.

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Duplication needs to be avoided. Definitions and vocabulary must be agreed. Information needs to be disseminated. Country and industry capacity for managing chemicals needs to be improved. UNCED is providing the vehicle for discussing ways to strengthen international collaboration as it relates to toxic chemicals including the establishment of an intergovernmental mechanism for risk assessment and management.21 programmes and the nations of the world, through UNCED, can accomplish a gr

I expect the pace of work in the United Nations and in member governments to be substantially quickened with the adoption of the five action programmes contained in the chapter on 'Environmentally Sound Management of Toxic Chemicals'. This is only one area in Agenda 21 but it now seems likely that it will represent a significant UNCED success story. Add up a number of these kinds of Agenda 21 programmes and the nations of the world, through UNCED, can accomplish a great deal in practical terms.

In reciting this one example, I do not want to take away from the dramatic possibilities for success on more topical issues such as climate and biodiversity. It is fundamentally important that the current negotiations on these two subjects result in strong initial conventions by the time of the Rio meeting. Even if they represent only the first steps of a process, they will lead to faster growth in knowledge about the climate process and about what is happening to species, as well as to a higher priority to action programmes in these areas.

One of the most important possible outcomes of the UNCED process will be the new understanding that environment and development are not separate competing issues. Environment and development must be seen as a single subject. Development is a failure if it is not sustainable. Environmental protection cannot be achieved by people living in poverty. Thus UNCED has the ambition to accelerate the development process even as it is focuses attention on important environmental issues.

The UNCED process is likely to agree on a number of needed changes in course and emphasis. For one thing, with the National Reports prepared for the UNCED process, countries have had to focus on the adequacies of their integration of environmental issues into the overall planning processes. This, in turn, has highlighted the need for reaching all people in society with education, on the desirability of more participatory approaches in decision making, on the important role of women, on the need to apply polluter pays principles and to avoid subsidies which encourage waste.

'An awareness of environmental limits is also forcing a rearticulation of development strategies in developing countires'

While UNCED will surely be able to show success in the expansion of knowledge about the inter-relationships between development and environmental issues, there remains the question as to whether or not this will be translated into decisive changes in course. UNCED will not be the place where the international trade regime will be decided. Nor will it be the place for solution of the debt overhang issue. Yet it could influence thinking on these issues.

Beyond that, it could signal a willingness by the industrial countries to face up to adjustments needed in their own consumption patterns and to review financing priorities, opening the way for higher levels of catalytic funding in support of developing country strategies.

A final test of success at Rio will be the follow-up. Of course the adoption of a revised statement of values and intent in the form of an Earth Charter or Rio Declaration would be a positive step. It will be important to sign the two conventions on climate and biodiversity. Principles on forestry can be helpful. The many programmes embodied in Agenda 21 will be critical. But we know from experience that unless member governments establish follow-up processes at both national and global levels and unless tough decisions are made about financing priorities, much of the UNCED Agenda will not be implemented.

In summary, using UNCED as a vehicle, the members of the United Nations will define strategies for the decades ahead and adopt a wide range of practical programmes for implementing those strategies. Only a bold outcome will bring about the changes in course needed both to abolish poverty and to achieve sustainability.

The motto for this Earth Summit is 'In Our Hands'. Whose hands? We are each participants whether we go to Rio or not. While the success or failure of the meeting in Rio is in the hands of governments, the real measure of success will come after Rio and will depend on how people, communities, organisations, industries and all other actors in our societies take to heart the messages of the UNCED process and put them into practice.○

J.W.

Development and environmental monitoring by satellites

by Philip GOLDSMITH (*)

Man has been observing the Earth — his planet — for many hundreds of years. Cartography dates back to the ancient Greeks and Romans. The first networks of meteorological stations were set up nearly 200 years ago. Earth observation from space is, on the other hand, comparatively young and recent. Its impact during the course of the last 25 years has nonetheless been widespread. For example, global data from polar-orbiting and geostationary satellites are now fed routinely into operational meteorological models, significantly enhancing the quality of weather forecasts around the globe. And remote sensing from space is being routinely applied to areas as diverse as vegetation monitoring, agriculture, forestry, geology, hydrology, land use, cartography and glaciology.

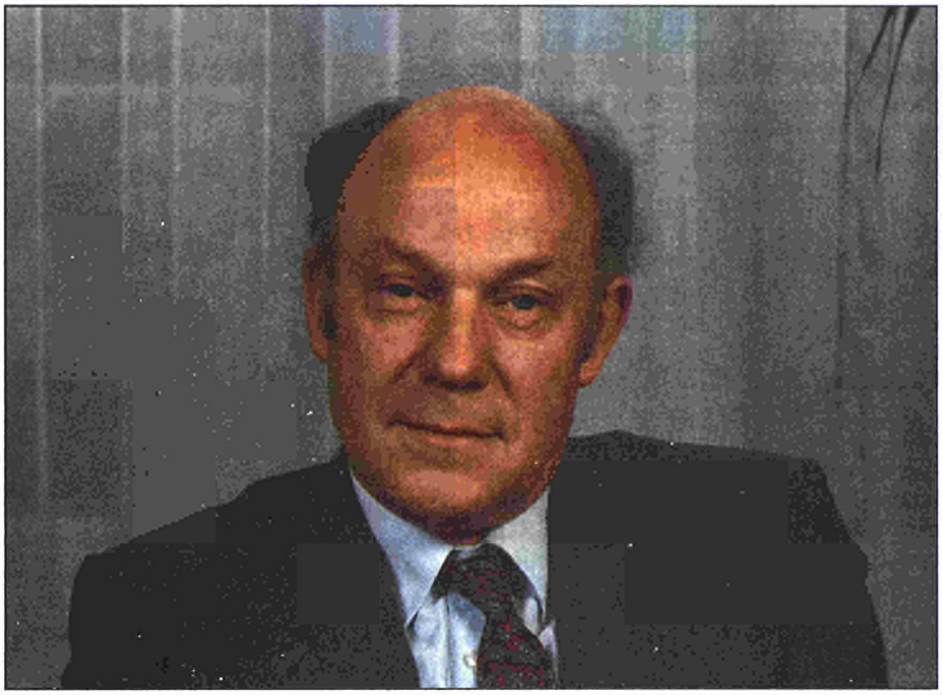

Photo ESA

The Director of the European Space Agency (ESA)

However, during the last few years a new element has appeared: it has become more and more widely accepted that some of the major challenges facing mankind today are environmental in nature. Mankind is now aware that its activities may disturb the delicate balance which determines the Earth's environment. Linked to this concern is the realisation that the Earth has only limited resources.

Today, it is obvious that industrial development on the one hand and both global and regional environmental issues on the other are closely linked together. However, this finding is very recent indeed. When Europe's industrialisation started about 200 years ago, environmental considerations did not play any role in the transition from an agricultural to an industrialised society. In addition, rapidly growing consumption required supply of renewable and non-renewable resources from outside the industrialised nations.

It was not until after 1945 that genuine development policies were established. In parallel, as pollution began to be perceived as a serious *local* by-product of industrialisation, most of the developed countries began to look for and implement measures to contain it. A few years ago, another turning point was reached: the recognition of *global* environmental challenges, such as climate change caused by greenhouse gas emission, deforestation and destruction of the stratospheric ozone layer. The discussion since then has established the point that there is no such thing as a local or regional solution to global problems. Thus, development policies need to be tied in with environmental considerations.

This requirement is now largely accepted and the problem of how to satisfy it has moved to the top of the agenda. Solutions to environmental problems are increasingly sought on a global level, and progress has been made recently with, for example, the Montreal protocol on the limitation of CFC emissions and the subsequent agreements.

This article does not set out to propose actual political solutions or suggestions for reconciling development and the environment. That is a political task. Satellite data cannot take the burden from the shoulders of those who bear the political responsibility for finding political solutions to political problems. But satellite data can constitute the indispensable tool to assist them in making decisions or concluding agreements, and will help them implement political measures. This article describes contributions that remote-sensing satellites will make to both the environmental and the developmental aspects of these problems.

Looking at this issue in depth now is very relevant. The forthcoming United Nations Conference on the Environment and Development in June 1992 will be a forum where these issues will be discussed in depth and with unprecedented political impact. The European Space Agency, ESA, has requested observer status at the conference. It is ESA's objective to make its expertise in space technology in general, and observation of the Earth and its environment from space in particular, an asset at the conference for the benefit of all the nations of the world.

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The dimensions of the problem

The global dimension of some environmental problems, in terms of their causes and consequences, has already been mentioned. It is now also apparent that only a global scientific effort, making extensive use of satellite data, can meet these daunting challenges. In parallel, remote sensing from space can be put to work immediately to solve a certain number of regional environmental and development problems. This section outlines these two aspects of the observation of the Earth and its environment.

International research into the environment: the global dimension

Today, the Earth is perceived as a single, intricate system with physical, chemical and biological interactions occuring between the atmosphere, the oceans, the land and the ice regions. A big step forward in our understanding of the planet was taken when international, interdisciplinary research programmes were set up. These are now rapidly gaining momentum. Most notably, the International Geosphere-Biosphere Programme and the World Climate Research Programme seek to advance the understanding of basic processes that control the Earth system. Essential to both is the provision of global data.

Since most of the processes involved cannot yet be adequately modelled in the laboratory, only observation of the Earth, both on the ground and from space, can deliver the comprehensive sets of data needed for the required research. Indeed, all disciplines of environmental research are making rapidly growing demands on governments and space agencies for Earth observation data, in particular from space. That is why the European Space Agency (ESA) has put observation of environmental factors to the forefront of its Earth observation programme.

Trends and changes can be monitored, and their driving forces understood, only if continuity of data over long periods is guaranteed. Here, decades rather than years are suitable units of observation time. To this requirement must be added timely delivery and coordination of data streams.

The need for a truly international global research effort is now largely accepted. A main objective of ESA's Earth observation programme is to make a significant contribution to this effort. It is of the utmost importance for everyone involved in Earth observation to seek collaboration and try to take full account of similar programmes around the globe. In space-based Earth observation, complementarity of instruments and orbits can now generally be taken for granted. Close cooperation has been established between ESA and bodies such as NASA and NOAA in the US, NASDA in Japan, the other national space agencies in Europe and Canada and user entities such as WMO, the EC and Eumetsat.

Regional monitoring and management: the local dimension

Remote-sensing data are now used on an operational basis for a number of applications, such as agriculture, forestry, geology, hydrology, land use and cartography. These applications are of immediate interest to a growing number of Third World countries as aids to the management and exploitation of their resources. In addition, satellite data can be used in support of certain local environmental tasks such as pollution assessment.

Established procedures for urban planning from the developed countries often fail in developing countries because of a lack of data on which decisions could be based. For example, the rapid, often chaotic, development of some of the big cities in the world can only be monitored continuously by observations from space.

Satellites: reconciling local and global dimensions

Contrary to occasional false impressions, satellites are not a costly source of data that could be obtained otherwise by Earth-bound instruments. In many cases, this option is not open and satellites are ideally suited to covering both the global and local dimensions: their measurements are global, but can still be used to monitor and manage local phenomena in remote areas or in developing countries with limited planning and statistical capabilities.

Global coverage is of prime importance for research into the environment. In addition, if a single type of instrument or mission provides global coverage, this ensures the coherence of data sets and helps to minimise systematic and statistical errors. This is why coordination between space agencies to achieve interchangeability of data sets is so important.

In addition to providing global coverage, only satellites have the flexibility to carry out repeated measurements over a particular location at short notice. Consecutive observations can be as little as three days apart in the case of the ERS-1 satellite, and range from 15 to 30 days in the case of satellites carrying imaging radiometer payloads, such as SPOT and Landsat, while geostationary meteorological satellites, Meteosat for instance, deliver an image of the Earth with a resolution of 2.5 kilometres at intervals as short as 30 minutes.

Finally, satellites are the most efficient means of obtaining comprehensive data from very extensive or remote areas such as polar regions, oceans, deserts and rain forests. For urban or more densely populated areas, or for management of natural resources, combining satellite data with aerial photography data or data gathered on the ground can be very advantageous.

Developing countries' requirements and opportunities for using environmental and resource management data

Developing countries generally do not sustain space programmes on their own, apart from a few notable exceptions such as China, India or Brazil. Nonetheless, developing countries can participate in observations of the Earth and its environment from space by using the data.

First, all countries should have the right of access to civil space data and, most importantly, data from remote-sensing satellites. It was this requirement that led to the emergence of what is now called the 'open sky policy'.

However, the generally accepted open sky policy has to be distinguished from free availability of data for use in development activities. Data from meteorological satellites are usually made available free or at marginal cost. In general, however, data from remote-sensing satellites are widely regarded as commercial goods for which a market price has to be paid. This situation worries not only developing countries but also a section of the worldwide scientific community which often has difficulties purchasing the data required for basic science projects. This is why it is now generally the practice to refer to 'ready access' to remote-sensing data as an adjunct to the open sky policy.

The European Space Agency has drawn up a data policy which seeks to reconcile the commercial exploitation of remote-sensing data and their ready availability for scientific and development purposes.

This policy is founded on three cornerstones. First, ESA sets up joint ventures with large institutions fostering science or development. Here the ESA contribution is either remote-sensing data as such or consultancy support on the use of data. One of the most advanced of these joint ventures in the field of the environment and development is the TREES tropical rain forest mapping project. In this case, the EC and bodies in numerous states in the tropical belt have become ESA's partners. Other projects have been started or are under consideration.

Secondly, the global environmental research effort is assisted by the appointment, by ESA, of scientists, called Principal Investigators, who are given privileged, free access to the data they require for their basic research projects. These scientists do not have to be from ESA Member States. Their results have to be published and are thus available to the entire scientific community.

Thirdly, pilot projects explore the viability of future applications of remote-sensing data. Once a pilot project has been accepted by ESA, the participating institutions and bodies obtain privileged access to remote-sensing data. Several ESA pilot projects concern ventures in developing countries.

Another requirement is the setting-up of a global network of ground stations to receive and process data, most notably from synthetic aperture radar instruments, SAR, on Earth observation satellites. Since SAR data rates are so high that tape recorders cannot be applied for on-board storage, the data stream has to be directed to a ground station as it is generated by the SAR. Then, dense networks of ground stations ensure that data relevant to regional or local issues actually reach the recipients at the least possible cost.

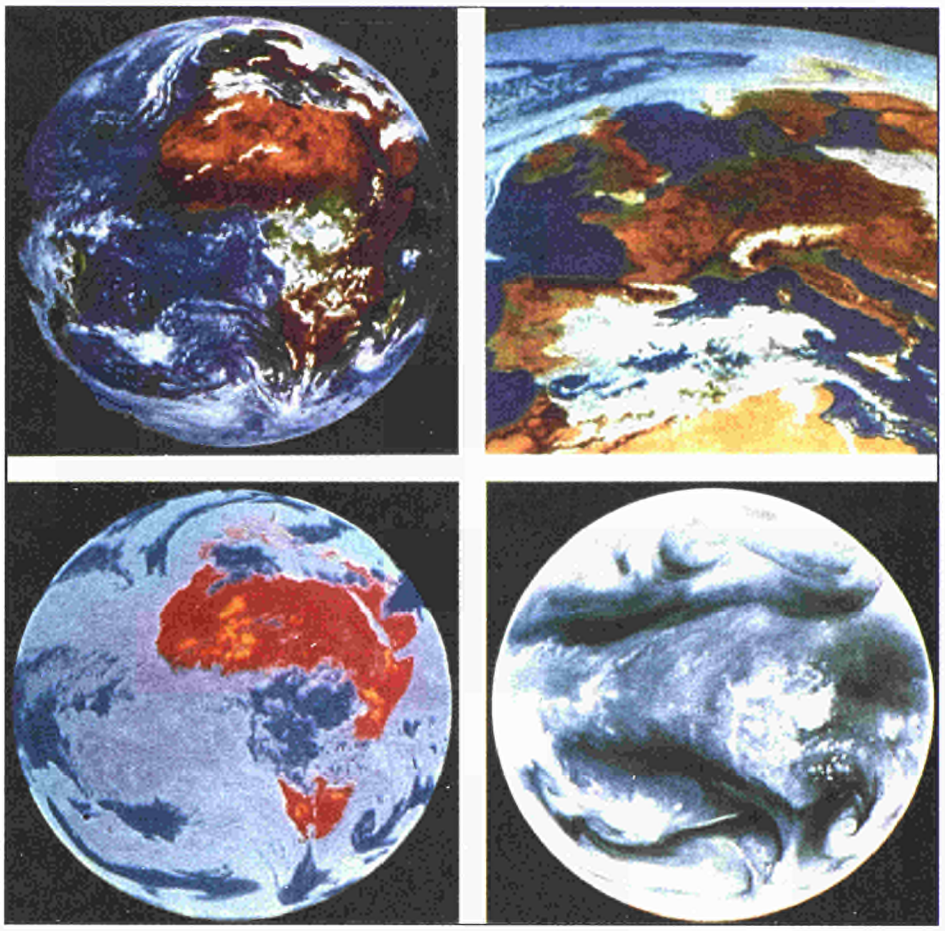


Photo ESA

Pictures of the Earth taken by Meteosat in different spectoral bands: visible, infrared and water vapour.
On the top right is a close-up of Europe

Decentralised data reception and processing are particularly important since data rates are expected to rise even further in the medium term. This is why ESA closely cooperates with operators of many ground stations in developing countries, for example in Brazil, Ecuador, India and Thailand. For the longer term, the data relay satellite systems will be a more cost-effective means of dealing with the high data transmission rate requirements.

A final, very important point concerns training of experts and the transfer of technology or expertise in data archiving, processing and interpretation. Much effort has been devoted to these areas over the past few years. Many universities and research institutes in developing countries are now offering remote-sensing courses and have purchased equipment to handle and interpret remote-sensing data.

In this area too, it cannot be the task of a space agency to organise training and transfer of technology on its own, since these activities need to be carried out jointly with bodies directly involved in development issues. ESA has sponsored remote-sensing training courses in the past and plans to step up this activity over the coming years. This activity is being developed in close cooperation with the UN, the FAO, the EC and various entities from ESA Member States.

The following parts of this section expand on these general considerations by discussing the prospects for developing countries in three important areas of environmental observation by satellite: climate change and pollution, resource monitoring and management, and meteorology.

Climate change and pollution

It has already been stressed that understanding and monitoring large-scale environmental change necessitates a global research effort to which satellite data will contribute significantly. For example, plans are now in hand to set up a Global Climate Observation System to build on the established, WMO-inspired World Weather Watch, in which extensive use will be made of satellites.

No comprehensive model capable of explaining the Earth's climate exists as yet. On the contrary, we are only just starting to become aware of the full range of factors which actually influence our climate. In the important field of air-sea interaction, for example, the European Space Agency's ERS-1 satellite started last year to deliver global data sets of sea surface wind fields, ocean wave fields, ocean currents and highly accurate sea surface temperatures. In atmospheric chemistry, sounding of ozone and other trace gases in all layers of the atmosphere is of the utmost importance. However, the development of suitable measuring instruments is still in its infancy. Global data on precipitation and evaporation, or the emission and absorption of radiation, can only be delivered by satellites.

The technical, operational and financial demands of running these satellite systems are very heavy, both for the satellites themselves and for the ground segment. The actual research effort aimed at a comprehensive understanding of the global Earth system is therefore principally a matter for the developed countries. Development issues are all the more important in the subsequent stage, i.e. the formulation of policies to minimise the impact of large-scale or global environmental change. The burden of decision-making and the consequences of meeting environmental challenges have to be distributed equitably. In particular, these policies must not militate against development objectives.

Although the scientific community has only limited influence on these political processes, it can contribute to the formulation of the terms of reference for political discussion in which due weight will be given to development issues: first, the relevant research programmes have to be accessible to every interested scientist; secondly, the results have to be made available to the entire scientific community and, thirdly and most importantly, the results have to be published in a comprehensible and readily accessible form, free from bias in their interpretation.

Resource management and monitoring

The monitoring of agricultural and renewable resources has already made considerable progress in the use of data from satellites, such as the French SPOT and the US Landsat satellites. It is now possible, for example, to identify different types of vegetation, enabling the deforestation of the tropical rain forests and acid rain damage to the European and US forests to be monitored. ESA itself is collaborating with the European Community in developing satellite-based methods for identifying vegetation types. This research is of the utmost importance for crop yield forecasts and hence managing food supply on a regional or global scale.

In the general area of agriculture, forest inventories and water management are further items high on the list of desirable applications. It is also highly desirable to develop systems for crop control and early warning of crop failure, for example due to diseases, in order to initiate remedial action.

The monitoring of non-renewable resources is another important activity, touching on geology, mineralogy, hydrogeology and tectonics. The principal objectives are to use satellite data to prospect for minerals and hydrocarbons and to help manage groundwater supplies. Surface water resources outside agricultural use (lakes, ice and snow) could also be monitored and useful information provided for studies on soil erosion, volcanic activity and earthquakes.

As a first step, ESA and the FAO have started setting up a system to disseminate Earth observation data. The primary

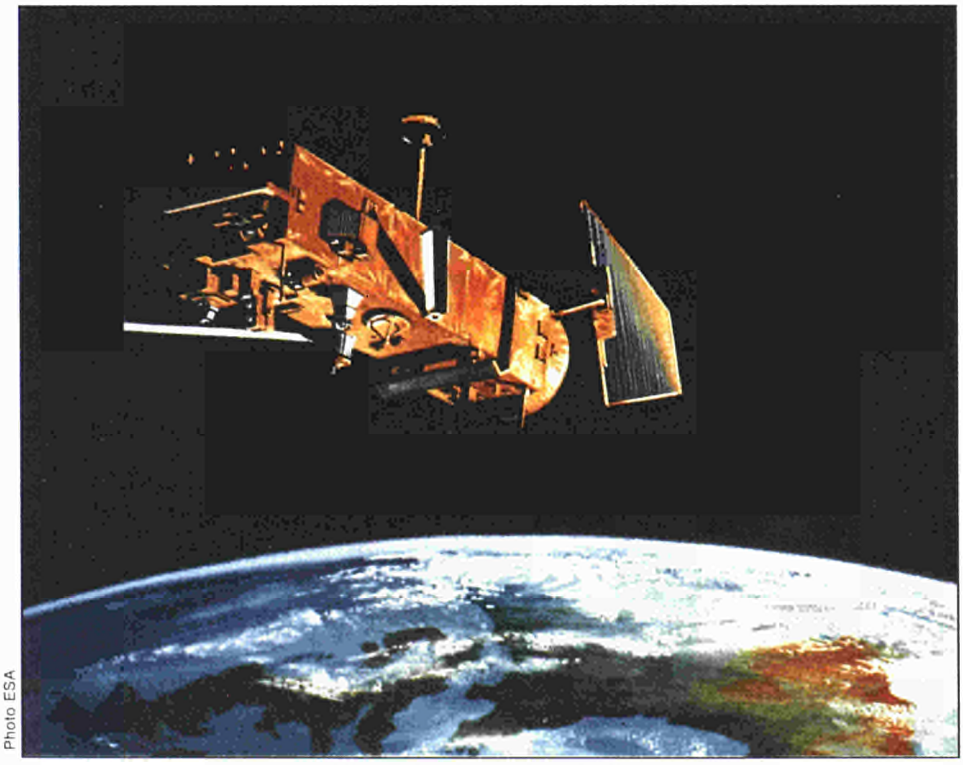


Photo ESA

The Columbus polar platform
Polar-orbiting Earth observation missions, scanning oceans, icecaps, continents and atmosphere

objective of this DIANA project is to help improve food security in Africa by transmitting forecasts and early warnings of imminent natural disasters through the FAO's African infrastructure. These will be based on pre-processed and analysed remote-sensing data, supplied by various European and US satellites and distributed by ESA's own telecommunications infrastructure.

Another project concerns data from the AVHRR instrument on board the US TIROS satellite. These data are highly relevant for a number of resource monitoring applications. ESA has initiated, together with the EC, reception of AVHRR data at three African ground stations in Kenya, Niger and La Réunion (France). A coordinated network of these three African, five European and two ground stations in the Antarctic has since been generating standardised AVHRR data products and a single catalogue. There are plans to extend the network jointly with the EC and the FAO, by ground stations in Egypt, Malaysia, Indonesia, the Philippines and Brazil.

Requirements in the area of resource management and monitoring are generally complementary to those for environmental studies. The relevant research or operational effort is usually provided locally or regionally. The number of projects is large, making it reasonable to decentralise them as far as possible. Decentralisation is also justified by the fact that individual projects are usually small in comparison with an international effort in environmental research. In most cases, resource management and monitoring exploit spectrally resolved satellite imagery, in the near future supplemented by radar imagery. The space segment is thus provided by the existing space agencies. The requirements of the developing countries in terms of ready availability of data, ground processing capacity and training have been discussed above.

Meteorology

Meteorology was the first civil application of Earth observation from space. Nobody can afford to neglect weather forecasting, which has an enormous impact on many areas of economic activity: agriculture, transport, leisure, etc. Weather forecasts have improved considerably over recent years, thanks to satellite imagery and steadily increasing computer power.

All weather forecasts depend on weather observation data coupled with numerical calculations. Current numerical methods provide forecasts for up to seven days ahead. But, even with more computing power available, input data of higher precision and better spatial resolution, and covering more variables, are required if further improvements are to be made. These objectives as discussed in the frame-work of the WMO will be taken into account by the space agencies.

For regional and local forecasts, satellite imagery and meteorological products have to be made available around the globe. This is the data dissemination function of the satellites of World Weather Watch, which equally ensures that all meteorological services are able to produce forecasts of a quality similar to that in developed countries. ESA and Eumetsat have contributed a series of six Meteosat satellites to this system, the first of which was launched nearly 15 years ago. Since weather forecasting is largely seen as a public service, and since reliable forecasts for all areas of the globe are vital to safe and reliable transport worldwide, there are few, if any, obstacles to the provision, to developing countries, of the data required to give reliable weather forecasts.

Current and future programmes

Earth observation is now occupying a prominent place in the space programmes of all space-faring nations. The space segment comprises well-known programmes such as Meteosat, GOES, SPOT, NOAA and Landsat, ERS and UARS, Topex/Poseidon and MOS. Cooperation is high on the list of priorities, particularly where the exchange of data, complementarity of orbits and exchange of instruments are concerned. Over the past three years, ESA has formulated an Earth observation strategy and a long-term plan. Both are centred on environmental questions, with operational meteorology, solid Earth and land applications as further cornerstones. Similar plans exist in the United States, based on the EOS-system being developed by NASA and NOAA, and also in Japan.

This section focuses on current and future European systems. However, it should be borne in mind that the other space-faring nations' efforts are comparable to ESA's, and are being coordinated with it.

Meteosat

The European Meteosat satellites were developed by ESA in the 1970s as part of an experimental programme. This programme became fully operational a few years ago and the financing and management of Meteosat-4, Meteosat-5 and Meteosat-6 was entrusted to a dedicated organisation, Eumetsat. ESA retains responsibility for the development, launch and orbital operations of these spacecraft. The Meteosat satellites image the Earth's disc every 30 minutes in three spectral bands — visible, water vapour and thermal infrared — with a resolution of between 2.5 and 5 kilometres.

Many products are routinely generated from these images: cloud motion vectors, sea-surface temperatures, cloud top height maps etc. These data are used not only by meteorologists but by many other disciplines. The Meteosat database of over 550 000 images spanning nearly 15 years amounts to an impressive climate archive.

The present Meteosat system will provide operational service until at least 1995, and an extension probably until the end of the century. Studies are already in hand for an improved system, Meteosat Second Generation, which is envisaged as a joint ESA-Eumetsat programme.

ERS-1

ESA's first remote-sensing satellite, ERS-1, represents Europe's biggest step forward in this field since the launch of the first Meteosat satellite. ERS-1 was launched on 17 July 1991 and carries three active all-weather microwave instruments: a synthetic aperture radar, a wind scatterometer and a radar altimeter. These are complemented by an along-track scanning infrared radiometer giving global sea-surface temperature measurements of unprecedented precision.

This complementary set of instruments provides data for research into phenomena of the greatest relevance to environmental research: interaction between the oceans and the atmosphere; ocean circulation and energy transfer processes;

establishment of the mass balances of Arctic and Antarctic ice sheets; coastal processes and pollution; and land use change.

The last two of these areas also provide examples of areas of practical applications, mainly fisheries, offshore activities and resource management.

To make the best use of ERS-1 instruments, much of the data is processed and disseminated in near-real time, i.e. within three hours of observation. Cataloguing, handling of requests, data quality control, scheduling etc. are performed at a central facility at ESA's ESRIN establishment in Frascati, near Rome. Five ERS-1 ground stations have been set up in Europe and Canada and provide the fast-delivery services with global coverage. In addition, four processing and archiving facilities in Europe generate a multitude of off-line precision products and are responsible for archiving data and products. Numerous foreign ground stations, notably in Japan, Thailand, Indonesia, India, Brazil and Ecuador, ensure the greatest synthetic aperture radar coverage possible and ready access for these countries to ERS-1 data.

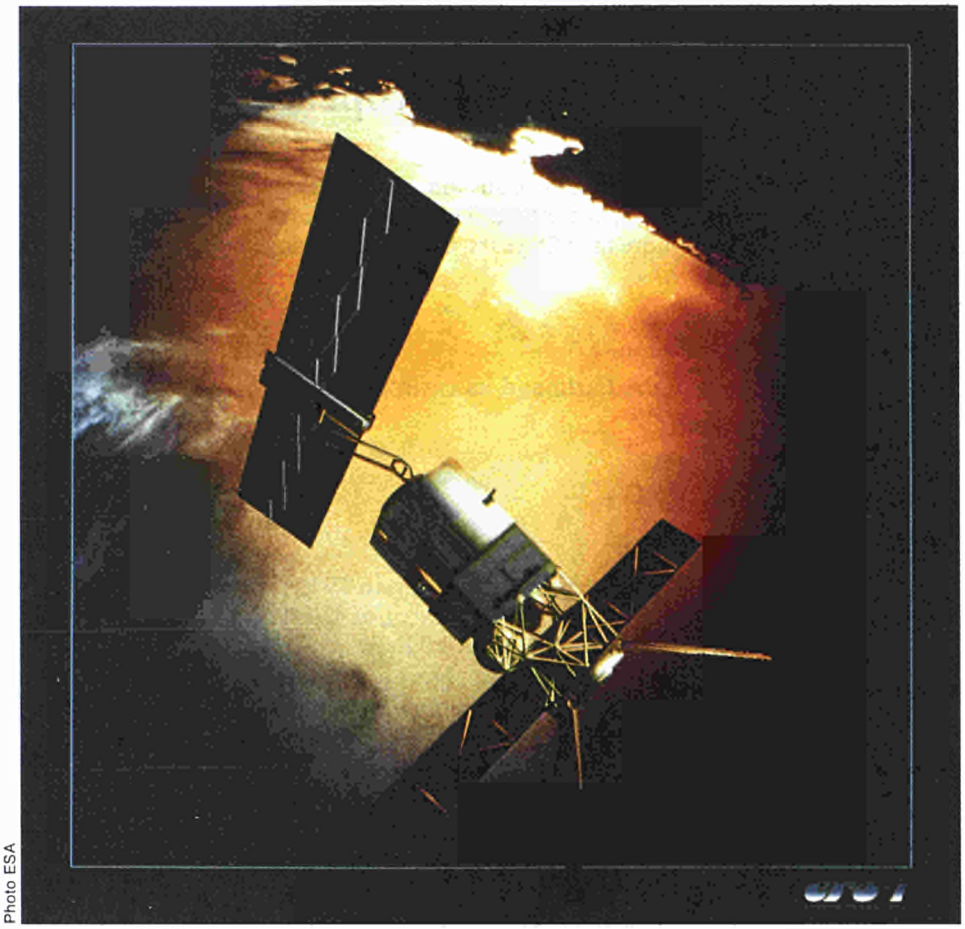


Photo ESA

ERS high above the coastline of Brazil. The importance of coastal areas lies in their vulnerability to man-made pollution

The full potential of ERS-1 can only be realised if continuity of data is ensured to the users. A second satellite, ERS-2, will take over when the operational life of ERS-1 ends in 1994. However, ERS-2 is not just a 'copy' of ERS-1, but will in addition carry a Global Ozone Monitoring Experiment (GOME) to measure the content of ozone and some related gases in the upper atmosphere. The relevance of this experiment to the current concern over the Arctic and Antarctic ozone holes is obvious.

Polar platforms

As Earth observation data come to be used by more and more disciplines, future missions will be broader in scope and Earth observation satellites will have to carry ever more instruments. The trend is illustrated by the following figures: the Meteosat payload weighs just over 100 kilograms, that of ERS-1 about 800 kilograms, and the next generation of missions is being planned for payloads of about 1,700 kilograms.

These future missions will involve a series of polar-orbiting platforms, based on the Columbus polar platform now under development and due for launch in 1998. Each satellite has an expected lifetime of about 4.5 years.

The exact composition of the payload has not been finalised. It will probably comprise three packages: first, a meteorological package of instruments similar to those currently flying on the American Tiros-N operational meteorological satellites; an atmosphere/ocean/ice package, including improved ERS-1 instruments; finally, an announcement of opportunity package, consisting of instruments selected on a competitive basis according to topical research. Lastly, the payload will include a set of instruments for studying ozone and related atmospheric trace gases.

Earthnet

It is important to realise that the European ground-based system for acquisition, archiving, cataloguing, preprocessing and dissemination of huge amounts of data has to be substantially expanded to match the development of new generations of satellites. There is little point in flying instruments without ensuring that the data reach the users. That is why ESA set up the Earthnet programme as early as 1977.

The Earthnet policy is based on the recognition and assurance of data availability over long periods of time. Another regular service to users has just started with the launch of ERS-1 and will continue into the next century.

In addition to data from ESA's own satellites, data from a variety of other satellites are handled by Earthnet. These include SPOT, Landsat, MOS-1, Tiros-N and, in the past, Seasat, Nimbus-7 and the Heat Capacity Mapping Mission. Earthnet operates ground stations at five European sites and acquires data from three others. The programme office is

ESA — European cooperation in space

No European nation would be able to sustain, on its own, an internationally competitive space effort. That is why European countries have, for more than 25 years, been undertaking joint ventures in

- space science
- satellite telecommunication
- satellite observation of the Earth and its environment
- applied space research
- launcher development
- manned spaceflight, and
- space technology.

The European Space Agency, ESA, was set up in 1975 to coordinate and supervise this joint effort; today, it has 13 Member States: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland and the United Kingdom. Finland is an Associated Member and Canada cooperates closely with ESA.

ESA's annual budget amounts to 2.9 billion ECU. Its activities cover all relevant areas of space exploration.

Space science:
Seventeen scientific satellites and space probes have been launched since 1968, including IUE, Exosat, Giotto, Hipparcos, the Faint Object Camera of the Hubble Space Telescope and Ulysses. Missions under development include SOHO/Cluster, ISO, Huygens and XMM.

Earth observation:
Meteosat, a series of six Weather Satellites, two European Remote-Sensing Satellites, ERS. For the late 1990s, a new generation of polar orbiting platforms is being developed.

Telecommunications:
Two pre-operational missions, ITS and Olympus, and two series of operational satellites, ECS and MARECS. Artemis, a third-generation mission and a data relay satellite system are currently under development.

Space transportation:
Four generations of Ariane launchers. The next stage will be Ariane-5 to be followed by the Hermes spaceplane.

Laboratories in space:
Spacelab, the most versatile laboratory in space yet, and Eureca, a retrievable automatic platform whose first mission will take place in 1992. Two Columbus laboratories: the Attached Module and the Free-Flying Laboratory are at present under development.

Space operators carry out the programmes upon the completion of development work: *Arianespace* has been commissioned to produce and sell Ariane launchers, *EUMETSAT* is now financing and managing the Meteosat system, *Eutelsat* runs the four ECS satellites and has developed a series of second-generation satellites, and the two MARECS satellites have been leased to *Inmarsat*.

Observation of the Earth and its environment from space

Earth observation data from satellites are now being used in many areas for research and operational applications involving:

atmosphere,
ocean,
ice and snow,
land,
solid Earth.

All have in common the objective of *'Understanding our Planet Better'*. ESA has made significant contributions to it with

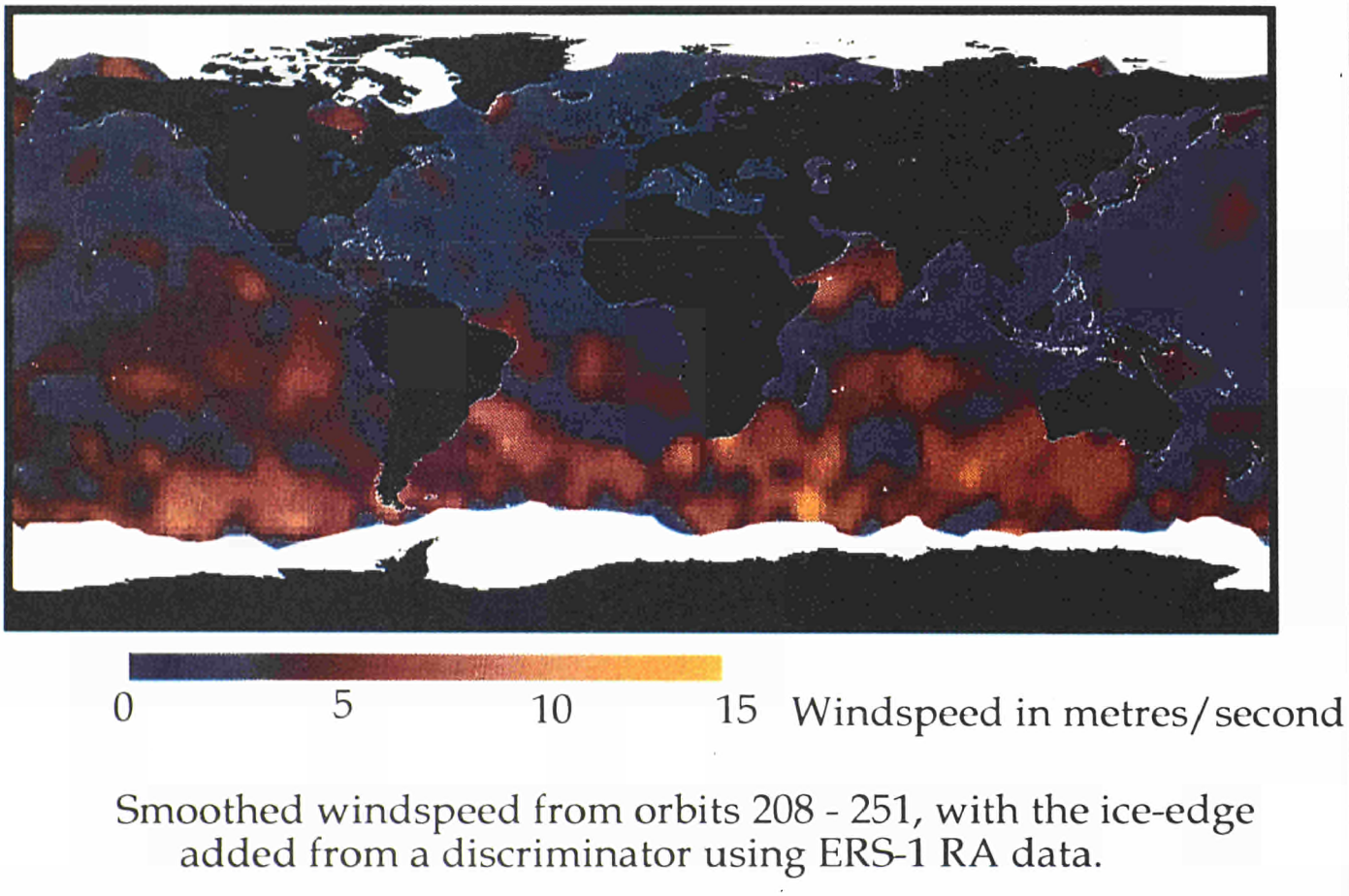
- the *Meteosat* Programme of Weather Satellites,
- the European Remote-Sensing Satellites *ERS-1* and *ERS-2*,
- a *new generation of polar platforms* for the late 1990s to cover most relevant areas of the Earth sciences.

ESA is also addressing the *ground segment* via the *Earthnet* Programme, which covers the reception, archiving, processing and dissemination of Earth observation data.

The ESA Earth Observation Programme makes a significant contribution to meteorology, resource management and the study of the environment.

ERS-1

Smoothed Windspeed, 1 - 3 August 1991



The figures show the distribution of the Wind Speed and Significant Wave Height (SWH) over the oceans and enclosed seas during one full 3-day cycle, from 1 to 3 August 1991. The global view depicts the main wind and wave patterns in the ocean/atmosphere system.

located at ESA's ESRIN establishment in Frascati.

Intensive cooperation with the EC has started with a view to creating an Environmental Data Network, EDN, which will ensure that data from the various sources are made available in the highest quality possible to all users.

Conclusion

The course of events has led to a situation, in Europe, in which the organisational structures concerned with satellites and space technology development are separated from those in charge of development policy and action. Raising or keeping barriers between the two is to be avoided, since ever closer cooperation is required. The European Space Agency has focused its Earth observation policy and programmes on environmental issues and has opened up its activities to joint projects in the field of development. Contributing to the reconciliation of environment and development policies is now firmly among the high priority objectives of ESA.○ P. G.

Trends in the ozone layer

by D. CARIOLLE (*)

The role of ozone; where it is, how it got there and where it goes to

Ozone is vital to the protection of life on earth because it absorbs short-wave ultra-violet rays from the sun. The ozone layer is the main shield for living cells, particularly their genetic material.

It is also an essential component of climate, because absorption of ultra-violet solar radiation heats the stratosphere at 10-40 km altitude and contributes to the greenhouse effect in the troposphere. So any natural or man-made change in the ozone layer will repercuss on both climate and life on the surface of the earth.

The bulk of the ozone layer is in the stratosphere, where 90% of all ozone is situated. If all the ozone molecules were brought together in a vertical column at the pressure and temperature obtaining at ground level, the layer obtained would only be about 3 mm thick. So the ozone concentration in the atmosphere is relatively weak, rarely going beyond 5.10^{12} molecules per cubic cm. The maximum ozone concentration is about 25 km up above the equator, coming down gradually to 16 km over the poles. This distribution is the result of the Hadley cell, which has a rising branch compressing the ozone layer at the equator, whilst its falling branches carry the ozone-rich air towards the higher latitudes and lower altitudes. The principal natural source of stratospheric ozone is the photo-degradation of molecular oxygen by short-wave ultra-violet rays (200 nm). This process produces atomic oxygen which combines to form ozone. The ozone is then photo-dissociated in turn or recombines with atomic oxygen. This cycle, introduced by Chapman in 1930, explains the presence of ozone in the stratosphere, but current theories suggest that other, minor things (hydroxyl, nitrogen and chlorine radicals), which control the ozone through catalytic cycles, are equally important.

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The first two of these are produced naturally by oxidation of water vapour and nitrous oxide (N_2O), a gas which comes from the denitrification of soil.

Chlorine atoms are produced by natural breakdown of methyl chloride, although the main source at present is decomposition by photodissociation of CFCs — molecules which the chemical industry produces for use in the refrigeration industry, expanded foam and semi-conductors and — until recently — as propellants in aerosols.

The chemistry of the stratosphere is in fact far more complex than in the simplified description above. Many things are involved and the main ones act as reservoirs for the radicals which act on ozone — nitric acid (HNO_3), for example, nitrogen pentoxide (N_2O_5), hydrochloric acid (HCl) and the radical $ClONO_2$. There are 50 or so constituents in total, linked by 100 or so reactions, which need to be taken into account in a complete description of the chemistry of the stratosphere. Modeling is the only way of producing a numeric solution of this complex system and predicting the concentration of the minor components and long-term development of the ozone layer.

It was in the early 1970s that the first questions arose as to damage to the ozone layer from aircraft making frequent flights through the stratosphere, since jets produce nitrogen oxides which destroy ozone in catalytic chemical cycles. Accusations were made against the supersonic Concorde project and the first theoretical calculations predicted that 100 planes per day flying the Europe-America route would destroy 20% of the ozone layer — gloomy forecasts which mercifully never came to pass. The fleet of Concordes remained very small and, in 1977, studies of atmospheric chemistry concluded that major reactions never taken into account in the original calculations could in fact lead to the production of small amounts of ozone at Concorde flight altitudes (around 16 km).

In 1985, however, analysis of the ozone measurements compiled since 1958 showed that the total quantity of ozone was in decline and more markedly so at high latitudes than at the equator. The decrease was soon blamed on the chlorine released from decomposing CFCs. Back in 1974, scientists had predicted that CFCs scattered in the atmosphere would bring about a gradual and more or less even decrease in the ozone layer, a global trend which has since been accompanied by a rapid and apparently localised reduction over Antarctica — the famous hole. Where has it come from? How will it develop in the coming years and what will happen in Antarctica? And in the middle latitudes?

This article takes stock of knowledge to date, emphasises the limits thereof and describes the scientific community's strategy for coping with all this.

Current trends

The ozone layer shrank by about 1% between 1978 and 1991.

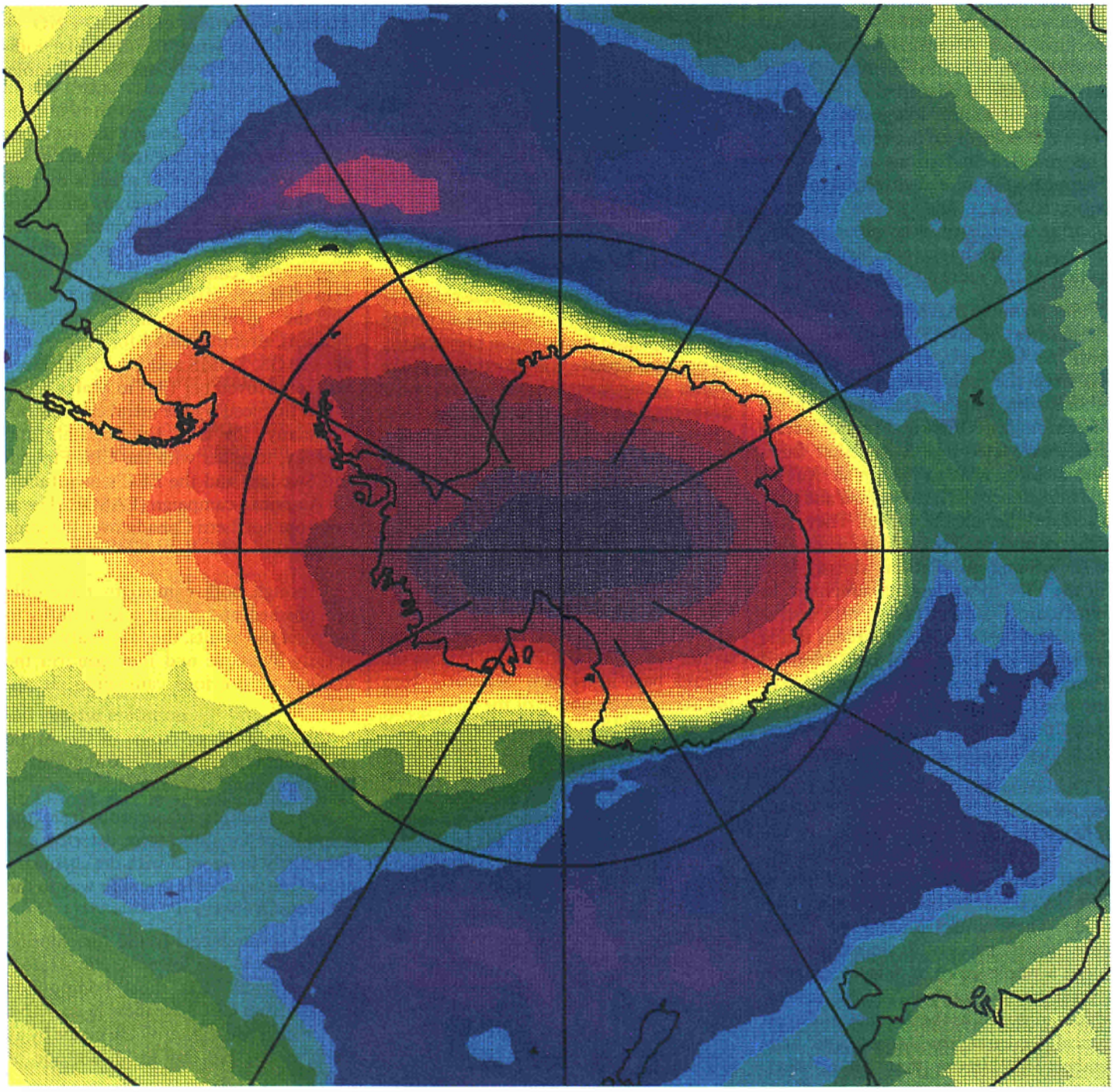
This figure was obtained from data collected by the network of Dobson ultra-violet spectrometers in the northern hemisphere. It is confirmed by recordings from the Total Ozone Mapping Spectrometer (TOMS) on the Nimbus 7 satellite (see table from the Scientific Assessment of Ozone Depletion, 1991).

Total ozone trends (% over 10 years)

Season	TOMS: 1979-91			Ground network: 26 ° N-64 ° N	
	45 deg. S	Equator	45 deg. N	1979-1991	1970-1991
Dec.-March	−5.2±1.5	+0.3±4.5	−5.6±3.5	−4.7±0.9	−2.7±0.7
May-Aug.	−6.2±3.0	+0.1±5.2	−2.9±2.1	−3.3±1.2	−1.3±0.4
Sept.-Nov.	−4.4±3.2	+0.3±5.0	−1.7±1.9	−1.2±1.6	−1.2±0.6

In the southern hemisphere, the decline observed by TOMS is more marked and has a large seasonal variation with the appearance of a hole in the ozone layer over Antarctica in the southern spring. In this region, the long polar night sees the creation of a vortex in which the air masses are very cold and remain relatively isolated from the middle latitudes. In early September, with the first sunshine, the ozone decreases rapidly and the decrease is as much as 50-60% inside the vortex by the end of October. The phenomenon has occurred virtually every year since 1980, with very clear minimum ozone formation figures (100-150 Dobson units — see figure 1) in 1985, 1987, 1989 and 1991. So the phenomenon modulates, apparently because of the quasi-two yearly oscillation in the lower stratosphere.

Figure 1: TOMS OZONE LAYER, MEASURED ON 5 OCTOBER 1991



Source: McPeters & Krueger, NASA/GSFC.

The hole in the ozone layer over Antarctica — medium-term trends

The main theory since 1985 has been that the rapid decline in the ozone layer is caused by the chlorine liberated by CFCs. Other potential causes involve a possible change in ozone transport from the low latitudes towards the pole.

A first measurement campaign, the National Ozone Experiment (NOZE), which was set up in 1986 by the National Oceanic and Atmospheric Administration (NOAA) at the McMurdo Station in Antarctica, produced the first measurements of minor components of the polar vortex involved in ozone chemistry. This revealed that ozone had virtually disappeared from a relatively thin layer between 14 km and 27 km and that chlorine chemistry was preponderant, leading to an abnormally high concentration of the radical OClO.

The National Aeronautic and Space Administration (NASA), in conjunction with NOAA, brought American scientists from the main NASA and NOAA laboratories, English scientists from the Meteorological Office and French scientists from Météo-France together for a vast measurement campaign in August and September 1987, to confirm and fully elucidate the phenomenon. They had airborne and satellite facilities in addition to the ground installations already used for the 1986 measurement campaign. In particular, two aircraft fitted with instruments and based at Punta Arenas in the far south of Chile — an ER2 (derived from the U2) and a DC8 — were able to measure a large number of chemicals at a range of altitudes and latitudes where ozone depletion is at a maximum.

That same year, the hole in the ozone layer was back. The first signs of a decline appeared in early September and, by the end of the month, the figures were the lowest ever recorded — 120 Dobson units, as against the usual 300 units of the 1970s. The flights from Punta Arenas were entirely successful, since they produced a whole series of data which took several years to analyse. The full results, which appeared in the Journal of Geophysical Research for August and September 1989 (more than 60 articles), clearly revealed that chlorine chemistry indeed is the main cause of the destruction of the ozone layer, with the concentration of the radical ClO measuring 100 times more than in the middle latitudes. The extreme meteorological conditions found in the polar vortex, with very low temperatures in the region of −100 deg. C and stratospheric polar cloud, all seem to increase the efficiency of the ozone killer chemical cycles. In particular, ice particles encourage uneven reactions which lead to active chlorine Cl and ClO being released from the chlorine contained in the HCl and $ClONO_2$ reservoirs.

An analysis of trends in the concentration of some trace gases also shows that the hypothesis of minimim polar ozone formation through redistribution of the quantity of ozone from the pole to the middle latitudes is also to be discounted. Indeed, it seems that 'dilution' of the ozone layer towards the middle latitudes is to be feared.

What about the Arctic?

One question raised by these results is, of course, whether such a phenomenon could appear in the northern hemisphere. In our hemisphere, very fortunately, the winter polar vortex is off centre, near Scandinavia, and the air masses take routes which lead them successively during the polar day and night. As a result, the air in the polar vortex is about 20 deg. C warmer on average than it is in the southern hemisphere, making polar cloud far less frequent.

Two international campaigns — Chemistry of Ozone in the Polar Stratosphere (CHEOPS) II and III — were run in winter 1988-1989 and 1989-1990 from the Kiruna base in Sweden. Scientists from the Service Aéronomie of the CNRS, the Laboratoire de Météorologie Dynamique in Palaiseau, the Laboratoire d'Optique Atmospherique in Lille, the Max Planck Institute in Heidelberg and the KFA in Jülich took various measurements of minor components and ice particles from balloons sent up by teams from the Centre National d'Etudes Spatiales (CNES, France) with the help of temperature forecasts from Météo-France. Alongside this, an Arctic campaign — Airborne Arctic Stratospheric Expedition (AASE-I) — similar to the one which NASA ran in the Antarctic, was organised in January and February 1989.

The results of these campaigns showed that the chemistry of the northern hemisphere vortex had also changed and that there were already considerable quantities of the active chlorine ClO and OClO, but that the depletion of the ozone layer had in fact yet to be confirmed. However, air masses with extremely low ozone concentrations were found and it seemed that the ozone layer was 'mot-heaten'. However, the vortex was apparently not completely denitrified, so there was a limit to the efficiency of the catalytic cycles which destroyed ozone through the rapid formation of nitrogen oxides and reactions of the $ClO + NO \rightarrow Cl + NO_2$ type when the first solar radiation dissociated the nitric acid molecules.

It was decided to answer the questions about the extent (time and space) of the polar ozone destruction process by running a large-scale campaign, the European Arctic Ozone Experiment, in the winter of 1991-1992. This, Europe's biggest ever campaign, involving more than 50 teams, with observation facilities on the ground, balloons (Kiruna, Sweden), aircraft (ARAT for France) and the TIROS, TOMS and UARS satellites, ran from November 1991 to March 1992. It was financed by the member countries (Germany, the UK, France, Italy and Norway, together with the CIS, Finland and Sweden) and the EEC's own funds. An American campaign (EASOE-II) was run from northern Canada over the same period.

Although both campaigns have only just finished and it will take months to interpret the results, the first analyses are already available and they confirm the findings of previous campaigns. It appears that:

— the quantities of ozone in the Arctic and the middle latitudes were abnormally low throughout the campaign;

— large amounts of aerosols from the eruption of Pinatubo were detected and seem likely to interact with the chemistry of the stratosphere in a similar way to the polar cloud cover;

— the measurements found for chlorine compounds in the lower Arctic stratosphere suggest that most compounds released from CFCs are there in an active form which could destroy the ozone by as much as 2% per day at an altitude of 18 km;

— the meteorology of the northern hemisphere is such that the zones where the chemical composition of the stratosphere

is upset stretch from the pole to northern England and Germany.

These are only preliminary results, but they do seem to confirm that the significant ozone depletion already recorded over the past decade will continue and maybe increase until the chlorine injected via the CFCs is below an estimated threshold of around 2 ppbv. Notwithstanding the signing of the Montreal Protocol, total chlorine (about 3 ppbv at the moment) will increase further to about 4 ppbv in the year 2000 and then go below the 2 ppbv-mark in about 2040 — so the ozone killer chlorine cycles can operate until then.

Furthermore, natural variability may lead to the appearance of a winter situation in the stratosphere in the northern hemisphere which is very similar to the one in the south, with a very cold vortex and frequent polar cloud cover. And of course there is the indirect effect of volcanic eruptions, which send particles into the atmosphere which can do the same as polar cloud cover to the chemistry of the lower stratosphere. So ozone trends in the high and middle latitudes in the northern hemisphere could still hold some unpleasant surprises.

Consequences of ozone depletion

Any increase in the amount of ultraviolet radiation reaching the ground would be the direct result of the reduction in the ozone layer. For living beings, UVBs (285-315 mm) are the biggest threat, because they can cause skin cancer and genetic mutation.

Recent analyses suggest that, when major ozone reducing events occur, the ultra-violet flux is virtually doubled — which bears out the theoretical calculations of radiation transfer in the atmosphere (see figure 2).

Yet systematic measurement of UV flux from ground stations in the middle latitudes fails to reveal any systematic trend over the past decade. This is in apparent contradiction with the reduction in stratospheric ozone observed over the same period and it is explained by the fact that, once the UV rays have gone through the ozone layer, they are further reflected and absorbed by the aerosols and tropospheric ozone which are increasing constantly due to more and more

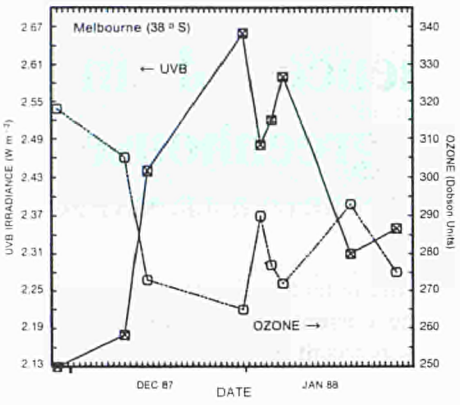


Figure 2: Simultaneous variations in UV-B and total ozone content at Melbourne, Australia. Source: Roy et al. – Nature 347, 235-236, 1990.

pollution at the bottom of the troposphere.

Less ozone in the stratosphere would also have meant an upset in the heat balance, and the climate therefore, in the upper atmosphere. In particular, a more than 10 deg. decline in temperature was noted at 20 km altitude beyond a latitude of 70 deg. S during the formation of the ozone layer over the Antarctic. This is the direct consequence of the reduction in the UV absorption at latitudes where the ozone was destroyed in September before the sun rose at the pole and it tallies with the calculations of the general circulation models, particularly as developed by Météo-France, and shows that the climate in the upper layers of the atmosphere has already been affected. More globally, in the troposphere, the decrease in ozone in the lower stratosphere should boost the increase in the greenhouse effect due to higher concentrations of CO_2, methane and CFCs. However, there are still a number of questions about the extent of this additional effect.

Conclusions

There is no doubt that total ozone has declined overall over the past two decades and that the large decrease observed at high latitudes in the southern hemisphere — the hole in the ozone layer — has to be attributed to the effect of the chlorine released when CFCs decompose. The problem of how the ozone layer develops is two-fold. What will happen in the medium term (over the next 20 years) and what will happen in the longer term, in about the year 2050?

In the short and medium terms, it is the polar chemical processes which are the greatest cause for concern. Will ozone destruction in the higher latitudes of the southern hemisphere stay localised? Will it reach the inhabited land masses? What will happen in the northern hemisphere? The scientific community intends addressing all these issues by combining campaigns in the field with measurements recorded by satellites and other networks and with kinetic chemistry studies run in the laboratory and integrating all the data collected in the numeric models.

Enormous means are required to do this. They are often beyond the bounds of individual nations, so European and international cooperation is getting organised to run scientific programmes together.

In the longer term, model simulations suggest a slow decline in ozone worldwide, with a relatively important effect at around 40 km altitude. But there are many things to take into account, in particular variations in solar radiation linked to the 11-year cycle, an increase and then a decrease in the atmospheric CFC concentration (if the Montreal Protocol is respected), an increase in other sources of active radicals in ozone chemistry (methane, nitrogen hemioxide), altitude, the frequency and quantity of aerosols injected by volcanic eruption and an increase in CO_2 leading to a lowering of the temperature in the stratosphere (the opposite of the tropospheric greenhouse effect) — an effect which boosts ozone production in the upper stratosphere — and perhaps the frequency of the polar cloud cover which is partly responsible for the hole in the ozone layer.

So the subject is a complex one and the interactions involved often non-linear. An observation system combining facilities in space with observatories on the ground is vital if we are to assess long-term ozone trends, and will validate the predictive models and serve as an early warning system in the event of any deterioration of the situation.

In any case, achieving the aims of the scientific community will mean international cooperation on a grand scale — which is taking shape in the International Geosphere-Biosphere Programme (ICSU) and the World Climate Research Programme (ICSU and the WMO). All the countries involved will have to make a sustained effort to support it over the coming decades. ○ D.C.

Consequences of an increase in the greenhouse effect

by J.F. ROYER (*) & J.F. MAHFOUF (*)

Greenhouse gases and global energy

About 30% of the average 342 watts per square metre (W/m^2) of solar radiation received over the world at the top of the atmosphere is sent back into space while some 240 W/m^2 are absorbed in the atmosphere and on the surface. The energy balance of the earth-atmosphere system is maintained by the emission spacewards of thermal radiation, most of it infra-red. The Stefan-Boltzmann law makes it easy to compute that the temperature of the black body radiating this amount of energy is 255 Kelvin (− 18 degrees Celsius) — the average temperature observed in the atmosphere at an altitude of about 5 km, approximately the height below which half the atmospheric mass lies. The average temperature on the surface of the globe is 15 degrees C (33 K above the radiation balance temperature) because the atmosphere contains gases which have absorption bands in the infra-red and because of the cloud cover. This heating of the lower atmosphere by selective filtering of the infra-red emission is commonly known by the evocative title of 'the greenhouse effect', but the greenhouse analogy applies only to the result, not to the physical mechanism, because greenhouse glass mainly suppresses turbulent exchanges. The greenhouse effect of atmospheric water vapour is equivalent to adding an extra 100 W/m^2 to surface radiation. The effect of carbon dioxide, 50 W/m^2, is only half that amount and that of cloud cover is 30 W/m^2.

This natural greenhouse effect is vital to the energy balance of our planet, because it helps to maintain the surface of the globe at a temperature which is favourable to our survival. This is what is behind the scientists' growing concern with the potential climatic consequences of the current increase in greenhouse gases. A recent report by an intergovernmental group of experts on climate change (the IPCC) has summed up what we know about this problem.

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Increase in the greenhouse effect

The first thing to attract attention was the increase in CO_2. Systematic measurements recorded at the Mauna Loa observatory in Hawaii since 1958 show that what was originally a concentration of 315 ppm (parts per million) increased regularly to reach 354 ppm in 1990. Analysis of fossil air bubbles trapped in the ice cap in Antarctica and Greenland suggests that the pre-industrial figure was only 280 ppm. Data relating to the past 160 000 years show that variations in CO_2 concentration have gone hand in hand with major changes in the climate. The lowest figures were recorded for the ice ages, with 200 ppm at the last glacial maximum 20 000 years ago, and the highest, still below 300 ppm, for the previous interglacial period 120 000 years ago. So today's figures are 25% up on the maximum values observed over the 160 000 years preceding the industrial era.

The main reason for the increase is the burning of fossil fuel as a source of energy. Carbon dioxide emission, which was equivalent to 0.5 gigatonnes of carbon per year. (GT p.a.) at the beginning of the century and 1.5 GT p.a. in about 1950, currently exceeds 6 GT p.a. The corresponding average per capita value for the world population as a whole — about 1.1 t of carbon — masks considerable disparity between people in the developing countries, who contribute only 0.4 t, and people in the industrialised countries, whose share ranges from 2.3 t in the EEC to more than 5 t in the USA.

Values for other gases in weaker concentration have gone up faster than for CO_2. The concentration of methane (CH_4), for example, has more than doubled in only a couple of centuries and it has increased to its present almost 1.7 ppm at the rate of almost 1% per year. Nitric oxide (N_2O) has a concentration of 0.31 ppm, increasing at 0.25% p.a., and CFCs, which are entirely artificial compounds and only began to be produced on an industrial scale just before the middle of this century, have reached values of 0.00028 ppm (CFC11) and 0.000484 ppm (CFC12) and are increasing at the rate of 4% p.a. This rapid increase and the fact that their global warming potential is higher than CO_2 mean that these trace gases' contribution to boosting the greenhouse effect is growing. Carbon dioxide is responsible for an estimated 55% of the greenhouse increase over the 1980-1990 decade, methane for 15%, CFC11 and 12 for 17%, nitric oxide for 6% and the other CFCs for 7%.

Most scenarios for future economic trends lead to the conclusion that, barring any unforeseeable disaster (such as generalised conflict or a world economic crisis), and even if other sources of energy are developed, CO_2 and other greenhouse gases will go on being emitted into the atmosphere for much of the 21st century. A number of possible scenarios have been proposed by the IPCC experts who attempted to assess their climatic effects.

Consequences of a stronger greenhouse effect — models

A large number of studies have been run over the past few years to see how the climate would react to changes in the radiation balance of the atmosphere produced by an increase in the greenhouse effect. Basically, these simulations use a range of physical-mathematical models of increasing complexity, from simple energy balance models and radiative-convective models limited to a vertical column through to general atmospheric circulation models reflecting the three-

dimensional structure and dynamics of the atmosphere.

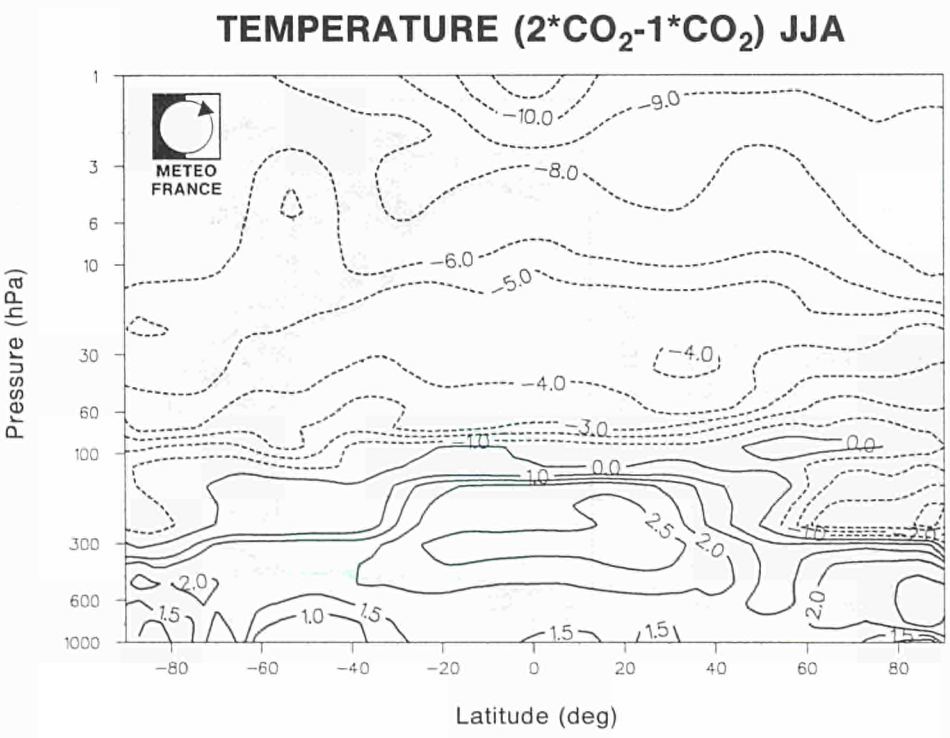
These latter models are based on equations of fluid mechanics with parameterisation schemes for the most important physical processes (radiation transfer, turbulence, convection, calculations of cloud cover and precipation and so on) and are similar to the models which meteorology departments have produced for forecasting weather several days ahead. For reasons of numerical stability, their dynamic equations have to be integrated in time with time steps of less than an hour. It takes hundreds of hours with the highest-performance vector calculators to compute climate statistics from simulations of several years.

Work has been focused on the climatic effects of a doubling of atmospheric CO_2. The direct effect as far as radiation is concerned is an increase of about 4 W/m^2 in the infra-red band in the lower atmosphere. This is difficult to translate into climatic parameters because of all the atmosphere's internal retroaction mechanisms, which can amplify or tone down the initial variation. If the radiation mechanisms were the only things to come into play here, the change in radiation would result in a 1.1° K rise in surface temperatures. But when the lower atmosphere warms up, it can contain more water vapour — which adds its greenhouse effect to the greenhouse effect caused by CO_2. The warming is increased to as much as 1.7° K by this water vapour retroaction and it gets a further boost, to 2.2° K, from a reduction in the snow or ice cover which it triggers at high latitudes and which enables the ground to absorb more solar radiation. The various models tend to agree on the above machinery of retroaction. Differences arise when it comes to taking cloud retroaction into account. Models which explicitly calculate the altitude of the cloud cover tend to simulate an increase in average altitude as a consequence of the warming of the lower atmosphere. Higher cloud is more transparent to solar radiation and has a stronger greenhouse effect than low cloud. This increase in cloud altitude brings surface warming up to 4.4° K in models which include this effect. The big question is the optical properties of the cloud cover, which are still little known and represented in only a very rudimentary fashion in the present models. Surface warming may vary between 1.5° K and 4.5° K, depending on the model formulation. So we will have to improve the representation of the physical properties of clouds if we are to reduce the margin of uncertainty in the current estimates of climatic sensitivity.

Ocean behaviour is another source of uncertainty in predicting the consequences of the greenhouse effect. Oceans play an essential part as a boundary condition determining the energy and water exchanges with the atmosphere and this has been behind the development of atmosphere-ocean coupled models. Most simulations of how the present balance will respond to a doubling of CO_2 have used simplified ocean models restricted to a mixed layer of fixed depth. The heat transport of ocean currents is such that general ocean circulation models are needed to predict the way in which rising sea temperatures will be distributed. The balancing of a coupled model which includes ocean dynamics calls for simulations of several hundred years — which are extremely expensive to calculate and can only be produced in a few major research centres with supercalculators dedicated to climate modelling. In Europe, the Hadley Centre at Bracknell (UK) and the Max Planck Institute in Hamburg (Germany) have recently brought out simulations of the transient response of the climate to the increase in the greenhouse effect for the next 100 years, with coupled models which include ocean and atmospheric dynamics. In these scenarios, which assume a gradual CO_2 increase over the years, the global warming predicted for the period over which the present concentration will have doubled (towards the mid-21st century) is less than that calculated at equilibrium because of the time lag (of about 10 years) attendant on the considerable thermal inertia of the ocean.

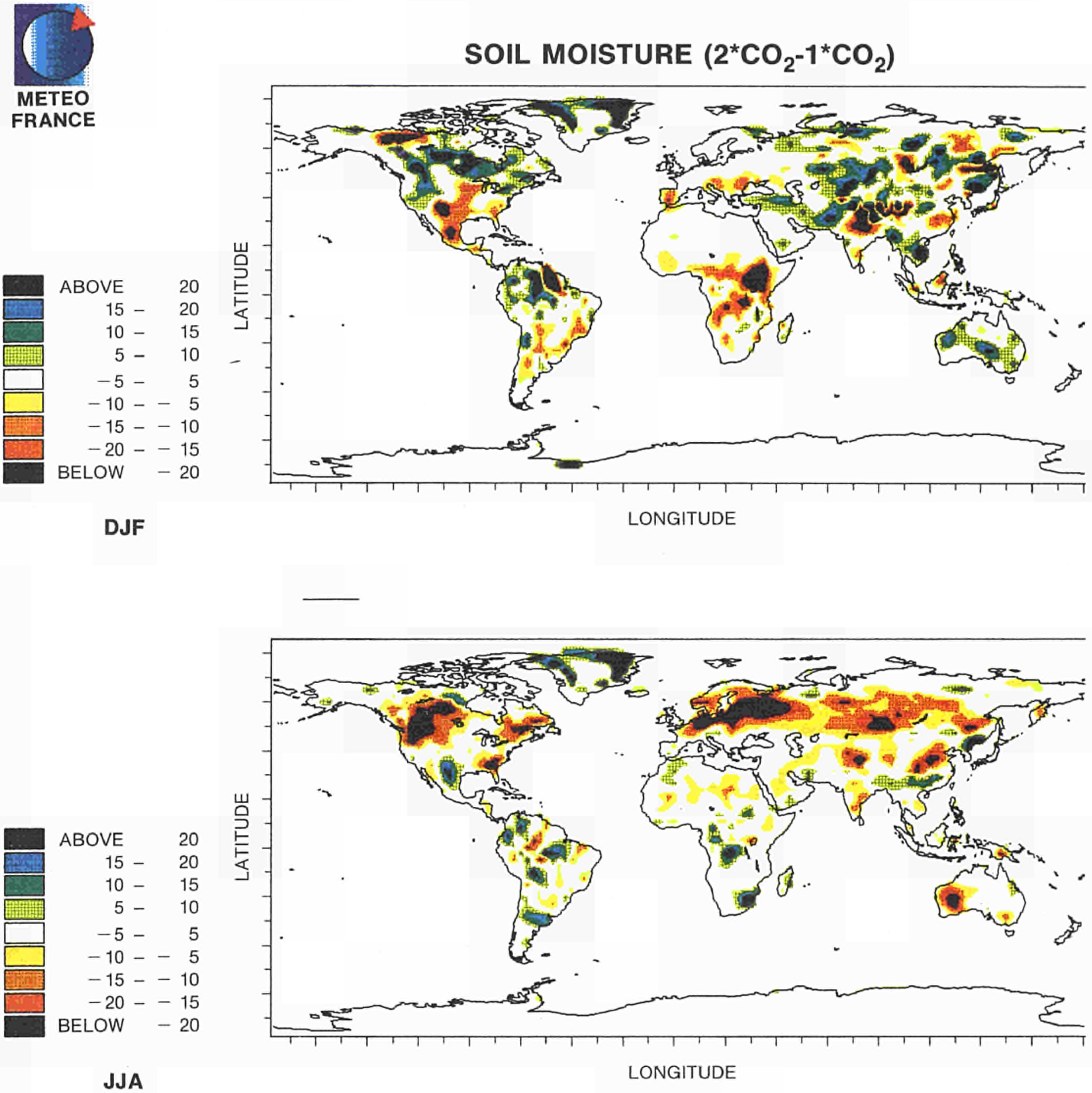
Climate reacts to an increase in the greenhouse effect

Despite uncertainty as to the extent of global warming (which, as we saw, varies between 1.5° K and 4.5° K with a doub-



Zonal distribution by latitude and pressure of the temperature change (Celsius) caused by a doubling of CO_2 (averages for June-July-August). These results were obtained in a simulation of an annual cycle made with the Météo-France atmospheric model and using the ocean temperatures predicted by the Max Planck ocean-atmosphere model

ling of CO_2), a comparison of the results of experiments run with general circulation models reveals various systematic effects which most models reproduce. Figures 1 and 2 illustrate this with the data obtained with Météo-France's model. In the stratosphere, a CO_2 increase produces cooling, which gets stronger with altitude. Tropospheric warming increases with height in the tropics, up to an altitude of 10 km, and with latitude near the surface. Surface



Geographical distribution of the response of soil humidity in the experiment described in figure 1 for winter in the northern hemisphere (DJF) and summer (JJA). Humidity variations are expressed as percentages (%) of the values of the reference simulation reproducing the present climate. This simulation illustrates the decline in soil humidity at middle latitudes in summer, which goes with warming

warming at high latitudes is subject to seasonal variation, with a maximum in winter and a minimum in summer — attenuating the annual temperature cycle. Greater warming in the polar regions reduces the difference in temperature between the pole and the equator, which tends to provoke migration to the pole from the climatic zones, particularly the sub-tropical high pressure areas and the depression belt in the middle latitudes. This could well explain the increase in winter precipitation between 50 and 70 degrees latitude.

In these simulations, global warming is accompanied by an increase in evaporation and precipitation which varies from 3% to 15%, according to model. The increase in the surface infra-red flux indeed increases the energy available for evaporation. The saturation pressure of the water vapour increases very rapidly with the temperature, so a larger proportion of turbulent surface-atmosphere exchanges occurs in the form of latent rather than ordinary heat, provided that there is water available on the surface for this purpose — which is the case on the oceans, but not necessarily on the continents. The increase in precipitation is concentrated around the equator and beyond 50 deg. latitude in both hemispheres. The increase in evaporation is fairly uniform latitude-wise, so there tends to be a deficit in the water balance of the soil (precipitation minus evaporation) between 10 and 50 degrees latitude, with a zone of soil humidity reduction which shifts through the latitudes with the seasons. In the middle latitudes, warming may lead to a reduction in the snow cover in winter and earlier melting in spring. More intense evaporation leads to drier soil in spring and autumn. The normal drying caused by water shortage in summer is stronger and occurs earlier — which increases the duration and intensity of summer droughts in the interior of the continents. However, it would be wrong to forget that the physical processes governing the water cycle are still represented in a very crude fashion, which must limit our confidence in the results. The various models tend to agree on the variations in zonal and seasonal averages, but diverge on detailed changes at regional level, so they cannot be used for predictions in a particular geographical area.

Indirect consequences of climate change

One possible consequence of ocean warming (which does not appear in the current models, since their mesh is not fine enough to represent such phenomena) would be to encourage the formation and shifting of tropical perturbations (typhoons and hurricanes) to higher latitudes than at present. We know that tropical cyclones can only develop in zones where the ocean surface temperature is above the threshold of 26-27 degrees C. Any increase in the frequency of tropical cyclones or changes in storm paths could trigger flooding and tempests and devastate coastal areas and exposed islands. The danger could be heightened by an acceleration in the rise of the level of the sea, which has averaged 1-2 mm p.a. around the world over the past 100 years. The projections of IPCC scenario A put the gradual rise in the level of the oceans provoked by their thermal expansion or the recession of mountain glaciers at 8-29 cm in the year 2030 and 21-71 cm in 2070. This could increase the frequency of flooding on islands and low-lying coastal land and lead to a reduction in the coastal reserves of fresh water due to greater encroachment of salt water.

One of the indirect consequences of warming could well be changes in surface water and thermal conditions, with an effect on farming, particularly when it comes to choosing the most suitable strains and the dates of the harvests. A reduction in soil moisture from evaporation could increase both the diurnal cycle and the maximum temperatures reached. And this could affect the frequency of forest fires and the extent of the regions concerned. The consequences of the climate change could be unfavourable in some regions (with, say, more drought and desertification in areas hitherto suitable for farming) and favourable in others (with milder winters at high latitudes, such that currently inhospitable areas could be developed). But the speed of climate change could well be a critical factor. Too fast a change could lead to ecological upheavals, such as a reduction in the size of forest zones. Forests would disappear fast from zones where climatic conditions had become unsuitable for them yet it would take decades for them to settle and grow again elsewhere. Boreal forests could be more threatened than tropical ones because of the amplification of warming at high latitudes.

Conclusion

The 0.3-0.6 degrees C increase in the average temperature of the surface of the globe and the average 10-20 cm rise in sea level observed over the past 100 years are within the limits of the effect attributable to the (roughly) 25% increase observed in atmospheric CO_2. However, the strong natural variability of the climate and the uncertainty of the current estimates of climatic sensitivity are such that we are still unable to establish a really sound statistical relation between these phenomena. The means of systematic global climate monitoring will have to improve in order to allow early detection of the climatic signature of the increase in the greenhouse effect (global warming of the troposphere and cooling of the stratosphere). It is highly likely that, by the first half of the 21st century, changes to the environment produced by economic activity, and changes to the composition of the atmosphere in particular, will be big enough to provoke a substantial increase in surface temperatures which will affect the climate in vast areas of the globe. So long-term plans should include a margin of uncertainty as far as climate change is concerned.

Interaction between industrial civilisation and climatic conditions around the world bring mankind face to face with a new responsibility — collective management of the composition of the atmosphere, with a need to stabilise and maintain that composition within the sort of limits which will ensure a climate that is conducive to development. International programmes (such as the International Geosphere Biosphere Programme, the WMO's World Climate Programme and the various EEC Commission-financed climate and environment research operations) and national programmes (such as France's National Climate Dynamics Study Programme) show that the scientific community has been mobilised to develop the inter-disciplinary research that is vital if we are to bring greater precision to our assessment of the climatic consequences of a stronger greenhouse effect. ○

J.F. R. & J.F. M.

Plants respond to changes in the climate

by Emmanuel CHOISNEL (*)

Anyone can see how the hazards of climate affect the output of farms, even if only through articles in the press or the disastrous effects on some countries' economies. Exceptionally heavy rain which floods land and even claims lives is the most spectacular example of this, and in the tropics there are hurricanes too. But drought, more insidious but equally terrible, is also a bringer of hunger, famine and death.

Weather goes wrong in different ways in different parts of the globe. In the medium latitudes, or temperate zones, drought is unlikely and it would in any case be very unusual for the same climatic anomaly to be repeated two years running. But things are different in the Sahel, where rainfall stayed stubbornly below the normal level (established over a period of 60 years) for 20 years, from 1968 to 1987.

In South East Asia, a late monsoon or temporary break in the rainfall can badly affect agricultural output on the Indian sub-continent or the islands of Indonesia. It happened in 1918, 1972 and 1987 and there was the recent El Nino episode, which persisted from June 1982 to April 1983, triggering drought in some places (North East Brazil, Venezuela, Australia, East and West Africa and China), and catastrophic rainfall over some parts of the Pacific Coast.

In this article, we look at an even more general prospect — that of an irreversible change in world climate and its potential impact on plant life. We shall see which are the relevant climatic variables to look at, investigate what a global weather change involves and outline the scenarios of change which might apply to the different ecosystems.

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Relevant climatic variables

Plants react to many of the variables of the natural environment — the parts above ground mainly to atmospheric variables and the roots mainly to the variables of the soil — and this response may be reflected in one or more physiological functions such as growth, photosynthesis, development and so on.

The general circulation models suggest that a higher concentration of carbon dioxide or greenhouses gases in general (methane, CFCs etc) will bring about a change in the different basic variables of the climate.

So we need to look at the direct effects of carbon dioxide concentration, of course, and at the individual and, above all, combined effects of climatic variables on plant physiology and, possibly, at any changes in the nitrogen cycle in the atmosphere caused by gas emission from burning savannah (to clear land for crops) and forests.

Without prejudice to the quality of the forecasting in the circulation models usually used to diagnose global weather changes, we should start with the following climatic variables — flows in global sunshine and more specifically in the range of active wavelengths vis-à-vis plant photosynthesis, air temperature and its many physiological effects (frost or heating and changes to the rate of development and growth), rainfall, windspeed and atmospheric humidity.

A proper evaluation of soil water deficits and their effects on the water available to plants also involves looking at the level of, and any variations in, the potential evapotranspiration — a variable which is a combined function of air temperature, sunshine, atmospheric humidity and windspeed.

What is climatic change?

Day-to-day observation of the weather shows that the meteorological conditions in any given place will vary locally in a manner which appears arbitrary but which in fact is dictated by large-scale atmospheric movements. Some paroxysmal atmospheric situations may even trigger dangerous meteorological phenomena such as hail, tornadoes and hurricanes, which may only last a short while but can be highly destructive nonetheless. The notion of climate is something else. First of all, it involves taking a particular period of time (fortnight, three weeks, month, season, year etc) and then observing it over a number of years — 30 consecutive years is the World Meteorological Organisation's standard — to characterise the climate of a particular place.

What about fluctuations in climate?

First of all, does this mean the climate of a region, a country, part of a continent (Western Europe, for example), a whole continent or the whole world?

A definition of the average climate is the starting point, using the average values, month by month, of the main components of the climate, calculated in the light of the 30-year climatic reference period. The average present climate is defined by reference to 1951-1980.

The climate varies around this average state to reflect the statistical dispersion of weather components around the average values. This climatic variability is natural and must be considered as intrinsic.

Nonetheless, each climatic anomaly (i.e. abnormal air temperatures, sunshine or rainfall for three weeks or more) may

An oasis in the Sahel region of Burkina Faso

'Plants react to many of the variables of the natural environment — the parts above ground mainly to atmospheric variables and the roots mainly to the variables of the soil'

cause agricultural output to decline in the region in question if it happens at a critical moment in the crop cycle — as with, say, a drought in the temperate zones in the northern hemisphere in July. And if the anomaly lasts for two or three seasons in a row, as occurred when Europe had a drought lasting from December 1975 to August 1976, the consequences on production may be disastrous.

A global climatic anomaly, i.e. a series of anomalies affecting different parts of the world, occurred in 1972. France had a cold, wet summer, the monsoon failed in India and Pakistan and there was drought in the European parts of the former USSR, disastrous drought in the Sahel and El Nino off the coast of Peru. There was a huge protein shortfall on the food and agriculture market as a result and a period of marked variation in grain prices began. There has been nothing like it since.

But it was not a real climatic change. A real climatic change is a change in the energy balance of the land-sea-atmosphere-cryosphere-biosphere leading to an irreversible change in the average climate. It is something which affects the whole globe and it can be caused by a heightening of the greenhouse effect through increased concentration of the so-called greenhouse gases (carbon dioxide, CFCs etc).

The consequences of a global climatic change will vary according to latitude, to season and even to where a region is located within the continent (on the coast, inland, on the east or west of the land mass etc).

Simulations of changes in world climate connected to a doubling of the relevant CO_2 levels using general atmospheric circulation models give a new level for the average climate season by season. A figure has been put on the rise in the annual temperature increase of the globe, but the models disagree about the scenarios for regional trends in rainfall. There is a great deal of uncertainty as to trends in cloud cover — on which any change in potential evapotranspiration (i.e. the climatic demand for evaporation on the vegetation) depends.

Furthermore, the climate modellers have not yet made any firm statement on a possible change in the degree of variability of the climate from one year to another because of the difficulty of interpreting the statistics on the results of the models. Yet this is the first thing the agrometeorologist asks when looking at the possible effect of global change in climate on agricultural production. An increase in the annual variability of rainfall (if a diagnosis were made) would have major repercussions on the annual variations in agricultural yield.

Diagnosis of the present situation — climate, arable zones and natural and cultivated ecosystems

Weather is fairly well understood today and it is described in all areas which have proper weather stations — i.e., roughly, the continental and non-desert zones with high- and medium-density populations. Ocean zones are still not so well understood, despite the fact that they play a vital part in the energy balance of the climatic system mentioned earlier.

The general atmospheric circulation models used to simulate the present climate reproduce, roughly, the main features of the different weather zones — although they over-estimate the annual

'The effect of climatic change on ecosystems may be apparent in a number of ways — in the response of plant communities, in the effects on crop yield... etc'

average rainfall in some parts of the globe (Burma and Malaysia in South East Asia, for example) by a factor of two.

The world's various climates can be described in a number of ways. They can be classified by the Köppen method, the oldest system but still an appropriate one (although specification is needed for the Europe-Middle East area), or by the Holdridge method (which uses a diagram combining an annual thermal index, total annual average rainfall and the ratio of potential evapotranspiration to annual rainfall), which is currently favoured by the modellers.

The earth's 16 million km^2 of arable zones take up very little more than 10% of its land (grazing land not included). The potential fragility of world agro-food resources is obvious when it is realised that the desert and semi-desert zones take up three times more — upwards of 30% of the continental land masses. More than half the arable land, the FAO suggests, is used to grow grain, 80% of it wheat, maize or rice.

What about the natural ecosystems? Almost a quarter of the land is forest, divided into two, clearly distinct groups:
— humid equatorial forests;
— northern forests.

Scenarios for trends in plant ecosystems

An in-depth investigation of this involves:

1) identifying the principal types of ecosystem to be taken into consideration;

2) knowing how plants and trees respond to a given variation in (one of the) climatic variable(s);

3) dividing continental zones into major climatic types;

4) looking at scenarios for climatic trends for each of these types.

The effect of climatic change on ecosystems may be apparent in a number of ways — in the response of plant communities, in the effects on crop yield, in changes in the range of species present in a given ecosystem or in the spread of that ecosystem. We shall deal with each of these in turn.

Different types of ecosystem

We use the word 'biome' for the major sets of ecosystems occupying the continents. The generic names for these are tropical forest, rain forest, savannah, Mediterranean forest, temperate forest, northern forest, steppe, tundra, desert etc. The word 'ecosystem' tends only to be used for natural vegetation. In cultivated parts of the globe, a classification by biome would be based on the vegetation which would occupy the land if there were no crops. By extension, we use the term 'cultivated ecosystem' here to mean agricultural areas which are priorities from the point of view of the world food supply. The distribution of biomes roughly reflects the major division of the continental land masses into principal climate types — illustrating the crucial importance of a global climatic change to the spread of plant ecosystems over the surface of the globe. So, to use Köppen's terminology, tropical forest and savannah are associated with a humid tropical climate, steppe and desert with a dry climate, northern forests with a sub-Arctic climate and tundra with a polar climate.

However, there are other subdivisions of ecosystems which may be useful to us here. For example, do they have annual or perennial crops and is the plant cover closed or not?

When it comes to global climatic change, the experts focus more on forest ecosystems than agricultural systems, on the grounds that the former are, on the face of it, more vulnerable than the latter and that, in the case of the latter, the type of crops can be changed when the time comes.

Plant sensitivity and response to variations in climate

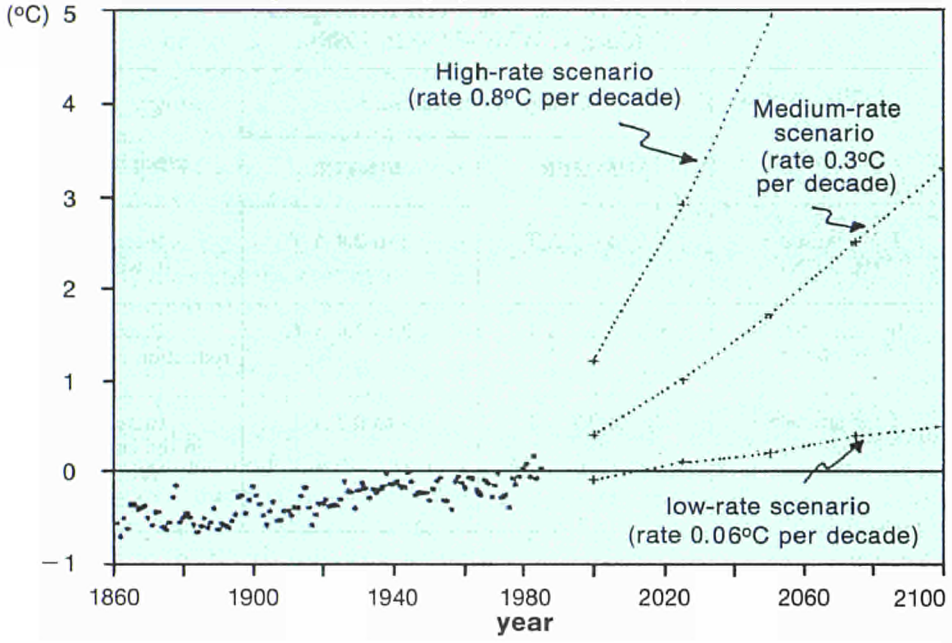
Basic knowledge in this field is obtained by studying the way a given plant reacts to a single element of the climate in isolation, in a strictly controlled laboratory environment.

The problem is in the natural climatic environment where a number of variables may fluctuate simultaneously. And the concomitant variations in any one region or season are marked by a relative interdependence of variables — a milder winter in a temperate ocean climate, for example, will usually go hand in hand with more rain.

The problem is complicated by the fact that the change in climate which concerns us here is also linked to an increase in atmospheric CO_2, which directly affects photosynthesis. Agricultural results suggest that this initially encourages the growth of plant life — but there again, this is a situation in which CO_2 alone varies and the other factors (temperature, water and nutritive elements) are at optimum levels.

In fact, the important thing in diagnosing plant response to climatic change in

Figure 1: Evolution of Global World Temperature
(Source: Jaeger, WMO-UNEP, 1988)



the light of scenarios for trends in climatic variables deduced from general circulation simulation models is to find out whether one element of the climate can constitute a limiting factor or not.

There are three limiting factors:
— light and sunshine;
— temperature;
— water.

Light, or, more precisely, the fraction of sunshine between, roughly, 0.4 and 0.7 µm, affects photosynthesis.

Because of its effect on photosynthesis, respiration and the translocation of carbohydrate, temperature affects both the running of the plant's timetable of biological development (phenological stages such as flowering, maturity etc) and its growth. These are what might be called the cumulative effects of temperature.

Temperature thresholds must also be taken into account here. Exposure to heat and exposure to cold can both be limiting factors if the temperatures reached provoke a lethal effect on the plant.

Availability of water also affects the various physiological functions of plant life. Water restriction (water stress) can limit or inhibit growth, compromise the success of bedding and speed up the development of the plant.

Lastly, CO_2 concentration affects photosynthesis, photorespiration, nocturnal respiration and morphological development.

Scenarios for trends in world climate

These are given for a doubling of the CO_2 equivalent concentration, i.e. assuming an increase in the concentration of this gas itself and translating the effect of an increase in the other new greenhouse gases into an equivalent increase in CO_2 from the point of view of their contribution to boosting the greenhouse effect.

The reference for CO_2 concentration is the so-called pre-industrial yardstick, i.e. the 270 ppmv of around 1880. So when it comes to the date at which doubling will occur, the scenarios depend on trends in industrial and human activity.

The first and principal figure is for the rise in the annual average temperature of the whole globe — assuming that a fresh state of land-sea-atmosphere-biosphere equilibrium gas been achieved (figure 1). The US Environmental Protection Agency published its estimated figures for this in 1983 — + 3°C to ± 1.5°C, which gives a range of + 1.5°C to + 4.5°C. The uncertainty is linked to poor understanding of the way ocean surfaces respond to thermal forcing from the atmosphere and to doubts about the way the cloud cover has been modelised.

Experts then came up with scenarios for regional trends. In 1987, the conclusions of a group of experts set up under the aegis of the World Meteorological Organisation and the UN Environmental Programme gave the following evaluation (northern hemisphere only):

— an increase in maximum air temperatures at high latitudes and in winter which is about double that of the annual average global temperature increase;

— an increase in the temperature of the tropics which is smaller than the increase in the global temperature, and without any seasonal changes;

— far less reliability of scenarios for rainfall trends. If rising temperature is not cushioned by increased cloud cover, then it will boost evaporation over the oceans. Experts predict that the atmospheric water cycle will speed up world wide. An increase in total annual rainfall without indication as to seasonal breakdown is of little interest when it comes to diagnosing the consequences on farming, because the crucial thing is evaluating water resources in summer, since plants' water intake depends on the level of potential evapotranspiration. Furthermore, agriculture wants maximum regularity of rainfall, since heavy rainfall over a short period can be damaging or just plain destructive and is more difficult for the soil to absorb.

Table 1 sums up the experts' scenarios for the two extreme seasons in three sections of latitude in the northern hemisphere.

The latest evaluation of the rise in average world temperature with a doubling of CO_2 is + 1.8°C, with a higher figure in the northern hemisphere (+ 2.5°C) than in the southern hemisphere (+ 1.0°C). If industrial activity neither declines nor speeds up, this doubling is expected to have taken place by about the year 2030.

In September 1990, the intergovernmental group on trends in the climate came up with various scenarios for regional trends in five zones which had scored fairly similar results in the various general circulation models used to simulate the climatic consequences of the

doubling of the CO_2 equivalent concentration. They were the central part of North America, South Asia, the Sahel, Southern Europe and Australia. The scenarios are set out, with reservations (due to a low level of confidence), in Table 2. For the purposes of interpretation, note that the data:

— are for extreme seasons (i.e. winter and summer);

— correspond to an average for the whole zone in the given ranges of latitude and longitude and therefore mask possible differences within those zones. 'Southern Europe', for example, goes from the near Atlantic to Turkey and covers a wide range of what are currently very different climatic types;

— are to be considered as 'best estimates'. For example, they may be cut by 30% for a low hypothesis or increased by 50% for a high hypothesis to reflect the range of results in the different models;

— contain no indication of any change in the extent of the variability of the climate.

The most recent conjecture here suggests that the annual variability of temperatures will decline and the annual variability of rainfall will go up. But in the absence of any season-by-season regional scenarios, it is not possible to say what the consequences on agriculture will be.

Table 1: Scenarios of climatic change by section of latitude and by season in the northern hemisphere
(Jaeger, WMO-UNEP, 1988)

	Change in temperature		Change in precipitation
	SUMMER	WINTER	
High latitudes (60-90°N)	0,5 to 0,7 Δ T	2 to 2,4 Δ T	Increase in winter
Medium latitudes (30-60°N)	0,8 to 1,0 Δ T	1,2 to 1,4 Δ T	Possible reduction in summer
Low latitudes (0-30°N)	0,9 to 0,7 Δ T	0,9 to 0,7 Δ T	Increase in the currently rainier zone

NB: Δ T represents the predicted increase in the annual global air temperature.

Table 2: Regional scenarios for trends in climate in five parts of the globe
(IPCC Working Group 1 report, 1990)

Central North America (35-50°N; 85-105°W)
2-4°C warming in winter and 2-3°C in summer.
0-15% extra precipitation in winter and 5-10% decline in summer.

South Asia (5-30°N; 70-105°E)
1-2°C warming over whole year.
Slight change in rainfall in winter and 5-15% increase in summer.

Sahel (10-20°N; 20-40°E)
1-3°C warming.
Slight increase in average rainfall over the region in summer.
Disparity in trends within the zone.

Southern Europe (35-50°N; 10°W-45°E)
2°C warming in winter and 2-3°C in summer.
Possible increase in winter rainfall, but 5-10% decline in summer.

Australia (12-45°S; 110-115°E)
1-2°C warming in winter.
10% increase in summer rainfall.
Disparity in trends within the zone.

Possible effect of a global climatic change on farming and forests

Here we have to consider not just the effect of the change in the range of variation of an individual component of the climate (temperature or rainfall), but also — and this is most important — of that effect combined with concomitant changes in temperature, rainfall and cloud cover affecting various physiological functions (growth, photosynthesis, transpiration, phenology, reproduction, mineral nutrition etc) and ecological processes. So it is an exercise which is full of pitfalls.

We also need a diagnosis of the current spatial distribution of crops across the world and of their suitability for the climate. In the southern reaches of the temperate zones, we have to identify the crops which have already reached the upper limits of adaptability as far as heat is concerned — on the assumption that warming is to occur.

We shall look at both the possible effects on farming and forests and — naturally, given what has already been said about the relations between plant distribution and the major climatic zones and on the different scenarios for climatic change in different latitudes — at the effect by section of latitude. The comments relate mainly to the northern hemisphere, partly because it contains more continental land masses than the southern hemisphere and partly because climatic simulations suggest it is more affected by the consequences of a doubling in the concentration of CO_2 equivalent.

The tropics

Temperature is not considered to be a limiting factor as far as farming is concerned and the higher temperature scenarios announced in case of climatic change tend to be lower than those in other sections of latitude. So rainfall is the real key variable here.

Here, where the main crop is rice (apparently the staple food of more than half of mankind), the length of the rainy season, closely tied up with the arrival of the monsoon, determines the year's agricultural output. The most sensitive regions are those where feeding an expanding population has forced people to grow crops in marginal areas where the soil is poor and less water is available. The scenario for South Asia (essentially the Indian sub-continent), in Table 2 involves an increase in the summer monsoon.

The irregular arrival of the monsoon has a lot to do with variability in the climate — a point on which the model makers are silent. Excessive rainfall at harvest-time can also be damaging.

The most immediate concern with the tropical rainforests is the present rate of deforestation — at least 11 million hectares are cleared every year, with a boost to the greenhouse effect too, when bare earth and the rotting waste from clearance release masses of CO_2 into the atmosphere.

However, the diversity of species making up what is left means that the ability for change is relatively good — in that rainfall trend scenarios are not geared downwards because, on the face of it, the species there are adapted to globally non-limiting hydric conditions.

In the semi-arid parts of the world, the length of the period of vegetation depends strictly on how long the rains last and any delay in the planting dates will reduce this period of growth and restrict production. The Sahel had 20 consecutive years of sub-normal rainfall ('normal' being established over a much longer period of about 60 years) and the decisive climatic factor constituted by this persistent downward trend in (roughly) 1968-1987 was a major factor of desertification there. So an analysis of the problem must take account of how the interaction of trends in the plant cover and surface energy processes help determine climate.

Temperate zones in medium latitudes

These are the main grain-producing zones, providing more than 75% of the world's wheat and maize output. The thermal effects as such on farming tend to be seen as positive since they extend the crops' potential growing period — providing, of course, that lethal high-temperature thresholds are not reached. However, higher summer temperatures combined with unchanged or diminishing cloud cover increase the potential level of evapotranspiration and thus help push up the crops' demand for water (with summer rainfall constant). Even with sound water resources, an earlier start to irrigation will put extra constraints on the farmer.

Both direct and indirect effects should be considered when looking at water resources. Lower summer rainfall is, of course, a directly limiting factor as far as non-irrigated crops are concerned, particularly for maize, which has a critical period in July. One worrying indirect effect is that a larger percentage of liquid precipitation in mountain areas than at present would reduce the water stored in the snow cover by an equivalent amount, thereby reducing the water resources of crops lower down in spring and summer.

The temperate forests, all of which are in the northern hemisphere, will apparently suffer from a northwards shift of the zone in which the species which make them up could spread. A crisis situation would be difficult to avoid if the annual average temperature rose by more than one degree in less than a century. The natural speed of seed migration deduced from an analysis of the distribution of species at the end of the Quaternary in Europe and North America is about 10-50 km per century for most forest species (it happened at the time of postglacial recolonisation). Natural regeneration can only occur through seed migration, with a 1°C drop corresponding to a shift of 100-150 km northwards. Changes in the productivity of forests and in the rate at which forest cover replaces itself naturally are in any case to be expected.

High latitude regions

The scenarios for these regions involve, typically, a change in winter climates, with an increase of as much as 4°C or more in temperature and extra precipitation. The thermal effect would shift the possible zone of extension of plants and shrubs northwards and extend the growing period — which would push up grain output in these places and make more productive strains a possibility. Winter wheat could be substituted for spring wheat in some parts, particularly Canada.

More rain in winter would be a help in zones with deep soil and heavy water storage potential in autumn and winter — although excessive rainfall could well have an adverse effect on farming methods.

Northern forests can be expected gradually to colonise land further north, but the thermal effect could well adversely affect the southern reaches. Increased precipitation would improve the growth of forest species growing on deep soil, but shallow-rooted trees would suffer more from the general increase in evapotranspiration throughout the year. The risk of organic matter in the tundra breaking down faster under the effect of warming is a cause of concern in monitoring atmospheric CO_2.

These prospects of climatic change in different parts of the globe make the need for forward-looking coordination of agro-food resources and plant life in general more urgent than ever. Constant monitoring of the ecosystems — along the lines of NASA's Earth Observing System — has to be set up by the end of the century.

Strategically speaking, the creation of seed banks could be an asset when it comes to maintaining a range of vital genetic material to cater for changing climatic and agro-food situations across the world. It is important to preserve the intraspecific genetic diversity of the wild species in the forest ecosystems — knowing that a forest with multiple species will, given all the faculties of adaptation of each one, withstand climatic change better than a forest composed of a single species of tree. ○ E.C.

Ocean and climate

by Pascale DELECLUSE (*)

Oceans are essential to shaping climate, be it over seasons, decades or millenia. The vast pool of energy constituted by the oceans shapes the way climate develops and modern research focuses on determining and understanding the complex movements which lead to the mass distribution of heat and salt observed in the ocean today. The machinery of exchange on the ocean-atmosphere interface upstream of these ocean movements gives the different masses of water their physical, chemical and dynamic properties.

Ocean-atmosphere transfers

It is at their surface that oceans exchange with the atmosphere the matter and energy which determine their movement. Energy supply from sources other than the atmosphere (thermal sources on the seabed, for example) is negligible. The atmosphere is very largely transparent to solar radiation — which is absorbed by the surface strata of the ocean, which radiates in turn, like a black body, towards the atmosphere. So the surface strata are warmer than the atmosphere, overall, and there is a substantial transfer of heat and latent heat from ocean to atmosphere. Latent heat is transferred when the surface waters evaporate, affecting not just the temperature of the ocean but salinity too. The other factors which affect salinity are rainfall, ice formation in the polar seas and, to a lesser extent, water from rivers. So salinity and temperature are determined at the surface by the multiple exchanges between ocean and atmosphere and the degrees they reach can only then be altered by advection or diffusion within the ocean. We shall therefore now look at ocean currents.

The ocean can store a great deal more heat than the atmosphere (a 2.5m column of water, for example, has the same thermal capacity as the whole of the atmospheric column above it). The net ocean heat budget is positive in quite specific regions (the tropics, particularly the east of the Pacific and of the Atlantic, accumulate a large amount of heat), while the warm western boundary currents (the Gulf Stream and Kuroshio) and high latitudes send back a large flow of heat towards the atmosphere. But the distribution of springs and wells is very spatially and temporally heterogeneous.

The ocean gets its mechanical energy on the surface too, from wind friction. Ocean circulation, which is very active, is measured in Sverdrups (million m^3 per second — a current such as the Gulf Stream reaches 90). Circulation redistributes the heat world-wide and makes the ocean a powerful regulator of climate, tempering the zonal temperature gradients. It makes up for unbalanced thermal flows by transporting as much heat from the equatorial regions to the poles as the atmosphere — several Petawatts (or 10 to the power of 15 watts).

Elements of ocean physics

The ocean can be roughly divided into three layers — the well-mixed surface layer, the main thermocline (in which the temperature fades noticeably) and the deep waters — which shape the climate on different time scales and are distributed.

Main, seasonal thermocline

The seasonal development of the ocean-atmosphere pair is controlled by the well-mixed surface layer, which stores heat during the summer and returns it during the winter, tempering the atmospheric conditions. In seasons in which warming occurs (spring and summer in the northern hemisphere), the heat which the ocean receives from the atmosphere builds up in this layer — whose physical properties (temperature and salinity) are homogenised vertically by strong, turbulent vertical diffusion. The depth of this layer varies considerably with region and season (but 200m is a reasonable figure) and it is separated from the underlying layers by a zone of strong thermal gradient which isolates the sub-surface ocean waters. The ocean communicates with the atmosphere solely through this surface layer, which accumulates kinetic and thermal energy. Many digital ocean study models have been designed to include this ocean layer at the bottom of a general atmospheric circulation model. This is the first way of describing the thermal inertia of the ocean in the development of the climatic pair.

In autumn (in the northern hemisphere), this surface layer gets deeper under the influence of wind and cooling and dissipates part of the energy built up over the previous seasons to the atmosphere in the form of heat and latent heat. The thermal energy is distributed over greater depths. The maximum depth, reached during the winter, corresponds to the position of the principal thermocline, the permanent thermal gradient zone in the oceans. This is when the process of dispersal of the thermocline may occur. In a region where the vorticity of the wind friction on the surface is negative (i.e. no waves), the Ekman spiral takes surface waters into the main thermocline with all their properties — temperature, salinity and vorticity — intact, a process which generates horizontal circulation on an ocean basin scale.

Only part of the thermocline is distributed each year and the circulation into which these waters are drawn is complex. Balance takes several decades (the typical adjustment time for a basin in the temperature latitudes) and involves many interactions between wind-driven circulation and density-driven circulation. We shall now look at the structure of the polar and tropical regions before moving on to the global scale.

The tropics

In the tropical oceans, seasonal thermocline and principal thermocline are one and the same, because very vigorous local dynamics make for efficient vertical diffusion to the principal thermocline, which is very shallow and near to the surface (50-200m) in these parts. Note, however, that the concept of the well-mixed surface layer may be based on the salt stratification in some regions (e.g. the western parts of the tropical Pacific). A shallow, clearly defined mixed layer in a zone where the Coriolis force is nil means

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The Courier

A tourist's-eye view of the Pacific

'As the warm water moves to the mid-Pacific, the zonal winds converge towards the warm anomaly — which is why the winds in the western parts of the Ocean reverse

that equatorial basins can adjust to atmospheric changes in only a few months, because the tropics develop wave-guiding properties. The speed of adjustment means that there can be an efficient pairing of atmospheric circulation and ocean circulation over a few months, with spectacular reversals of tropical circulation (which we shall be discussing when we get to the major natural variability of the climate — El Nino).

Polar latitudes

The mixed layer also has a special part to play at high latitudes. During the winter in the hemisphere under scrutiny, very harsh conditions on the surface lead to the formation of only very slightly stratified masses of water, sometimes going right down to the ocean floor. The very cold air masses at these latitudes lead to cold, dry winds blowing over the ocean. The temperature difference between sea and air may then be more than 10 degrees, with intense heat transfers from ocean to atmosphere. Between −1 and −2 degrees, sea water freezes at the surface, throwing back its salt content into the ocean. Variations in the volume of sea water are then controlled by salinity and not temperature. Excess salinity leads to the formation of dense water, which is heavier than the surrounding waters and sinks to the bottom — producing deep convection. The masses of water thus formed drop to the level of water of equal density. They fill the bottom of all the ocean basins — 75% of the world's waters (more than 10 to the power of 9 cubic kilometres!), although the areas in which they are formed only account for a few thousandths of the ocean surface. Deep convection processes, which are intermittent and localised, occur in difficult atmospheric conditions and therefore tend not to be under direct observation at the present time. The deep waters of the ocean have a fabulous storage potential which takes a very long time to respond — centuries, a thousand years even — so deep circulation is unlikely ever to be stationary.

Average ocean circulation

A major difficulty in studying ocean circulation is that of describing quantity and quality. In some, well-observed basins (the North Atlantic, for example), it is perfectly possible to map monthly temperature and salinity variation, but there is no exhaustive description of circulation. Direct measurements are rare and widely separated in space and time.

Furthermore, average circulation is strongly affected by turbulence and is difficult to determine. At temperate latitudes, eddies cover an area equal to the internal radius of turbulence (50 km) and last for about a month. Their addition to the normal heat transport in the ocean may, in some parts, double the average figure. They are a potential major contributor to climatic balance, although estimates are still very hypothetical. Turbulence is very unevenly distributed over the surface of the oceans. Although the rings of the Gulf Stream were the first eddies to be detected, this type of activity occurs in all parts of the globe, albeit with varying morphology and energy levels. Satellite measurement is a very useful way of monitoring the global behaviour of the kinetic energy of turbulence. How exactly does it contribute to the general movement of the oceans? That is still the question.

How oceans affect climate

ENSO

In 1983, serious climatic anomalies occurred over the whole of the Pacific. There were torrential rains in Peru, forest fires in Australia and devastating hurricanes in Polynesia — not isolated events, but ones which hit a peak of particular intensity that year, with dramatic economic consequences. The ENSO (El Nino Southern Oscillation) anomaly occurs at intervals of 2-10 years, a three-year gap being the most common, and, since it is the clearest manifestation of the natural variability of climate on an interannual scale, is of great interest to many oceanographers and meteorologists.

Southern Oscillation and El Nino are the manifestations in atmosphere and ocean of the same climatic anomaly — which, in its fully developed phase, takes the form of an extension of warm water throughout the tropical parts of the Pacific Ocean and a reversal of the sea slope. The ocean thermocline goes down tens of metres in the eastern part of the basin and the currents are reversed, with strong eastward currents appearing on the surface and the Equatorial Undercurrent diminishing, possibly to nothing. In the atmosphere, the trade winds drop, often to the point where they reverse in the western part of the basin. The convection zone, usually over the islands of Indonesia, moves eastwards and so rainfall declines in the western Pacific and increases in the central and eastern parts.

The two zones in which the surface winds of the Pacific come together merge into a single convergence zone over the centre.

Meteorologists say that the trade winds weaken because of a change in the distribution of warm water in the tropical parts of the Pacific, with the east-west temperature gradient declining and the Walker cell no longer maintained. As this warm water moves to the mid-Pacific, the zonal winds converge towards the warm anomaly — which is why the winds in the western parts of the Ocean reverse.

Oceanographers say that the appearance of warm waters in the central and eastern reaches of the Pacific has something to do with the waning of the trade winds which, under normal circumstances, would be maintaining an upwards slope from east to west. As soon as the trade winds stop, there is nothing to maintain the slope and so the warm waters flow over the whole of the equatorial region. The Equatorial Undercurrent wanes and the west wind creates surface ocean currents moving eastwards.

Neither atmosphere nor ocean can develop the anomaly independently of the other. Both elements are closely linked by easily destabilised interactions. An anomaly in the surface temperature of the ocean will immediately trigger an anomaly in atmospheric circulation — which will then maintain and develop the initial ocean temperature anomaly and vice versa. But the response is not confined to the zone of the original anomaly, because the equatorial waves soon spread along the equator, bringing the whole tropical ocean reservoir into play for more than a year.

North Atlantic Deep Water circuit

The uneven distribution of temperature and salinity for a given level of pressure generates thermohaline circulation — important in view of the masses which it shifts and the time it takes to adjust. The circuit which Gordon put forward (1986) for inter-ocean exchange illustrates the space- and time-scales involved here. North Atlantic Deep Water (NADW) is formed in very restricted convection zones — the Labrador Sea and on the edge of the Greenland Sea and the Norwegian Sea. The water mass flows southwards by the deep western border current to mix with water from the Mediterranean. It influences the Atlantic basin to a depth of more than 100m, flowing into it gradually, mixing with the neighbouring waters and upwelling slowly. In the southern parts of the Atlantic, it is taken eastwards by the Antarctic Circumpolar Current, with powerful upwelling around the Antarctic, and ends up in the intermediate Antarctic waters which flow into the thermocline. The return journey to the Atlantic is mainly via the 'hot route' through the tropics.

The waters of the thermocline in the Pacific flow between Indonesia and Australia into the Indian Ocean. This region, a maritime continent, has heavy precipitation and vertical mixes on the passage between the islands. The water we are monitoring gets warmer and loses a lot of its salinity (the minimum level, clearly, is on the Indian Ocean crossing between isotherms 10 and 20 deg.C). It follows the South Equatorial Current and gradually joins the much more saline thermocline waters from the southern part of the Indian Ocean. Before Madagascar, a major branch of the mass of water veers southwards to feed the Agulhas Current, most of which turns into the Antarctic Circumpolar Current by a process of retroflexion. Part, however, gets to the South Atlantic, in the form of warm eddies which are then drawn into the sub-tropical anticyclone circulation of the South Atlantic, joining a major supply of warm water to the South Atlantic. Some of these waters are drawn along by the South Equatorial Current, cross the equator north of Brazil and then move northwards in the Guyana Current, which joins the Gulf Stream. From there, they gradually take up the warmth of the tropical latitudes and leave it behind them again as they move northwards.

So it is perfectly possible for a particle of water to circumnavigate the globe. But it will change many times in the process. NADW starts cold and with medium salinity and warms up gradually as it moves south. It will take almost 1000 years to reach the Antarctic Circumpolar Current and be drawn into the thermocline waters. When in the intermediate Antarctic waters, its salinity and temperature go up when it mixes with the surface waters. The 40 000 km 'hot route' in the thermocline is much faster because, with speeds in the intermediate layers of 0.10 to 0.01m per second, the journey back to the deep water formation zones takes 13 to 130 years.

This potential journey of the waters formed in the North Atlantic points up the complexity and difficulty of understanding global ocean adjustment, because the time-scales are extremely large and anything may happen on the way. Two processes (which happen often when compared with thermohaline circulation) may affect it. Fluctuations lasting 10 years or so may occur in the sub-polar regions and strongly affect the quantity and quality of NADW. Circulation may be seriously disrupted or even reversed during inter-glacial cycles and the whole circulation of the ocean thermocline in the Indian, Pacific and Atlantic Oceans may be affected 1000 years later. Moreover, links between the oceans are very sensitive to changes in the distribution of atmospheric wind and pressure fields. Displacement of the wind vortex south of Africa can alter the movement of water into the Atlantic Ocean. Similarly, not much is known about the move through the maritime continent region and it is seemingly influenced by ENSO anomalies. Oceanic thermohaline flow, which is the result of the variations in temperature and salinity in the oceans, is still largely hypothetical. It is often thought of as being stable and permanent, though largely because it has not been observed for long rather than because of any proper investigation of its balance. A local change has general repercussions which we are in no position to assess today. But we do know that other states of circulation have existed and that there have been very strong variations in regional temperatures and sea-levels.

Over shorter time spans, clearly, the ocean-atmosphere pair may oscillate between various states of equilibrium. ENSO affects weather conditions in the tropical Pacific for more than a year and triggers variations of tens of centimetres in sea level. Amplification of a small disturbance leads to enormous energy and heat transport over a whole ocean. The difficulty of understanding a system involving a climatic pair comes from the many ways in which the two can relate and interrelate and from the variations in the time which responses may take. The ocean, in particular, leaves a delayed but inevitable stamp on the climatic system and it will take the intensive development of observation and digital simulation to grasp it.○ P.D.

Environment, development and poverty — what ENDA thinks

by Philippe ENGELHARD & Taoufik Ben ABDALLAH (*)

The people living below the bread line have increased in terms of absolute numbers (1.2 billion) and as a percentage (23%) of the total population over the past decade. Four fifths of them are in rural areas and heavily dependent on whatever natural resources — land, water, biomass and genetic resources — are available.

'Poverty' in many cases is a linguistic nicety filling a gap in the concept of development which people are ever more reluctant to discuss, the fashion being more for adjustment and financial and economic rationalisation. It's an ill wind... When the idea of development loses its fascination, ultimately a question of common sense will occur — how, practically speaking, can we improve the daily life of the greatest number and reduce the distress of the pariahs and the excluded?

The idea of growth may one day be updated, by way of reaction, by the feeling (because it is still only intuition) that the prime aim of proper growth is to do away with poverty or at least the most flagrant injustice, poverty and moral and physical dereliction. And this would make way for a brave question about inverting the orthodox approach — how can reducing poverty in everyday life help trigger growth and development?

Ultimately there is no choice. A billion people or thereabouts are massed on the edge of the metropolises, lost to the modern economy and with no choice other than to organise their day-to-day survival by producing the goods they need and catering for their collective needs as best they can — in short, by creating another kind of urban system and another kind of economy. A new kind of growth is already with us, surreptitiously, and we need to know how to support it in such a way as to help develop the environment of the whole planet. But this emergent world should not blind us to the poorest and the most excluded of our number — starting with those in the countryside...

What we need to know is this: What relation maintains the campaign for poverty and the environment? How can we make the content of the concept of poverty more operational? How does unequal international development worsen poverty in some parts of the world?

Poverty, environment and population

The fact that some people get poorer no doubt has a lot to do with environmental deterioration and fast population growth — although the importance of the latter has probably sometimes been overestimated.

Ecological dysfunction is often rooted in demographic pressure, but cause and effect is not as automatic as it may seem.

In Africa at least, there is a tendency to see a causal relation between greater demographic growth, a deteriorating ecological environment and a decline in per capita agricultural output. But the reverse is worth serious consideration too. In some cases, it has been the rural exodus and the waning of traditional herding methods which have upset the physical environment and destroyed systems of production — and with no compensation either. Intelligent agricultural intensification (often involving agro-forestry) would require a bigger labour force and have the advantage of higher yields, better productivity and greater resistance to erosion from wind, water and drought.

Experience has shown that properly thought-out systems of production which best combine plants in space and time can both push up income, reduce input and offer decent defence against aridity. ENDA has been successful with some of these systems in Senegal with several hundred young farmers. But developing an original kind of agroforestry with the youngest is no reason for not helping the poorest and most excluded to prevent aridification and so we are working on this in parts of Senegal too, in the Thies area, for example, where we have helped the people to build small dams and other hydro-agricultural installations.

The infinite variety of attacks on the environment should never cloud two, possibly vital, ideas — first, that the environment is to be protected not as a museum, but as a complex system to be geared to productive, domestic, aesthetic and spiritual requirements and, second, that what we consider to be environmental degradation should be subjected to close inspection. Take the suggestion that half of the land in Africa is under threat of rapid and probably irreversible deterioration. What is this estimate actually worth? It would take data gathered in the field to tell and transparency here depends on the information from networks of NGOs and research workers and peasant movements being fluid — the only way to a proper exchange of experience and know-how. So we are working with groups and associations in both North and South to set up data networks of this kind.

In the past, low population density and culture-specific regulation has usually ensured some degree of ecological stability. For example, religious institutions once banned some fishing techniques and the most destructive sorts of machinery on the shores of Lake Ahémé and Lake Toho in Benin, defining the boundaries of sacred places (where fishing was prohibited), which thus became protected areas. But now we have to devise new environmental regulations to reflect the population's strategies and the constraints of their survival. Economic interest and environmental interest often coincide, sometimes unexpectedly. A mixture of crops is an ecological ad-

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vantage in itself and, if it is properly organised, it will improve yield and lower fertiliser and pesticide costs too. Combating aridification also involves a proper understanding of biodiversity and how to rehabilitate it.

Demographic pressure is a problem because there are more basic issues which have not been addressed — an alternative hypothesis which should be examined as a matter of urgency.

Socio-spatial disparities have been seriously affected by demographic pressure, with an ill-distributed increase in migratory movements towards the towns and various so-called privileged areas. It would be utopian to try to put a stop to the rural exodus now, of course. Never has such a thing been attempted with success. The only sensible course is to aim to slow it down — although, obviously, this means distributing public amenities better (and the only way of doing that is with an active, concerted policy of regional development), ensuring that country areas have the basic educational and public health infrastructure and encouraging a style of farming which pays.

And that, of course, means dropping aims which are more ideological than economic — such things as the principle of self sufficiency in food, a slogan which confuses ends and means, raised to the level of dogma. No-one denies that any region or country will want to feed itself, but the worst way of doing so is to go for self sufficiency regardless of economic or social cost (as the current rice situation in the Sahel so eloquently shows). What the target should be is prosperous farmers... (with self-sufficiency as a bonus).

It would be perfectly legitimate to try to discourage the consumption of food which is too expensive to import or produce locally, particularly given the tendency to underestimate the flexibility of eating habits. People may well want to eat rice, but when irrigated rice is three or four times the world price in some places, it is reasonable to wonder whether it might not be a good idea to wean them on to potatoes or sweet potatoes (which have at least six times the yield) instead. The least bad solution would be either to go to the world market and buy cereals which are very cheap and try to sell properly developed agricultural produce (off-season vegetables and tropical fruit, for example) on the external markets, or to eat things which are sufficiently cheap to produce at home, or both. A strategic revision of this sort, however, can only be entertained if there are investments to go with it and a huge effort is made to tell the people about it — a drive we are doing our best to encourage.

Towns will doubtless continue to grow fast (by 5-7% p.a.) and most people in the Third World will be urbanised in 10 years' time. Although a move to the town regulates the rate of reproduction (it is lower in urban areas) in the long run, the population will go on getting younger for some years to come, with all that this implies in terms of spending on transport, energy, education, housing, roads, drainage, water supplies and so on. It is now crucial to see just where people, and even young people, fit into political, social and economic life, as social peace and the future of the greater part of the planet depend on it.

It seems obvious that no solution will be viable unless the people themselves are involved in managing and planning the towns. Equally obviously, the popular urban economy is and will continue to be the biggest provider of jobs, goods and services for the vast majority of these people. First and foremost, the anti-poverty campaign must find out how this economy can be supported without its creativity being sterilised. One of ENDA's warhorses over the past decade has been the management of the Third World's cities and the promotion of the popular economy, using a two-pronged strategy of backing up groups in the slums and providing proper information for decision-makers in various African countries in the Third World... and in the North.

Poverty and insecurity

Poverty has a great deal to do with insecurity and the non-availability of certain critical resources.

A meaningful grasp of development must incorporate the idea of security.

The idea of security has to be taken in its broadest sense, obviously, with all its social, political and economic connotations. One of the intellectual fashions of today is to attack the welfare state. It is by no means clear that there can be un limited coverage of social risks and a modest degree of risk is probably one o the rules of the economic game. But it i equally clear that reducing social risk t acceptable proportions is an essentia feature of well-being. Political security which includes the possibility of group and individuals living as they see fit an contributing to collective choices, is also a basic element.

The question is to fix the collectiv production threshold below which th minimum security and resources can n longer be assured — and it is a minimun which alters according to the society an its ecological and cultural make-up There is nothing to prove that develop ment has to be up to the level in th industrialised world to achieve it. Th fact that there is only a small correlatio between per capita GDP and the huma development index strengthens our con viction here and gives us some justifi cation in all we think and do.

The availability of some resources is a crucial aspect of security. But the rarity o others is often artificial and based on o nothing more than poor production an productivity.

When it comes to health and basi needs, this is obvious enough not t require lengthy explanation. The averag African lives 15 km from a health pos (often without even the minimum re quirements) and has to get there as best h can. This is not security. It is insecurity a far as health is concerned and it i worsened, obviously, by the shortage o clean drinking water — something whic affects half the population of the con tinent — and more than 80% of tropica disease is water-related. AIDS threaten millions of people in the long term particularly in Africa. We have tried t start countering it with reflexion an active prevention campaigns, but we an our partners can currently only scratc the surface of the enormous task befor us.

The hazards of climate could also b considered as a barrier to any attempt a innovation — as involving too much risk The minimax theorem shows that there i a degree of poverty at which the potentia cost of innovation is more important tha its advantages. And what is worse hundreds of thousands of people are hi by war, tribal conflict and, more gen

erally, insecurity of the very worst kind, threatening their bodies and their goods and chattels. So campaigning for democracy, and therefore campaigning to protect people first and foremost, and campaigning to put an end to the violence and arbitrary behaviour of some states should be a vital obligation for all national and international leaders. We, with our meagre resources, have always tried to provide front line assistance to refugees and others under particular threat. The Mauritanian refugees in Senegal are just one example.

The idea that some countries' poverty — which is initially apparent in a shortage of budget resources — has been considerably worsened by the colonial legacy and a tendency to rely on imported methods of organisation cannot be dismissed lightly. A large percentage of the community's assets is managed in unsuitable ways and exorbitant costs are the end result, leading to poverty when the so-called modern systems are at variance with the ability to cope with recurrent costs — or, quite simply, the management. That is not to say that what is new is wrong. What it means is that believing in new for new's sake leads to absurdity. New technology should not be espoused because it is new, but because it is the best answer in a given economic, social and cultural situation.

Insecurity of this sort is pointed up by certain so-called modernistic prejudices and a lack of attention and imagination.

Experience suggests that, from a strictly economic point of view, productivity can be improved even with labour-intensive techniques. In other words, even if, for a series of social and economic reasons, a country or a group does go for labour-intensive technology, there is nothing to prevent it from boosting its productivity and it could do this by gearing research and development differently, for most research is only concerned with combinations of capital-intensive techniques. What we are fighting for is an alternative kind of research — although, alas, with far fewer means than the job actually requires. Getting governments and opinion leaders to grasp the fact that efficiency does not necessarily mean going for what is most modern or most recent is still a constant concern.

The use of brush fires as a means of preparing the ground for agriculture can contribute to desertification and destruction of the environment, thus accelerating the impoverishment of developing countries

What is wrong with thinking that local know-how could be put to better use? In their way, the peasants who have selected plants over the centuries have been acting as informal research. Popular technical knowledge can be of immense benefit to society — provided, of course, it does not get bogged down in a technical or economic way of thinking which only sees progress in the narrow terms of historical experiences, which can in all probability not be generalised. That is not to say that all advanced technology has to be dropped. But it has to be combined with older technology discerningly, with the idea that boosting productivity in production is not an end in itself. The main end should be to improve the daily living conditions of the greatest number and to reduce the unpleasantness of domestic and productive tasks.

A realistic analysis of the living conditions of the poorest sections of the population and proper attention to the way they themselves see their daily environment and any practical improvements which could rapidly be made for them would of course be another major source of progress. If these people are given the means of communication, information and participation, they can usually come up with the right answers to their problems themselves. We have plenty of examples of this popular know-how, sometimes in unexpected forms — for example in a working class area of Dakar where an ENDA team went to help (Grand Yof).

Poverty and international equality

Another cause of poverty (subjective and objective) is the unequal world distribution of wealth, knowledge and development.

All the middle classes of the world have a standard (Western) model of consumption. It is a factor of poverty and in any case a dead end as far as a large part of mankind is concerned.

The appearance of a standard model of consumption was inevitable and may, after all, be legitimate. The problem — that it works independently of the production and import potential of the less developed regions — is all the more acute because of the mimicry which the model

transmits to virtually every section of society. The result, obviously, is a series of psychological maladjustments which combine to give relative and sometimes absolute poverty among the people of the Third World. One of our priorities, in both our publications ('Vivre autrement') and the networks we help to run, is to trigger ways of life and social organisation which cost the community less.

Given the incredible fluidity of the media in the North, these maladjustments will inevitably increase in the future. Once again, there is no question of stoking up the guilt complex of the countries in the North (which is also a source of ambiguous and demagogic behaviour). The idea is to find out whether a change in their life-style and communications might not be an answer to some worldscale imbalances which they have helped to bring about and, wittingly or unwittingly, to maintain.

This does not mean that Third World societies (starting with those in Africa) are free of all responsibility. There is something paradoxical about the fact that the Third World movements which make the most powerful religious and/or political attacks on the West virtually never complain about the materialistic way of life of the industrialised nations. Gandhi was an exception.

One thing is fairly obvious. In the long run, the Western consumer model cannot be generalised. Indeed energy and pollution constraints alone put the idea entirely out of reach in the present state of our knowledge. Although the West has done some amazing energy saving, it still needs to set the example with ways of life which are less of a burden on the environment and more suitable for mankind as a whole. This would make its campaign to save the planet more credible to its partners in the South. It should in any case back the most credible alternative approaches to health, education, urban development, transport, energy, technology, communications and organisation and more.

The uneven distribution (or erratic management) of wealth leads to absolute poverty in some populations. The uneven distribution of the capacity for research and knowledge is a source of present and future unfairness of an extent unknown before.

The strategies for dealing with scarce resources have shifted and the political

Logging in the Third World has certain economic advantages but felling without replanting leads to the continuing destruction of tropical forests which have a significant role in the world ecology

pattern they trigger has certainly been less brutal over the past 10 or 20 years — although recent events in the Middle East are there to remind us that the strategies used to control some scarce resources, starting with oil, have something to do with the upheavals in some parts of the world...

The way strategic raw materials are controlled obviously affects their price. Over a long period, of course, prices tend to adjust to the marginal cost, but a 'long period' is often an abstraction and the price politicised. With more ordinary commodities like coffee and cocoa, it is the market price which obtains. But should this price be a sort of dogma which does away with the idea of fair pricing? It is an important indicator of the degree of rarity, of course, but it would be wrong to leave it to the unseeing market machinery to decide on the producers' income and the retail prices all by itself. It is not by chance that agriculture is subsidised (albeit with what may be debatable discernment) by most developed economies, starting with the USA, the EEC and Japan — which still buys rice from its farmers at seven times the world market rate!

Another source of perturbation — and new inequality perhaps — is already on the horizon. Mankind is unlikely to manage without cutting its emission of carbon monoxide and other pollutants responsible for the greenhouse effect in the near future (1). Regulation of this sort has some chance of leading to a global 'right to pollute', which would be defined annually and shared, and, if we are not careful, the growth potential of the poorest countries of the world will be compromised in the process.

In the fairly near future, a large number of countries in the South are going to see a biotechnological revolution involving increasing yields, production and productivity — innovations which will help food security, of course, but not without bringing major problems in their wake. On the one hand, there is a considerable risk of the right to use genes being privatised and excluding or generating dependence on the part of the user countries (which will have no choice in the matter). On the other, expanding production and the emergence of substitutes for a large number of staples (such as sugar, coffee and cocoa) cannot but marginalise many of the peasant populations of the Third World, with no possibility of compensation, as is already happening in the sugar industry in the Caribbean. And duties will be a heavier burden on the already meagre budgets of both states and peasants.

Lastly, if the anticipated massive reduction in tariff barriers actually comes to pass (which, mercifully, it is not bound to do), the risk of various farm-dominated economies being marginalised would be heightened. In the extreme scenario of generalised free trade, a good third of the countries with few or no product advantages (Niger, for example) would have no other choice than to rely upon international charity. The absolute effectiveness of comparative advantages would thus be apparent world-wide! Can half of mankind really be fed by the other half — which has no work and is therefore condemned to no more than survival? The inevitable result would be urban and then international migration on a far greater scale than we know today, and there would be disastrous consequences, not least the abandonment of the cultivation of some plants (reducing biological diversity) and the disappearance of traditional know-how which could be extremely useful to mankind.

Researchers, NGOs and international development bodies should put priority on preparing the governments and people

(1) See article by J.F. Royer and J.F. Mahfouf.

of the South — a major undertaking which cannot be embarked upon piecemeal. Powerful systems of reflexion, research and action must be set up, just as they are in Asia, and given efficient means of communication (electronic mail, for example). We, with our limited means, are involved in setting up networks to deal with such things as energy, desertification, biotechnology, biodiversity, climate and the international environment. We are concentrating on Africa in particular — no doubt the continent least informed and least equipped to handle these major problems, among which debt and structural adjustment are very much to the fore.

The existence of standard development models makes solving the poverty problem even more crucial — in which the cultural background is vital.

All too often, Third World cultures still think and reflect in a metalanguage or metaculture which is that of the West. This is not to say that the thinking is bound to generate sterility. Quite the contrary. The fertilisation of one culture by another is a virtually constant part of history (what about the Greek influence on Rome or the ancient Egyptian influence on Greece?). But fertilisation implies a proper marriage and not an unhappy, maybe even schizophrenic biculturalism which thrives on skin-deep modernity and fails to identify the underlying moral idea (individual responsibility) or the points on which it falls short itself. Although cultures must evolve (and not be preserved unchanged like animals in a zoo), it seems clear to us that any sudden reorganisation will make the populations more vulnerable by depriving them of a fundamental prop for their understanding and action. This attention to culture and the ecosystems around it is an important aspect of our thinking and action.

Modernism raised to the level of a rational belief has the fundamental notion that economic growth is the only way to leave poverty behind. No-one will deny that secular growth in the West has gradually done away with the biggest pockets of poverty. Western development has got a lot of things wrong, of course, despite its undeniable successes (a reasonable degree of fairness, great efficiency and great freedom). But there is nothing to prove that this form of growth is socially speaking the most efficient way of rapidly improving the quality of life of the greatest number and enabling those whom progress passes by to achieve a minimum of wellbeing.

Simplifying things a little, the countries of the South, or a fair number of them at least, are likely to be faced with the following paradox in the coming years. Either they will stimulate the most dynamic sectors of their economies (but transfers from rich to poor will be out of the question or affect the rich politically or financially) or they will put priority on erasing the pockets of poverty, but to the detriment of the growth of the whole.

The paradox is perhaps not as clear-cut as that, because the poor — who have yet to be identified — are not always as marginalised we in the West tend to imagine. They may be families of the popular economy, or peasant families which need proper support in terms of training and credit facilities. They may be genuinely excluded, of course, but efficient and sensitive help will enable them to make a better job of running their lives and catering for their basic needs. In other words, it must be realised that the process of growth does not have to be the privilege of the few. What it should be is an effort by the population as a whole, even the poor — and this is what we are trying to get across to the governments in the South and their funders in the North.

In conclusion, poverty occurs in many forms and at many levels. It has to be tackled at root in the districts and the villages and on the fringes of the cities and localities. It has to be tackled in international relations too. Information must be digested and improved and action geared to many fields. The cost of information does not always balance out its advantages, but it often takes far less than people imagine to provide those genuinely vital details on which decisions and action have to be based. So it is wise to identify the most sensitive points in what might be called the environment-insecurity-poverty system — poverty being when people in an economic, social and environmental system are no longer in a position to cover the costs of their reproduction, which means the system has been upset from within or without, or both.

Ideally, the most significant poverty-making processes and the reasons for the breakdown in reproduction should be detected. The situation should be understood from within, so that schemes and changes can be devised to repair or replace the torn fabric. A basic fact of such understanding is that it is probably not possible to talk about the poor without listening to what they have to say, for if they are not listened to, there is always a danger of artificially grafting on ready-made, technocratic solutions. That is not to say that the planetary implications of poverty are to be ignored, but that they should be approached, as far as possible, through practical situations — the only situations which concern the people who live and die on this earth, after all.

The so-called standard development model postulates linearity (i.e. a succession of obligatory phases), major productivity and per capita production improvements as the only way to social progress and the idea that the costs of mounting inequality are offset by mounting per capita production. The economic bias of the standard model is highly debatable and the idea that 'you can't make an omelette without breaking eggs' perhaps more so, because if too many eggs are broken, there will be no omelette in the end either. Tears in the social fabric ultimately hamper growth and the new idea is to reverse the process and hope that improving health and education and paying attention to the way of life and the environment will ultimately trigger a responsible growth process which cares about the everyday life of man and his environment.

Governments and international developments institutions are ill-placed to set up and speed up such a process. There is so much at stake that everyone on the planet is concerned. But in the absence of strong civil societies with close relations between them, there is a danger that sterile struggle, dogmatism and fanaticism will be perpetuated. Knowing, understanding, communicating, informing and backing up innovatory schemes is, ultimately, one of the only ways of changing the world order — or doing something about the unfair disorder which a good half of mankind is unable to support. In the end, this kind of effort could give a proper content to democracy — which is nothing more than respect for other people and the common good. And if that democracy is the end of history as recounted by Hegel, then it is a fine ending. But there is more ground to cover then he thought...○ P.E. & T.B.A.

Desertification in Sahelian Africa

by L. STROOSNIJDER (*)

The word desertification has gained worldwide recognition since the 1977 United Nations Conference on Desertification in Nairobi, Kenya. However, a comprehensive and generally accepted definition for this complex phenomenon is still lacking. The reader might, therefore, benefit from a kind of visualisation of what is meant by 'desertification'.

On the small spatial scale, the Sahelian zone (in the regional sense) shows a distinct north-south gradient in natural vegetation cover. From being almost devoid of vegetation at the Sahara border in the north, it proceeds, via a Sahel steppe dominated by annual species, into a Sudanian and Guinean savannah with a higher tree density and more perennial grasses. On the large scale, local variation, due to a multitude of factors, is extremely wide, with bare spots next to dense forests.

Due to the semi-arid climate, the natural vegetation is highly dynamic in terms of production as well as in species composition. Again, two scales should be distinguished. Sequences of 3-10 years of drier and wetter (than the average) years occur. This results in north-south shifts (and vice versa) of the various vegetation zones and of certain species (perennial grass is a classic example) of hundreds of kilometres. In addition, inter-annual variation, often on a large spatial scale, makes vegetation look very different from one year to another.

This dynamism has often misled western scientists visiting the area for a brief period only, and has led to many wrong conclusions with respect to the potential (in wetter years) and desertification (in dryer years) of the area. Shifting dunes at the fringe of the Sahara, spectacular as it may look, should certainly not be regarded only as desertification. Desertification occurs everywhere within the Sahelian zone where human-induced physical and chemical soil degradation reduces the capacity of the ecosystem to recover from short or long periods of drought and/or overexploitation.

The natural vegetation of the Sahelian zone has been remarkably resilient to climatic changes and for decades, perhaps centuries, there has been a dynamic equilibrium. However, the present fear is that due to a number of interfering causes, such a dynamic equilibrium does not exist any more and that irreversible changes are occuring. Desertification may be taking place right now all across Sahelian Africa!

Significance of the problem

There is overwhelming evidence, though not always expressed in quantitative figures, that the vegetation cover has decreased in recent decades. This can be shown by time series of satellite images, aerial photographs and vegetation surveys. Such surveys also provide information about dramatic changes in vegetation composition, such as the disappearance of perennial grasses, in coverage of shrubs and trees, the replacement of annual species with a long growing cycle by those with a short one and an overall decrease in biodiversity.

It is less clear whether it is the vigour of resilience that has decreased or the effectiveness of that vigour. Restoration of perennial grasses for instance needs a number of years. It is a striking observation that in many cases, on land that has been fenced, perennial grasses germinate in situations where the nearest plants that produce seeds are tens of kilometres away. However, physical or chemical degradation or lack of protection due to overgrazing may reduce the effectiveness of a still existing vigour. Other land has been physically degraded to the extent that even with protection by fencing, no spontaneous vegetation recovery occurs and germination is observed only after breaking of the soil's crust.

The decrease in vegetation cover leads to a change in reflectance of solar radiation (albedo) and there is a fear that this might damage the climate, i.e. by causing higher temperatures and less precipitation. The fact is that in many locations in the Sahel rainfall has decreased over a period of 20 years. However, since historical rainfall records are scarce, it is still not proven by agroclimatologists whether this decrease is more than a natural long-term persistent dry spell.

The local population experiences the change in daily life. Women suffer from the lack of trees for firewood. Fuelwood is consumed faster than it is produced and cattle dung and crop residues are used more and more as fuel. Soil fertility has declined so that ever more hectares are needed to obtain the same food production. This leads to an expansion of the area used for arable farming which is ever faster than population growth, leaving large tracts of land with too little protective vegetation cover and susceptible to wind and water erosion during part of the year.

The cause

Under natural conditions, i.e. without external inputs by man, annual biomass production is in equilibrium with the amounts of available water and plant nutrients. Geologically, the African Sahel is an old weathered landscape with chemically poor soils so that the majority of plant nutrients are stored in the organic matter of the soil. Each year about 2 % of the available amount of organic matter mineralises so that nitrogen (N) and phosphorus (P), which are the main plant nutrients, become available. In order to maintain the stock of soil organic matter at an equilibrium level fresh organic material must be added to

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the soil each year and converted into soil organic matter by soil (micro)biological activity.

Decades ago, with fewer people to feed, farmers were able to maintain the fragile natural resource base by utilising pastoral animal husbandry systems and shifting agriculture for crop production. In a situation of dynamic equilibrium, the formation of biomass was equal to the losses, leading to a constant level of soil organic matter. Losses were due to biological breakdown of dried or dead biomass, occasional burning as the result of lightning and the limited use of biomass by man and animals. The presence of perennial grasses and trees with their considerable stock of above- and below-ground biomass (root systems) had a stabilising influence on year-to-year variations.

In recent decades, biomass losses have increased rapidly. Man started burning the savannah as a management practice and this resulted in a significant loss of carbon and nitrogen. The livestock population increased as a result of the drilling of water holes and improved services, hence consumption of biomass increased. In the opening-up of land for arable farming, huge amounts of biomass were burned and the organic matter in the top soil was carried away by water and wind erosion. Gradually, under the influence of long persistent droughts, the occurrence of perennial grasses and trees, with their slow and long growing cycles, has decreased, thus reducing the buffering capacity of the biomass-soil organic matter turnover system.

The resulting decrease in the organic matter content of the soil means that fewer plant nutrients become available each year, triggering a downward spiral in biomass production. In addition, a lower soil organic matter content also has a physical influence on the soil. Soil structure decreases and surface crusting becomes the rule rather than the exception. The proportion of the annual rainfall that does not infiltrate into the soil but runs off into depressions or rivers can increase by up to 60%. This further aggravates the downward spiral in biomass production.

Much has been theorised in the literature about who to blame for desertification. In our view it is certainly not the ignorance, obstinacy or lack of interest of the local population or the 'tragedy of the common man' or colonial imperialism. The central issue is overpopulation: not in absolute terms since Sahelian population density is among the lowest in the world, but in relative terms with respect to the 'natural' carrying capacity as determined by poor natural resources and the harsh climate. In this respect lessons can be learned from agricultural development which occurred, relatively recently, in the developed world. There, economic development in other sectors of the economy provided the means to supply inputs to the agricultural sector, thus boosting the carrying capacity of the environment.

Experiences: what does not work

If we understand and accept that, in order to stop further desertification or reverse the present trend, we must increase biomass production, we can also understand why so many concepts intended to fight desertification have failed. To mention a few:

(1) Attempts based on the idea that the low biomass production is due to water shortage have failed. Plants need both water and nutrients and both are in low supply. By improving one of the two, the other quickly becomes the growth-limiting factor.

(2) Attempts based on the idea that there are more efficient ways to extract nutrients from the soil, called soil mining, are doomed to failure. They may increase the biomass production for one or a few years but ultimately they lead to a still lower soil organic matter content than the less efficient mining systems, leading to a physical collapse of the soil. This has happened in a number of commercial cash crop systems.

(3) Ideas to develop sustainable integrated arable/livestock systems under the assumption that such systems produce enough (quantitative) manure of adequate (qualitative) standard to maintain soil fertility. In many parts of the Sahel, the ratio between arable and silvopastoral area is such that there is simply not enough organic matter, either fresh or as manure.

(4) Attempts that assume that desertification is only a social-political problem neglect the technical aspects of the problem, notably the difficulty in increasing the soil organic matter. It takes 20 years to increase the soil organic matter content from 1% to 1.5% with an annual input of fresh organic material of more than 10 000 kg/ha.

(5) Attempts to increase the number of trees have faced many problems and failures. The first misconception is that there is a need for the introduction of exogenous species. Such species appear, sooner or later, less adapted to the harsh climate than local species, which are there by natural selection, and of which seeds and seedlings are available in large quantities. The problem is that few of these seedlings survive, owing to browsing, the harsh climatic conditions and the degraded state of the soil.

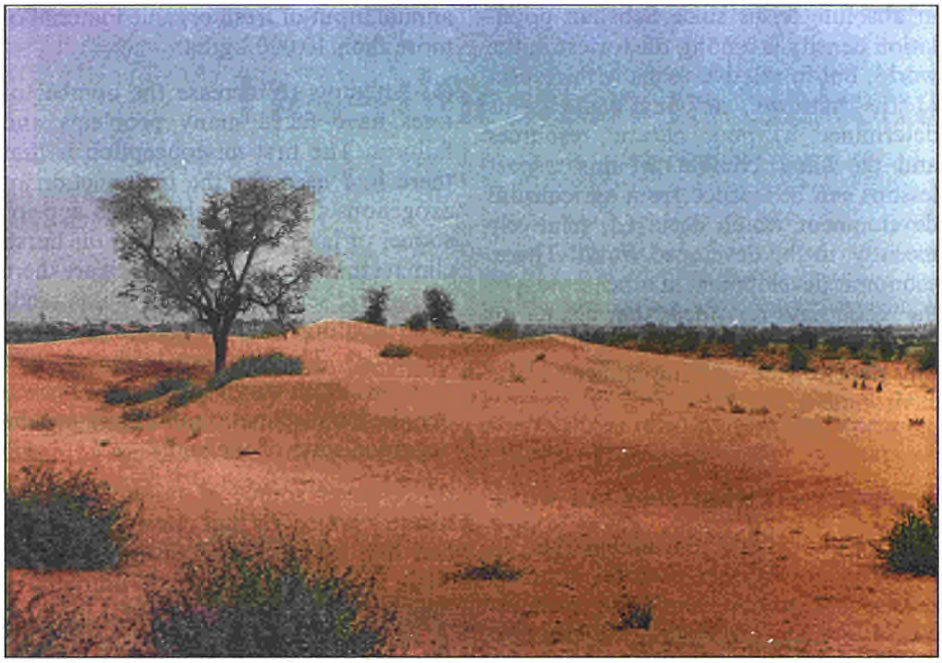
(6) Another source of failure of many forestry projects is that one overlooks the fact that mature trees consume a lot of water and stock a lot of plant nutrients in their above- and below-ground biomass so that they compete for scarce production factors in systems with a mixed vegetation stand. An understanding of 'competition' is crucial in developing systems where trees are mixed with arable farming, i.e. in agroforestry systems.

(7) Attempts that consider indigenous conservation techniques a panacea for desertification are doomed to fail. Many studies appear to be anecdotal case histories. Lessons are to be learned from studying such techniques but a framework for their systematic evaluation must be developed first.

(8) The idea of many western experts that communal property is a serious constraint for development and the subsequent emphasis on 'privatisation' of land tenure. This drive risks harming traditional users' rights and communal survival strategies which provide a remarkable willingness to invest, mainly through labour, in land as a capital asset.

(9) The idea that with the present population density, desertification can be halted, natural resources can be used in a sustainable way and Sahelian countries can become self-sufficient in food production without increasing external inputs to the agricultural sector.

(10) It has become popular to expect wonders from improved coordination of activities. However, the resulting coordination bureaucracy has killed initiatives and actions. As stated above, the cause of desertification is complex and there are enormous spatial variations in conditions. This suggests that there is no simple and uniform approach for solving



Drought and the southward advance of the Sahara are beginning to spread as far as the northern borders of Nigeria. As early as 1987, the Government opted for projects to combat erosion and desertification in Katsina State financed from the EDF

the problem and there must be room for a multiformity of actions and approaches.

Hints towards a direction that might work

(1) Without external inputs, climatic change in the positive sense or drastic changes in land use, desertification will continue and probably at an increasing rate.

(2) Given the highly dynamic nature of Sahelian vegetation, monitoring procedures should be improved in order to separate natural short- and long-term changes from irreversible ones. Accessibility of the growing data base should be improved by using a standard geographical information system.

(3) Given the economic conditions of the local population, their governments and world market trade, it is obvious that external inputs (particularly crop nutrients) must be provided or at least subsidised for an extended period of time by the richer developed countries.

(4) Other sectors of the economy should be developed to provide room for agrarian development. As long as this is not achieved, population growth should be kept at a minimum.

(5) Inputs are most effectively used in an intensive agricultural production system using the better soils. Intensification of rainfed based systems increases annual variation in production faster than it increases the average production. So food production should be concentrated (on a much smaller) area using a combination of organic and inorganic fertiliser and a higher degree of water control. Where irrigation is feasible, it should be developed as a stabilising factor providing the local population with greater security in food production.

(6) In the better part of the remaining silvo-pastoral areas, biomass production and biomass cover must be stimulated by stepwise sequential intervention. The latter includes simple low-cost technology operating in tandem with natural soil recovery. An example of such a package is: first year: stone lines or bunds initiating better establishing conditions for woody species and soil biological activity including termites; second year: stimulation of woody species with local available rock phosphate; fourth year: pruning of woody species for use as cover and termite stimulation in crusted bare spots between the stone lines or bunds.

(7) Management schemes for these silvo-pastoral areas should be developed which are adapted to Sahel conditions. Special attention is to be paid to the quantity and quality of feed during the long dry season Long-distance transhumance make better use of spatially variable resource than short-distance transhumance.

(8) There is an urgent need for research o alternative animal husbandry systems Systems with supplementary feeding o with zero grazing should be tested fo viability. Great care is needed to transfe management practices that are successfu in other semi-arid pastoral zones of th world, like rotational use of silvo-pas toral areas and protection practised in th USA and Australia, to the Sahel becaus physical-meteorological and socio-econ omic conditions vary significantly.

(9) It is not realistic to develop sus tainable systems for the worst degrade silvo-pastoral areas and the margina washed-out arable zones taken out o production. They will need, when i productive use, expensive permanent aid It is better to bring these under long-tern protection and provide alternative em ployment for their traditional users.

(10) Given the present state of desertifi cation, the population is moving south wards for survival. Since prevention o degradation is cheaper than regeneration prevention of degradation in the non degraded areas in the south shoul receive priority over restoration of de graded marginal land in the north.

(11) Prevention of desertification b unintentional over-exploitation of th natural resources by the local populatio should be based on providing the popu lation with more (food) security. Conser vation 'packages' are only accepted i they also provide short-term benefits i security.

(12) Assistance should be given t societies undergoing unavoidable rapi social changes. Support is needed fo groups suffering from the growing in equity which often characterises rapi social change or economic growth.

What is going on?

Our understanding of the complexit of 'the Sahelian problem', of whic desertification is part, has increased. W have accepted that the washed-out stat of an area may be linked to an area wit excess manure elsewhere in the world. I other words, we are aware of the globa nature of environmental problems whic can only be solved if international term of trade are taken into account. There is

world-wide interest in environmental studies in a global context. More and more comparative studies are being started and is education changing from being site and country specific to dealing with underlying concepts and understanding.

Since 1976, regional research in the Sahel has been coordinated by the Sahel Institute (INSAH) in Bamako, Mali. This is the result of coordination between Sahelian countries and donors (CILSS and Club du Sahel). INSAH's 1990-1994 anti-desertification programme comprises the following three aspects: (1) improvement of soil and water conservation measures with an emphasis on nutrient conservation, (2) reafforestation with an emphasis on local multi-purpose species and (3) monitoring the dynamics of desertification by building a data base. This all looks very promising but there is a fear, based on experience, that too much bureaucratic coordination kills initiatives and actions.

In some Sahelian countries there has, since colonial times, been an export commodity oriented infrastructure. Examples are the networks for cotton and irrigated rice in Mali and groundnuts in Senegal. The gradual transformation from colonial to national management of these networks has paved the way to use this infrastructure more and more for combating degradation.

The World Conservation Union (IUCN) has a special Sahel Programme which focuses on nature conservation by improving subsistence security and lengthening the time horizon of the local population. Nevertheless many projects wrongly take 'ignorance' of the local population as their starting point.

The European Community supports a research network (R3S) that studies, among many other topics, agricultural intensification by improving irrigation in inland valleys. Indirectly this reduces the pressure for the expansion of rainfed agriculture on marginal soils. The Organisation for Economic Cooperation and Development (OECD) undertakes studies looking at alternative development scenarios for the Sahel. All this helps to mobilise national and international opinion for political change.

Studies are undertaken to understand feedback mechanisms in global climate changes. Is it true that changes in reflection due to the decreased vegetation cover cause rising surface temperature and affects the local climate? And does increased runoff lead to a reduction in precipitation?

A large number of forestry oriented projects attempt to solve the shortage of wood. Communal systems have a bad record of success, private approaches seem better. The majority of these projects still assume that there is a significant potential for natural resilience. Quantitative estimates of cycles of and the need for water and nutrients to achieve certain production goals are often lacking.

So-called integrated projects help the local population with a variety of short-duration improvements but leave long-term prospects hidden.

Constraints

Though the message seems old-fashioned, outdated and not popular, the slow progress in reducing population growth is a major constraint in fighting desertification. It is too easy to state, and presented as a law of nature, that family planning in sub-Saharan Africa will be successful only if poverty is eradicated. Family planning has been successful in countries like Indonesia and Thailand and seems more related to education and communication levels than to poverty. The local population, at least the women, seems to be aware of the circular nature of such reasoning; poverty is the result of population growth and population growth cannot be stopped because of poverty. The large migration out of marginalised areas and the subsequent social sufferings form the basis of knowledge of and willingness for family planning, provided the means are made available.

At present, a great deal of project-organised development aid is spent in the Sahel. Most is of short duration, embraces only a small area and is, in spite of much research during recent decades, based on the wrong assumptions.

Local institutions, including governments, are not able to cope with the complex problem and the massive assistance that is needed to halt desertification.

The limited education and health status of the local population as well as the vacuum of social structure between old and new institutions hampers the bottom-up approaches which are needed for a real breakthrough in cooperation.

The economic conditions of the local population, their governments and terms of trade in the world market do not allow a competitive development of the agricultural sector. Development of other economic sectors which should provide the means for agricultural inputs is not likely.

Finally, too much emphasis and public support is still being given to cosmetic actions eradicating symptoms instead of attacking basic problems and constraints. For the large part, this is due to the stereotype image of African poverty and ignorance that is presented by the western press. This is justified as the only way to maintain public support for donor aid but it has, in reality, more to do with the sensationalist nature of the popular press.

The above discussion of desertification in Sahelian Africa is very general. It should be realised that there are large local differences and that combating desertification is only possible if the local conditions are carefully taken into account and measures are tailored to these local conditions.

The cause of desertification seems to be known and the technical means to stop the process of desertification are known. However, Africa is not at present able to make the necessary investments. The developed countries need to make a serious long-term commitment to stopping the desertification of Sahelian Africa. Failure to recognise and solve this problem could have serious negative effects for developed countries as well.

Research should be site-specific, focus on optimum returns on investments in agriculture and take the social repercussions of a change in land use and farming system into account. The problem cannot be solved with the traditional disciplinary approach. Multi- and interdisciplinary attacks have become popular, but their superiority in identifying viable development paths is still to be proven.

So-called integrated projects too often put up a smoke screen for unclear or unrealistic targets based on the wrong assumptions and resulting from a lack of understanding of the underlying processes. More research, slow as it is and expensive as it might seem, is still needed. ○ L.S.

Desertification control

The Community's approach

by Donatella DIANE (*)

Drought, a serious water shortage which temporarily compromises agricultural potential, is a hazard of climate. Desertification, that complex phenomenon which implies irretrievable deterioration of soil and plant cover, is triggered primarily by human activity. It occurs not only in areas such as the Sahel, where periodic drought is to be expected, but also in humid and semi-humid places which are miles from any desert.

It was when they saw the two great droughts in the Sahel in 1968-1969 and in the early 1980s — and, of course, the disaster they brought in their wake — that people woke up to desertification and the need for strategies to beat it.

These strategies have altered a lot over the years. Since the early days and the more global approaches such as the UN Action Plan, far more complex plans, covering regional and local ramifications as well as the global aspect, have evolved. The important thing now is participation — realisation of the fact that local institutions and communities can and must contribute if any desertification control campaign is to work.

The Community's interest and concern here were clearly reflected in Lomé III (signed in 1984), which dealt exhaustively with the safeguarding of natural resources (and desertification control especially) in Articles 38-43.

The idea of the Convention was to make desertification control an integral part of all areas of agricultural and rural development. Particular emphasis was on extending agroforestry systems, on research and development into plant species better suited to local conditions, on soil productivity maintenance and recuperation techniques and on involving local people and authorities. Other complementary operations — energy-saving schemes as well as awareness and training campaigns, for example — were also covered.

Lomé III-type principles also apply in the long-term European Action Plan approved by the Council Resolution of April 1986, which coordinates the Community and Member States' desertification control drive. This Plan tackles desertification globally and suggests a range of different but complementary schemes. Both direct and indirect actions (reafforestation and anti-erosion operations; research, training and rational management of resources) are included. The Plan also points to active involvement by the local populations as the key to efficiency here. Achieving a particular overall volume of assistance to match the extent of the problem and ensure continuity is also considered to be a requisite.

The European Action Plan was first assessed in November 1989 in a mid-way report on the approach used and the schemes financed.

The extent of the Community commitment emerged clearly from the number of projects and the total amount ploughed into this sector. Between 1986 and 1989, 230 projects dealing directly or indirectly with desertification control were financed. They involved three kinds of operation:

— specific anti-desertification (i.e. reafforestation and anti-erosion) schemes;

— agricultural development and livestock schemes with rational management of resources as one of the prime aims;

— development schemes in which the safeguarding of resources was just one of the components.

An estimated ECU 1000m out of a total of ECU 1700m was invested in desertification control measures.

One of the things the report showed was that most rural development schemes had a resource protection component.

One or two examples of significant schemes run in the different areas of anti-desertification will perhaps be helpful at this point.

On the rural development front, the integrated development programme for the Sourou, Yatenga and Passore provinces in Burkina Faso is worth a mention. It is sited in a Sudano-Sahel zone where the land was under serious threat of deterioration from an expanding population. The Sixth EDF ploughed ECU 44m into a variety of complementary schemes, mainly to provide water control facilities to establish and improve the farmers' output. Work included such things as creating a 500 ha irrigated plot, providing water points (mainly boreholes and fittings), setting up anti-erosion sites and putting water to many uses on small irrigated plots, in grain fields, market gardens, reafforestation and herding and in the home.

Back-up schemes to help the basic anti-desertification and food security cam-

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In Mali, farmers show how desertification can be combated by bringing water to the surface and producing vegetables from what was once arid land

paign are being run to develop rural facilities, improve the roads and give support to the local people's health, primary education and drinking water operations.

The project was remodelled halfway through to cater for problems which had arisen during the first part. It was also realised that more than technology was required to make the operation a success, that the village communities had to be more involved in managing their resources and that training had to be provided to improve local skills, particularly when it came to combating erosion.

Livestock, a potential risk factor in the management of natural resources, has also got all the attention it needs in the Community Action Plan. The main idea here is still to manage natural resources rationally and it involves, for instance, catering for the consequences of overgrazing of pastureland — with veterinary care improving health conditions, herds can be expanded and they may be too big for grazing land which is still managed by traditional methods.

Technical and vocational training programmes for herdsmen are included in these projects. They are intended to help them make a more rational job of managing their pastures by using simple, cheap methods such as herd rotation and controlled burning of some areas when the weather is right for regrowth.

One example of Community assistance in the livestock sector is the rinderpest control campaign, underwritten with a global ECU 70m (from the EDF regional monies) which was granted in accordance with agreements between the Community and the recipient countries.

The campaign provided vaccination, supplied medicines and rehabilitated livestock services and was associated with desertification control measures. The main schemes were irrigation in Djibouti and improvements to grazing land by aerial sowing in Ethiopia, and both of them were very successful.

Another key to the desertification control drive is energy, for burning firewood is one of the obvious causes of desertification and the effects around African towns, big and small, are there for all to see. A significant example of action on this front is Zaire's Bateke Plateau reafforestation project, which planted 6 000 ha with trees (using know-how from the Kinzono Forestry Centre and experience acquired in agroforestry tests). It has been a real success technically speaking, although there are still problems to sort out to ensure that the new woodland is managed rationally and the scheme is viable. It is extremely important because it involves preserving the environment around Kinshasa, where the population is expanding at the rate of 7% per annum and bringing considerable pressure to bear on the natural resources. Unfortunately, despite its promising results, the political situation in Zaire has brought the project to a standstill.

Lomé IV has brought major developments to this field by introducing the principle of sustainable development, which involves taking the rational management of natural resources into account in every development operation — a broader concept than just preserving natural resources. Articles 54 to 57 of Title II (agricultural cooperation, food security and rural development) deal with desertification control.

Several countries — Mali, Nigeria and Burkina Faso, for example — have desertification control as a priority in their National Indicative Programmes. Mali, in particular, has a national desertification programme. Nigeria has produced specific desertification programmes for the Sokoto, Katsina and Borno provinces in the North. There are plans to sensitise and teach the people how to look after natural resources and there will be rural development infrastructure and service supply programmes too. Burkina Faso's schemes are geared to developing and managing water resources and managing land under the National Territorial Management Programme.

Erosion control and soil conservation are features of Indicative Programmes in other countries (Zimbabwe, for example). Small village irrigation programmes are planned in Niger, where emphasis is also to go on protecting and rehabilitating land in the river basins.

Schemes financed outside the European Development Fund, particularly via the 'Ecology in Developing Countries' budget line, are also worth a mention. The Commission set this line up in 1982 with an initial ECU 30 000 and a total of ECU 39m was added to it between 1982 and 1991.

From the outset, the lion's share (ECU 11.5m or 29%) of these resources went into desertification control, mainly for studies and projects designed to produce a better definition of the problem by remote sensing.

Thanks to the budget line, a contribution was made to financing the launching of the Mas Palomas satellite station in the Canaries, which can receive satellite data for West Africa (Landsat, Landsat thematic mapper, Tiros and Spot).

These techniques and the satellite data from Mas Palomas have made it possible to investigate the dynamics of the phenomena of desertification on the southern edge of the Sahara. This involved the Joint Research Centre at Ispra's coordinating a number of European research institutes in a study to evaluate water resources (Guinea, Mali, Senegal), determine the degree of deterioration of the plant cover (Burkina Faso and Mali) and monitor the state of natural grazing land in the light of cloud and rainfall (Niger) and ensure agro-climatological monitoring of crops in the Sahel.

Another significant scheme was the study and design of standard catchment basin development projects in the Fouta-Djalon and in the upper reaches of the Niger. The basins were listed and it proved possible to study trends in tree cover over a period of ten years.

All this made it possible to look at desertification from every angle and, using the results of analyses, to define high-risk areas where long-term EDF-financed operations were called for — as in the case of the Fouta-Djalon plateau in Guinea, where the main Sudano-Sahelian rivers take their sources.

In 1991, a study combining sociological investigation and remote sensing was financed in Northern Benin. It aimed to see the process of desertification as a whole and consider such things as population growth, migratory movements and methods which farmers and herdsmen use on the land. All these factors are changing the traditional balance between these two types of operators and they can involve heavy pressure on the fragile equilibrium of these marginal zones where the risk of desertification is high.

The study reflects the new approach which has been shaped by experience with desertification control projects. Local populations, their dynamics and their participation are key factors in the drive to halt desertification processes and, more generally, to preserve our natural resources. No reafforestation or anti-erosion project will work unless the people concerned are involved from the very outset — and there are plenty of examples of desertification control projects which failed because they were enforced from above.

This latest study also makes it clear that desertification also occurs in areas which are not near any desert. One example of this is the Southern Sahel, where better weather conditions have encouraged people to come down from the north in search of new land for farming and herding.○ D.D.

The European Community and tropical forests

by Marcus ROBBINS (*)

The European Community is linked to tropical forests by more than the hardwood veneers that lined the Commission's Berlaymont corridors. The value of forest resources to developing countries has, from a very early stage, been recognised as an important element in the Community's development links with the Third World. Many goods that originate from tropical forests, not only timber, benefit the populace of the Member States, and are linked by commerce. Such benefits may well increase in the future, thanks to the rich genetic diversity of those forests. And recently, the links to global climate have been recognised as having a potential to affect us all.

These actions have covered much of the Third World. However, they initially concentrated on ACP countries, as is reflected in the following table. But there is now increasing additional involvement in ALA countries, where the bulk of the world's tropical forests lie.

Geographic distribution: % of expenditure 1978-1991

Africa	78%
Caribbean and Pacific	3%
Asia	15%
Latin America	4%

Development links

The strongest link at present certainly originates from the development interests of successive Yaoundé and Lomé Conventions, and other agreements. Over the past twelve years, some 250 projects related to the forestry sector have been financed from various Commission funds, with a total cost of nearly ECU 400m. Initially, many of these were related to dry savannas and the problems of desertification. But now more emphasis is being given to moister forests, and the specific problem of rainforest conservation. The following table summarises the types of action that have been carried out, classified by subsector according to the Tropical Forestry Action Programme:

Types of forestry actions: % expenditure 1978-1991

Forestry in land use (support of agriculture)	44%
Forest-based industrial development	29%
(Forest resource management and development for industrial uses 7% + others 22%)	
Fuelwood/wood energy	3%
Conservation of tropical ecosystems	15%
Institutions	9%
(Research 4% + Training 3% + Others 2%)	

It is interesting to compare the Community and its Member States with regard to total overseas development assistance (oda) for the tropical forestry sector. The following table, summarised from FAO statistics (Report to the Committee on Forest Development in the Tropics, 1991), lists the contributions in order of magnitude for the year 1990. The proportion of the Community's contribution is likely to increase as more funds are allocated to the forestry sector, and new programmes develop.

ODA (mECU) for the tropical forestry sector, 1990

Germany	160	50%
Netherlands	36	11%
EEC	35	11%
France	34	10%
Denmark	24	7%
UK	22	7%
Italy	7	3%
Other Member States	2	1%
Total	320	100%

This total is about half the ECU 690m provided in 1990 by all donors worldwide. Judging from the current action plans of developing countries in the forestry sector, the yearly expenditure should be in excess of ECU 1000m. Thus the Community and Member States provide about a third of the required amount. As will be apparent, there is still a large shortfall to make up.

The majority of Community projects have been covered by European Development Funds, under the Lomé Conventions. But many have also been supported by Community budget lines, such as those concerned with development actions in Asia and Latin America; Co-financing with NGOs; Ecology in Developing Countries; and Science for Technology and Development; and more recently, the Tropical Forests budget line. The actions have covered periods of a few months to several years, at a cost of a few thousands to many millions of ECUs. Smaller projects have concerned community forestry afforestation schemes, studies on mangrove management, and satellite survey of forest resources. The projects described below represent the larger end of the spectrum, and indicate the increasing emphasis given to conservation actions.

Widespread forests: wide ranging actions

The Central African regional programme for the conservation and sustainable use of forest ecosystems concerns the biggest tropical forest area after that of the Amazonia. Adopted as a result

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The Community has spent some ECU 400m on more than 250 forestry projects in the ACP States

of the Brazzaville Declaration of May 1990, it covers seven countries: Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic, Sao Tomé and Principe, and Zaire. Supported from EDF regional funds to a total of ECU 24m, the main objectives of the programme are: the protection and conservation of natural forests; the sustainable development and utilisation of forest ecosystems in conjunction with the local populations; the development of agro-forestry activities in the outskirts of the forests; and the stepping up of training and research activities.

Across the Atlantic in the South American continent, the Pilot Programme for the conservation of Brazil's Amazonian Forests is being initiated. This was prepared by Brazil with the support of the Commission and the World Bank in the light of the conclusions of the Dublin European Council of June 1990. The Commission's contribution now stands at ECU 15m. Its aim is to optimise the environmental role of the Amazonian forest in a way that is compatible with the policy for sustainable development of Brazil, thus contributing to a steady reduction in the rate of deforestation. The main objectives are: the better management of natural resources and restoration of damaged areas; the boosting of human and institutional resources; the conservation of biological diversity; support for scientific and technical activities; the maintenance of the way of life and culture of forest dwellers; the promotion of environmental awareness; and the creation of demonstration areas.

Two further projects exemplify the importance given to research in Community actions. A joint programme between the European Space Agency and the Joint Research Centre of the European Communities called *TREES* (Tropical Ecosystems Environment Observation by Satellites) is working out a methodology for continuous monitoring of tropical forests. And a new European Tropical Forest Research network, initiated by the Commission, will be assisting in the concertation of scientific activities of numerous actions by: creating greater transparency; giving advice on strategic research issues; and facilitating access to existing knowledge.

The plans behind the actions

Projects funded by the Community have thus run the whole gamut of size, location and topic. But what has been the policy and planning framework in which these actions have been developed? Like the forests it is helping to conserve, this framework is steadily growing, feeding on the wide range of experience that has been acquired from past actions. Forest protection and sustainable forest management issues are now increasingly addressed as an integral part of the Community's development aid policies.

The fourth Lomé Convention, effective from 1991 to 2001, states that development should be based on a sustainable balance between economic objectives, the rational management of the environment, and the enhancement of natural and human resources. The problem of deforestation and degradation of tropical forests is referred to in the context of the environment, agricultural cooperation and food security, drought and desertification control, energy development and regional cooperation.

Cooperation agreements with Asian, Latin American, and Southern and Eastern Mediterranean countries have also provided a sound basis for the implementation of cooperation on sustainable management of natural resources.

In 1989, the Commission services took an overall look at the problem of deforestation, and summarised the issues in a document entitled 'Role of the Community in the conservation of tropical forests', finishing up with an outline strategy. This document served as a basis for a resolution that was adopted by the Council in May 1990 entitled: 'Tropical forests: development aspects'.

Policies need principles

A look at the Council resolution will give an idea of the many issues that need to be considered. It began by emphasising the importance of tropical forests and the need to conserve them. It acknowledged that more funds should be provided using existing instruments. A series of principles and activities were then endorsed which included the reaffirmation of the sovereignty of tropical-forest countries, along with the need to assist them to carry out conservation actions themselves.

The Resolution recognised that the Tropical Forestry Action Programme (TFAP) was a basic framework for coordinated funding and action, that needed to be used and improved. In addition, the role of the International Tropical Timber Organisation (ITTO) in promoting forest management was recognised, as was the role of forestry research; and the importance of legal, fiscal and institutional measures was emphasised. The resolution also noted the need to consider geographical allocation of funds, at the same time accepting that actions should vary according to the needs of individual countries. The particular importance of the social dimension of forests and the involvement of NGOs was recognised.

The Commission's Communication and the Council Resolution have served as a stimulus to further analyses by several Member States, such as Germany, the Netherlands and the UK, and also by non-government institutions such as WWF. The Parliament is currently about to embark on its own examination. All have produced opinions as to what should be the Community's role in relation to tropical forests. As such, they will form a valuable body of ideas from which future Community policy can continue to be developed. Current discussions in the framework of UNCED will be important for sifting, clarifying and consolidating these ideas, so that policies and plans will emerge that really address the needs of the developing countries and the forests they possess.

We are not alone

During the past five years, the Community has attempted to bring a more holistic approach to its actions. It is recognised that its own efforts must be harmonised with those of other donors worldwide. For this reason, the Tropical Forestry Action Programme (TFAP), an instrument for coordination and cooperation, is being supported — not only on paper, but also by participating in and supporting the process in individual countries. The Lomé IV indicative programming in ACP countries takes into account the TFAP forest sector reviews, so that support for individual countries can be better oriented in the future. The TFAP has not been without its problems, which the Commission recognises must be overcome. But the way to do this, hopefully becoming apparent to all concerned, is to improve the TFAP by using it, and using it well.

The Community, as a signatory of the International Tropical Timber Agreement, and member of the International Tropical Timber Organisation (ITTO), makes an active contribution to this institution. There is no doubt that the timber trade is an important link in the conservation of tropical forests, and can play a valuable role in promoting sustainable management. The current aim of ITTO to achieve sustainability by the year 2000 is fully supported, particularly the role that ITTO is playing in promoting guidelines and procedures for good practice.

Many other international efforts are being supported by the Community. The idea of a general statement of principles on the conservation of all the world's forests, being developed in the framework of UNCED, is one of them. This could develop into a Convention. The role of Biodiversity and Climate conventions already in preparation is also being promoted. Actions in the framework of CITES with regard to endangered tropical timber species, and the promotion of forestry research within the framework of the CGIAR are other examples. All of these are actions that must be made to work, and to support each other.

The people behind the plans

There is a wide range of Community institutions, directorates, divisions and people behind the actions, and the plans and policies from which they emerge. DG I (External Relations) covers development actions in ALA countries, in particular the Pilot Programme for Brazil. DG VI is concerned with forests in the Community countries, through which there are several links to the tropics. DG VIII covers ACP countries as well as taking the lead in TFAP, ITTO, and managing several budget lines that support the sector. DG XI (Environment) is especially concerned with global benefits of tropical forests in the context of UNCED, and is helping to promote interservice coordination. DG XII, with its research centres, is concerned with research matters and thus covers the TREES projects, and the European Tropical Forestry Research Network.

As involvement increases, so must capacity — not only in the developing country institutions, but also in those that are helping them. The Commission's Berlaymont offices have been vacated — to allow for renovation — and the tropical veneers now enjoy a calm like the original forests from which they came. The shifted populations, inhabiting new pastures, need to expand and become more active to cope with the ever-growing range of ideas, policies, plans and actions. Then stronger and stronger links can be forged with developing countries that really help them use their tropical forests wisely — more wisely than the north has made use of its own forests. In this way we all benefit. ○ M.R.

Changes in livelihood strategies in northern Benin and their environmental effects

by Dr Leo J. DE HAAN (*)

Livelihood strategies have been subject to rapid change in northern Benin since the 1970s, partly because of the drought in Western Africa and partly because commercial agriculture has developed. This has led to ecological deterioration in various places, but fortunately steps are being taken today to preserve the environment and come up with new ways of managing the land.

The National University of Benin and the University of Amsterdam, in conjunction with the National Centres for Agro-Pedology and for Remote Sensing (two departments in Benin's Ministry of Rural Development and Cooperative Action), and at the request of the Commission of the European Communities, are investigating how changes in relations between the region's main forms of livelihood — farming and breeding, that is to say — have affected the environment and how the ecological changes in turn have affected reciprocal relations. The study project is particularly concerned with the highly dynamic Borgou prefecture (50 905 km^2 in area and with a population of 600 000), where cotton production has soared, nomadic herdsmen from the Sahel have immigrated in large numbers and the European Development Fund is active in animal health and the development of water tanks for the cattle. The study comprises a socio-economic analysis of farmer-herdsman relations and a pedological and botanical analysis of the environment, using field surveys and interpreting satellite pictures.

Relations between the two forms of livelihood — farming and herding — in Northern Benin have been subject to considerable change. This is something which happens often in the semi-arid regions of Western Africa, where the environment determines the zone of contact between agriculture and transhumance cattle rearing (nomadic pastoralism). There used to be interaction, based on the interdependence of the two groups and making for greater security of livelihood in a relatively unstable climate, but in the 1980s, circumstances were such that tension between the two groups mounted. This was partly due to technological changes (introduction of draught animals and motorised pumps) and the farmers' increasing involvement in the market — which led to considerable extension of cotton and groudnut crops and market gardening, something which happened particularly fast in Northern Benin — and partly to a period of relative drought affecting the country's herdsmen especially. At the same time, the flow of herdsmen immigrating from the Sahel increased considerably. There is nothing special about this immigration in itself. The people of the Sahel have been migrating over the Sudanese zone of Western Africa for centuries. This recent immigration is the result of aridification in the Sahel. In fact, it is only one element of transhumance movements on a vast scale. Typically, large numbers of nomads flock in from Niger, Nigeria, Burkina Faso, Togo and even Ghana and Mali during the dry season. There are many of them, particularly when drought in the Sahel is dramatic, as it was in 1984 and 1985. It is a long time since the Sahel herdsmen confined their migration to the Borgou prefecture and now they go into prefectures in the centre and south of Benin too — where the peasants are not used to nomadic herdsman and immigration creates a problem.

The Borgou region

In the far north of the Borgou prefecture lie the valley of the River Niger and the sub-prefectures of Karimama and Malanville. These sub-prefectures are limited to the north west by the River Niger, which also marks the national boundary. In the south, the Government has opened the National Park of the 'W', the Cygenetic Zone of Djona and the Listed Forest of Goungoun — an uninterrupted sweep of protected areas closed to farming, herding and housing. South of the protected areas are the sub-prefectures of Kandi and Banikoara, heavily used by farmers and herdsman, with a very dynamic cotton trade working solely for export. Further south in the Borgou are areas where cotton, maize and yams are grown.

The Borgou is in the Sudanese climatic zone. The northern parts have previously had average rainfall of 800-950 mm — a figure reached rarely since 1969. Annual variations are considerable. The rainy season runs from May to October. Annual rainfall is as much as 1100 mm in southern Borgou. Almost all the villages in the Niger valley have been built along the river. The water has rarely covered the banks over the past 20 years, because there is very little rain and irrigation has been augmented upstream. The broad bed of the Niger is currently being used to grow sorghum, maize and rice and there is market gardening along the tributaries. The vegetables are sold on the national market via Malanville, a small town with a sizeable frontier market, the second largest market in Benin.

There has been little development of agricultural techniques in the Borgou and the natural conditions, like the variability of the rainfall and the poor quality of the soil, are crucial. Draft animals and motor pumps are two major exceptions to the region's traditional agricultural practices. In the 1980s, the arable land was extended enormously thanks to draught animals and expanding cotton production. The shortage of land has not been an absolute problem so far, but the extension of the fields combined with the herdsmen's use of the land are putting increasing pressure on the environment and leading to a process of soil deterioration. In the far north, motor pumps have been used to irrigate market gardens along the rivers and extend the growing period.

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Symbiosis between farmers, breeders and merchants heretofore allowed the preservation of nature. Changes in the way of modern-day life are accentuating the deterioration of the environment linked to these activities

Deterioration of the environment

From an environmental point of view, the ecological situation in various parts of the Borgou is cause for alarm. In the northern sub-prefectures of Karimama and Banikoara and part of Kandi too, soil and vegetation are deteriorating badly because of commercialization and a series of demographic and climatological factors. In a subprefecture like Kalala in south east Borgou, the situation is better, as lower population density and better rainfall have meant less deterioration of the environment — although there are too many cattle overloading it in the dry season.

Tree formations are deteriorating badly in the National Park of 'W'. The gallery-forest has disappeared. The clear forest and the park savannah are dwindling and shrub and grass savannah have gained a great deal of ground. The deterioration of the plant life is caused above all by brush fires and roaming cattle. Transhumance activity in the Park has increased since the 1970s. Several herds crop the grass throughout the year and the pastureland is over-exploited as a result. Heading does not take place and brush fires burn the grasses and prevent germination. So the pastures of the Park are replaced by neither regrowth nor germination — indication that the land is overloaded.

But herding is not the only cause of decline. There is deterioration in the cotton-growing areas of Banikoara and Kandi too. Draught animals mean trees have to go. A large number of young trees have been felled to make way for cotton fields. Soil usually declines because its physical and chemical make-up is upset, but various types of erosion are already at work here and there. In the Kandi sub-prefecture, observation of deterioration suggests that the zone can be divided into two. One part has bare hillocks, fields generally along old valley floors and a fairly serious threat of erosion, which is gradually attacking the fields. The other part has hills of quartz — also found on the neighbouring plains. The fields are on homogeneous soil and there is less erosion.

In the sub-prefecture of Banikoara, observation of the deteriorating soils suggests that this area can also be divided into two parts. One is the eastern and northern area with one or two flat-topped hillocks, where the soils vary from slightly leached to leached and the degree of deterioration is fairly moderate to moderate. The other is east of Banikoara, where there are slightly leached ferruginous and hardened ferruginous soils or slightly leached hydromorphic soils on basic rock. Both types are very degraded.

Symbiosis of livelihood strategies and the management of lasting natural resources

The symbiosis between herdsmen and farmers in northern Benin until the 1960s and 1970s cannot just be seen in terms of socio-economic relations between the two groups, because, as we shall see, it also involved regulation of the management of natural resources.

More than a century ago, Peul herdsmen in search of good grazing land penetrated northern Borgou en masse. The Bariba and the Dendi had settled in this region a little earlier and had developed agriculture (Bariba) and farming combined with fishing, an activity which they had depended on before (Dendi).

Since the farmers had the longest-standing rights to the land, the Peuls had to ask them for permission to use it — a principle which still holds good today and which for years did nothing to prevent genuine equality and relatively harmonious relations between the two groups. Relations between farmers and herdsman until the 1960s and 1970s can be reconstructed as follows.

Interaction of the groups ensured the best living conditions in a fairly capricious, semi-arid climate and symbiosis was founded on this interdependence. It included the bartering of goods and services and — something very interesting from our point of view — land management in the form of alternate use of space. The types of relations differed according to season and in periods of severe drought. Contact was not always free of tension, but it was efficient, overall, for both groups.

The Peul used their period of space-sharing in the farmers' crop cycle, of course, to feed and water their herds. Relatively permanent camps served as bases. Families stayed there in the dry season with one or two head of cattle and food was grown there during the rainy season. In the driest months, the herds left for transhumance pastures further south, where there would be grass and water, and at the beginning of the rainy season, they came back for the new grass. They never went too near the fields, preferring cropless land a few kilometres outside the villages.

When the harvest was over, the animals went into the fields of stubble and deposited dung and the farmers often gave grain in return — the 'manure contract'. As soon as the stubble had been

eaten and the water reserves were dwindling, the herds went back south.

The fact that this livestock system helped preserve a physically vulnerable environment is of vital importance from the ecological point of view. Transhumance herding is extensive, but calculations suggest that it is a satisfactory response to climatic instability. The seasonal water shortage especially forces herds to go south in search of waterholes. As they come back only with the first rains, they do not overburden the land. Peasant farmers used to get the Peul to look after their cattle — which therefore left for the transhumance pastures too — and the Peul herdsmen kept the milk and some of the calves in exchange (keeper contract).

The fact that the peasant farmers did not put down fertiliser, but had herdsmen graze their cattle on the stubble fields and leave their dung in exchange, is also important from the ecological point of view. This method was one of the rare traditional methods of countering soil deterioration.

Disputes sometimes arose when herds went too near the crops. In relatively dry years, the herdsmen were forced to take their animals to waterholes in the croplands prematurely. Any disputes were settled at the level of the individual.

In the 1970s and 1980s, changes occured in the symbiotic relationship and, therefore, in land management too, accelerating ecological decline. A large number of the Sahel's herdsmen settled in the Borgou and made the overburdening of the pastureland worse. Now the Sahelian nomads also go into the Borgou in search of pastures in far greater numbers than they did before the drought and they do so earlier in the dry season and go ever-further south. They graze their cattle in places which Benin breeders have already left by this time of year, so the land is over-used, which leads to serious damage to trees, since branches are cut off so the cattle can eat the leaves. Relations with the farmers are far more of a problem for these foreign transhumance (or recently settled) herdsmen. They are viewed with suspicion, they have few links with the region and its inhabitants and they cause more damage to the natural environment and the crops.

Draught animals have made it possible to bring a great deal more land under crop, but this has restricted potential grazing land or rendered it inaccessible. The two groups' traditional space-sharing has been seriously upset. Since the herdsmen depend on the farmers for the right to use the land, the farmers think they can proceed to plant crops on pastures and cattle trails without consultation. Yet there is an imperious need for space, particularly during years of drought. This is why the protection areas are being used more and more, particularly in north Borgou where there are very few waterholes in places legally accessible to cattle — i.e. outside the protected areas. Things should be better in Karimama and Malanville because these two sub-prefectures are by the River Niger and crossed by two other rivers, the Sota and the Alibori. In fact, the extension of low-water crops has taken over the rich dry season pastures on the river bed and prevented the cattle from getting through to the waterholes. Herdsmen from the river valley are also forced to move south in the dry season. Even if they do not graze their cattle in, say, the National Park of the 'W', they are forced to cross it (despite this being officially prohibited) to reach the grazing land further south.

Towards a new ecological balance and new land management

Cohesion between the farmers and the herdsmen is declining as their complementarity wanes. The shortage of waterholes, the influx of herdsmen and the extension of agricultural areas and market gardens are such that the farmers' land is subject to increasing damage from cattle. As the farmers are making more and more use of chemical fertiliser, they attach less and less importance to the manure contracts. And with disputes getting more common, they are less and less inclined to have the Peul look after their animals — which now stay and graze around the villages throughout the season.

So reciprocal relations are in constant decline, which is regrettable, bearing in mind that new types of land management are needed if lasting use is to be made of the environment. Farmers and herdsmen have to enter into local agreements to settle such things as the routes cattle can take to the waterholes, the measures required to prevent grazing land from being hemmed in by fields and the times at which herdsmen can graze their cattle on the stubble fields.

New water tanks installed by development projects enable herdsmen to stay away from farmland and the protected areas. But they are still in short supply — and cattle come from all directions to crowd the land around them. Herdsmen should refrain from over-burdening the pastureland by regulating its use. The uncontrolled immigration of foreign herdsmen is also a particularly troublesome complicating factor. Nonetheless, the herdsmen will probably be forced to reduce the size of their herds in order to push up the quality.

The farmers must speed up their application of conservation techniques if the ecological decline of the agricultural areas is to be stemmed. There is still a lot of ground to cover here. Few farmers follow the recommendations and rotate their cotton crops with agricultural products and fallow periods to prevent soil damage and deterioration. Instead of alternating cotton with maize or groundnuts, they grow cotton in the same field year after year. They do not always stick to the different levels when tilling the fields either, nor do they bother with any other method of countering erosion — which is gaining momentum as a result.

Fortunately, peasants, often with backing from development projects, are trying out conservation techniques here and there all over the Borgou. These are still rare exceptions, but they are an encouraging example. There are one or two peasant farmers rotating their cotton fields strictly, working the land according to level and even planting trees around their fields to prevent erosion by wind and water. There are herdsmen and farmers in some villages who stopped using the brush fire technique years ago. And there are peasants who are experimenting with the small-scale ensilage of grass for fodder in the dry season or putting by forage in the form of hay. Yet they usually have no more than draught oxen. The most encouraging example of land management is the Pastoral Units in south east Borgou, which were set up on the initiative of the UNDP-FAO and the Livestock Directorate-EDF. They are organised around a new artificial lake and managed by a committee of herdsmen and farmers and they should gradually develop into an association which will both run a livestock input store and a cattle market and be responsible for managing the land. ○ L.J.D.H.

Ecological problem solving

A look at the work of the Institute of Terrestrial Ecology

by Dr M.D. HOOPER

The Institute of Terrestrial Ecology is a component part of the Natural Environmental Research Council, formed in 1973 as part of the British Government's reorganisation of its research, by the amalgamation of pre-existing research groups. ITE currently has two hundred scientific staff and six research stations, charged with both basic ecological studies and the application of the ecological sciences to practical problems. Most of the basic work, representing about one third of ITE's annual budget, is funded by the UK Department of Education and Science. The remaining two thirds of funds come from contracts with other government departments and agencies, foreign governments, organisations such as the European Commission and the private sector. The majority of these contracts are concerned with either the sustainable exploitation of natural resources or the danger of damage to these resources caused by pollution in all its myriad forms. There are currently 65 projects and over 250 subprojects under investigation.

In this article, Dr M.D. Hooper of the ITE describes some of the Institute's work, which may have particular relevance to ACP countries, in the field of ecological problem solving.

Sustainable exploitation of natural resources

Inventory: taking stock. Virtually all ecological problem solving has to start with the questions of what is where and why is it there. ITE has therefore invested part of its basic research funding in the development of cost-effective and efficient methods of survey, both on the ground itself and using data captured by remote sensing methods. Data can also be handled by the most modern methods for collating, analysing, interpreting and presenting that data. Most of this type of work is dealt with by ITE's Environmental Information Centre (EIC) which has specialist sections on Remote Sensing, Data Banking, Biological Records and Geographical Information systems. One major international involvement in environmental applications is evident in the participation in the CORINE (Co-ordinated Information on the European Environment) programme. CORINE is an integrated information system on the state of the environment of the European Community, and will provide a nucleus for the new European Environmental Agency. Within this programme, the EIC has advised the European Commission on the compilation of a computerised inventory covering sites of importance for nature conservation in the Community.

But EIC is involved to some degree in many of the applied projects in ITE, whether it be the production of a vegetation map for a small natural area of Tunisia threatened by development (also on CEC funds) or a land cover map (partly on funding from the Department of Trade & Industry) of the whole of the UK; whether it be the geographical distribution of a single rare species or the measurement of ecological parameters for global ecological research.

Resource utilisation: tropical forestry

AFRICA: ITE has been doing research on tropical hardwoods for the last 15 years. Much of the early research was concerned with developing techniques of vegetative propagation which should increase plantation productivity by giving higher yields, better quality and shorter crop rotations. However, such gains will not be realised unless a sustainable and ecologically stable system of reforestation with indigenous trees is developed. ITE's tropical forestry programme has been expanded to examine techniques for sustainable silviculture.

Most ecological studies of tropical forests have focused almost entirely on the natural forest ecosystem. Consequently, little is known about either the effects of different amounts of forest damage on the establishment, ecological stability and performance of plantations, or, conversely, the effects of plantations of indigenous trees on the ecosystems. Damage to plantation sites arises from logging operations and the subsequent use of ecologically insensitive site preparation treatments. For example, very

A bush fire as a means of land clearance. Studies by the Institute of Terrestrial Ecology show that manual clearance is preferable to mechanical methods or burning

different forms of site preparation may be used. These methods range from total forest clearance by bulldozer, to manual opening of the forest by machete. The former is very damaging to both vegetation and the soils, while the latter retains most of the species diversity and does little, if any, damage to the soil.

Studies of the different methods of site treatment have been carried out in the secondary, moist, deciduous forest of Mbalmayo Forest Reserve in Cameroon. This research, carried out in close collaboration with ONAREF (Office National de Régénération des Forêts) and with the University of Edinburgh also showed significant changes in the spores of mycorrhizal fungi associated with the tree roots and their mineral nutrition. In late 1990 an opportunity arose in Côte d'Ivoire to evaluate changes in spore populations and nutrient availability over a much longer time period, by examining forests which had been cleared and replanted by mechanical or manual methods up to 24 years previously. (This study was part of a multidisciplinary evaluation of forest plantations in Côte d'Ivoire, which included environmental, social, economic and institutional issues.)

As in Cameroon, soil samples were taken in an 'undisturbed forest' control (which had been protected from logging since 1965), in forests which had been cleared mechanically and replanted in 1990, 1989, 1985 and 1978, and in forests which had been cleared manually and replanted in 1990, 1989, 1975 and 1967.

The results show that in terms of mycorrhiza and tree roots, manual clearance appears preferable to mechanical clearance because:

— spore numbers increase rapidly during the first two years after manual clearance, when the trees are competing with weeds and rapid growth is vital; and

— the balance of spore types is like that of the undisturbed forest, thereby increasing the likelihood of maintaining root infection with appropriate fungal species.

In terms of soil chemistry, manual clearance is also preferable because:

— levels of available phosphorus and cations are significantly higher;

— soil organic matter is not removed from the site, thereby protecting the soil's cation exchange capacity; and

— an increase in pH may avoid possible toxic effects of metals such as aluminium and manganese.

In terms of other effects, manual clearance avoids the severe soil compaction caused by bulldozers, but requires more intensive weeding, because weeds are also stimulated by the larger supply of nutrients following manual clearance and burning.

SUDAN: Woody species are also of significance in the dry tropics. The dark, cracking clay soils in much of the Sudan savanna zone are inherently poor in nitrogen, phosphorus and organic matter. In the past, soil fertility has been maintained by the traditional system of rotational cropping of sorghum (*Sorghum bicolor)* and millet (*Pennisetum americanum*), with *Acacia* fallows. The trees restore soil fertility over the 10-20 years of the fallow period, probably through increased soil organic matter and nitrogen fixation by the *Rhizobium* root nodules. The trees also provide the benefits of fuelwood, and *Acacia senegal* yields a valuable 'hard currency' crop of gum arabic after about eight years.

Since the 1950s, between two and three million hectares of *Acacia* forest have been cleared and continuous crops of rain-fed sorghum, millet and sesame (*Sesamum indicum*) established. Initially, this policy was very successful. However, in many areas, yields have decreased progressively as soils have become 'exhausted' and, when the land has been abandoned, it has often reverted to desert.

In the Dali region of the Blue Nile province, annual yields of over 2 tonnes ha^{-1} of grain have decreased to less than 0.2 tonnes ha^{-1} over a period of 5-15 years. In 1970, 13 400 ha of land in the Dali region was handed over to the Central Forests Administration (CFA). The (CFA) seeded about 4000 ha with *Acacia senegal* in 1971-72, and has seeded the remaining area at intervals up to 1982.

Today great emphasis is placed on the need to conserve and restore soil fertility in areas of rain-fed agriculture. Perhaps the traditional practice of rotational cropping with *Acacia* fallows should be restored, in conjunction with the development of sustainable tree/crop mixtures? There is little or no published information in the Sudan on the rates of increase of nitrogen and organic matter in soils under *Acacia,* or on their rates of depletion under sorghum and millet. Information on these rates and on the nutrient balances is essential before advice can be given about the optimum fallow period.

A joint field trip by ITE and the Institute of Environmental Studies at the University of Khartoum located sites with the help of the local staff from CFA. Five sorghum sites from early (1 year) to late (> 20 years) rotation, four *Acacia* stands from early (4 years) to late (16-17 years) rotation, and two older natural stands of *Acacia* were identified. One year later, in February 1988, seven soil samples were taken from each site.

An initial chemical analysis of the soil sampled from each of the eleven sites showed some interesting trends in the levels of nitrogen over a 40-year period. There is a gradual loss of nitrogen over 20 years of continuous cropping; the decline then appears to be reversed after a prolonged period of fallow.

One of the long-term aims of this project is to determine the nitrogen budget of the *Acacia* fallows and, in particular, the rate of nitrogen fixation. One of the factors thought to control the rate of increase in soil fertility under *Acacia* is the level of *Rhizobium* supply. No nodulation has been observed in the field during four field trips.

Two other factors considered to be important in determining the pattern of the rise and fall in soil fertility were the distribution and amounts of roots at both the *Acacia* and sorghum sites.

The results suggest that the redistribution of nutrients from depth via root turnover could be one of the most significant factors affecting productivity during the cropping cycle. Some initial calculations based on the turnover of each season's fine root production imply that nitrogen inputs from this source could account for 50-100% of the measured increase in soil nitrogen during the late stages of the *Acacia* cycle.

The information from this project is intended to provide useful, practical guidance for sustaining soil fertility and crop yields, by using *Acacia* tree fallow systems at the optimum level, this to maximise food production and prevent further desertification.

But there is still a problem with establishing trees in a dry area like the Sudan. If the rate of tree planting were increased and tree raising and planting made more successful, then some progress could be made.

Joint work with the Institute of Environmental Studies (IES) in the Sudan has shown that adding low rates of polymers to sandy soil:

(a) increases its water holding capacity,

(b) reduces the rate of water loss,

(c) increases plant establishment (by up to 90%),

(d) increases plant dry weight,

(c) increases the period of survival of tree seedlings in the nursery (by factors up to 5),

(f) increases the chance of survival of transplanted young trees, and

(g) is cost-effective.

GHANA AND KENYA: However, with the greenhouse effect it is possible that the tropical forest climate will change and ITE staff have recently visited Ghana & Kenya to predict possible effects upon the natural environment of a range of possible scenarios to the year 2030.

As agricultural and coastal/marine ecosystems were being studied separately by other consultants, ITE's studies covered all natural terrestrial and freshwater environments and their flora and fauna. These comprised an assessment of the Forest Zone, The Savanna Zone, Freshwater ecosystems and Insect-borne diseases.

The present day (base case scenario) status of the natural environment has been reviewed and predictions made as to the impact increasing population, changing agricultural and forestry practices and changing climate could have over the next 40 years.

Pollution

Hazard and risk assessment: Much of the research on pollutants has been reactive, monitoring effects already evident in the environment and attempting to explain the exact mechanisms by which damage occurred. Clearly, the prediction of likely effect before the problem arises is the more desirable. 'Hazard assessment' attempts to predict potential adverse

effects of chemicals under generalised circumstances whilst 'risk assessment' attempts to quantify these effects under particular circumstances. Hence, the prediction of the temperature rise as a result of greenhouse gases is in essence a Hazard Assessment and the particular cases of Ghana and Kenya, mentioned above, are Risk Assessments. Both terms are more commonly used in the field of toxic chemical pollution where ITE has over 30 years experience of research. Nevertheless, the methodology for making predictions for toxic chemicals is still in its infancy. The information required includes both standard laboratory toxicity test results and estimates of levels likely to be found in the environment. Hazard assessment then relates likely exposure to likely effect. At present, reviews of the information on reasonably well studied chemicals allow detailed assessments of what effect they have had on organisms in the environment and also highlight areas where research effort should be increased. Such reviews are conducted both by national governments and by international organisations.

International efforts to gather information on — and reviews of — toxicity and exposure into a single source are being supported by ITE. The United Nations Environment Programme set up a computer-based system in Geneva, the International Register of Potentially Toxic Chemicals (IRPTC) and ITE have been working with this programme for some years. Information is exchanged with other computer data bases on chemicals. ITE also hold, at Monks Wood, extensive literature files on a large number of environmentally important compounds.

ITE are involved in drafting reviews and evaluations of chemicals, both nationally, for the Department of the Environment, and internationally, for the International Programme on Chemical Safety (IPCS), a joint programme between UN agencies — the World Health Organisation, the United Nations Environment Programme and the International Labour Organisation.

Final decisions on definition of hazard can only be made by the scientific community as a whole. Draft reviews of the IPCS are subjected to extensive review on circulation to member countries of the UN. The document is amended accordingly and finalised by an international gathering of experts in the various areas of human health and environmental hazard. The final document is used to control use of chemicals and to draft regulations in many third world countries unable to conduct their own reviews owing to lack of resources.

Critical Loads: One way of limiting pollution may be by using the 'critical load' concept. A 'critical load' is defined, in simple terms, as the 'highest pollutant load which will not cause long-term harmful effects on the most sensitive ecological systems'.

This critical load concept has been adopted by the United Nations Economic Commission for Europe (UNECE) under the Convention on Long Range Trans-Boundary Air Pollution as a means for controlling emissions of gaseous pollutants. In Britain, the Department of the Environment is funding ITE to carry out the national mapping programme as part of the UNECE activities.

Already, UNECE workshops have agreed estimates of critical deposition loads and critical gaseous concentrations for a number of susceptible ecosystems and pollutants, such as sulphur and nitrogen.

To establish an emission control strategy, the spatial patterns of pollutant depositions are needed. These can be derived from field measurements and models, and data are available in the UK. Overlaying these data upon distribution maps of 'receptors' such as sensitive soils or areas of vulnerable plant species shows where critical loads are being exceeded. Using transport models to identify pollutant sources, emission controls may be planned to reduce the loadings on sensitive areas.

The ITE project is reviewing available databases and mapping methodology to produce critical load maps of air pollutants for the UK.

We are adopting a similar 'mapping' approach as a framework for climate change studies. Species distributions can be overlaid on climate parameters and other environmental factors. This approach can:

— summarise currently available data
— identify possible climate effects
— indicate areas for future study
— provide a means for extrapolating field data.

This project will link with other ITE projects looking at climate change effects on both plants and animals.

Radionuclides: A small team of radioecologists was first established by ITE in 1979. The main objective then was to look at the fate of the radionuclides derived from the nuclear fuel reprocessing cycle, after their release into the natural environment.

The work involved determining the physical and chemical form, and behaviour, in varying soils and thus the biological mobility of plutonium and related elements. In the soil profile, activity falls rapidly with depth, with over 90% residing in the top 15 cm.

The area is mainly under different regimes of grassland management with a few arable crops grown to feed stock and the local community. Preliminary soil analyses yielded concentrations of about 50 Bq kg^{-1} dry weight for sandy soils and 30-70 Bq kg^{-1} (*) for loamy soils. Samples from pasture, broadleaved and conifer woodlands, all on adjacent land, gave contrasting values of 64, 186 and 381 Bq kg^{-1} respectively.

Following the Chernobyl accident, a national survey was mounted which involved all the ITE stations in collecting samples of vegetation from 500 sites covering all classes of land in Britain. The results were incorporated into a computer-drawn radioactivity 'contour' map of Great Britain. The highest values recorded were from Cumbria and reached 6670 Bq m^{-2} (about 11 200 Bq kg^{-1}).

Research is now being concentrated on the transfer of radiocaesium from vegetation to the soil, its behaviour in the soils and uptake or remobilisation by plants. A selection of grazing animals — sheep, deer, rabbits and grouse — is being studied in relation to their different habitats to determine rates of transfer up the food chain, culminating with a predator, the fox.

At present, parts of West Cumbria have retained high levels of radioactivity, and sheep and their lambs are still subject to restrictions on their movement and slaughter for human consumption. These sheep and their management are one of the major studies of the unit. ○ M.D.H.

(*) 1 Bq (Becquerel) = 1 disintegration per second.

THE EUROPEAN COMMUNITY'S APPROACH TO UNCED

Sustainable development — A strategy for the 21st century

After all the festivities are over, and everyone has gone home, the documents that are left after Rio will be examined with a fine toothcomb. Two years of hectic and frenetic negotiation will be encapsulated into three or four basic texts that will represent the international community's contract for concerted action in the field of environment and development. Every signatory to these texts will be obliged to take them away and analyse their implications for their own nation or organisation.

At the time of writing, only four months before the UNCED conference, the content of these contracts is very vague. All is still to play for. But no-one denies that the stakes are very high. During the last 20 years, since the 1972 Stockholm Conference, there have been very profound changes in people's perceptions of environment and development issues. Originally put into separate boxes and left to wage their own battles in isolation, the 'environmentalists' and the 'developmentalists' have been obliged to merge their forces and to come up with a united strategy for addressing the world's problems.

The key has been introduction of the concept of 'sustainable' development. There have been a myriad of interpretations of what this means, but this does not matter. What does matter is that this concept has changed our way of viewing either environment or development issues. The quick-fix solutions are no longer appropriate. All the long term consequences must be worked through.

This sounds relatively easy, but who would have thought 20 years ago that ozone levels and greenhouse gases would be the subject of international conventions? Planning for the unpredictable remains one of our greatest long-term challenges.

Rio will also be about equity, about burden-sharing and about responsibilities for maintaining the life processes of the planet. These are highly complex and contentious matters. Time will tell whether they can be resolved within the very tight timeframe before us.

Launch of a new programme for sustainable development

The European Community is a major player at Rio. It has already taken a number of major steps systematically to incorporate sustainable development criteria into its own programmes and activities. As the UNCED process is about to reach its peak at Rio, the Community is set to embark upon one of its most ambitious programmes to date. 'Towards Sustainability': A European Community Programme of Policy and Action in relation to the Environment and Sustainable Development will set the agenda for the Community's 340 million citizens over the next ten years.

Its objective is simple and direct: to ensure sustainability criteria are integrated into the heart of the Community's economic decision-making. This approach is to be applied not only within the Community borders, but also in its commercial and other relationships within the wider international framework.

Historical perspective

It is no coincidence that this, the Community's 5th Action Programme on the Environment, coincides with a major international conference on the Environment and Development. Before 1972 the Community had no Environment Policy. It was not provided for in the Treaty of Rome which established the European Economic Community in 1957. But in response to the 1972 Stockholm Conference on the Human Environment, the Community's leaders decided that it should establish its own Environment Programme, which was approved in 1973 for a five-year period. This was followed by the 2nd, 3rd and 4th programmes in 1977, 1983 and 1987 respectively. Since then over 200 pieces of environmental legislation have been adopted and implemented.

During recent years there has been considerable interest in the linkage between the Environment and Development.

There is no doubt that the seminal work of the World Commission on Environment and Development, chaired by Gro Brundtland, which published 'Only One Earth' in April 1987 has greatly influenced Community thinking. It sparked off an internal debate which culminated in December 1988 in a Declaration at the Rhodes Council of Ministers' Meeting that: 'Sustainable development must be one of the overriding objectives of all Community policies'.

This was followed in May 1990 by a Council of Ministers resolution on Environment and Development, and at Dublin in June one month later by a statement which remains the cornerstone of the Community's policy in this area: *'We recognise our special responsibility for the environment both to our own citizens and to the wider world. We undertake to intensify our efforts to protect and enhance the natural environment of the Community itself and of the wider world of which it is part. We intend that action by the Community and its Member States will be developed on a co-ordinated basis and on the principles of sustainable development and preventative and precautionary action... The objective of such action must be to guarantee citizens the right to a clean and healthy environment... The full achievement of this must be a shared objective'*

The Lomé IV Convention

During the last 20 years, the Lomé Convention has been the cornerstone of the Community's policy towards its partner ACP countries. The evolution of the various texts is in itself a barometer of changes in world opinion on the most pressing development issues. At the time of the negotiation of the Lomé III Convention, the word 'sustainability' had not entered modern jargon. Attention was focused on the appalling droughts and

famines in the Sahelian countries. Not surprisingly, the development of strategies to alleviate food shortages and to combat desertification became the central themes.

Although these problems have not gone away, when negotiators started to examine possible Lomé IV texts, it became clear that the concerns expressed in the Brundtland report had to be adequately addressed. The result is that sustainable development has moved on to the centre stage as the main thrust of the Community's development policy. The Lomé IV Convention was signed in December 1989 and includes for the first time a new Title I on the environment. Many of the policies set out in the Convention are reflected also in 'Towards Sustainability', with the major difference that this latter document attempts to set implementation targets for a range of environment and development objectives.

Articles 4, 6 and 14 of Lomé set out some of the basic principles of this policy, which must be:
'based on a sustainable balance between its economic objectives, the rational management of the environment and the enhancement of natural and human resources... priority must be given to environmental protection and the conservation of natural resources, which are essential conditions for sustainable and balanced development from both the economic and human viewpoints... co-operation shall entail mutual responsibility for preservation of the natural heritage.'

The programming exercise for Lomé IV is virtually complete and in a large majority of cases environmental concerns feature prominently. The translation of these into concrete projects and programmes is currently underway.

Other Community agreements

The emphasis on sustainable development has not been limited to the Community's Lomé partners. The Community's agreements with its partners in Asia and Latin America (ALA), in the Mediterranean, and most recently in Eastern Europe all reflect the same priorities. The environmental component of these programmes is now very significant in response to the severe environmental degradation and decay facing them.

Increases in internal budgets for funding ecology projects in developing countries, as well as tropical forestry actions, have also taken place following repeated demands of the European Parliament to expand European intervention in these areas.

Most recently, in February this year, a special extra provision of ECU 50 m was set aside to fund tropical forest conservation programmes. This decision reflected the increasing public interest in this issue and the feeling that the Community, as a major consumer of tropical woods and a significant supporter of forestry development programmes, has a special role to play in this important sector.

Overseas development assistance

As well as being the world's largest importer and exporter, the European Community also provides a larger proportion of overseas development assistance than any other country or grouping. At present, the aid from the European Commission and its Member States represents 47% of all overseas development assistance to developing countries, consisting of 0.45% of GDP (this propor-

European Community aid for the environment in the ACP countries (as in Fiji, above) has covered every aspect of forest protection or conservation

tion is twice as high as that provided by the United States or Japan).

Although it is very difficult to put precise figures on the amount allocated for 'Environment' programmes — due to problems in defining what activities should be included in this category — the overall annual allocation to developing countries by the Commission, excluding bilateral programmes funded directly by the European Member States, is probably in the region of ECU 1 billion per year.

The increasing awareness of environmental problems amongst developing countries has been reflected in the high priority given to this sector in the Lomé IV programmes, and will no doubt be translated into an increasing number of projects and programmes.

Environment projects in ACP countries

The diversity of actions that have so far been financed has already been touched on by other articles in this issue, notably the Commission's programme for the Fight against Desertification in the Sahel, and the wide number of activities in the forestry and fisheries sectors. As might be expected, Africa has been the primary beneficiary of such support.

In the forestry sector, evaluated in April 1991, some 255 projects were financed between 1978 and 1990. The latest and biggest is the ECU 24 m programme in West and Central Africa for the conservation and sustainable use of the forestry resources. The Commission has been an active member in the Tropical Forest Action Programme (TFAP) process, has supported the preparation of TFAPs in Guinea, Zaire and the Congo and will provide similar support to the CARICOM countries, Nigeria and Ethiopia. It is also co-leading with the World Bank the TFAP in Guinea Bissau. The Commission recognises that there are many difficulties in implementing the TFAP process but recognises its inherent merits as a means of establishing comprehensive national forestry policies and programmes.

As regards the fight against desertification, an analysis in 1989, which has not yet been updated, indicated that 230 primarily environmental projects had been financed between 1986 and 1989 for a total of some ECU 1700 m.

As regards the Fisheries sector, which covers a very wide series of interventions at both the industrial and the artisanal levels, significant efforts have been made to improve fisheries management measures. There has been a special focus on regional projects: in the Gulf of Guinea, the Indian Ocean, West Africa and the Pacific, since it is well understood that fish do not respect national boundaries and therefore management measures must be widened beyond the national frontiers. The most comprehensive programmes have been established in the Pacific, where there is already a good infrastructure for regional fisheries management, and the Commission has assisted in fish tagging studies and overall management policy through a ECU 10m marine resources programme.

In the energy sector, many projects have been directed towards boosting the role of renewable energy resources and reducing energy demand. Improved use of fuelwood through the introduction of more energy efficient stoves (Malawi), rural energy schemes (the Bahamas) and rural electrification (Mayotte and Fiji) are just some of the many schemes that have been tried.

Finally, mention should also be made of the specific efforts of the Commission to support national parks and wildlife management. The bulk of these activities are focused on Central and Western Africa and East and Southern Africa. Rehabilitation of the National Parks in Uganda has been a major programme, and similar efforts are being developed in Kenya, Tanzania and elsewhere. The Commission remains convinced that such activities merit substantial support. Apart from the conservation of biodiversity arguments, for many of these countries the revenue created from exploitation of national parks and reserves makes a highly significant contribution to the national economy (in Kenya for example it represents 40% of all foreign exchange earnings.)

Environment projects in Asia, Latin America and the Mediterranean

In general, Commission-funded environment activities are less well-developed in the above regions compared with the Lomé countries. The most significant programme to date (ECU 11.8m in 1991) has been the MEDSPA programme in the Mediterranean, run by the EIB in co-operation with the World Bank.

However, some recent Council decisions have resulted in reserving a fixed proportion (10%) of certain budget lines for these countries for environment programmes and these are under consideration at present.

Also, the Commission has already made a commitment of ECU 15 m towards a major forestry conservation and development programme in Brazil and is co-ordinating, together with the World Bank and the Brazilian authorities, a major donor effort within which various Member States, notably Germany, are providing the lion's share.

These brief examples illustrate that the Commission is conscious of environment imperatives and that these are widely reflected in the actual co-operation agreements and programmes funded by the Commission throughout the developing world.

Community position at UNCED

Since the adoption of UN Resolution 44/228 in December 1989 calling for the convening of a UN Conference on the Environment and Development in 1992, the Community has played a very active role in trying to ensure that the Conference is a success.

Organisationally, the Community position is co-ordinated by the Presidency, which rotates every six months, and which prepares Community statements on each of the UNCED topics in co-ordination with the Commission services.

In common with many other organisations, the lead 'ministry' within the Commission responsible for UNCED has been the Environment Directorate-General, assisted by the Development and External Relations Directorates-General and other relevant departments.

As well as playing an active role in the International Framework Convention on Climate Change and the International Convention on Biodiversity, the Community has, during the course of 1990 and 1991, refined its position on the various agenda points.

The 3rd Preparatory Committee in Geneva (August 1991) marked an important move forward in this respect, since the Community under the Netherlands Presidency was able to respond in a positive sense to the various positions taken by the Group of 77 countries.

Forest felling in Africa. For the past ten years the European Community, working within the Lomé Convention, has been developing an ambitious policy for protecting Africa's forests

Mr J.G.M. Alders, Minister of Housing, Physical Planning and Environment of the Netherlands, speaking on behalf of the Community in Geneva, was outspoken in his support for a dynamic and new process of international action to launch initiatives at UNCED which are concise and realistic and would last well into the 21st century.

The Commission, for its part, adopted in October 1991, a Common Platform for a Community Position on UNCED which sets out in great detail, the way in which the Commission has responded to the UNCED issues. This position was subsequently taken on board by successive meetings of European Development and Environment Ministers in December.

This Council of Ministers' position represents a marked advance on the position adopted by the first ever meeting of OECD Ministers of Environment and Development on December 4th, and has laid the groundwork for the Community position at the 4th Prepcom in New York (regrettably *The Courier* had to go to press before the results of this meeting were known.)

The European Parliament too has debated UNCED in both its Development and Environment Committees and adopted very strong statements in support of the UNCED ideals.

At the time of writing it is not difficult to predict the main sticking points. The key issue of 'new and additional financial resources', approved in the UN resolution of December 1989, and subsequently adopted by the European Council of Ministers in December 1991, has provoked a lively discussion between the main UNCED players.

In the 4th Prepcom papers submitted by the UNCED Secretariat in February 1992, a figure of US $125 billion per year was considered to be the minimum requirement to implement the Agenda 21 (the document refers to a real requirement of five to six times this figure.) If this is set in the context of the Commission's total annual budget of approximately ECU 70 billion (covering all agriculture, structural, and other expenditure), or the ECU 12 billion figure for the entire Lomé IV programme over a five-year period, this illustrates the enormous gap that needs to be filled.

The developing countries believe that the industrialised world, having been largely responsible for the global environmental problems, should finance the clean-up operations. The industrialised countries accept this analysis in part, but do not believe that provision of additional financial resources will, in itself, solve these problems. What is needed is change, in both the developed and developing countries, in the way in which economic development activities are conceived and implemented.

The Commission has certainly taken this on board, and the 5th Environmental Action Programme referred to at the beginning of this article is intended to set the Community's own agenda. But in a world where many economic activities are interlinked, the Community may be reluctant to push too far forwards when it sees that its economic competitors are not playing the same tune. For example, the Community initiatives on an energy tax, and on rapid reductions in CO_2 and CFC levels, have, in the Commission's view, to be followed by the international community as a whole.

Although, inevitably, much attention is currently focused on Rio and the specific outputs of the UNCED negotiations in June, the Commission is very much aware of the rapid — and often unpredictable — changes in the world community: the unprecedented developments in Eastern Europe, the advances in the democratisation process in Africa and elsewhere, political evolution within Europe after Maastricht, the GATT and UNCTAD negotiations etc.

These often dramatic changes demand a flexible and dynamic response. UNCED must therefore not be seen as a straightjacket to which policies and programmes are strictly aligned, but rather as an internationally accepted framework into which each country and institution can bring its own appropriate contribution.

The Community, as a major player on the world scene, is conscious of its role in shaping future developments. It is determined to improve the long-term welfare of its own citizens as well as of those of its partners. It has accepted the basic principle of sustainable development as the key to future economic development. In the fields of development policy and environment policy the Community has been, and will continue to be, a pacesetter. The challenge, so cogently put in the Brundtland report, is there before us: can the present generation pass the environment on to the next generation in a fit state to maintain public health and social and economic welfare at a high level? UNCED will be the litmus test.○

Tim Clarke
Principal Administrator, DG VIII

International environmental law in 1992 A whistle-stop tour

by Katrien DEBEUCKELAERE (*)

International environmental law, and in fact environmental law as a whole, is a relatively recent development. It has gained a lot in importance over the last two decades. Two milestones mark the development of international environmental law in this period. The first was the Stockholm Declaration of 1972 (The Declaration on the Human Environment adopted by the UN Conference on the Human Environment, Stockholm, 16 June 1972). This marked the recognition of the fundamental principles of environmental law. As a result the United Nations Environment Programme (UNEP) was created and it has, in turn influenced the environmental policy of the European Community. The second milestone will be the United Nations Conference on Environment and Development or the Earth Summit (UNCED) which will take place in June of this year in Rio de Janeiro. Not only will this mark the 20th anniversary of the Stockholm Declaration, but it will also manifest the greatly increased importance attached to protection of the environment and development by political leaders, non-governmental organisations and scientific and academic groups.

Nature, influences and evolution

Environmental law is, to a significant extent, international in character because of the transboundary nature of many environmental problems. This is particularly the case with marine, river and air pollution, as well as any other source of pollution situated close to borders. Of their very nature, the problems caused by such pollution require an international approach.

There have been several major influences on the development of international environmental law. One such influence has been the public reaction to serious environmental accidents causing acute pollution (for example, Amoco Cadiz, Torrey Canyon, Piper Alpha, Exxon Valdez, Bhopal, Seveso, Sandoz). Another influence has been the concern about the effects of long term or chronic pollution (for example, trees suffering from acid rain, sites contaminated by leaking drums containing dangerous waste, water contaminated by long term over-use of pesticides or fertilisers). A third influence is of a political kind. It started with the Stockholm Declaration. This declaration was followed by the publication of 'Our Common Future' in 1987 (the report presented to the United Nations by the World Commission on Environment and Development) or 'The Brundtland Report' as it is generally referred to after the chairperson of the Commission which prepared the report. Due to the Brundtland Report the link between Environment and Development, which was already recognised in the Stockholm Declaration, became much stronger. As a result of the Report a lot of thought has since been devoted to ways of realising the notion of *sustainable* development. Sustainable development has, therefore, only very recently begun to be put into practice and it still needs wider recognition.

When looking at a chronological table of this century of international environmental action taken, it is obvious that the subjects covered by international environmental law are now more diverse than at the beginning of the century. Initially environmental concern was limited to protection of fauna and flora. The first international action taken to limit 'pollution' as such was that of the United Nations Economic Commission for Europe on noise and air pollution caused by motor vehicles. This dates from 1958. Increasingly, the problem has been recognised as an environmental one that requires intervention, (the effectiveness of legislation to deal with such pollution was even then apparent in the success of the United Kingdom Clean Air Act which cleared up London's infamous smogs). There is a clear trend in the subjects covered by international environmental law; initially protection was confined to fauna and flora, sectoral problems then began to be covered, but in a fragmentary way and now, increasingly, the global issues of environmental protection are being considered. The discussions on the international convention on climate change, tropical forests, the ozone layer and the Antarctic are clear examples of this new global approach to protection of the environment. In fact, the first example of such a global approach was the United Nations Convention on the Law of the Sea (UNCLOS) which was signed in Montego Bay on 10 December 1982.

Aim

The aim of international environmental law, in the first place, is the same as that of classical international law, namely the regulation of relations between States. More specifically, its object is to protect and to preserve the biosphere — in other words, the planet Earth with its oceans and subsoil down to where it is explorable and the layer of air which can be studied as influencing our immediate surrounding environment.

Enforcement

The enforceability of environmental law depends on the legal instruments used. International conventions can more easily be enforced than mere guidelines although it is always more difficult to enforce a convention between sovereign states than national legislation between individuals. Three important positive aspects of environmental conventions can be noted. First, the existence of a convention in itself signifies that the contracting parties have agreed that a particular problem is of such importance that it requires a discussion and accord at multilateral or bilateral level. Second, a convention represents a specific legal text to regulate the problem addressed. Third, most conventions include an arbitration clause in the event of a dispute about its provisions and the International Court of Justice in the Hague can also sometimes be asked to settle a dispute.

In the framework of international law, the EC is something of a special case. While it was sovereign states that signed the treaties establishing and amending the European Communities, these

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treaties confer powers which are much more far-reaching than is usually the case. Article 100a and Articles 130r to 130t of the Treaty establishing the European Economic Community provide the legal basis for Community environmental legislation. The legal basis for enforcement of Community environmental law lies in the Treaty and more particularly in Articles 169 to 171. It means that the Commission, as guardian of the Community system, can bring an action before the European Court of Justice if it considers that a Member State has failed to fulfil its legal obligations.

Scope

International environmental law can be categorised largely by reference to the type of pollution or aspect of the environment with which one is dealing. The division into types of pollution is more obvious than, for example, a geographical approach and is self-explanatory.

Fauna and flora. As has already been mentioned, protection of fauna and flora has been the subject of international action since the beginning of this century. Several conventions dealing with protection of the marine environment or rivers also include protection of the fauna living in such environments.

Noise. It should be noted that noise pollution is not generally recognised as environmental pollution. At international level there has been relatively little action in this area, with the exception of measures taken under the auspices of the International Civil Aviation Organisation on the limiting of aircraft noise. The EC has been more active on the noise pollution side, but even so it is clear that it is not recognised as being as important as other types of pollution.

The marine environment. UNCLOS, and more particularly Part XII of the Convention on the Protection and Preservation of the Marine Environment, concerns protection of the oceans and seas on a global level. Part XII was included in UNCLOS because the oil pollution caused by the Amoco Cadiz accident made the world aware of the need for a global approach to protection of the marine environment. The 1958 Convention on the High Seas and the Convention on the Continental Shelf only very briefly touched upon protection of the marine environment. Article 197 of UNCLOS calls for cooperation on a global and regional basis, and in the latter context quite a lot has already happened. Under the auspices of the Regional Seas Programme of UNEP, several action plans have been adopted for regional seas, such as the Mediterranean, the Caribbean, the West and Central African Region, the Eastern African Region, the Arabian Gulf, the South Pacific and the South-east Pacific. Other areas covered by international conventions are the North Sea and the Baltic. Most of the regional seas actions have an umbrella convention setting out the general rules for which the contracting parties need to elaborate protocols. Among the matters covered by specific protocols are: dumping from ships and aircraft, specially protected areas, pollution from land-based sources and co-operation in emergencies. Regulation of offshore exploration and exploitation of mineral resources is needed in the areas where such activities are being carried out.

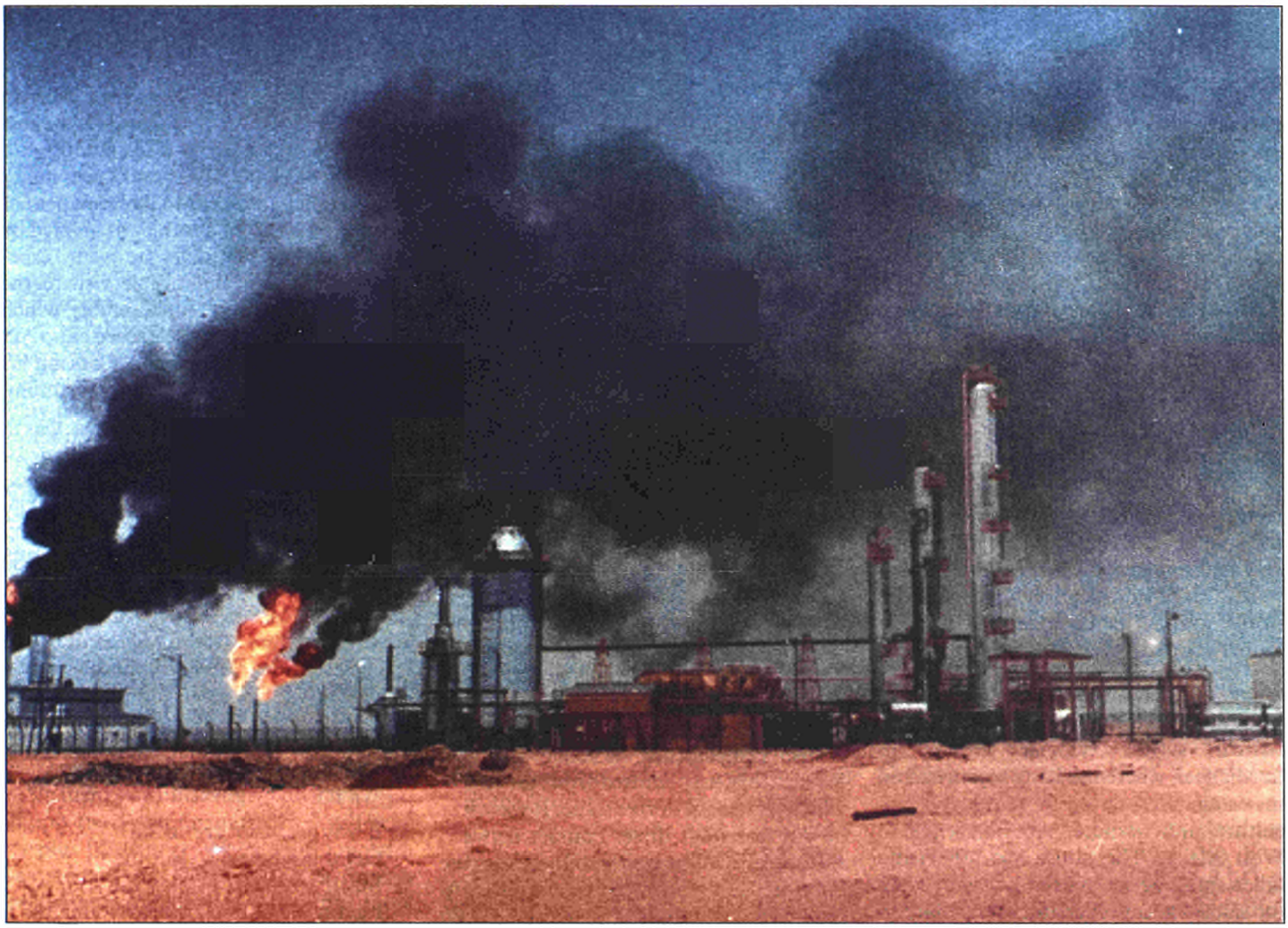
Oil pollution at sea is also regulated by international conventions on a more or less global level. Conventions not only provide for a reduction in oil pollution, they also provide for compensation for damage and for co-operation in emergencies. In the framework of combating oil pollution and the call for damages, the main conventions are MARPOL or the International Convention for the Prevention of Pollution from Ships and its Protocols, the International Convention on Civil Liability for Oil Pollution damage, the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, and the International Convention on Oil Pollution Preparedness, Response and Cooperation, signed in 1990. The last-mentioned was put together in a very short space of time as a result of the Exxon Valdez disaster. These conventions were developed under the auspices of the International Maritime Organisation.

Rivers. Transboundary rivers and large rivers receive international attention with a view to reducing pollution. Here again one can see the importance of dealing with the problem on an international basis. Water is one of the easiest carriers of pollution with, for example, damage caused at the source of a river capable of being carried downstream to the estuary. Rivers are, in some ways, even more important than the sea because of their use as sources of drinking water (sea water is only used in extreme circumstances for drinking water because of the difficulties and extremely high costs involved in desalination). International action has been undertaken to protect, *inter alia*, the Chad basin and the Zambezi, Rhine, Mosel, Danube and Senegal rivers.

Air. Air is also an easy carrier of pollution across borders. The Convention on Long-Range Trans-Boundary Air Pollution and its Protocols, as well as the Vienna Convention for the Protection of the Ozone Layer, are the prime examples of international action to protect the air. In comparison with water pollution, it can sometimes appear that less attention has been paid to contamination in the air but one of the explanations might be that much of the knowledge of the effects of air pollution is more recent and in any event it is not so visible as, for example, an oil slick. Another factor to be taken into account is that there has been more action in this area at national (and EC) level. A number of measures have been taken by states and by the Community to combat air pollution caused by motor vehicles, factories, power stations etc.

Nuclear. The nuclear sector forms its own sector in international law as well as within the European Community system. The International Atomic Energy Agency, within the UN framework, is the body concerned with all aspects of atomic energy and the commercial and scientific uses of radio isotopes. The Euratom Treaty (the Treaty establishing the European Atomic Energy Community) is the basis for EC legislation in nuclear matters. In this sector, international action covers such topics as accidents, ships, waste, weapons, energy, material and explosions in which there is a nuclear component. After the accident at Chernobyl in April 1986, the urgent need for a Convention on early notification of a nuclear accident was recognised and one was signed in September of the same year in Vienna.

Waste. A type of pollution which has existed for centuries, but which has not been recognised as an environmental problem until very recently, is waste. At European Community level, action to intervene in this area began initially with the 1975 framework directive on waste



L'air transporte facilement la pollution par delà les frontières

(75/442/EEC). On a global scale, other than in the field of nuclear waste, action has come rather late in the day. MARPOL includes some provisions on waste. International rules on the dumping of waste at sea date back to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. There are also other provisions covering dumping or incineration of waste at sea but it was only in 1989 that wider rules were adopted. In the summer of 1988, the scandal caused by the *Zanoobia*, the ship which travelled from Italy to ports across the world in a fruitless effort to offload its cargo of toxic waste, ensured that the problem of waste trafficking could no longer be ignored. After this incident, a number of other waste scandals came to light, demonstrating that the Zanoobia incident was far from being an isolated one. The response to the problem was the conclusion of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989), which deals with the problem of waste trafficking and disposal.

Worker protection. International action on worker protection can be included in environmental law but since it refers to a specific environment, namely the working environment, and it is closely linked with labour law, it will not be discussed here.

Global. As already mentioned, global problems have only attracted attention more recently. The earliest action in this field was the Antarctic Treaty of 1959 which regulated activity in that frozen continent. More recent action has been seen in the field of Climate Change, Biodiversity and Tropical Forests, whilst the discussions on the Antarctic have become more lively again, particularly with the Wellington Convention on the Regulation of Antarctic Mineral Resource Activities in 1988, which has given added urgency to the discussion on the possible declaration of the area as a world natural reserve.

Conclusion

International environmental law has evolved quickly and it appears that its progress will be even more rapid in the future, owing to new scientific discoveries, growing political awareness and the wish to do something on a large scale to protect the environment.

However, it must always be recognised that international environmental law (with the exception of EC law) suffers from a major disadvantage. In comparison with national law, it is very difficult to ensure implementation and enforcement, and this is something which will have to be addressed if we are serious about tackling the environmental challenge on a global basis.○ K.D.

King Ja Ja:
the folk song and the man

A West African ruler in the late nineteenth century, King Ja Ja of Opobo, spent only three months in exile in the Caribbean island of Barbados, yet became one of the country's folk heroes with a song to match, *King Ja Ja.*

Although the song is still popular, the King's personality is largely forgotten, thanks to the country's highly anglicised educational system, which, over the years, has excluded important aspects of its history. The King has, of course, been the subject of several newspaper articles and radio broadcasts, but Barbadians remain largely uninterested in a man who would appear to have inspired nothing more than an irreverent, saucy love song.

Still, apart from the people themselves, who are largely descendants of West African slaves, Walmer Cottage in St Michael, where the King sojourned on the island, is one of the country's few cultural inheritances with reference to West Africa. The house has reportedly fallen into neglect, indeed it was once up for sale — a sad reflection on its place in the collective memory.

Despite its sad end, King Ja Ja's life was nothing short of a fairy tale — a slave who became a King. Born in a village in the Orlu district of Nigeria in 1821, he was sold as a slave, at the age of 12, to a chief who took him to Bonny, a prosperous trading town. Despite his social status, he was able to work for himself and Bonny was the right place to be for an industrious man with a sense of business. Trading on palm oil, he became wealthy, rose to the rank of a chief and was soon competing with none other than the King of Bonny himself. This commercial rivalry became so fierce and violent, however, that Ja Ja was forced to flee with his followers to Opobo, where he took the title of King.

The King of Bonny, however, would not leave him in peace. He attacked Ja Ja, and, in the war that ensued, commerce was so severely disrupted that British merchants in the area, who represented the British Government, had to intervene. A settlement was reached and sealed with a treaty in which both the King of Bonny and the British Government recognised Ja Ja as King of Opobo.

Ja Ja became a very good ally of the British trading companies and of the Imperial Consul on the Niger Coast. When the British had a war on their hands in Ashanti in the then Gold Coast in 1875, he sent a contigent of soldiers to assist them. For this he received a Sword of Honour from Queen Victoria. The King cleverly exploited his friendship with the British to extend, by force, his areas of influence, but he was uncompromising towards them when it came to commerce. He refused to allow them trading access to the interior where he had set up a monopoly, and in 1884, when a treaty was signed with all the potentates in the south setting up a British Protectorate, he made sure that his territory was omitted from the article which provided for free trade. It was clear he did not want direct contact between European traders and producers in the interior. He even nursed an ambition to send large quantities of palm oil directly to England himself.

When, in 1887, the British Consul decided to ignore the provisions of the Protectorate Agreement and apply the terms of the 1885 Berlin Treaty, which guaranteed freedom of navigation, the stage was set for confrontation in the creeks.

Constant harassment by Ja Ja's agents of canoes carrying mail led the Consul to extract a promise from the King to bring such acts to an end. A document to that effect was signed in Opobo, but Ja Ja was to ignore it, for a few days later he had the Consul himself held up on the river during a trip, to signal his dissatisfaction with the terms. The Consul's reaction was to persuade the British Government that the deportation of the King was vital to peace and commerce in the Niger delta. With the guns of HMS Goshawk trained on his position, and threatened with annihilition, King Ja Ja was persuaded to surrender and to come aboard the Goshawk. He was taken to Accra, where he was tried and sentenced to be deported.

Transported with a few of his loyal servants, first to St Vincent, King Ja Ja arrived in Barbados on 1 March 1891. The arrival of this authentic African monarch on the island created a sensation, and there were fears among colonial officials that his presence might incite blacks to rebellion. Newspapers of the period speak of how he was greeted by a large crowd wherever he went, especially during his memorable visit to the House of Assembly, an assembly which two days earlier had passed an Act providing for his maintenance during his exile — 800 pounds sterling per annum.

There is no doubt that Ja Ja was a source of pride for black Barbadians of that generation. At the same time he was also the subject of gossip, especially about affairs of the heart, for the folk song to which reference has been made earlier is about his supposed love for a woman whose identity to this day remains a mystery. The song goes like this:

Chorus

King Ja Ja wun let Dovey 'lone
King Ja Ja wun let Dovey 'lone
King Ja Ja wun let Dovey 'lone
What Dovey got is all she own.

1) If you want to live in sin
Get a big house to put me in,
But if you start to play the fool
I get a big stick and beat you cool.

2) If you want to treat me nice
I'll comb your hair and cook your rice,
But if you start to play the fool
I get a big stick and beat you cool.

In another version of the song the woman's name is Becka. Historians have tried for years to figure out who she was. King Ja Ja did not arrive in Barbados with his wife. He is, however, known to have received several visits from a woman whose character has been described as 'impeccable', a Miss Hayne, an evangelist whose intention apparently was to convert the King to Christianity. And it appears that Ja Ja's interest in her was to enlist her support in his attempt to persuade the British Government to allow him to return to his native land.

King Ja Ja was eventually allowed to return when his health deteriorated and heart and lung disease was diagnosed. He left Barbados in May 1891, but never saw his native land again. He died at Tenerife in the Canaries. He was, however, buried at Opobo.○

Augustine OYOWE

CTA Bulletin
TECHNICAL CENTRE FOR AGRICULTURAL AND RURAL COOPERATION

Integrating science and tradition for pest management

by Sarah REYNOLDS

Farmers have always had to accept that pests and diseases are going to take a share of their crop. But need it be such a large share? Chemical control of pests may be effective but it is costly, not only in terms of cash but also, perhaps, to the health of the people who use them and to the health of the environment.

Approximately half the population of the world is engaged in agriculture but this average disguises the relatively low proportion in the developed world and the very much higher proportion, as much as 80% in Uganda for instance, in the much more populous developing world. The majority are small-scale farmers, frequently resource-poor farmers, who have to produce enough from their harvests to feed their own families, supply the domestic market and still have surplus for export. While their countries remain largely dependent on foreign exchange earnings from agriculture, these farmers have a heavy responsibility to bear.

Many of these resource-poor farmers, espacially those in ACP countries, regularly lose 20% to 30% of their crop to pests and diseases and sometimes very much more. They appreciate only too well that yields can be improved by better planting material and more effective crop protection measures and yet they have no money to invest in modern cost-effective technology for achieving these. The small size of their farms and the need to grow enough food for the family means that it may be difficult to adopt some crop protection measures, such as crop rotation. Furthermore, unless all farmers in an area can be persuaded to act collectively, crops that may have been cleared of pests on one farm are likely to be rapidly re-infested with pests from a neighbour's fields. Such farmers therefore need low cost, simple and sustainable means of reducing the damage caused by pests.

Integrated Pest Management, or IPM, is a much-talked about strategy for controlling pests that seeks to eliminate, or at least reduce to a minimum, the use of chemical pesticides. It is a multi-disciplinary approach where all available methods of reducing pest population on a given crop production system are integrated to achieve optimum economic benefit with minimal ecological impact on the environment. These methods may include: the choice of resistant plant varieties; all aspects of cultural control such as burning plant residues or enforcing a closed season; quarantine measures; biological control, and the proper and approriate use of chemicals.

Resistant varieties

Use of resistant varieties is one of the most applicable, low-cost and attractive pest control techniques for resource-poor farmers. Governments and private sectors have invested heavily in this technology and there are numerous examples where resistant varieties have contributed significantly to increased productivity. However, reliability and availability of resistant varieties is often very variable and farmers continue to grow genotypes which are susceptible to pests. In some cases this is because no resistant genotypes are known but often it is because such varieties are difficult or too expensive to obtain. Similarly, the advantages of hybrids have been too little exploited by such farmers because they cannot afford, or may not have access to, the new seeds required for every cropping season. It is also true that varieties have been developed by scientists for their resistance to insect or pathogen attack but with insufficient regard for the qualities of taste, colour or quick maturity. There is little point in achieving higher yields of a pest-resistant variety if no-one wants to eat it.

Choosing the right variety in the first place can ease the burden of pest control later on. For instance, farmers in Zimbabwe are encouraged to grow a hairy variety of cotton because it is resistant to early season attack by jassids.

Cultural control

Of course it is not only choice of variety that is important but where, when and how it is grown. The world's largest millet-producing ecozone lies in a tract of Africa which extends from Senegal to Somalia, south of the Sahara. Millet is subject to a range of pests including millet head miner, millet stem borer and grasshoppers. For farmers in Mali, using chemical pesticides would mean a six fold increase to a farmer's average annual cost of total inputs and is obviously impractical given the low market value of millet. However, by surrounding fields of millet with sorghum, which is more resistant to grasshopper attack, yields are improved.

Millet is a crop which also responds well to weeding, a labour-intensive task which farmers may be tempted to abandon in favour of applying pesticides. The parasitic weed, striga, has become an increasingly severe problem over the last six years in Mali, as elsewhere in Africa. Collective effort to uproot it, before it flowers and seeds, has kept the weed under control in the past and should not be abandoned now. It has also been shown, in Kenya, that encouraging soil fertility, for example by incorporating cow manure, improves the vigour of the crop and therefore its ability to overcome or outgrow pest problems.

Removing the availability of the host plant to an insect pest or disease can be achieved by establishing a closed season. This requires understanding of the principles involved by the farmers concerned and, either legislation which can be enforced or, as in the case of Zimbabwe cotton growers, voluntary cooperation. Burning plant residues, feeding them to livestock, or even crushing stems flat and allowing the sun to destroy the pests harboured within them, are all effective cultural control methods of crop protection. It may also be possible to reduce pest attack by planting early in the season, before the pest population builds up.

And, of course, choosing healthy planting material is another aspect of integrated pest management which farmers have always practised when it is within their power to do so.

Cultural control practices are normally within the scope of small-scale farmers

although, alone, they rarely achieve very high levels of control. In certain cases, physical measures like picking off insects by hand or laying traps may be employed but the success of such measures will depend on all farmers in the area working together.

Biological control

Biological control has several advantages in that at its best it is sustainable and, to the farmer at least, of low cost. There are no health hazards and no risks of environmental pollution. However long and detailed ecological studies have to be done before a successful package can be developed and with the continual introduction of exotic crops, and therefore their pests, the task will always be a continuing one.

Spectacular results have been achieved, notably in the control of the cassava mealybug *(Phenacoccus manihoti)* with the parasitoid *Epidinocarsis lopezi*. Another pest of cassava, cassava green mite *(Mononychellus tanajoa)* also causes heavy yield losses. Some promising phytoseiids have recently been obtained and it is hoped that using a combination of classical biological control, complemented by cultural control and host plant resistance will eventually ensure ecologically sustainable cassava plant protection. The Larger Grain Borer *(Prostephanaus truncatus)*, which can reduce stored maize to dust if undisturbed, is another pest which, it is hoped, will be controlled by biological means. The predatory beetle *Teretriosoma nigrescens* is at present being tested by the Kenyan authorities and is being bred in large numbers for release next year.

Plant quarantine

The need for classical biological control will undoubtedly continue because it is virtually impossible to prevent the accidental introduction of exotic pests. Strict quarantine measures can help to reduce this problem, and is a particularly appropriate pest management strategy for island states, where such controls are easier to establish.

Chemical control

When chemical control is undertaken by resource-poor farmers, the risks are of misuse and particularly underuse. Such farmers cannot afford to replace spraying equipment as needed and are likely to continue to use leaking spray packs, the dangers of which are compounded by lack of proper protective clothing. Underuse has led to pests acquiring resistance to the chemicals used.

UNEP – Mark Edwards

'When chemical control is undertaken by resource-poor farmers, the risks are of misuse and particularly underuse'

And yet chemical pesticides are generally popular with farmers because of their quick effective action. It is presently accepted that the risks to human lives and to the environment are so great that there is no longer any question about the necessity for changing to crop protection techniques that minimise the use of chemicals. Farmers in Mali have found that millet can compensate for early pest damage if rainfall later in the season is adequate. If farmers can be advised that good rains are coming, a technique which is possible with remote sensing, they can guard their limited resources of pesticide, knowing that the crop will not suffer. Another way to reduce pesticide use is to understand when not to spray. Farmers in Ghana, who were attempting to control grasshoppers on cassava, were in fact killing the beneficial insects that were protecting the plants from cassava mealybug. By spraying the weeds around the cassava fields, which is where the grasshoppers were breeding, better all-round control was achieved with less, but more effective, use of pesticide.

Integrated pest management should be the best and most appropriate combination of techniques from the sophisticated which may have to be supplied on a regional basis, such as biological control or remote sensing, to the traditional on-farm cultural methods practised by resource-poor farmers. And it should not be overlooked that there may be marketing aspects of integrated pest management, for example, for produce which has not been treated with chemicals, produce which may command a premium price for that reason.

But the knowledge of how best to combine these techniques may, in itself, be very sophisticated. It could be argued that another aspect of IPM is to train and educate so that farmers can make choices that suit their situation. To discuss all aspects of integrated pest management, scientists from many ACP countries met at a seminar organised jointly by CTA (The Technical Centre for Agricultural and Rural Cooperation) and NRI (Britain's Natural Resources Institute) at the University of Sussex, November 4-8-1991. Summarising the findings of the seminar, Alan Jackson, of CTA, emphasised that scientists and farmers must work together far more often and over longer periods of time. And when policy-makers try to identify farmer needs, they must consult farmers themselves so that their indigenous knowledge of how to grow crops and protect them from pests is fully recognised. ○ S.R.

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THE CONVENTION AT WORK

EUROPEAN DEVELOPMENT FUND

In February, after a favourable opinion from the EDF Committee, the Commission decided to finance the following projects, totalling ECU 37 290 000, from the 7th EDF.

SADCC Region: (7th EDF) — Grant: ECU 1 695 000

Project: International baccalaureate studies for the SADCC region (Southern African Development Coordination Conference)

Niger: (7th EDF) — Grant: ECU 1 000 000

Project: Centre for training and the promotion of music

All ACP & OCT: (7th EDF) — Grant: ECU 2 000 000

Project: Short basic training courses and advanced training sessions for ACP cadres in Europe in 1992-1993

Côte d'Ivoire: (7th EDF) — Grant: ECU 15 500 000

Project: Structural adjustment support programme

All ACP: (7th EDF) — Grant: ECU 12 700 000

Project: Contribution to the financing of the ACP Secretariat-General

Belize: (7th EDF) — Grant: ECU 4 400 000

Project: Rehabilitation of the Sibun River stretch of the Hummingbird Highway

The Commission has also decided to finance the following proposals under Lomé IV.

Cameroon — Grant: ECU 265 000 000

This grant, which is for the supply of medicines is part of a health sector back-up programme.

It involves providing technical assistance and the basic stock for a supply unit to help with the implementation of a national policy geared to supplying essential and generic medicines.

Swaziland — Grant: ECU 1 850 000

This grant, which is for technical assistance programmes, will improve the management potential of various Ministries (Health, Finance and Industrial Affairs) and national agencies, which can then make a better job of using project financing provided by the Community.

EUROPEAN INVESTMENT BANK

ECU 3 million loan for aluminium plant in Ghana

The European Investment Bank (EIB) is lending ECU 3 million for modernising and expanding a plant for recycling aluminium near Ghana's capital Accra. The funds, from risk capital resources provided for under the third Lomé Convention and managed by the EIB, are made available in the form of

— a conditional loan of ECU 2.8 million for 12 years at 5% to Aluminium Enterprises Limited (AEL);

— a subordinated loan of ECU 165 000 for 12 years at 2% to Ecobank Ghana Limited (EBG), for onlending to AEL in the form of a shareholder's advance, and

— a conditional loan of ECU 35 000 to EBG for subscribing capital in AEL.

The project is expected to cost ECU 4.55 million and comprises mainly equipment for processing raw materials, as well as facilities for melting used aluminium.

EMERGENCY AID

The Commission has recently decided to finance the following emergency aid projects:

Ethiopia: ECU 1 million

This money is to finance a humanitarian transport operation. It is being run by the ICRC, which is organising buses and trucks within the country to move ex-soldiers and displaced persons back home.

For Tuareg refugees in Mauritania: ECU 100 000

On 27 March, the Commission decided to send emergency aid to Tuareg refugees in Mauritania and medical products and food worth ECU 100 000 were flown out that same night. This is part of a far larger aid operation which the Commission is currently planning.

Angola: ECU 2 000 000

The money is to cover the domestic costs of flying the food aid provided by the Commission since early 1992 — i.e. 1800 tonnes of cereals, 105 t of vegetable oil and 350 t of other products.

It is 11 months since the civil war ended, but the people of Angola still have severe difficulties to cope with.

Particularly problematic are the massive numbers of Angolan refugees who came home from Zaire and Zambia as soon as the fighting was over.

Then 150 000 soldiers are being demobilised and they and their families also need food immediately. The fact that populations are on the move increases the risk of epidemics.

FOOD AID

Global quantities fixed for 1992

The Commission has fixed the global amounts of food aid for the 1992 programme and listed the products to be supplied, as follows (1991 figures in brackets): cereals 1 385 100 t (1 360 000 t), milk – 53 000 t (83 500 t), butteroil – 6 800 t (12 000 t), vegetable oil – 70 000 t (60 000 t) and sugar – 11 540 (15 000 t), plus ECU 48 million-worth of other products (ECU 50 million).

Budget restraint has forced the Commission to reduce the quantities of milk products, sugar and other products. However, it has put priority on two other products, vegetable oil and cereals.

The food crisis in sub-Saharan Africa is such that the Commission thought it should improve on the extra amounts of cereals given in 1991, albeit in only a very small way. Experience has shown that it takes more than a year to wipe out the effects of a drought as bad as the one in 1991. The Commission is not claiming that this very small increase is a full response to the extra needs in sub-Saharan Africa, particularly on the Horn, and it is very possible that the total quantities of cereal will not be enough to meet the developing countries' requirements. The situation will be monitored carefully so that action can be taken quickly if any problems arise.

The list of products to be supplied as food aid this year is the same as in 1991. However, a combined nomenclature code has been adapted to include the pigmeat added to the list in 1991.

Commission proposes a special aid programme for 1992

On 1 April, the Commission decided to suggest to the Council and the European Parliament that a special food aid programme be set up for various countries in sub-Saharan Africa and other parts of the world.

The Commission feels that this is necessary if the Community is to provide a proper response to the already serious famine situation facing about 60 million people. Estimates suggest that something like 6.5 million tonnes of food aid will be needed in 1992.

The Commission proposes that the special programme cover 800 000 t of cereal equivalent, costing ECU 220 million. This would be in addition to the approximately 1.4 million t of cereal equivalent provided under the normal food aid budget for 1992.

Financing this special programme will mean using the procedure described in the declaration which the three institutions annexed to the decision on financial prospects adopted at the trialogue on 5 February 1992.

The size of the operation and the need for speedy, efficient implementation are such that the Commission suggests revising the financial prospects and then adopting a supplementary and amending budget.

It therefore proposes that the Council decide on the principle of a special food aid programme of 800 000 t of cereal equivalent for various countries of sub-Saharan Africa and other parts of the world in 1992.

It is also calling on Member States to mobilise their own resources so that the response of the European Community as a whole is equal to the challenge.

After a favourable opinion from the Food Aid Committee, the Commission has taken the following decision on a multi-annual project:
(tonnes)

		Cereals	Milk-powder	Butteroil	Other products
UNRWA 1992	D	6 270	3 927		1 921 VO 2 924 S.
Burkina Faso 1992	D	7 000			
Tunisia 1992	P	3 000			
ICRC	D	65 000	380		600 S. 5 700 VO (*)
UNHCR	D			1.417	584 VO (**)

D: to destination.
P.: to port; VO: vegetable oil.
S: sugar.
(*) pulses to the value of ECU 3 000 000.
(**) pulses to the value of ECU 1 348 000.

Lomé IV

Indicative programmes signed

Cameroon and Gabon

ECU 128.5 million is what Cameroon gets from the Community under the Lomé IV national indicative programme, signed in Yaoundé by the Cameroonian Planning Minister and DG VIII Deputy Director-General Philippe Soubestre on 14 February. This includes a first structural adjustment support allocation of ECU 18.5 million. The framework of mutual obligations for the use of Stabex transfers 1990, worth ECU 67 million, was also signed on this occasion.

Philippe Soubestre was received by President Paul Biya and also had the opportunity to meet the leaders of the opposition party, who had asked to see him.

In Gabon, Mr Soubestre and the Gabonese Planning Minister signed the ECU 34 million national indicative programme (including ECU 5 million for structural adjustment support) in Libreville on 18 February. President Omar Bongo and Prime Minister Oye Mba attended the ceremony. The agreement fixing the immunities and privileges of the Commission delegation in Gabon was also signed by Mr Soubestre and the Foreign Minister. There have been political changes in Gabon and the present Prime Minister is in office following a national conference.

Comoros

Comoros hosted the signing ceremony for the Indian Ocean Commission's indicative programme in the Ministry of Foreign Affairs and Cooperation in Moroni on 21 February. The IOC was represented by its President-in-Office, His Excellency Said Hachim Said Hassane, Minister of State for Foreign Affairs and Cooperation, and the Community by Louis Huby, Head of the Indian Ocean division.

This Lomé IV programme will give the IOC ECU 25.5 million of the total ECU 30 million allocated to regional cooperation in the south-west Indian Ocean. It will go to finance, *inter alia*, trade, services and personnel projects and help make these countries better economically integrated.

Sanctions maintained against Haiti

Ministers met in Lisbon on 17 February to discuss Haiti in the light of the OAS decision on sanctions.

The Community and the Member States said that they intended to continue with their suspension of financial and technical cooperation with this country, although the humanitarian relief measures (about ECU 4 million in emergency aid and emergency food aid so far, distributed through NGOs) would be maintained. They also expressed solidarity with the OAS embargo.

COCOA

Meeting of the ACP-EC consultative group on Article 75 (Lomé IV)

On 12 February, a brief consultation meeting was held in accordance with Article 75 of Lomé IV, at ACP request.

The ACPs wanted to remind the Community of the resolutions which the various Joint Assemblies had made on the negotiations on a new International Cocoa Agreement.

The Group took this opportunity of reiterating the concern of the cocoa producers, especially those in Africa, about the critical situation in this sector and recalling the documents which the cocoa-producing alliance had presented in August 1991, pleading in favour of an International Agreement with economic clauses based on a system of export quotas.

Since it was impossible for some of the Member States of the Community to agree to such a system, the Commission, represented by Peter Pooley, first listened to what the ACPs had to say and then outlined the Community's attitude at the ICCO conference which began in London the next day (13 February). Although the Community objected to any discussion of the idea of a quota system as things stood, the indication was that it might be willing to look at other formulae for an International Agreement with economic clauses.

Namibia: Visit of Vice-President Marin (Windhoek, 15-17 March)

Dr Sam Nujoma, President of the Republic of Namibia, Prime Minister Mr Hage Geingob and Vice-President Manuel Marin held wide-ranging talks in Windhoek, including a discussion of the programmes of cooperation between Namibia and the European Community.

At the end of the discussions, President Nujoma and Mr Marin signed the National Indicative Programme for Namibia under the Fourth Lomé Convention, to which Namibia acceded in December 1990.

The National Indicative Programme identifies agriculture, rural development, education, human resources development and health as the main focal sectors for development cooperation under the Lomé Convention.

During the discussions, President Nujoma expressed Namibia's appreciation for the generous support received so far from the European Community before and since independence. The EC will make ECU 45 million (approximately R 168 million) available in grants for development assistance under the 1st financial protocol of Lomé IV. In addition, a minimum of ECU 6 million (approximately R22 million) will also be made available in risk capital through the European Investment Bank for the development of private sector activities in agro-processing and manufacturing and for transforming local natural resources. The risk capital would also be available for the development of productive infrastructure, as well as assistance to small- and medium-scale enterprises.

President Nujoma impressed on Mr Marin the severity of the situation arising from the present drought and famine throughout the country and appealed to the European Commission for food aid and emergency assistance.

Vice-President Marin paid tribute to the leadership and people of Namibia for their successful transition to independence, and recalled that the principles of democratic self-government and respect for human rights enshrined in the Namibian Constitution are principles which the European Community is actively encouraging through the Lomé Convention in all 69 ACP countries.

Vice-President Marin extended an invitation to President Nujoma to visit the Community in Brussels at the earliest mutually convenient date, which the President accepted.

GENERAL INFORMATION

Famine in Africa

International organisations and donors meet in Brussels

A coordination meeting on the food needs in African countries was held in Brussels on 27 February 1992. The meeting, which brought together representatives of several international organisations, non-governmental organisations as well as individual states, was convened at the initiative of the United States Agency for International Development and was hosted by the Commission of the European Communities.

Most of the major donors involved in relief programmes in Africa were present at the meeting: EEC Member States, Australia, Austria, Canada, Switzerland, Nordic Countries (Norway, Sweden, Finland) and the United States, the World Food Programme (WFP), the UN High Commission for Refugees (UNHCR), the UN Children Fund (UNICEF), the UN Disaster Relief Organisation (UNDRO), the UN Development Programme (UNDP), the UN Food and Agriculture Organisation (FAO), the International Committee of the Red Cross (ICRC) and the Commission of the European Communities.

It was the second time such a meeting had taken place in the Belgian capital. Its objective was to review the results of efforts made by the international donor community during 1991 and to assess the ongoing needs for food relief in African countries following a long drought and the continuing armed conflicts in several parts of the continent. Special attention was paid to the situation in Ethiopia, Sudan, Somalia, Djibouti, Liberia, Zaire, Zambia, Zimbabwe, Mozambique, Angola and southern and western Africa.

During the meeting it was estimated that greater quantities of food and emergency aid than were previously thought necessary would be required before the end of 1992 because of the especially grave drought situation in central and southern Africa. Only a part of these needs are already covered by the international donor community.

Against this background, the meeting discussed a wide range of operational and technical issues relating to mobilisation, transport, distribution and monitoring of food and emergency aid for Africa.

The meeting once again demonstrated the seriousness of famine problems on the African continent and the increasing solidarity amongst the donor community to meet the challenge. It has enabled an enhanced level of communication and coordination which should ensure the greater effectiveness of future famine relief operations.

Meeting of the International Cocoa Organisation

The ICCO council met to put the finishing touches to its strategy for a final consensus on the negotiation of a new International Cocoa Agreement with economic clauses.

Problems prior to this meeting made the European Community's job a particularly difficult one, given that the Member States diverged on which economic system to use and even on the idea of an economic agreement (UK and Belgium).

However, the Anglo-Belgian positions were relaxed and the Community was then able first to support an alternative economic system (to the one proposed by the producing countries) and then to agree to negotiate in Geneva on this basis in mid-April.

The President of the Council also played a major part in presenting a draft decision likely to receive the producers' and consumers' agreement on the principles involved. Nonetheless, obtaining a consensus on the document involved striking out all references to any specific economic system and leaving nothing more than a reference to a 'production policy' and the 'regulation of supply'.

Thanks to this compromise, negotiations can be started in Geneva with some hope of success.

EC-ALA

Community finances repatriation and resettlement of 'Boat People' in Vietnam

The Commission has decided to make an ECU 23.5 million contribution to the international programme of assistance for Vietnamese refugees as agreed in 1990 with the Vietnamese Government and in conjunction with the UN High Commission for Refugees.

The Community had already provided a first lot of financing (ECU 12.5 million) in 1991 for a pilot phase of this two and a half-year plan — which will cost an estimated ECU 102.5 million in all.

The idea is to help some 80 000 Vietnamese to return to their country safely and with dignity. These people are currently housed in camps in Hong Kong and the ASEAN countries and are requesting asylum, but they are not eligible for refugee status or, therefore, for permanent resettlement in a host country.

The 116 000 people currently asking for asylum are spread over Hong Kong (62 500), Indonesia (19 500), Malaysia (12 500), Thailand (12 500) and the Philippines (7 500).

Repatriation will be assured under the aegis of the UNHCR, which guarantees the safety and dignity of the returnees in accordance with the global plan of action produced by the International Con-

ference on Indochinese refugees in Geneva in June 1989.

The programme will make a significant contribution to the socio-economic reintegration of the repatriates in their country of origin by supplying direct technical assistance, expanding job creation in the regions concerned and improving living conditions and infrastructure in the host communities.

Emergency aid

Bangladesh

The Commission has decided to provide emergency aid amounting to ECU 500 000.

Intensified persecution of Muslims in Arkan, the only Muslim majority state in the mainly Buddhist Myanmar, has led to a sudden and unforeseen influx of more than 35 000 Muslims, known as Rohingyas, from Myanmar into South-Eastern Bangladesh. The aid is intended to help cater for this situation and for the humanitarian needs arising from it. It will go to financing the provision of relief supplies (food, blankets, tents, medicines, medical material, expatriate and local staff etc) and will be channelled through the Federation of Red Cross/Crescent Societies (ECU 160 000) and Médecins sans Frontières, France (ECU 340 000).

PHARE

Loan for Romania

Late last year, the Community agreed on a medium-term loan of ECU 375 million to Romania. Commission Vice-President Henning Christophersen and Director-General Enrico Cioffi signed the contract for the Community and Romania was represented by Economic and Finance Minister George Danielescu and Central Bank President Mugur Isarescu.

The loan was one of a series of G24 measures intended to provide $1 billion support for the Romanian balance of payments (the Community and other members of G24 had committed about $730 million for 1991 at that stage).

It was paid over in two instalments, the first of them, ECU 190 million, immediately, so as to repay a bridging loan which the Community's central banks made in September 1991 in anticipation of the Community loan. The second instalment was paid in early 1992.

When signing the loan contract, Henning Christophersen welcomed the progress Romania was making with its reform programme and said how important it was to pursue reforms geared to the market, so as to get on with changing the economy and ensure that growth takes off again and the standard of living improves. The Community, he said, was particularly in favour of unification of the exchange markets and the forthcoming introduction of convertibility of the Romanian currency.

ECU 500 million credit guarantee for Russia

Mr Van Miert, the European Commissioner responsible for credit and investments, welcomes the ECU 500 million credit which the Community has guaranteed for Russia.

The guarantee, originally intended for the Soviet Union, is to cover a loan which a banking consortium headed by the Deutsche Bank has granted for the purchase of food products in accordance with the exchange of letters between the European Community and the Soviet Union, represented by Mr Silaev, on 26 November 1991. The dismantling of the Soviet Union, and particularly the reorganisation of the banking structures, meant that lengthy negotiation was required to ensure that the whole operation went off smoothly.

An exchange of letters between Mr Van Miert (on behalf of the Commission) and the Russian Government (represented by Mr Bourboulis, the Prime Minister) clarified the situation and settled problems related to the guarantee. The banking consortium can therefore go ahead with the loan for the Republic of Russia, which will enable food to be supplied rapidly.

New boost for Community food aid for Russia

New developments have occurred in the Community programme three months after the Maastricht decision to grant food aid worth ECU 200 million to the cities of Moscow and Saint Petersburg.

Mid-way report on an innovative programme

ECU 5 million-worth of humanitarian relief (2600 tonnes of food and 271 t of medicines and medical supplies) was channelled through the NGOs when the operation began and the Community is now completing its despatching of two instalments — worth ECU 10 million and ECU 85 million — covering 13 000 t of milk powder, 12 500 t of butter and 47 200 t of beef.

More than 40% of what has arrived so far has been put on sale in State shops. The prices were fixed in the light of trends in the 'market' and are currently lower than those charged elsewhere, especially in other shops. Goods have gone faster in recent weeks, in particular because there are now more sales points (700 in Moscow and 450 in Saint Petersburg). More than 2200 t of meat were sold in Moscow on 16-22 March, a considerable increase on the 950 t of the previous week, and stocks have been reduced to provide meat for sausages — more than 3000 t in Saint Petersburg and 4000 t in Moscow.

Money accruing from the sale of these foodstuffs will go straight into the counterpart funds set up in the two cities.

Losses have stayed within reasonable limits, by and large, the average being less than 1.5% — the satisfactory result of the monitoring and control prescribed by the Commission. With a task force of 60 experts from the Member States, specialists from three Community companies and the support of the Russian authorities, the Commission has indeed set up an efficient system there. More than 100 people are involved in the operation.

Fresh stimulus

First use of the counterpart funds

The counterpart funds enable the Community to reach underprivileged sections of the population — some of whom, selected with the help of the Russian authorities, have been getting allowances or meals in local canteens since early March.

Thanks to the sale of the first ECU 10 million instalment, the Moscow fund has already allocated a monthly R 150 increase to 222 000 people on retirement pensions. Single mothers, large families, any family with a handicapped child of under 16 and families with no income will also be getting R 150 per month for a period of three months. More than 618 000 schoolchildren get the equivalent of R 45 per month for their meals.

In Saint Petersburg, 33 000 students (orphaned, disabled, married, pregnant) have received an R 150 allowance and 33 000 pensioners and invalids will be getting free meals in local canteens (equal to R 450 per person) for a period of three months.

All in all, the sale of the first two instalments of Community aid (ECU 10 million + 85 million) will make it possible to assist more than 3 million people in Moscow and Saint Petersburg.

Goods put out to public sale contract

A public sale system, based on sealed bids and aimed at macro-consumers and groups of retail shops, started operating this week. Traders who undertake to stick to the rules (on wholesale bans, local consumption etc) will be getting quantities of about 20 t.

Next instalment — ECU 100 million — released

Once it had received formal applications from the two cities, the Commission produced a list of products to be sent out in April and June. Although milk products are still the priority, other things such as oil, baby food and sugar are creeping in. Meat will not be so important this time.

Extending the operation to other cities

Other Russian cities have expressed a need for assistance so the Community has decided to extend the operation to Nizhny Novgorod, Saratov and Chelabinsk, which will each be receiving 1000 t of milkpowder, 500 t of baby food and 100 t of sugar (worth ECU 10 million in all).

European Community and Lithuania initial a trade and cooperation agreement

On 1 February 1992, Community and Lithuanian delegations initialled a trade and economic and commercial cooperation agreement — the first agreement between the two since the EC recognised Lithuania's independence in August 1991. The Lithuanian delegation was led by Vytenis Aleskaitis, Minister for External Economic Relations, and the Community delegation by John Maslen, head of unit at the Commission of the European Community.

The new agreement is similar to those which the Community has negotiated with various countries in Eastern and Central Europe over the past couple of years, but there are innovations. In particular, specific quantitative restrictions on Lithuanian goods imported into the Community have been removed. Like its predecessors, the agreement includes the most-favoured nation clause for trade, cooperation in a wide range of economic fields and the setting up of a joint committee to monitor trends in relations between the two parties. It also provides for other agreements to be negotiated in particular sectors in the future.

Emergency aid

Estonia

Urgent humanitarian needs calling for immediate action led to the Commission's recent decision to provide ECU 250 000-worth of emergency aid for Estonia.

It will be used to buy, shift and distribute about 500 t of sugar and will be implemented by the Commission's usual partners or the Commission itself.

Armenia

ECU 500 000 are being provided to cope with humanitarian needs arising from Armenia's domestic troubles. This will be used to buy, shift and supply medical equipment, medicines and first aid and hygiene equipment and will be implemented by Pharmaciens sans Frontières, France (ECU 400 000).

The Directorate-General for Development will allocate the ECU 100 000 reserve (via the European Humanitarian Relief Office as soon as it begins operation) as eligible requests come in from the Commission's usual partners.

Azerbaijan

Azerbaijan has had internal troubles, in Upper Karabakh, and ECU 500 000 are being provided to cope with the situation and the humanitarian needs it has triggered. The aid will be used to buy, shift and supply medical equipment, medicines and relief and hygiene equipment and will be implemented by Médecins sans Frontières, Belgium.

Bosnia-Herzegovina

Displaced persons in Bosnia-Herzegovina are to get food aid from the Commission.

The decision to send 1500 t of flour was taken one day and implementation began the next, the rate of delivery being 200 t (in 10 trucks) per day. The transport is being organised by the Commission and distribution by the UN High Commission for Refugees, via the local Red Cross.

EUROPEAN COMMUNITY

New European Parliament working group on Population and Development

A new European Parliament Working Group on Population and Development has been formed to raise awareness and understanding of population issues and the effects of rapid population growth rates in the developing world.

The founding co-Presidents are:
Gianni Baget Bozzo (Italy, Socialist)
Yvon Briant (France, RDE)
Margaret Daly (UK, ED)
Enrico Falqui (Italy, Green)
Marijke van Hemeldonck (Belgium, Socialist)
Christopher Jackson (UK, ED)
Maartje van Putten (Netherlands, Socialist)
Simone Veil (France, LDR)
Maxime Verhagen (Netherlands, EPP).

Marie Stopes International, a British based NGO, has been asked by the Group to provide the administrative and research services.

The inaugural meeting of the Group was held in Strasbourg on 10th December. The co-Presidents agreed to ensure that references to population are included in all relevant European Parliament Resolutions. They will also work to increase resources devoted to population programmes from the European Community budget and the Lomé Convention.

Christopher Jackson, the first chairman of the Group, commented that 'The co-Presidents share a concern for the problems caused at global, national and individual levels by high fertility rates'.

Most developing country governments now acknowledge the need to reduce population growth rates and have instituted a population policy. It is also clear that there is a huge unmet demand for family planning information and services in the world.

It is to these important issues and the means to tackle them effectively that the new Working Group will address itself.

A Resolution on Demography and Development, tabled by the co-Presidents of the Group, was passed by the ACP-EEC Joint Assembly at its meeting in Santo Domingo on 17-21 February.

The Resolution recommends that a Population Unit be created within DG VIII in the Commission to assist with the planning and execution of population initiatives. It calls on the Community to increase resources for population programmes and the governments of ACP countries to increase funding for voluntary family planning programmes. In addition, it urges the Commission to consider the demographic impact of development programmes, particularly in the area of primary health care and education.

The first plenary meeting of the Working Group on Population and Development will be held in Strasbourg on 9 June 1992. Dr Sai, President of the International Planned Parenthood Federation, the umbrella group for family planning associations, will address the meeting, which will be open to all members of the European Parliament.

Development cooperation policy

German MPs visit

The Bundestag's cooperation committee went to Brussels on 18 March for a meeting on the Community's development cooperation policy. This was an important event — a première, in fact, at least in this field — and it shows that German MPs are keen to go right to the source at a time when the Community is expanding its activities more and more. The Commission was represented by a team from DGVIII, led by Director-General Dieter Frisch, and DGI, led by Eberhard Rhein. Four German Euro-MPs were also there.

The two main items on the agenda were the Europeanisation of the development policy in the light of the Maastricht agreement and the Community's policy on human rights, democracy and development.

Discussion was frank and constructive. The German MPs were anxious to see the transfer of powers to Brussels monitored democratically by the European Parliament and to keep enough influence for themselves over the content of European policy, particularly in the event (as outlined by Dieter Frisch) of the phasing in of a Community framework to lay down guidelines for the policy of both Community and Member States. Instead of trying to centralise the management of our cooperation instruments, he said, the aim in the long run was gradually to transform the present coexistence of 12 policies plus one into a coherent whole, with proper respect for the principle of subsidiarity.

Spain and Portugal join DAC

Spain and Portugal have become new members of the Development Assistance Committee (DAC). This was accomplished last December during the annual high-level meeting of DAC. In becoming members, Spain and Portugal have also subscribed to the aims of the Committee as well as to the specific recommendations and guidelines it has adopted over the years. Portugal has, meanwhile, requested that it be removed from the DAC's list of Developing Countries, now that its aid programme, which currently stands at $150 million, represents 0.25% of its GNP. Spain has an aid programme of $800 million, about 0.16% of its GNP.

POLITICAL COOPERATION

Declaration on air terrorism

The Community and its Member States welcome the unanimous adoption by the Security Council on 21 January of Security Council Resolution 731.

Recalling the statement issued by the Maastricht European Council on the bombing of flights Pan Am 103 and UTA 772, they underline the great importance which they attach to compliance by Libya with Security Council Resolution 731 and urge Libya to fulfil the requests to which the Resolution refers without delay.

Statement on South Africa

The Community and its Member States welcome the outcome of the

referendum held in South Africa, which will allow the determined pursuit of the democratisation process initiated more than two years ago.

They consider that the outcome of the referendum and the responsible attitude of all sections of the population during the campaign and the ballot clearly demonstrate the commitment of the South African people to the transformation process under way in their country. They are confident that all South Africans will be involved in future consultations.

Recalling their Statement of 26 February 1992, the Community and its Member States reiterate the importance they attach to the work of the Convention for a Democratic South Africa, as a unique opportunity for the peaceful transformation of South Africa. In this context, they commend the courageous stance of President De Klerk and Mr Nelson Mandela.

The Community and its Member States will continue to support the creation of a democratic and non-racial South Africa and the well-being of all its people.

Statement on Mozambique

The Community and its Member States, who have been following from the outset the course of the peace negotiations between the Government of Mozambique and RENAMO, welcome the signing of Protocol III, concerning the electoral law and citizens' rights, which took place in Rome on 12 March.

They hope that this important new development for the process of national reconciliation will be followed by a significant decrease in the intensity of fighting on the ground before the signing of the ceasefire agreement.

Recalling their statement of 27 May 1991, the Community and its Member States reiterate their support for the efforts of the mediators and encourage the negotiating parties to pursue their efforts towards bringing about a final comprehensive peace agreement.

Declaration on Zaire

The Community and its Member States stress the importance they attach to respect for human rights and to the realisation of the democratisation process in Zaire.

In this connection, they vigorously condemn the act of violence perpetrated by the security forces in Kinshasa on 16 February 1992 and deplore the fact that a large number of innocent victims were injured or killed among the population as a result of the intervention of these forces.

The Community and its Member States refer to their declaration of 22 January 1992 and reiterate their support for all the institutions and political forces involved in order to enable the National Conference to resume its work shortly and under normal circumstances.

Statement on Haiti

The Community and its Member States welcome the agreement reached in Washington, on 23 February 1992, between President Jean-Bertrand Aristide and the Parliamentary Commission for Negotiation, which opens the way for the restoration of constitutional order and the return of the legitimate authorities in Haiti.

The Community and its Member States call on all Haitian parties involved to implement this agreement.

The Community and its Member States recall their will to support all efforts conducive to a settlement of the Haitian crisis. They reaffirm their readiness to resume relations of cooperation with Haiti as soon as the rule of law is entirely reestablished.

Statement on ASEAN

The Community and its Member States welcome the conclusions reached by the ASEAN Heads of Government at their summit meeting in Singapore on 27/28 January. They believe the summit has opened up promising political perspectives: the internal strengthening of ASEAN and its opening towards the neighbouring countries of South East Asia give hope for the emergence of a strong new pole of stability in Asia, in the context of a multipolar world.

The moves to an ASEAN free trade area through a programme of tariff reductions wholly consistent with GATT are particularly welcome. The Summit's clear endorsement of the GATT open multilateral trading system will assist in our mutual efforts to ensure a successful outcome of the current Uruguay Round.

The Community and its Member States share the wish of ASEAN members for an intensified cooperative relationship, look forward to strengthening the dialogue process and note with interest the proposed widening of the scope of the post-ministerial conference process to include security matters.

The Community and its Member States look forward to the next EC/ASEAN ministerial meeting, tentatively scheduled for Autumn 1992, which they see as an opportunity for further discussion, in equal partnership, of issues of both bilateral and global concern. They also look forward to the signing, on that occasion, of a new EC/ASEAN cooperation agreement. The Community and its Member States are also ready to share their experience in regional cooperation.

ASEAN's proposal to seek endorsement of the United Nations for the Treaty of Amity and Cooperation in South-East Asia and its commitment to the central role of the UN in the maintenance of world peace and security are welcome.

Statement on Ethiopia

The EC and its Member States have from the beginning supported the process of democratisation in Ethiopia which was initiated by the National Conference held in Addis Ababa in July 1991. The recent signing of a revised national indicative programme with Ethiopia, providing for over ECU 200 million of assistance under the Lomé IV Convention, together with Member States' bilateral assistance programmes, show their readiness to support this process. But they firmly believe that the holding of elections, to be preceded by the return to camp of the armed forces of the groups involved, as set out in government proclamations, is the essential next step in taking this process forward.

They have therefore watched with increasing anxiety over recent weeks the difficulties apparently preventing the electoral process from moving forward. They urge the parties involved to conclude their negotiations over encampment of troops rapidly, thereby displaying the essential spirit of compromise. In this way the process intended to lead to free and fair elections can get under way again.

The European Community and its Member States would be deeply concerned by any abandonment of the process of democratisation.○

CDI

PARTNERSHIP

Information Bulletin from the Centre for the Development of Industry - May-June 1992 - Nr 1

CDI - Rue de l'Industrie 28, B-1040 Brussels - Tel. +32 2 513 41 00 - Fax +32 2 511 75 93

To our readers

At the commencement of the fourth Lomé Convention, the CDI conducted a radical review of its objectives, its strategy and its structures. It was therefore only logical that it should also redefine the main means of communication through which it informs those in the ACP countries and Europe who are interested in its activities.

Our traditional newsletter, "Industrial Opportunities", has therefore changed its name and its presentation : it is now more compact, "targeted" and appropriately called "CDI Partnership"*.

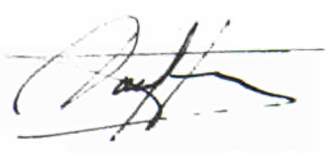
- To us, it seems that this term is more in keeping with the Centre's main task : to develop lasting industrial partnerships between SMIs in the ACP countries and companies in the European Community.

- This name also reflects the role played by the CDI in supporting this cooperation between industrialists : the CDI too is a "partner", offering an extremely varied range of assistance and services to guide ACP companies in their early days.

- Finally, to mobilize the financial, technical and human resources available in Europe and in the ACP countries, the Centre also relies on partnerships with finance institutions and other company-support organizations.

Consequently, and to inaugurate this new presentation, this first edition of CDI Partnership devotes a full-length article to the work carried out by the CDI in Madagascar covering a wide range of projects, in cooperation with the Caisse Centrale de Coopération Economique (CCCE-France) and with Madagascar Promotion Industrielle.

In addition, as the Annual Report for 1991 has just come out, this number also describes the key elements of the action taken by the Centre over the past year in the light of the new strategy for Lomé IV.



Paul Frix
Director of the CDI

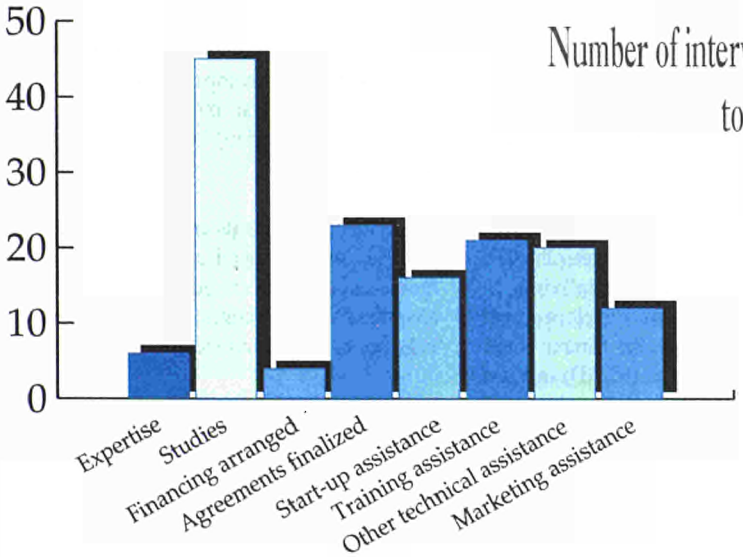
* "Partenariat CDI" in French

The Outstanding features of 1991

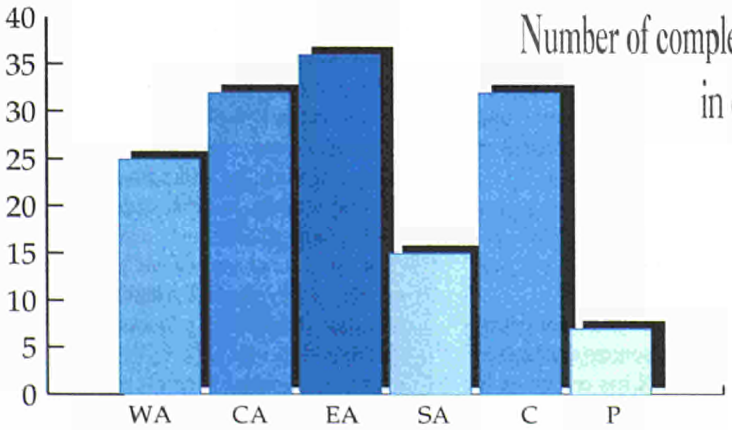
The CDI Annual Report

Almost 97% of the CDI's intervention resources were committed in 1991 : this figure, well up on previous years, is in itself a clear indication of the efforts made by the CDI over the past financial year to accomplish the tasks assigned to it. Following the three lines on which its action is based - coordinating the ACP networks, organizing the EC network and intervening at company level - we pick out below the main features of a year which saw the launch of the Centre's new strategy for Lomé IV and the restructuring of its departments.

Number of interventions, by type, to ACP companies



Number of completed interventions in each ACP region



The Outstanding Features of 1991

The ACP network

The Centre's action in the ACP countries is based on a three-point plan :

• Priority for those ACP countries which, in their national indicative programme for Lomé IV, have earmarked significant resources to be devoted to developing their industrial sector, preferably in cooperation with the CDI.

• Decentralization, with a view to strengthening the role and the impact of the CDI's local antennae and correspondents by helping them take charge of assistance and follow-up for a larger number of projects. The central structures, in Brussels, will be concentrating more and more on large-scale projects and broader interventions, placing the emphasis on industrial partnerships and on coordination and support for the various networks.

• The search for greater synergisms with other institutions active in the field in the ACP countries, particularly finance institutions. This cooperation policy is being developed primarily with :

- assistance instruments operating within the framework of the Lomé Convention, especially the EDF and the EIB;
- financial or technical support operators. Examples in 1991 : cooperation between the CDI and the RAS in Kenya (specializing in rehabilitation), the Société de Développement Régional (SDR) in the Congo, the Banque Ouest Africaine de Développement (BOAD) in West Africa and the Africa Project Development Facility (APDF) in West and East Africa, together with the numerous interventions made by the Centre in conjunction with the agencies of the Caisse Centrale de Coopération Economique (CCCE).

Another positive development in this context was the creation of the "Okoumé Club", a contact cell launched by the CDI at the EC-ACP Forum in Libreville to promote active synergisms between financial organizations, on the one hand, and technical support bodies for companies and businessmen on the other (see our article in "Industrial Opportunities" No. 83).

The EC network

Here, the accent is placed on increased mobilization of the financial and technical resources available in Europe. In this respect, the CDI has continued to develop cooperation agreements with national, regional or local institutions in the 12 Member States of the EC. In 1991, for instance :

• a cooperation and co-financing agreement was signed with the Administration Générale de Coopération et de Développement (AGCD) in Belgium;
• new cooperation agreements were signed with two Portuguese banking institutions (the Banco de Fomento e Exterior and the Banco Portugues do Atlantico);
• three existing agreements were renewed and enlarged. These agreements concern : the DEG (German financial company for financing in the developing countries), the EOMMEX (Greek SME and craft organization) and the Brussels-Capital Region in Belgium.

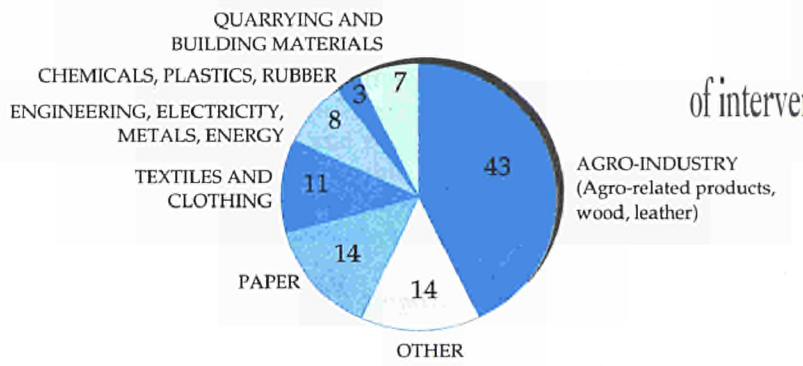
All in all, 26 agreements are operational at present. In 1991, they allowed additional funds to be mobilized for projects equivalent to 25% of the amount of the CDI budget allocated to interventions in favour of ACP countries.

Interventions in favour of projects

The CDI has set itself new priorities as regards project identification and evaluation. These priorities involve :

• taking account of the efforts made by ACP member States implementing voluntary and coherent aid policies for SMIs. In these countries, the CDI's operations will be concentrated on sectors of major importance to the local economy;
• developing a more sectoral approach by giving preference to whole industries when identifying and evaluating projects. In 1991, several interventions were made along these lines :

- for garment industries in Madagascar and Fiji;
- in the textile sector in Burundi;
- to develop timber processing in the East Caribbean States (OECS);
- for the non-metal minerals sector in Trinidad and Tobago.



Breakdown of interventions as a %

The CDI also focused its assistance and follow-up efforts on "reference projects" (fifteen in 1991) selected as particularly useful examples and for their demonstration value.

Broadly speaking, the aim is to avoid interventions being spread out too thinly : in 1991, the average amount of expenditure committed per intervention was about 12,000 ECU (compared with an average of 7,000 ECU before 1990).

Results obtained
Total interventions in 1991

• Number of interventions undertaken : (see breakdown of interventions by industrial sector	337
• Number of interventions completed : (see distribution of intervention types by ACP region on the two graphs on the opposite page)	147
• Number of CDI-assisted companies having started up or restarted production in 1991 :	
- new companies	23
- rehabilitated companies	6
- companies having diversified their production	6
- Total	35
• Budgetary commitments in 1991 for networks and interventions (1) :	3.95 million ECU
Breakdown :	
- Disbursements on ACP and EC networks	15%
- Project identification and evaluation (including studies, advice and missions)	45%
- Direct assistance to companies	40%

(1) This amount does not include staff expenses, mainly incurred through project-related activities, and concerns only interventions directly linked with networks and projects.

THE SPIRIT OF ENTERPRISE BREATHES ON THE "BIG ISLAND"

Survey: CDI assistance in Madagascar

Since 1989, the Malagasy public authorities have been pursuing a policy of opening up to industry. Several projects relying on the quality and moderate cost of local labour have been implemented in close cooperation with European firms. On this promising basis, CDI has also been able greatly to increase its assistance to the country, particularly as regards training. This survey is intended to present an overview of the Centre's various projects and concrete measures.

CCCE, partner to the private sector

The Caisse Centrale de Coopération Economique (CCCE) employs a staff of 1,200. It is a major financing organisation which operates on behalf of the French Ministry of Cooperation and Development. Its purpose is to encourage, mainly in Africa and the Caribbean, economic and human development favourable to foreign or national private investors.

CCCE has 34 agencies installed in the countries where it is active. Some of them have a staff of about ten on the spot, who are thoroughly familiar with local conditions, qualified to identify the opportunities for involvement and assess or initiate activities. The Madagascar agency has a staff of three.

In order to provide the private sector with the financial means it needs for entrepreneurial development, CCCE also set up the Société de Promotion Pour la Coopération Economique (PROPARCO), a finance company with a capital of FF 225 million, in which the CCCE holds a 69% share. One pre-condition for obtaining financial assistance from PROPARCO is private-sector involvement, even if only on a minority basis, in the capital of the firm concerned. PROPARCO's advantage is that it can provide venture capital in the form of a holding in a company's equity capital with a total investment ceiling for capital and loans combined of FF 33 million per firm. The CCCE can also provide any top-up capital required to achieve an objective.

In parallel with this financial lever, the CCCE developed a fund, in operation since May 1990, for studies and for encouraging the formation of partnerships. The fund has the same goals as CDI and pursues them by similar means. It provides aid to companies considering investment and finances feasibility studies and partnership and training programmes. Mr J.P. Gonon is the CCCE official in charge of the various forms of private-sector assistance.

As can be seen from this issue's survey, cooperation between CDI and the CCCE is particularly close. At the present moment, out of some thirty files on financial assistance for the private sector being considered at CCCE, about a dozen either envisage or already include CDI as a partner. According to Mr Oudin, Mr Gonon's senior assistant and CDI's main contact in the CCCE, "files are considered sometimes on the suggestion of CDI, sometimes on that of the CCCE. What matters is to be involved from the outset in the examination of a file, in order to avoid duplication of efforts and ensure prompt analysis".

Madagascar Promotion Industrielle's expertise

MPI's vocation is to convince European industrialists to invest in free zones with Madagascan partners. The mainspring of this organisation is Jean Caron, a French textile engineer who, since 1984, has conducted various interventions in Madagascar at the request of the European Communities Commission. In 1988, it produced a study by the Madagascan Minister for Industry, Jose Rakotomavo, financed by the European Commission. Its remit was to identify an export strategy for Madagascan finished production.

Within this framework a permanent structure was established, in December 1988: the MPI unit, Madagascar Promotion Industrielle, financed by the European Development Fund. Given the priority accorded by Madagascan authorities to the development of the textile sector, MPI commenced its activities mainly in this field.

In collaboration with the trade federations for garments and clothing, MPI contacted the big names in French textiles which it invited to Madagascar. It had to convince the garment makers (and not the wholesalers) to transfer the know-how, to relocate a part of their production and invest in Madagascar. MPI introduced potential Madagascan partners and convinced them to work together.

Its mission may be split into three sections: to meet, prospect and assist the investor. Maintaining an interface role with local administrations, MPI also supervises the progress of agreement procedures as well as the follow up on

At the EC-Africa Industrial Forum at Dakar in 1990, Paul Frix, CDI's Director, spelled out one of the guiding principles of the Centre's new strategy for Lomé IV: "CDI plans to concentrate its resources as a priority on the growth sectors and on those countries which offer coherent support for the industrialisation of their economies".

Madagascar most certainly offers a good example of this coherence. Its policy, geared to attracting foreign investment and liberalising the economy, is bearing fruit. More specifically, the establishment of a free zone in the capital, Antananarivo, triggered four of the projects studied here (the JOIE, DEMAD, MACOTEX and FLEURUS projects).

The importance of synergy

In the case of Madagascar, CDI's assistance is based on profitable synergy with two other organisations from the private industrial development sector which are very active in the island:

- The Caisse Centrale de Coopération Economique (CCCE), a French financial institution for development with which the Centre maintains a policy of close cooperation in most of the projects listed.

- Madagascar Promotion Industrielle (MPI). Sponsored by the Ministry of Industry of Madagascar, this organisation is responsible for promoting foreign investment in the free zone.

We should also mention the transmission role played by CDI's Madagascar antenna, the Société d'Etudes et de Réalisations pour le Développement Industriel (SERDI).

In all the projects reviewed in this survey, cooperation between organisations with different approaches but sharing the same goal - the active development of private industry - has made it possible to provide the most appropriate support for industrial projects.

CDI's action in Madagascar has been concentrated on three growth sectors: textiles, agri-foodstuffs and the exploitation of local raw materials.

Survey : The Spirit of Enterprise Breathes on the "Big Island"

1. Textiles: a labour-intensive sector

A. Three new projects in the free zone

During 1990, CDI intensified its relationship with Madagascar Promotion Industrielle (MPI) with the aim of identifying useful forms of assistance for textile firms considering a move into the free zone.

Quite apart from the advantages afforded by a free zone, there are other persuasive arguments encouraging investors to take an interest in the "Big Island":

- firstly, a high quality workforce which is not only inexpensive, but also able, skilled and versatile;
- Madagascar is a signatory to the Lomé Convention which guarantees it access to the Community market;
- lastly, for the clothing industry, it offers an alternative to the traditional Asian and North African sources of supply.

MPI submitted six projects for study by CDI. After in-depth assessment, three of them were approved for CDI support in 1991: JOIE and DEMAD (both producing children's clothing) and MACOTEX (Sportswear). CDI will provide aid to the other three projects in the course of the 1992 financial year.

The first three projects have the same basic characteristics:

- they are joint ventures with French partners. They involve investment in the free zone to produce goods entirely for export (marketing is guaranteed by the French partner);
- they are based on the employment of a substantial local workforce (the three projects together, once they are up and running, will generate a total of 600 jobs). This involves a significant transfer of know-how.

A flexible response to urgent training needs

It very quickly became apparent that success in the three projects depended upon staff training. This was absolutely essential if the quality of clothing produced in Madagascar was to meet the requirements of the European market.

However, Madagascar has no local vocational training structure suitable for the textile sector and no possibility of setting one up in the short term. Further to consultations with the EDF, CDI accepted to undertake, with cofinancing with the CCCE and the French partners in the three projects, the organisation of a large-scale training operation specifically adapted to the urgent needs of these three clothing factories.

This measure demonstrates the flexibility of the Centre's response to the specific needs of projects. It had two facets:

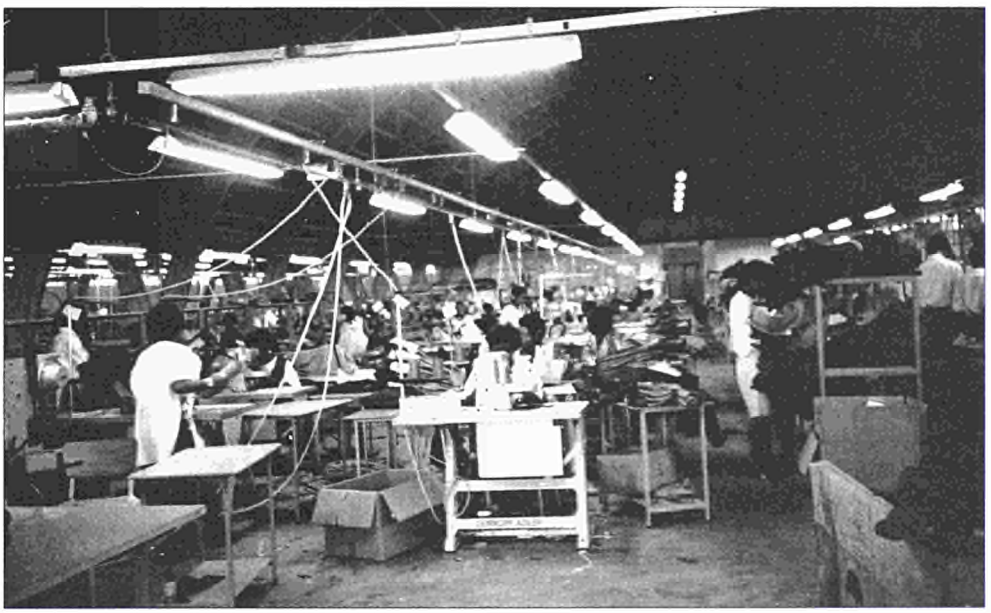
- on the one hand, the organisation of traditional in-house training courses for Malagasy technical staff in the European company;
- on the other, the implementation of a training programme for the whole of the basic staff of the three factories.

The local training was provided by the Groupement Interprofessionel de l'Industrie de l'Habillement (GIH - France). They developed the training programmes with the partners, defined the procedures and sent training experts.

All the personnel recruited were thus given training on the spot in two three-week phases. This ranged from a basic introduction to industrial production processes to the acquisition of know-how on the actual product. Workers learned how to make the piece they would be required to produce on the machine itself, under the constant supervision of a trainer who gave advice, demonstrations and explanations.

There was a third sup-plementary three-week training period for the team of supervisors.

By providing this transfer of know-how on the spot, this kind of training gives Madagascar a considerable asset: a skilled workforce capable of keeping up with technical development and the manufacturing of products with a high added value.



JOIE: A training programme set up by CDI in coordination with the EDF.

Survey : The Spirit of Enterprise Breathes on the "Big Island"

The JOIE Project

The JOIE company (Jullien Océan Indien Expansion) has played a pioneering role. In June 1991, it was the first joint French-Malagasy textile unit to go into production in the free zone. The JOIE factory makes children's clothing (trousers, shorts, Bermuda shorts, etc.) for export to Europe.

This Malagasy company was set up in close partnership with the French Jullien company. The agreement between Jullien and the Malagasy developers provides for a factory managed exclusively by Madagascar nationals. Apart from the local programme described above, training had also to be arranged for the factory managers. The present production head was given 12 months' training in France. The chief engineer in charge of maintenance also spent a nine-week period of in-house training in the workshops of the French partner.

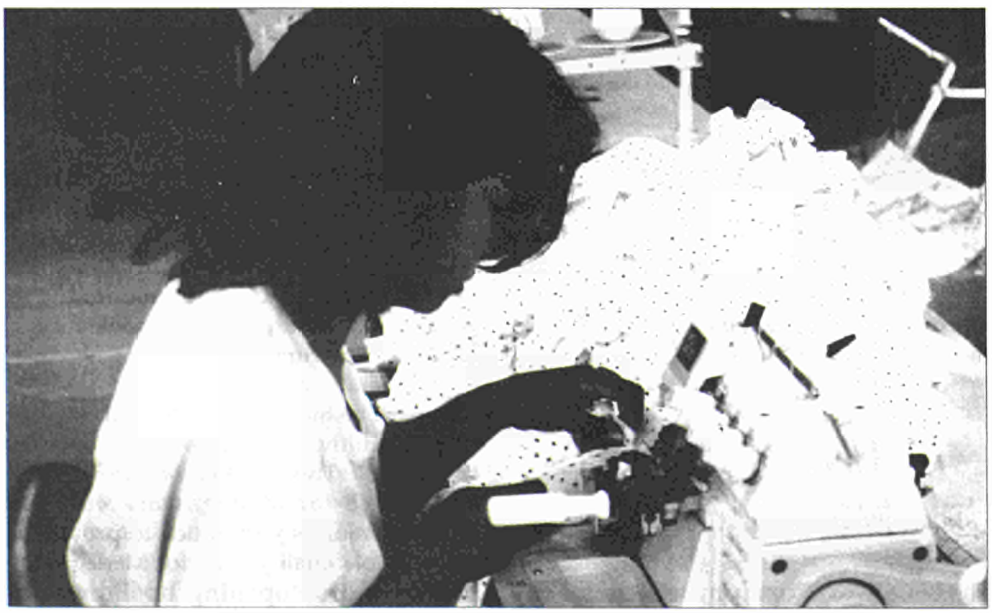
The present daily production of children's clothing is 1,600 high quality standard pieces made with textiles imported from Mauritius. A first consignment of 55,000 pieces for sale in France was dispatched at the end of December 1991.

As a priority, the CDI is concentrating its resources on potentially interesting sectors and on countries which, like Madagascar, are actively supporting the development of their SMI.

DEMAD Project

The factory, launched in September 1991, has four production lines. The French partner is the DECANT textile firm. They supply all the textiles and accessories and design computer models. The company plans to produce 190,000 articles of children's clothing in its first year, with production rising to 570,000 pieces in five years.

At DEMAD, the maintenance chief was trained by the suppliers of the stitching equipment and went on to spend three weeks in the French investor's workshops. CDI and the CCCE cofinanced this training, along with the subsequent training provided on the spot for workers that are cutting and stitching, in accordance with the schedule described above.



DEMAD: In its first year, the enterprise expects to produce 190,000 children's clothes.

The MACOTEX project

The MACOTEX project, launched in December 1991, is based on a partnership between the French firm Paul Boyé and a Malagasy businesswoman, Mrs Radilofe, who is the company's managing director. The factory produces sportswear authorised to carry the French partner's quality label, which means that it meets strict final quality control criteria.

CDI had previously provided support in this project for the execution of a feasibility study during the pre-investment phase. With respect to training, in addition to the

basic course for personnel, the Centre also granted aid for sending an engineer to France for three months.

B. Two other textile projects in Madagascar

Also in 1991, CDI provided assistance for SAMAF, another undertaking in the textile sector in Madagascar.

This business was established in 1976 by the Malagasy Meralli-Ballou family. It has one spinning unit and another, equipped with knitting, cutting and assembly lines, for the production of T-shirts. SAMAF has experienced continuous growth since it was set up. It now employs a workforce of 200 and has exported 30% of its production, much of it to the former USSR, its biggest customer.

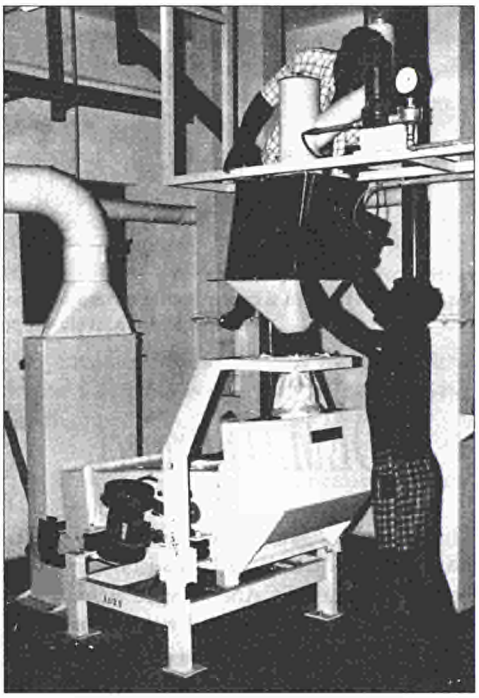
Given the changing economic context, however, the company wished to expand its export outlets in Europe. To win over such a demanding market, it had to upgrade its quality standards. This required technical support to bring its staff up to the appropriate quality level. SAMAF therefore turned to the ITF-Maille organisation (Institut Textile de France, Centre d'Etude et de Recherche de la Maille), which drew up a training programme. CDI contributed one third of the costs, the rest being covered by the CCCE and the promoter.

Finally, an older "success story" is worth mentioning to close this chapter on textiles. The PERLIN company, also a Malagasy enterprise, began receiving assistance from the Centre before 1991. This manufacturer of up-market children's clothing was established in 1986 by a young Malagasy lady, Mrs Ramahay-Mandimby, on her return home after engineering studies in Paris. She then obtained joint CDI/CCCE funding for the services of a full-time French clothes designer who worked with her for the whole of 1987. CDI also funded participation by PERLIN in special showings in Europe.

In five years, the PERLIN firm has managed to gain a solid foothold in France, in particular by opening a marketing agency for its clothes. The firm now employs a workforce of almost 800.

2. AGRO-FOOD SECTOR: HIGH ADDED VALUE

Given the significant repercussions on rural areas, the creation of small industrial units to increase the value of produce from the countryside is indeed a priority target for a developing country.



The "agro-food" partnership creates a permanent transfer of know-how and opens European markets to Madagascan products.

Two projects of this type have been developed in Madagascar, based on partnerships with French promoters, one for quality vegetable production, another for foie gras. In both instances, the CDI supplied technical expert advice and initial assistance with the local training of rural producers.

A. The LECOFRUIT project for quality vegetable production

The LECOFRUIT company was created, in 1989, by the Madagascan firm Barday, a Grand Island group already active in the industrial - and more notably the agro-industrial sector. This promoter's objective: to tackle the European market for choice vegetables (green beans, extra-fine gherkins, asparagus, artichokes, etc.) for which there is a growing demand. To this end, LECOFRUIT has associated with two French partners, the Segma Maille and Eurofroid groups, with whom commercialisation contracts were agreed.

As for the supply situation, LECOFRUIT has set up a system grouping some 2,000 peasant family farming. Each family, comprising six to seven people, works small production areas of approximately 10 ares, around Antananarivo. The enterprise provides the peasants with seeds and advice on cultivation and has established a system for collecting the harvests. Given the strict requirements on quality demanded by the two partners, the success of this industrial project comes from LECO FRUIT's ability to organise the group of peasants.

In 1989-90, the enterprise mainly produced gherkins, packed in casks. The export of extra-fine green beans began in 1991. In 1992, LECOFRUIT will be producing gherkins in vinegar and sterilised bottled green beans. The production line for frozen extra-fine green beans is due to start in 1993.

The CDI has followed LECOFRUIT since it was created. In cooperation with the CCCE (French overseas development agency) it has given assistance and advice in the drafting of partnership agreements and the definition of the technical characteristics of the project. Additionally, help has also been given with the briefing of the case for financing the bottled, sterilised vegetable production line and for the project's feasibility study. A final fundamental aspect will also be implemented: the training of local experts responsible for the supervision of rural producers.

This partnership may be extended to other types of cultivation and to other zones on the island. This has been an exemplary experience for Madagascar. Its first preoccupation is very much to provide a recognisable quality label for Madagascan produce, thus opening up European markets to them. The impact at rural level

is not negligible, it provides the peasants with an outlet and hence a stable income.

B. The FGM project (Foie gras from Madagascar)

Madagascar has a tradition of small-scale duck breeding and the production of foie gras. A Madagascan promoter, the Bongou company, has created a small industrial unit for the local market. Hoping for association with a French partner which would open up important outlets in Europe, Bongou obtained financial aid from the CDI to search for an associate when participating at a food fair in 1989 in Paris to present his products.

The varied contacts made by the Madagascan promoter aroused the interest of the great French names in the production of foie gras, who were keen to obtain new sources of supply. During a visit to Madagascar, they discovered not only the high quality of the foie gras from locally raised ducks, but also the presence of an abattoir equipped with the most modern equipment in line with European norms.

An initial project was aimed solely at awarding a contract to the abattoir for the slaughter and butchery operations. In 1991, at CDI's suggestion, the French partner created FGM, Foie Gras from Madagascar, in partnership with the Bongou company.

Besides the economic advantage of this association which offers the possibility of a profitable means of exportation, generating foreign currency, FGM has a significant impact on the creation of a stable income for the rural sector. In effect, to guarantee its supplies, FGM relies on some 400 family duck farms, supervised by 13 local assistants and 15 intensive duck-breeders.

In all, at end-1991, 1,200 people were employed in feeding 58,000 ducks each year. Owing to the optimum utilisation of the abattoir, 10.8 T of meat were dispatched (end-December 1991) 2.4 T of which were liver. In 1993, the objective is to achieve exports of 77 T of meat and 32 T of liver.

The CDI intervened to finalise the slaughter-butchery contract between FGM and the local abattoir. Progressively, and in line with the needs for expansion of the project, the Centre will contribute, together with the CCCE, towards the financing of the establishment costs, the supervision of duck breeders, and feeders, as well as the training of butchery personnel. A school for feeding is also underway.

A. Fleurus (Madagascar) Project

This project enables a local raw material, leather, to be developed, produced in two tanneries, Omnium Industriel of Madagascar (OIM) and Anjeva.

In cooperation with Madagascan partners, the FLEURUS (Madagascar) enterprise has been established by the FLEURUS company, a French group, which has been manufacturing watch-straps, fancy leather goods and jewellery for fifty years.

With all the textile projects described at the start of this folder, FLEURUS (Madagascar), established in the Antananarivo free zone, is part of the Madagascan government's policy of opening up the country to foreign investment, by emphasising the quality of the local labour force and its modest costs. The company's objective: increasing the value of local leather to produce 1.2 million watch-straps per year by 1993, representing the creation of 250 jobs. The whole production goes to the French partner and through his European distribution networks.

FLEURUS-Madagascar obtained approval in October 1990. The project represents an investment of some ECU 360,000. The

FGM: Bongou obtained financing from CDI for its search for partners able to open up outlets for it in Europe.

FLEURUS: In parallel with the industrial and financial aspects, an important training scheme has enabled this project to rapidly become operational.

3. Increasing the value of local raw materials

Throughout 1991, the CDI has been helping with two projects which are now operational and which are designed to increase the value of Madagascan raw materials.

factory became operational in May 1991. During the year, it had produced 167,000 watch-straps. It currently employs 122 people trained with CDI help.

To enable it to start operations quickly, CDI intervened, together with the CCCE (French overseas development agency) and the FLEURUS (France) company, in an initial training phase for about fifty technicians as well as for the current director of the factory, the mechanics and production personnel.

Given a well filled order book, the dexterity of Madagascan technicians and the high quality of the products manufactured, FLEURUS (Madagascar) has recruited a further fifty people to train in leather work.

The CDI decided to support this second training programme to which the CCCE and FLEURUS (France) also contribute. The training of personnel recently engaged is undertaken by 2 teachers in Madagascar. It will be complemented by special training for a mechanic responsible for the maintenance of the leather department's machines. Finally, the training of those in charge of the sections connected with manufacture and precision equipment will alternatively be organized in France.

The transfer of know-how goes beyond the watch-strap manufacturing arena. Through its work in conjunction with the tanneries, FLEURUS (Madagascar) has also brought about a significant improvement in the quality of the leather treated.

B. AMI Project
(Arts des Mascareignes Industries S.A.)

This project is an interesting example of the organisation of the transition from local know-how of a fundamentally craft nature - basketwork - to an initial "pre-industrialisation" phase. The impact in terms of employment and increased value at traditional village level is significant.

AMI is based on a partnership between two European companies on the one hand, the firm Fandec in Belgium and the French firm Mahjor Import, both of which specialise in importing basketwork from China and, on the other hand, a Madagascan promoter, Simon Ralambomanana, director of a company commercialising local craftwork.

The EC partners wanted to assemble their own production unit with a Madagascan partner whilst guaranteeing its commercialisation from the outset. The Madagascan promoter had already amply demonstrated his export ability: in 1987 and 1988, he had been honoured as "best exporter in Madagascar". The decision was taken to establish a company "Les Arts de Mascareignes" as a joint venture (30% Madagascan, 70% European).

The project was conceived to adapt to the very special conditions created by basketwork production based on local craftsmen. The partners first of all want to test the quality of Madagascan raw materials, the reaction of the European market and the capacity of the local traditional labour force to assimilate new manufacturing techniques. Hence the definition of an initial pre-industrialisation phase, limited to a simple product: basket production.

AMI functions through a network of basket workers recruited in the villages, forming groups of about 150 persons, who work on the ready-made forms supplied by the firm. The aim is to help the managerial staff, appointment of leaders amongst the craftworkers and the collection of products. The finishing of the baskets is carried out by about twenty persons who apply fungicides to them, comb them, varnish them and pack them for dispatch.

The CDI, alongside the CCCE, intervenes with about one-third of the overall budget for establishing this pre-industrial phase. The intervention is wide and varied. It covers training (mainly supervisory), as well as some expatriate costs and transport of materials. Belgian cooperation - in line with the AGCD (Belgian overseas development agency)/CDI protocol agreement - also plays its part in this partnership by financing part of the equipment needs.

First results are encouraging. End-February 1992, five containers with 150,000 baskets were sent to Europe, following four months' production. A core of 80 persons destined to supervise the producers was formed in Antananarivo and 700 villagers thus learned to make these semi-finished items to satisfy the requirements of the pilot project. The objective for end-1992 is to have 3,000 rural craftsmen produce 130,000 baskets per month. The complete range should offer some 400 different models, each group of producers specialising in a limited number of forms.

AMI: Antananarivo factory, weaving the baskets.

Operational Summary

No. 68 — May 1992

(position as at 28nd April 1992)

EEC-financed development schemes

The following information is aimed at showing the state of progress of EEC development schemes prior to their implementation. It is set out as follows:

Geographical breakdown

The summary is divided into three groups of countries, corresponding to the main aspects of Community development policy:

— the ACP countries (Africa, the Caribbean and the Pacific), which signed the multilateral conventions of Lomé I (28 February 1975), Lomé II (31 October 1979), Lomé III (8 December 1984) and Lomé IV (15 December 1989), plus the OCT (overseas countries and territories) of certain member states of the EEC, which get the same type of aid as the ACP countries;

— the Mediterranean countries (Maghreb and Mashraq), which signed cooperation agreements with the EEC since 1976 and 1977;

— the ALA developing countries of Asia and Latin America, beneficiaries since 1976 of annual aid programmes.

The information within each of these groups is given by recipient country (in alphabetical order).

Note

As the information provided is subject to modification in line with the development aims and priorities of the beneficiary country, or with the conditions laid down by the authorities empowered to take financial decisions, the EEC is in no way bound by this summary, which is for information only.

Information given

The following details will usually be given for each development scheme:
— the title of the project;
— the administrative body responsible for it;
— the estimated sum involved (prior to financing decision) or the amount actually provided (post financing decision);
— a brief description of projects envisaged (construction work, supplies of equipment, technical assistance, etc.);
— any methods of implementation (international invitations to tender, for example);
— the stage the project has reached (identification, appraisal, submission for financing, financing decision, ready for implementation).

Main abbreviations

Resp. Auth.: Responsible Authority
Int. tender: International invitation to tender
Acc. tender: Invitation to tender (accelerated procedure)
Restr. tender: Restricted invitation to tender
TA: Technical assistance
EDF: European Development Fund
mECU: Million European currency units

Correspondence about this operational summary can be sent directly to::

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Commission of the European Communities
G 12 4-14
200, rue de la Loi
B-1049 Brussels

Please cover only one subject at a time.

DESCRIPTION SECTOR CODE

A1	**Planning and public administration**
A1A	Administrative buildings
A1B	Economic planning and policy
A1C	Assistance to the normal operations of government not falling under a different category
A1D	Police and fire protection
A1E	Collection and publication of statistics of all kinds, information and documentation
A1F	Economic surveys, pre-investment studies
A1G	Cartography, mapping, aerial photography
A1H	Demography and manpower studies
A2	**Development of public utilities**
A2A	Power production and distribution
A2Ai	Electricity
A2B	Water supply
A2C	Communications
A2D	Transport and navigation
A2E	Meteorology
A2F	Peaceful uses of atomic energy (non-power)
A3	**Agriculture, fishing and forestry**
A3A	Agricultural production
A3B	Service to agriculture
A3C	Forestry
A3D	Fishing and hunting
A3E	Conservation and extension
A3F	Agricultural storage
A3G	Agricultural construction
A3H	Home economics and nutrition
A3I	Land and soil surveys
A4	**Industry, mining and construction**
A4A	Extractive industries
A4Ai	Petroleum and natural gas
A4B	Manufacturing
A4C	Engineering and construction
A4D	Cottage industry and handicraft
A4E	Productivity, including management, automation, accountancy, business, finance and investment
A4F	Non-agricultural storage and warehousing
A4G	Research in industrial technology
A5	**Trade, banking, tourism and other services**
A5A	Agricultural development banks
A5B	Industrial development banks
A5C	Tourism, hotels and other tourist facilities
A5D	Export promotion
A5E	Trade, commerce and distribution
A5F	Co-operatives (except agriculture and housing)
A5G	Publishing, journalism, cinema, photography
A5H	Other insurance and banking
A5I	Archaeological conservation, game reserves
A6	**Education**
A6A	Primary and secondary education
A6B	University and higher technical institutes
A6Bi	Medical
A6C	Teacher training
A6Ci	Agricultural training
A6D	Vocational and technical training
A6E	Educational administration
A6F	Pure or general research
A6G	Scientific documentation
A6H	Research in the field of education or training
A6I	Subsidiary services
A6J	Colloquia, seminars, lectures, etc.
A7	**Health**
A7A	Hospitals and clinics
A7B	Maternal and child care
A7C	Family planning and population-related research
A7D	Other medical and dental services
A7E	Public health administration
A7F	Medical insurance programmes
A8	**Social infrastructure and social welfare**
A8A	Housing, urban and rural
A8B	Community development and facilities
A8C	Environmental sanitation
A8D	Labour
A8E	Social welfare, social security and other social schemes
A8F	Environmental protection
A8G	Flood control
A8H	Land settlement
A8I	Cultural activities
A9	**Multisector**
A9A	River development
A9B	Regional development projects
A10	**Unspecified**

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To obtain any information concerning PABLI please write, specifying the option chosen (terminal or telex) to:

ECHO Customer Service
177, Route d'Esch
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ACP STATES

New projects are printed in italics and offset by a bar in margin at left

Projects under way are marked with an asterisk and with words or phrases in italics

ANGOLA

Road rehabilitation — Section A: Lubango — 41 km — Section B: Serra de Leba — Lubango. Resp. Auth.: Ministère de la Construction. Estimated total cost 15 mECU. EDF 12.5 mECU local 2.5 mECU. Works by int. tender. Works supervision: ★ short-list done. ***Date financing April 92.*** 6th EDF.
EDF ANG 6011 A2d

ANTIGUA AND BARBUDA

Road Rehabilitation Programme Phase 2. Resp. Auth.: Ministry of Works and Communications. Estimated cost 3.100 mECU. Reconstruction of the road from Golden Grove to Urlings (11.75 km). Project on appraisal. 6th EDF.
EDF AB 6001 A2d

BARBADOS

Hospitality Studies Project. Resp. Auth.: Ministry of Education and Culture. Total estimated cost 2.5 mECU. EDF 1.6 mECU, local 0.900 mECU. Construction of Tourism Training Centre-cum-Hotel. Project on appraisal. 6th EDF.
EDF BAR 6006 A5c

Livestock Development. Resp. Auth.: Ministry of Agriculture. 2.475 mECU. Renovation and construction of administrative buildings, supply of vehicles, equipment and ★ computers. Line of credit and T.A. ***Project in execution.*** 5th and 6th EDF.
EDF BAR 6004 A3a

BELIZE

Belize City Hospital. Phase I. 8.6 mECU. Work constructions and supply of equipment. 4th, 5th, and 6th EDF. Works: in. tender foreseen 1st half 92. Project in execution.
EDF BEL 6004 A7a

Community Development Programme. Resp. Auth.: Ministry for Social Services. 0.150 mECU. Project preparation study. Short-list done. Project on appraisal. 6th EDF.
EDF BEL 6002 A6b

Improvement of Hummingbird Highway - Sibun River Section. Resp. Auth.: Ministry of Works and Housing. 4.4 mECU. Works will be executed by local companies ★ still working for the initial phase. ***Project in execution.*** 7th EDF.
EDF BEL 6001 (7001) A2d

BENIN

Fish breeding. Applied research and popularization actions. Resp. Auth.: MDRAC. Estimated cost 2 mECU. Project on appraisal 6th EDF.
EDF BEN 6009 A3d

General Import Programme – S.A.P. II. 24 mECU. Hard currency allowance to import ACP and EC goods. There is negative list of items not eligible (military-luxury items). Project in execution. 6th and 7th EDF.
EDF BEN 7200 A1c

BOTSWANA

Wildlife Conservation in Northern Botswana. Resp. Auth.: Department of Wildlife and National Parks. (DWNP). 6.800 mECU. New tracks, construction of administrative office quarters and accommodation. Supply of equipment (earthmoving — tractors — 4×4 pick-ups). T.A. and training. Project on appraisal. Date foreseen for financing 1st half 92. 6th EDF.
EDF BT 6026 A3e, A5i

Airborne Electromagnetic survey in the Ghanzi-Chobe fold belt and Shinamba Hills. Resp. Auth.: Dept. Geological Survey. 1.6 mECU. Investigate mineral deposits and water potential. Production of ★ geological maps. ***Project in execution.*** 7th EDF.
EDF BT 7001 A1g

BURKINA FASO

Structural Adjustment Support – General Import Programme. 22.500 mECU. Hard currency allowance to import ACP and EC goods. There is negative list of items not eligible (military-luxury items). T.A. for monitoring, auditing and follow-up. Project in execution. 7th EDF.
EDF BK 7200 A1c

BURUNDI

Rutana province water supply. *Resp. Auth.: Ministère du Dév. Rural. Dir. Gén. de l'Hydraulique et de l'Energie. 5.5 mECU. Construction of 17 water supply networks. Works and supplies by int. tender (conditional) nº 3533 launched on April 3rd 92. Opening 10.6.92. Project on appraisal. Date foreseen for financing. June 92. 6th and 7th EDF.*
EDF BU 6002 (7001) *A2b*

Structural Adjustment Support. General Import Programme. *12 mECU. Hard currency allowance to import ACP and EC goods. There is negative list. Evaluation after 1st phase. Project on appraisal. Date foreseen for financing. July 92. 7th EDF.*
EDF BU 7200 *A1c*

Development of the health sector in the Mosso and Imbo regions. *Resp. Auth.: Ministère de la Santé Publique. Total estimated cost 24.630 mECU. EDF 17.530 mECU, local 5.444 mECU. Counterpart Funds for G.I.P. 1.654 mECU. Health centres staff training, supply of equipments and health services rehabilitation. Constructions, T.A. Project on appraisal. 7th EDF.*
EDF BU 7003 *A6bi, A7*

CAMEROON

Rural development programme in the Logone and Chari. Resp. Auth.: Semry. Estimated cost 12 mECU. Consolidation and extension of existing actions. Project on appraisal. 6th EDF.
EDF CM 6013 A3a

Rural development poles: Saa-ntui, Sang melima, Bafut. Resp. Auth.: Ministères de l'Agriculture et du Plan et de l'Aménagement du Territoire. Total estimated cost 14.625 mECU. EDF 10.300 mECU, local 4.325 mECU. Strengthening of the monitoring structures, improvement and extension of basic socio-economic infrastructures, training, education, popularization of rural development, health. Works: tracks, buildings; supplies for civil works, vehicles, crop inputs, rural equipment. Project on appraisal. Date foreseen for financing 1st half 92. 6th EDF.
EDF CM 6012 A3a

Creation of a medicines provisioning unit. *(to prepare the programme: Social Dimension Adjustment — S.D.A.-Health) Resp. Auth.: Ministère de la Santé Publique. 0.265 mECU. T.A. short-term by G.T.Z. (F.R. Germany) who will purchase essential medicines. Project on appraisal. 7th EDF.*
EDF CM 7003 *A7*

Support to the Structural Adjustment Programme. General Import Programme. *Hard currency allowance to import ACP and EC goods. There is a negative list. 29.5 mECU. T.A. for starting and follow-up. Project on appraisal. Date foreseen for financing May 92. 7th EDF.*
EDF CM 7200 *A1c*

CHAD

Strengthening of the health sector in the Sahelian prefectures. Resp. Auth.: Ministère de la Santé Publique. 16.5 mECU. Supply of essential medicines, training programme and T.A. Int. tender for vehicles ★ launched in July 90. ***Project in execution.*** 6th and 7th EDF.
EDF CD 6003 A7e

Rural development programme. Phase 2. Resp. Auth. Office National de Dév. Rural (ONDR). 28 mECU. Works, feeder roads, school buildings, agricultural equipment, pumps, T.A., follow up and evaluation. Project in execution. 6th EDF.
EDF CD 6005 A3a

Support programme to revitalize primary education. Resp. Auth.: Ministère de l'Education Nationale. 10 mECU. Works by acc. tender or direct labour. Building materials, equipment, and educational equipment, by int. tender. Training programmes and support infrastructures. ★ ***Project in execution.*** 7th EDF.
EDF CD 7001 A6a

Support Project to the National Authorizing Officer. (NAO). *Resp. Auth.: N.A.O. Estimated cost 1.8 mECU. T.A. to the N.A.O. (2 experts). Project on appraisal. 7th EDF.*
EDF CD 7002 *A1f*

Environmental conservation in the South-East. Resp. Auth.: Ministère du Tourisme et de l'Environnement. 3,5 mECU. Flora and fauna reconstitution in the Zakouma region. Integration, growing public awareness and participation of population for conservation of natural resources.
★ Project on appraisal. ***Date foreseen for financing May 92.*** 7th EDF.
EDF CD 7001 (4017) A8f

COTE D'IVOIRE

Central Region food crops programme. Resp. Auth.: Ministère de l'Agriculture. EDF 40 mECU. Irrigation, agriculture modernization, young settlements. Food crops production marketing improvement. Works, soil improvement, supplies. T.A. studies, follow-up and evaluation. Project on appraisal. Date foreseen for financing 1st half 92. 6th EDF.
EDF IVC 6009 A3a

Support to the Structural Adjustment Programme. General Import Programme. Hard currency allowance to import ACP and EEC goods. There is a negative list of items not eligible (military-luxury products). 15.5 mECU. T.A. for the Ministère de l'Economie et Finances and
★ T.A. for the Ministère de la Santé. ***Project in execution.*** 7th EDF.
EDF IVC 7200 A1c

Health sector support programme. *Estimated cost 9 mECU. Strengthening basic cares, correcting unbalances between regions and support to decentralization. Project on appraisal. 7th EDF.*
EDF IVC 6011 (7001) *A7*

Support programme to secondary cities. *Estimated cost 27 mECU. Social and economic infrastructure, planning and management of municipalities. Project on appraisal. 7th EDF.*
EDF IVC 7001 *A8a, b*

DJIBOUTI

Urban development programme. Phase II. Resp. Auth.: Ministère des Travaux Publics. 8.750 mECU. To finish works in bloc 4 and sanitation and road
★ works in bloc 1 and 2. ***Date financing April 92.*** 7th EDF.
EDF DI 6002 (7001) A2d

Fight against desertification and development of livestock husbandry in Western-Djibouti. Resp. Auth.: Ministère de l'Agriculture et du Développement Rural. 1.665 mECU. Supply of equipments, studies, T.A. Project on appraisal. 7th EDF.
EDF DI 6008 A3a

DOMINICAN REPUBLIC

Sectoral Import Programme for Petroleum Products. Resp. Auth.: Oficina del Ordenador Nacional — Secretaría de Estado de Finanzas y el Banco Central. Refinería Dominicana de Petróleo, S.A. 22 mECU. Purchase by int. tender. Specialized T.A. for preparation tender dossier, evaluation,
★ follow up. Project on appraisal. ***Date foreseen for financing May 92.*** 7th EDF.
EDF DO 7200 A1c

EQUATORIAL GUINEA

Essential goods import programme. Resp. Auth.: Presidency of the Republic. Estimated cost 1.5 mECU. Hard currency allowance to import essential goods. Project on appraisal. 5th and 6th EDF.
EDF EG 0000 A1c

Conservation and rational utilisation of the forest ecosystems. Resp. Auth.: Ministry of Agriculture, Livestock farming, Fisheries and Forests. Directorate General for Forests. 5.070 mECU. Land Classification and Use Master Plan — National System of Conservation Units — Forest Training and Research Centre. T.A. and supply of equipment. Project on appraisal. Date foreseen for financing 1st half 92. 6th EDF.
EDF EG 6001 A3c, e, i

M'Bini — Akalayong road. Rehabilitation and improvement of the road. 65 km. Int. tender for works (conditional) foreseen
★ ***1st half 92.*** Estimated cost 1.6 mECU. Project on appraisal. 6th EDF.
EDF EG 6006 A2d

Rural development programme in the South-East. *Resp. Auth.: Ministère de l'Agriculture. 4.500 mECU. Works, supplies and T.A. Project on appraisal. Date foreseen for financing June 92. 7th EDF.*
EDF EG 6005 (7001) *A3a*

ETHIOPIA

South Shewa conservation-based rural development. Resp. Auth.: Ministry of Agriculture. 26.2 mECU. Buildings, roads, rural infrastructure, agricultural inputs, consumer goods, training, T.A., micro-projects, credit line. Project in execution. 6th EDF.
EDF ET 6005 A3a

Coffee improvement programme III. Resp. Auth.: Ministry of Coffee and Tea Development. 38.1 mECU. Construction and civil works, supply of equipment, vehicles and agric. inputs, aerial photography, training and T.A. Project in execution. 6th EDF.
EDF 6003 A3a

Lake fisheries project. Resp. Auth.: Ministry of Agriculture, Fisheries Dept. 7.5 mECU. Provision of inputs to fishermen, development of cooperatives, establishment of marketing organisation and infrastructure, training, research and fingerling production centres. Works, supplies and T.A. Project in execution. 6th EDF.
EDF ET 6008 A3d

Foreign trade development. Resp. Auth.: Ministry of Foreign Trade (MOFT). 1.5 mECU. T.A.: two-years marketing expert. a team of marketing specialists (short-term consultancy services in Ethiopia). Market research, training in international marketing and international trade, technical seminars. Equipment and supporting services Project in execution. 6th EDF.
EDF ET 6010 A5de

Sectoral Import Programme IV. *Resp. Auth.: AISCO and ESC for agricultural inputs. Vice Minister of Industry in charge of private sector and handcrafts development, the National Bank, the Commercial Bank of Ethiopia, and the EDF Nat. Auth. off. for the hard currency line for the private sector. Fertilizers, seeds and chemicals by int. tender. Procurement Unit for 3-4 years. Total estimated cost 27 mECUs. Project on appraisal. Date foreseen for financing May 92. 7th EDF.*
EDF ET 7200 *A1c*

FIJI

Investment and export development. Resp. Auth.: Ministry of Trade and Commerce (MTC) and Fiji Trade and Investment Board. 7.2 mECU. Land purchase for the Tax Free Zone, works, supply of equipment, T.A and training. Project in execution. 6th EDF.
EDF FIJ 6007 A5d

GAMBIA

Rural Development Programme. Resp. Auth.: Ministry of Finance and Economic Affairs. 14.5 mECU. Rehabilitation of Water schemes, supply of road equipment and materials, T.A. and supervision. Project in execution. 6th EDF
EDF GM 6004 A3a

GHANA

Accra Plains Livestock Development Project (APLDP). Estimated total cost 4 mECU. EDF part 3 mECU, local 1 mECU. Provision of veterinary and animal husbandry extension services, including construction of cattle treatment centres, water points and other inputs. Project on appraisal. 6th EDF.
EDF GH 6006 A3a

Twifo oil palm development. Maintenance aid 1988-1991. Resp. Auth: Ministry of Finance and Economic Planning (M.F E.P.). Total estimated cost 12.6 mECU EDF 5 mECU, local 7.6 mECU. Works, supply of equipment and T.A Project on appraisal. 6th EDF.
EDF GH 6007 A3a

Ghana regional Appropriate Technology Industrial Service (GRATIS). Phase II. Resp. Auth.: GRATIS. 3 mECU. Supply of equipments, vehicules, T.A. and
★ training. ***Project in execution.*** 7th EDF.
EDF GH 6004 A4g

Second microprojects programme. (Lomé III). Total cost 9 mECU, Ministry of Finance and Economic Planning 2 mECU. District assemblies – communities 1 mECU. Construction of schools, clinics, wells, sanitation facilities, markets. Local T.A. Project on appraisal. 6th EDF.
EDF GH 6102 A6, A7, A8

Structural Adjustment General Import Programme. Hard currency allowance to import ACP and EEC goods. There is a negative list of items not eligible (military-luxury and environmentally hazardous product). 20 mECU. T.A. for procurement agent ★ possible. ***Project in execution.*** 7th EDF.
EDF GH 7200 A1c

GRENADA

Tourism development project. Resp. Auth.: Grenada Board of Tourism. 0.812 mECU. T.A. – consultancy services and supplies for a marketing and promotion ★ campaign. ***Project in execution.*** 7th EDF.
EDF GRD 5007 A5c

Farm and feeder roads project. Resp. Auth.: Ministry of Agriculture. 1.580 mECU. Construction or rehabilitation. Works by ★ direct labour. Project on appraisal. ***Date foreseen for financing June 92.*** 7th EDF.
EDF GRD 7002 A3a

Microprojects programme. Resp. Auth.: Ministry of Labour, Social Service, Community Development. 0.220 mECU. Water supply, road improvements, repairs and extension of schools, medical and community centre and sports grounds. Project on appraisal. 7th EDF.
EDF GRD 7102

GUINEA

Contribution to the Rubber and Palm Tree and Rice Programme in 'Guinée Forestière'. Resp. Auth.: Ministère de l'Agriculture and SOGUIPAH. EDF part 5 mECU. Intensification of village rural production. Soil preparation, feeder roads, rice ★ inputs. ***Project in execution.*** 6th EDF.
EDF GUI 6008 A3a

Support to improve electrical sector. Resp. Auth.: Ministère de l'Industrie and ENEL GUI. 6.145 mECU. Supply of equipments: 30,000 sets of power-meters and fittings, spare parts for hydro-electric powerstations, generator sets, tools, work-shops ★ equipments, radio-sets, vehicles. ***Project in execution.*** 5th EDF.
EDF GUI 5042 A2ai

GUINEA BISSAU

Rural development programme. 23.8 mECU. Improvement of food and fisheries production, line of credit, microprojects, T.A. and training. Project in execution. 6th EDF.
EDF GUB 6001 A3a

Project for the rehabilitation of social and economic infrastructures. Resp. Auth.: Ministry of Public Works. 7.8 mECU. Road rehabilitation, schools, health centres, urban roads, markets, water and sanitation. Construction of secondary bridges, access roads, supply of a ferry. Works, supplies and T.A. 2 Projects on appraisal. 5th and 6th EDF.
EDF GUB 6013 (PRI) - 6014 (PASI) A7, A8

GUYANA

Structural Adjustment Support – General Import Programme. Foreign currency facility to the Bank of Guyana for importation of goods for the non-traditional and traditional productive sectors. 4.5 mECU. T.A. to the Bank (procurement ★ expert) and evaluation. ***Date financing April 92.*** 7th EDF.
EDF GUA 7200 A1c

JAMAICA

Negril and Ocho Rios sewerage schemes. Resp. Auth.: National Water Commission. 25 mECU. Negril: 17 km of trunk sewers, 13 pump stations and 2 treatment plants. Ocho Rios: 5 km of sewers, 6 pump stations, 1 treatment plant and deep sea outfall. T.A. for supervision. Works by int. tender Project on appraisal. 5th EDF.
EDF JM A8bc

Support to the Structural Adjustment Programme. General Import Programme. *Hard currency allowance to import ACP and EC goods. 8.4 mECU. T.A. for following, evaluation and procurement Agent. Project on appraisal. Date foreseen for financing June 92. 6th and 7th EDF.*
EDF JM 7001 *A1c*

KENYA

Strengthening of research resources of the national museums of Kenya. Resp. Auth.: NMK Directorate 3 mECU. Construction, transport, equipment, T.A., training and research links with national, regional and international organizations. Project in execution. 6th EDF.
EDF KE 6020 A6f

Rehabilitation Advisory Services. Resp. Auth.: Ministry of Finance. 1.950 mECU. T.A. to rehabilitation advisory services. A consulting firm specialized in the rehabilitation of medium scale entreprises. ★ ***Project in execution.*** 7th EDF.
EDF KE 6018 A4,A5

LESOTHO

'Lesotho Highlands Water Project' – Muela Hydropower Project (MHP). 44 mECU. Engineering supervision and part of the civil works. Project in execution. 7th EDF.
EDF LSO 6001-7001 A2ai

MADAGASCAR

Maize development programme in the Middle West. Resp. Auth.: Ministère de la Production Agricole. 9.5 mECU. Building of a nursery and farmers training. Works, supplies, T.A. evaluation and training. Project in execution. 6th EDF. T.A.: CONSULT-IBERICA (E)
EDF MAG 6006 A3a

Local handicraft, improvement Programme. Resp. Auth.: Ministère de l'Industrie de l'Energie et des Mines. 2.750 mECU. To improve production and marketing. T.A., training and line of credit. Project in execution. 6th EDF.
EDF MAG 6022 A5d, e

Rice and fish-breeding promotion and popularization. Resp. Auth.: Ministère de la Production Animale, des Eaux et Forêts (MPAEF). 2.300 mECU. Fish-breeding and research centres, excavation, rehabilitation, reclaim of swamps, access roads, supply of equipments and T.A. T.A.: ★ short-lists done. ***Project in execution.*** 6th EDF.
EDF MAG 6023 A3a

Livestock development in the South-West. Resp. Auth.: Ministère de la Production Animale. Estimated total cost 6.850 mECU. EDF 5.700 mECU, local 1.150 mECU. Buildings and feeder roads. Supply ★ of equipments and T.A. ***Date financing April 92.*** 6th EDF.
EDF MAG 6013 A3a

MALAWI

Strategic fuel reserve. Resp. Auth.: Office of the President and Cabinet. Contingency Planning Unit. 4.2 mECU, Construction of tanks for diesel, petrol, ethanol. Associated infrastructure and equipment. T.A. Project on appraisal. 5th EDF.
EDF MAI 5020 A2a

Programme for industrial products imports. 12.5 mECU. Supply of industrial equipment, raw materials and spare parts. Project in execution 6th EDF.
EDF MAI 6019 A1c

Aid for refugees. *Resp. Auth.: Food Aid Coordination Unit in the Office of the President and Cabinet (OPC). 5.224 mECU. The programme concerns basic needs foor refugees from Mozambique. Roads, wells, drinking water, health, education. Management by UNHCR, Red Cross, MSF, Concern Universal. Project on appraisal. Date foreseen for financing June 92. 7th EDF.*
EDF MAI 7255 *A6, 7, 8*

MALI

Rice-growing intensification programme in the large irrigated areas of 'Office du Niger' and 'Opération Riz Segou'. Resp. Auth.: Ministère de l'Agriculture. 65 mECU. Improvement of the irrigated areas, roads. Supply of equipment for maintenance and for agriculture, study, T.A., training and experimentation. Study: short-list done. Project in execution. 5th and 6th EDF.
EDF MLI 6004 A3a

Support for Structural Adjustment Programme. 31 mECU. Project in execution. 7th ADF.
EDF MLI 7200 A3a

Support programme to S.M.E. creation. Lines of credit, T.A. and follow up. 13 mECU. Project in execution. 7th EDF.
EDF MLI 6001 (7001) A4,A5

Health programme and population. *Resp. Auth.: Ministère de la Santé Publique. Estimated total cost 51.7 mECU. EDF 12 mECU, F.R. Germany and France 6.4, World Bank 21.6 mECU, local 3.5 mECU, USAID 8.2 mECU. Rehabilitation of health centres. T.A. for pharmaceutical sector, supply of medicines (with anticonceptionals and condoms). Project on appraisal. 7th EDF.*
EDF MLI 7022 *A7*

MAURITANIA

Aioun El Atrouss hospital. Resp. Auth.: Ministère de l'Equipement. 1.050 mECU. Renovation and supply of equipment for 3 buildings. Works by acc. tender. Supplies by int. tender. Project on appraisal. 5th EDF.
EDF MAU 5012 A7a

Rehabilitation of Nouakchott National Hospital. Resp. Auth.: Ministère de l'Equipement. 4 mECU. Renovation and upgrading for building, supply of medical-technical and surgical equipment. Project on appraisal. 6th EDF. STUDIES: STUDIO BICHARA (I)
EDF MAU 6003 A7a

Support programme for the development of the Gorgol region (PDRG). Estimated cost 35 mECU. Improvement of the irrigated areas, support for traditional crops, regeneration of natural habitats, rural infrastructure, sanitation of Kaedi. Project in execution. 6th EDF.
EDF MAU 6007 A3a

First road programme. Resp. Auth.: Ministère de l'Equipement et des Transports, 17.5 mECU. Strengthening works, training works supervision. Works by int. tender. Project on appraisal. Date foreseen for financing May 92. 7th EDF.
EDF MAU 7001 *A2d*

MAURITIUS

Pamplemousse — Grand Baie Road. Resp. Auth.: Ministère des Travaux Publics. Road construction. 11.8 km. Works and supervision. Works by int. tender (conditional). Supervision: short-list done. Estimated total cost 7.4 mECU. EDF 5.7 mECU, local 1.7 mECU. Project on appraisal. 5th and 7th EDF.
EDF MAS 5014 (7001) A2d

MOZAMBIQUE

Integrated development programme of Cabodelgado. Resp. Auth.: Ministry of Commerce. AGRICOM. 8 mECU. EDF 5 mECU, local 3 mECU. Support to ± 50 000 people in the districts of Mocimboa, Priaia and Mueda. Works, supplies and T.A. Project in execution. 6th EDF.
EDF MOZ 6022 A3a

NIGER

Training programme. Resp. Auth: Ministères de l'Education, Commerce, Culture, Plan, Agriculture. 4,366 mECU. Three priority sectors: rural development, business development, cultural development. Supply of equipment T A. and scholarships. Project in execution. 6th EDF.
EDF NIR 6101 A6b, c,i

General Import Programme. Support for structural adjustment. Estimated cost 27 mECU. Project on appraisal. Date
★ foreseen for financing ***July*** 92. 7th EDF.
EDF NIR 7001 A3a

Training Centre and music promotion (CFPM). Resp. auth.: Ordonnateur National Ministère du Plan. 1 mECU. Supply of equipment, T.A. Recurrent costs.
★ ***Project in execution.*** 7th EDF.
EDF NIR 7002 (6101) A6d

Support to the development of the private sector (S.M.E.). Resp. Auth.: AFELEN (Agence pour le Financement et l'Encouragement de la Libre Entreprise au Niger) - Niamey. 12 mECU. T.A. for the
★ AFELEN and line of credit. ***Date financing April 92.*** 7th EDF.
EDF NIR 6023 (7002) A5b

Re-arrangement of the health services located in the ancient 'Maternité Centrale' in Niamey. Resp. auth.: Ministère de la Santé Publique. Estimated total cost 9.650 mECU. EDF 3.150 mECU, Spain 6.500 mECU. Works by acc. tender (EDF part), supply of equipments and T.A. by
★ Spain. ***Date financing April 92.*** 5th EDF.
EDF NIR 6027 A7a

NIGERIA

'Middle belt' programme. Resp. Auth.: States of Kwara and Niger, Executive Committees. Estimated total cost 38.662 mECU. EDF 33 mECU, local 5.662 mECU. Education, health, social infrastructure. Renovation works, rehabilitation, supply of equipment, T.A., training and evaluation. Project in execution. 6th EDF. T.A.: B.M.B. (NL) — TRANSCON LTD. (UNI)
EDF UNI 6007 Aabe

Mambilla Tea Integrated Development Project. Resp. auth.: Nig. Beverages Production Company Ltd. 28 mECU. Civil works: dam, roads, buildings utilities. Supply of vehicles, factory and irrigation equipment. T.A. for management and train-
★ ing. ***Project in execution.*** 7th EDF.
EDF UNI 5004 A3a

Export Development Programme. Resp. Auth.: Nigerian Export Promotion Council. 37 mECU. To transfer export know how to ±250 Nigerian firms. Components: sectors, market, human resources and institutional development. Others: T.A. for management and supervision. Project on appraisal. 7th EDF.
EDF UNI 6011 A5d

General Import Programme. 55 mECU, Hard currency facility to import goods and equipment not specifically excluded via a negative list. T.A. foreseen. Project on appraisal. 7th EDF.
EDF UNI 7200 A1c

Oban Hills Programme. EDF 16.5 mECU, Germany (KFW) 11 mECU. Park management and conservation, support zone development, park research and monitoring. To give the local people an incentive to protect – support the park. Buildings-peripheral facilities, supply of equipment and vehicules, T.A. and research studies. Villages Developpment Funds and recurrent costs. Project on appraisal. 7th EDF.
EDF UNI 7001 A3c, e-A8f

PAPUA NEW GUINEA

Road and Bridge Rehabilitation Programme. Resp. Auth.: Ministry of Works. Parallel cofinancing with World Bank. EDF, part estimated 21.520 mECU. Works and
★ supervision. Project in execution. ***Int. tender nº 3485 launched in March 92. Opening 1.7.92.*** 6th EDF.
EDF PNG 6014 A2d

Second Structural Adjustment Programme. General Import Programme. 11 mECU. Foreign currency facility to the Bank of PNG. There is negative list of items not eligible (military-luxury items). Project in execution. 7th EDF.
EDF PNG 7200 A1c

RWANDA

Institutional Support. Resp. Auth.: Ministère du Plan. Estimated cost 4 mECU. T.A. by 4 experts for 4 years to strengthen administration capacities to implement Lomé IV. Project on appraisal. Date foreseen for financing July 92. 7th EDF.
EDF RW 7001 *A1f*

ST. KITTS AND NEVIS

Development of Social Infrastructure – Phase II. Resp. Auth.: Ministry of Education and Ministry of Works, Communications and Public Utilities. 0.872 mECU. Construction and supply of furnitures for primary schools, supply of equipments, T.A. for supervision of works. Project on appraisal. 5th and 6th EDF.
EDF SCN 6001 A6a

SENEGAL

Consolidation of the livestock development programme. Resp. Auth.: SODESP. Estimated cost 1.6 mECU. Study under way by Bessel Ass. (UK). Project on appraisal. 5th EDF.
EDF SE A3a

Support programme for the phosphate sector. Sysmin. Resp. Auth.: Ministère du Développement Industriel. 15 mECU. Research for methods to eliminate cadmium from rock and/or from phosphoric acid. Investments in 2 processing plants. Research actions, studies, new humid storage (central conveyor, adjustable stocker, rail scraper, longitudinal conveyor), mining equipment, 3 dumpers, 1 bulldozer, 2 loaders, 1 hydraulic shovel. Project in exe-
★ cution 6th EDF. ***2 int. tenders nº 3467 and 3470 launched. Opening 4.6.92 and 8.7.92.***
EDF SYS SE 17 A4af

Support to the Sectoral Adjustment Programme for Transports. Resp. auth.: Ministère de l'Equipement, des Transports et de la Mer. M.E.T.M. 70 mECU. Works by int. tender for 4 roads. Supervision: short-lists to be done. Training. General Import Programme (10 mECU). Project on appraisal. Date foreseen for financing April 92, 7th EDF.
EDF SE 5046 (7001) A2d

SEYCHELLES

Tuna quay rehabilitation. Resp. auth.: S.F.A. 1.200 mECU. Supply of equipment and works. Project in execution. 6th EDF.
EDF SEY 6008 A2d

SIERRA LEONE

North Western artisanal fisheries and community development programme. Resp. Auth.: Ministry for Agriculture and Natural Resources (Fisheries Division). 6 mECU. Infrastructure, supply of equipment, line of credit. T.A. Project in execution. 6th EDF.
EDF SL 6004 A3d

Rehabilitation of the Telecommunications network. Phase 2. 7.5 mECU. Works, supplies and T.A. Project in execution. 6th EDF. T.A.: BRITISH TELCONSULT (UK)
EDF SL 6006 A2c

Tourism development programme. Estimated cost 0.850 mECU. T.A. to the Ministry of Tourism and supply of equipment. Project stage: identification. 5th EDF.
EDF SL 5026 A5c

Agricultural Sector Support Programme. *Resp. Auth.: Ministry of Agriculture. Total estimated cost 16 mECU. EDF 14 mECU, local 2 mECU. Construction of stores, rehabilitation of feeder roads, vehicles, agricultural inputs, materials, T.A. for project management, training. Project on appraisal. Date foreseen for financing July 92. 7th EDF.*
EDF SL 7001 *A3a*

SUDAN

Sudan Railways Support Programme (SRSP). Resp. Auth.: Sudan Railways Corporation. 19 mECU. Supply of materials, tools and replacement parts, for the most immediate repairs and maintenance of the track Khartoum-Port Sudan and those required for a direct improvement of telecommunications. Works and supplies by int. tender. Project in execution. 5th and 6th EDF.
EDF SU 6011 A2d

Post Flood Reconstruction and Rehabilitation Programme (PFRRP). Resp. Auth.: agricultural part: Agricultural Bank of Sudan. Transport infrastructure: Roads and Bridges Public Corporation (RBPC) and Sudan Railways Corporation. 15 mECU. Agricultural sector: supply of spare parts for repair and replacement of 2500 pumps. Int. tender and direct agreement. Supply of maintenance parts for 100 trucks (6t): by int. tender. Supply of 100 pumps by int. tender. T A. for repair, control and credit allowances. Transport sector: bridges repair and work supervision. Supplies for railways, gabions, pipes by int. tender. Project in execution. 6th EDF.
EDF SU 6020 A2d

SURINAME

Rehabilitation Road Section Jenny – Ingikondre. Resp. Auth.: Ministry of Public Works. Estimated cost 4.4 mECU. New asphalt surfacing on 37 km and ancillary works. T.A. for supervision and tender dossier preparation. Short-list done. Project on appraisal. 5th EDF.
EDF SUR 5011 A2d

SWAZILAND

Human resources development programme. Resp. Auth.: Ministry of Education. 8 mECU. Works and supply of educational equipment, T.A. and training. Int. tender launched in July 89. Project in execution. 6th EDF.
EDF SW 6010 A6a, b

Rural dam rehabilitation programme. Resp. Auth.: Ministry of Agriculture. 4mECU. Works and supervision. Project in execution. 6th EDF.
EDF SW 6012 A3a

Upgrading of the Manzini-Matsapha Road. Resp. Auth.: Ministry of Works and Communications. 10 mECU. 8 Km dual carriageway. The existing 2-lane road is to be upgraded to a 4-lane highway. Works by int. tender foreseen 1st half 92. Short-list done for supervision. Project on appraisal.
★ ***Date foreseen for financing June 92.*** 5th and 7th EDF.
EDF SW 5016 A2d

Technical Cooperation programme. *Resp. Auth.: Government of Swaziland (N.A.O.) 1.860 mECU. T.A. 12 person-years to selected agencies in the public and parastatal sectors. Project on appraisal. 7th EDF.*
EDF SW 7001 *A1f*

TANZANIA

Management Assistance To Morogoro Canvas Mill. Estimated cost 2 mECU. Continuation of T.A. for the management. Project on appraisal. 7th EDF.
EDF TA 6002 A4b

Port development Zanzibar and Pemba ports, phase II. Resp. Auth.: Ministry of Works. Zanzibar. Estimated total cost 13.4 mECU. EDF 10 mECU, Italy 3.4 mECU. Procurement and rehabilitation of cargo handling equipment. Rehabilitation of transit sheds, construction of passenger terminal with RO-RO facilities. Study: design of passenger terminal with RO-RO facilities for Zanzibar port. Short-list done. Project on appraisal. 7th EDF.
EDF TA 6009 A2d

Structural Adjustment Support – General Import Programme. Resp. Auth.: Central Bank of Tanzania. 30 mECU. Importation of goods in the context of Tanzania's open general licence system, subject to a negative list. Project on appraisal. ★ ***Date foreseen for financing July 92.*** 7th EDF.
EDF TA 7200 A1c

Support for Aids Control in Tanzania. Resp. Auth.: Ministry of Health. 3 mECU. To strenghten health and other support services. Supply of equipments and T.A. Project on appraisal. 7th EDF.
EDF TA 08000/000 (7001) A7c

TOGO

Rural development programme in Bassar. Resp. Auth.: Ministère du Dév. Rural. EDF 10.3 mECU. Rural intensification and diversification, soil protection, improvement of infrastructure, support to the small-farmers association, marketing improvement. Works, studies, research, evaluation. Project in execution. 6th EDF. T.A.: S.A. AGRER (B)
EDF TO 6006 A3a

Support programme to the phosphate mining industry. Resp. Auth.: Office Togolais des Phosphates (OTP). 15.7 mECU. Research actions on cadmium problems. Purchase of drying machines and shovels. Project in execution. 6th EDF. Pilot Trials: DUETAG (F).
EDF TO-SYS 6015 A4a

General Import Programme. *Hard currency allowance to import ACP and E.C. goods. T.A. for management and implementation. 17 mECU. Project on appraisal. Date foreseen for financing July 92. 7th EDF.*
EDF TO 7200 *A1c*

TONGA

Vava'u Airport Development Project. Resp. Auth.: Ministry of Civil Aviation 2.130 mECU. Works. supply of equipment and training. Works by direct labour, supplies by int. tender. Project on appraisal. 5th and 6th EDF.
EDF TG 5003-6001 A2d

Vava'u development programme. Resp. Auth.: Vava'u Committee. 5 mECU. Construction of new market, road improvement and maintenance, education and health facilities, training. Project in execution. 6th EDF.
EDF TG 6002 A8b

TRINIDAD AND TOBAGO

Sectoral import programme: industry. 12 mECU Allocation of currencies to import raw materials and intermediate products. Project in execution. 6th EDF.
EDF TR 6002 A4b

TUVALU

Electrification development programme. Upgrade existing diesel power station – extend provision of electricity for home lighting to households on the outer islands. Supply of photovoltaic systems. 0.880 mECU. Project on appraisal. 6th EDF.
EDF TV 6004 A2a, i

UGANDA

Rehabilitation of Kampala City Roads. Phase II. Resp. Auth.: Ministry of Local Government. 30 mECU. Rehabilitation of some 33 km of roads in the Kampala City network, improving drainage, construction of side walks and parking areas. Works ★ and supervision. Project on appraisal. ***Date foreseen for financing June 92.*** 7th EDF.
EDF UG 6011 A2d

Structural Adjustment Support – General Import Programme. 35 mECU. Hard currency allowance to import ACP and EC goods. There is negative list of items not eligible (military-luxury items). T.A. procurement agent. Project in execution. 6th and 7th EDF.
EDF UG 7200 A1c

ZAIRE

Kivu programme. 40 mECU. Action for crops (coffee, corn, palm-trees, rice) environment (Parc de la Virunga), lines of credit. 1st int tender launched in April 89. Project in execution. 6th EDF.
EDF ZR 6002 A3a

Kinshasa hinterland programme. APEK 25 mECU. To improve crop production. 1st int. tender launched in July 89 Project in execution. 6th EDF.
EDF ZR 6003 A3a

Rehabilitation programme of SNCZ. 7.5 mECU. Supply of raw materials and spares to replace railways system. Project in execution. 6th EDF. T.A.: TRANSURB CONSULT (B)
EDF ZR 6017 A4a

Apek Programme, roads section. Resp. Auth.: Office des Routes. 35 mECU. Rehabilitation of 111 km of surfaced road on the Kinshasa-Kikwit route with works supervision — upgrading of 384 km of major earth roads managed by Office des Routes. Rehabilitation of 496 km of country earth roads managed by local authorities. Bridge repairs, additional technical and economic studies, training programme. Supply of equipment. Project on appraisal. Date foreseen for ★ financing ***1st half 92.*** 6th EDF.
EDF ZR 6006 A2d

ZAMBIA

Smallholder development in copper belt region. Resp. Auth: Ministry of Agriculture and water development. 12 mECU. Basic infrastructure by acc. tender Supply of vehicles and materials by int. tender T.A. Project in execution. 6th EDF
EDF ZA 6004 A3a

Smallholder development in central province. Resp. Auth.: Ministry of Agriculture and water development. 12.35 mECU. Basic infrastructure and social facilities. Works, supplies and T.A. Project in execution. 6th EDF.
EDF ZA 6005 A3a

General Import Programme. *Resp. Auth.: Bank of Zambia. Hard currency allowance to import ACP and EC good. T.A. already financed on previous funds still on the spot. Project on appraisal. Date foreseen for financing June 92. 7th EDF.*
EDF ZA 7200 *A1c*

ZIMBABWE

Small scale irrigation programme. Resp. Auth.: Agritex Irrigation Division. 14 mECU. Irrigation works over 700 ha. Supply of vehicles and equipment. T.A., training, studies Int. tender launched in July 90. Project in execution. 6th EDF.
EDF ZIM 6010 A3e

Human resources development programme. Resp Auth.: Ministry of National Scholarships. 3.4 mECU. T.A. and scholarships, awards, seminars. Project in execution. 6th EDF.
EDF ZIM 6020 A6

Zimtrade Support Programme. Resp. auth.: Zimbabwe's new Trade Development Organisation (TDO) in Harare. 10.200 mECU. The programme will be delivered by a six man T.A. team. These will supervise local and international consultatns engaged to execute specific elements of the programme. T.A., training, supply of equip- ★ ment. ***T.A.: Prequalification launched in March 92. Date financing April 92.*** 7th EDF.
EDF ZIM 6001/7001 A5d, e

OMAY land use and health programme. Resp. Auth.: A.D.A. 6.031 mECU. Raising the standard of living of Omay rural population. Conservation and improved utilisation of the Wild Life resource, support to agriculture and improvement of social infrastructure. Road network, water, sanitation, building of a district hospital, equipments and supplies. Project on appraisal. 7th EDF.
EDF ZIM 6004/7002 A3a

Overseas Countries and Territories (OCT)

ARUBA

Airport extension. Extension of airport facilities. Apron, taxiway, new arrival building, car park, access roads, platform buses, fencing, security, peripheral road, technical studies. Estimated cost 14.5 mECU. EDF 6.3 mECU, The Netherlands ± 8,2 mECU. Works, supplies and T.A. (final design, tender dossier, supervision). Project on appraisal. 6th EDF.
EDF ARU 6003 A2d

ST. HELENA

Sea defences. Resp. Auth.: Public Works and Services Dept. 3 mECU. 2,5 mECU EDF, 0.500 mECU UK. To protect shore facilities at James and Rupert's Bay. Rehabilitation and reinforcement of existing sea walls. Project in execution. 5th and 6th EDF.
EDF SH 5001 A8g

Regional Projects

BENIN — BURKINA — NIGER

Regional project for the management of the 'W' national park and adjoining game reserves. Estimated total cost 10 200 mECU. To establish three management units and 10 bridges and 20 observation posts with their equipment. Building and rehabilitation of administrative, technical and social buildings, tracks and bridges. T.A., training and studies. Project on appraisal 6th EDF.
EDF REG 6122 A5i, A8f

INDIAN OCEAN ACP COUNTRIES

Regional programme of meteorological cooperation concerning tropical hurricanes. Resp. Auth.: Madagascar as Regional Authorizing Officer. 5 mECU. Purchase of specialised equipment by int. tender. T.A. and training Project in execution. 6th EDF.
EDF REG 6508 A2e

Development and management of tuna resources. Phase II. Resp. Auth.: Indian Ocean Commission (I.O.C.). 5 mECU. Installation of a legal structure for management and regulation: regional programme of applied research: collection, exchange and analysis of fisheries statistics: training. Supply of equipment, T.A. training and evaluation. Project in execution. 6th EDF.
EDF REG 5504 A3a

PACIFIC ACP COUNTRIES

Regional tourism development programme. Phase II. Resp. Auth.: SPEC and TCSP. Development of tourism and tourism related sectors of the Pacific ACP States and OCTs. 7.4 mECU. Works: implementation of programme components, supply of films, promotion and teaching materials, T.A., support for TCSP and project. Project in execution. 6th EDF.
EDF REG 6027 A5c

MEMBER COUNTRIES OF CILSS

Regional programme for soil protection and reafforestation. Resp. Auth.: Cape Verde Ministry of Rural Development and Fisheries. 4.250 mECU. Works, training, supply of equipments and T.A. Project in execution. 6th EDF.
EDF REG 6145 A3e

Information and training programme on the environment. Resp. Auth.: CILSS Secretariat. 10 mECU. Supply of pedagogical equipment, T.A. and training. Project in execution. 6th EDF.
EDF REG 6147 A8f

EAST AFRICAN COUNTRIES

Statistical training centre for Eastern Africa in Tanzania. Resp. Auth.: Secretariat of the centre. 2.0. mECU, Widening of capacity. Construction of classrooms, offices and housing. Project stage: identification. 5th EDF.
EDF REG 5311 A6b

Institutional support to Eastern and Southern Africa Management Institute (ESAMI). Resp. Auth.: ESAMI, Tanzania. Estimated cost 4.5 mECU. Extension of ESAMI installations plus provision of library, audio visual and printing equipment and improvement of kitchen and laundry facilities. Project on appraisal. 6th EDF.
EDF REG 6311 A6b

P.T.A. COUNTRIES (Preferential Trade Area)

Computerisation programme for customs and external trade statistics. Resp. Auth.: P.T.A. Secretariat. 6.7 mECU. Project in execution. 6th EDF
EDF REG 6922 A1b

BURUNDI — RWANDA — ZAIRE

Institutional support to the Institut de Recherche Agronomique et Zootechnique (IRAZ), at Gitega, Burundi. Resp. Auth.— IRAZ and Ministère des Travaux Publics, Burundi. EDF part 2.430 mECU. Building of administrative and research complex. Works by int. tender. Project in execution. 6th EDF.
EDF REG 6318 A1a

MEMBER COUNTRIES OF ECOWAS AND CEAO

Automatic processing of trade statistics and customs data. Resp. Auth.: Executive secretariat of ECOWAS. Director-General of the ECOWAS Fund. 5 mECU. Supply of equipment and T.A. Project in execution. 6th EDF.
EDF REG 6163 A1 bcef

BURUNDI — RWANDA — TANZANIA — UGANDA — ZAIRE — KENYA

Northern Corridor-Rwanda. Rehabilitation of the road Kigali-Butare-Burundi border. Resp. Auth.: Ministère des Travaux Publics. Estimated cost 8 mECU. Project on appraisal. Date foreseen
★ for financing ***1st half 92.*** 6th EDF.
EDF REG 6310 (RW....) A2d

Northern corridor alternative. Kericho-Isebania road Kenya. Resp. Auth.: Ministry of Transport and Communications, Kenya. 9 mECU. Rehabilitation of bitumized road of 170 km in the Lake Victoria region.
★ 6th EDF. ***Project on appraisal.***
EDF REG 6315 (KE) A2d

Musoma — Sirari Road. Resp. Auth.: Ministry of Works — Tanzania — Estimated cost 22 mECU. Upgrading to bitumen standard of existing road. Works, equipment and supervision. Project on appraisal. 6th EDF.
EDF REG 0000 (TA 6005) A2d

MALAWI – MOZAMBIQUE – ZAMBIA – ZIMBABWE

Regional Tsetse and Trypanosomiasis Control Programme: extension of preparatory phase. Resp. Auth.: Deparments of Veterinary Services. 22.700 mECU. Research and development, training, environmental monitoring and assessments of the economic and land-use implications of tsetse control, T.A. and supply of vehicules, field, scientific and
★ camping equipment. ***Project in execution.*** 6th and 7th EDF.
EDF REG 5420 A3a

SADCC

Maseru Container Terminal. Resp. Auth.: Government of Lesotho and SADCC. 1.350 mECU. Construction of container terminal and supply of containers, handling equipment. Study required: detailed design of works. Short-list already drawn up. Project on appraisal. 5th EDF.
EDF REG 5421 A2d

Regional Wildlife Training Programme. Resp. Auth.: Ministry of Natural Resources. Tanzania 0.500 mECU. Supply of field training and office equipment, teacher training, restoration of college buildings. T.A.: Project in execution. 6th. EDF
EDF REG 6408 A5i

International Baccalaureate Studies. Resp. Auth.: SADCC Regional Training Council. 1.695 mECU. Supply of scholarship programme for selected secondary school graduates from Angola and Mozambique to study for the International Baccalaureate Diploma in Swaziland. T.A. and
★ evaluation. ***Project in execution.*** 7th EDF.
EDF REG 6440 (7016) A6a

SADCC — MOZAMBIQUE

Limpopo line rehabilitation. Resp. Auth.: Mozambique Ministry of Transport. 15 mECU, Community contribution to an overall rehabilitation programme for the
★ Limpopo railway line. ***Project in execution.*** 6th EDF.
EDF REG 6421 A2d

Beira port dredging contract. Resp. Auth.: Ministry of Construction and Water. Estimated cost 9 mECU. Dredging for two years of the access channel to the port of Beira. Works: 2 years, 4 million m^3/year. Supervision and training. Project on appraisal. 6th EDF.
EDF REG 6401 A2d

CAMEROON — CENTRAL AFRICAN REP. — CHAD — CONGO — GABON — GHANA — NIGER — NIGERIA

Aeronautical satellite telecommunications. Project for Central and Western Africa. Estimated cost 38.5 mECU. Improvement of air traffic safety. The project will provide high quality voice and low speed data links between the Air Traffic Control Centres in eight countries. Project on appraisal. Int. tender (conditional) no 3442 launched in June 91 — Opening 31.10.91.
★ Date foreseen for financing ***1st half 92.*** 6th and 7th EDF
EDF REG 6038 A2d

BENIN — COTE D'IVOIRE — GHANA — GUINEA — GUINEA BISSAU — TOGO

Regional programme to increase awareness in western coastal African countries of natural resources protection. Resp. Auth.: Ministère de l'Environnement-Togo. Estimated cost 10 mECU. Priorities: fight against bush fires and deforestation and for soil protection. Project on appraisal. 6th EDF
EDF REG 6113 A3e

OECS — TRINIDAD AND TOBAGO BARBADOS — GUYANA

Regional fruit and vegetable marketing programme. Resp. Auth.: Caribbean Food Corporation. 6.2 mECU. T.A. and supplies. Project on appraisal. 6th EDF.
EDF REG 6620 A5de

OECS AND MONTSERRAT

Tertiary education. Resp. Auth.: OECS Secretariat. 7.2 mECU. Construction, supply of equipment, training, trainers training, T.A. and evaluation. Project in execution. 6th EDF.
EDF REG 6628 A6bcj

ACP AND OCT COUNTRIES

ACP and OCT countries participation in trade development actions and services. Resp. Auth.: Programme coordination by Trade Devt. Unit in DG VIII-Brussels and geographical units in DG VIII-Brussels and EEC delegations. 5.800 mECU for ACP's and 0.928 mECU for OCT's. Trade fairs and tourism, seminars, conferences, workshops and symposia. T.A. to prepare programmes and actions and for training. Commercial missions (regional), publication of brochures and documentation. Project in execution. 6th EDF.
EDF REG 7001 A5e

MEDITERRANEAN COUNTRIES

ALGERIA

Centre to Develop Pesticides (CDP). Resp. Auth.: CERHYD (Centre de Recherche pour la Valorisation des Hydrocarbures et leurs Dérivés) 1.9 mECU. T.A. and training, supply of equipment. Project in execution.
SEM AL A3a

Support programme for the hydraulic sector. Resp. Auth.: Ministère de l'Equipement Direction de Développement des Aménagements Hydrauliques (DDAH) and Agence Nationale des Ressources Hydrauliques (ANRH). 8 mECU. T.A. for National Water Plan, supervision and monitoring for dams, studies, waste water treatment stations. Supply of equipment. Project in execution.
SEM AL 183/90 A2b

Financing of artisanal enterprises from 'Société Nationale de l'Electricité et du Gaz (SONELGAZ)'. Resp. Auth.: Ministère de l'Industrie et de l'Artisanat and SONELGAZ. 9.060 mECU. Supply of line of credit for artisanal enterprises, supply of pedagogical equipment, T A. for bank-office in charge of credits. Project in execution.
SEM AL A4d

Support to the development of the artisanal fishery in the Centre and West. Resp. Auth.: Ministère de l'Agriculture. Agence Nationale Pour le Développement de la Pêche. Estimated total cost 15.6 mECU. EEC contribution 12.6 mECU. Works by acc. tender. Supply of equipment
★ by int. tender. T.A.: short-lists done. ***Project in execution.***
SEM AL A3d

EGYPT

IUD production. Resp. Auth.: National Population Council (NPC). EEC 2.100 mECU. T.A., equipment, raw material for local production of IUD. T.A. by Organon (NL) Equipment by int. tender. Project in execution.
SEM EGT A7c

Bardawil Lagoon development project. Resp. Auth.: Ministry of Agriculture and Land Reclamation (MOALR) and the General Authority for Fish Resources Development (GAFRD). 3 mECU. Protection of natural resources by controlling and improving the salinity of the lagoon. Improvement of the marketing of fish and reduction of losses. Construction of an additional landing place with basic marketing facilities and improvement of the existing one. Installation of a cool chain including an ice-making machine. Improvement of fishing methods. T.A. for the development and implementation of training and extension programmes. Purchase of equipment and vehicles by int. tender. Project in execution.
SEM EGT 510/90 Aai

Ras Mohammed National Park Sector Development Project. Phase II. Resp. Auth.: Egyptian Environmental Affairs

Agency (EEAA). 2.5 mECU. Supply of equipment, transport, T.A. and training. Project in execution.
SEM EGT 692/91 A8f

Oil pollution combating emergency centre at the entrance of the Gulf of Aqaba. 4.300 mECU. ***Project in execution.***
SEM EGT 771/91 A8f

JORDAN

Ground water investigation in the Hammad and Sirhan basins. Resp. Auth.: Ministry of Water and Irrigation, Water Authority. 4 mECU. Initial studies, drilling exploration, surveys and analysis. Project on appraisal.
SEM JO 589/90 A2a, A9a

Cooperation project in science and technology. Resp. Auth.: Higher Council for Science and Technology (HCST). 3.5 mECU. Supply of specialized equipment, staff exchanges, T.A. training, evaluation. Project on appraisal.
SEM JO A6f

Social Development Project — Development and Employment Fund. DEF. Resp. auth.: D.E.F. EEC contribution 4 mECU. T.A. and lines of credit. ***Date financing April 92.***
SEM JO 932/91 A3b

MALTA

Improvement of infrastructure. 3.1 mECU. T.A. and supply of equipment. Management of natural water resources, long term development plan for 'Telemalta Corporation' Supplies by int. tender. Project in execution.
SEM MAT 88 A9b

Protection of Malta's coastline against oil pollution. Resp. Auth.: Oil Pollution Executive 2.4 mECU. Supply of specialized equipment, training and T.A. Project in execution.
SEM MAT A8f

Upgrading of standards laboratories. Resp. Auth.: Maltese Government. 2.2 mECU. Identification by European T.A. of the present situation of standards laboratories. Training and organizational matters, purchase of equipment. Restructuring of some laboratories. Supply of analytical, microbiological and calibration equipment. Project in execution.
SEM MAT 1012/90 A1c

Strengthening educational and economic relations with the Community. 1.7 mECU. Scholarships and traineeships, establishment of a Euro-Information Centre, integrated marketing programmes and tourism promotion. Differents T.A. and purchase of equipments. ***Project in execution.***
SEM MAT 91/431 A5c, d

MOROCCO

Support to strengthen technological and scientific education structures. Resp. Auth.: Ministère de l'Education Nationale. EEC 40 mECU Completion of Beni Mellal and Settat faculties. Construction of Errachidian and Mohammedian faculties and CPRT of Settat. Supply of equipment for faculties and CPRT, studies, T.A. and supervision. Works and equipment by int. tenders. Project in execution.
SEM MOR A6b

Support for scientific research. Resp. Auth.: Ministère de l'Education Nationale. 1.625 mECU. Supply of specialized equipment and study fellowships in Europe. Project in execution.
SEM MOR 653/91 A6f

Support to modernize 'work system' in the Ministry of Finance. Resp. Auth.: Direction du Budget du Ministère de Finance, EEC contribution 0.260 mECU. Supply of computerized equipment, T.A. and training. Project in execution.
SEM MOR 694/91 A1c

Medical Research Programme. Resp. Auth.: Ministère de la Santé. EEC contribution 0.557 mECU. Supply of specialized equipment and study fellowships in Europe Evaluation. Project in execution.
SEM MOR 649/91 A6b, i

SYRIAN ARAB REPUBLIC

Water Supply Bseira and Hama Rural Regions. Resp. Auth.: Ministry of Local Administration. Governments of Deir Ez Zor and Hama. EEC contribution. 7.5 mECU. Drinking water supply. Supply of pipes and fittings and electrical-medical equipment. T.A. Project in execution.
SEM SYR 662/91 A2b

TUNISIA

Date-palm trees in the Rejim-Maatoug region. Resp. Auth.: Office de Mise en Valeur de Rejim-Maatoug. EEC contribution 15 mECU. Italy 7 mECU. Drilling works by int. tender. Drilling equipment— Italy. Electrical equipment: Italy. Irrigation equipment: int. tender. T.A. Italy Project in execution.
SEM TUN A3a

Mobilization of water resources in the Kasserine Governorate. Resp. Auth.: Ministère du Plan et du Dév. Régional. Commissariat Régional de Développement Agricole de Kasserine. EEC Contribution 7 mECU. Water schemes, dams, drilling. Works by acc. tender. Project in execution.
SEM TUN 254/91 A3c, A9b

Support to the Structural Adjustment Programme. General Import Programme. *Hard currency allowance. T.A. for follow-up and evaluation. EEC contribution 40 mECU. Project in execution.*
SEM TUN 000/92 A1v

Waters and soil conservation. *Resp. Auth.: Ministère de l'Agriculture — Direction de la Conservation des Eaux et des Sols, EEC contribution 45 mECU. Works by acc. tenders or direct labour. Supplies by int. tender. T.A.: ORSTOM (F) funded by France. Project in execution.*
SEM TUN 000/92 A3c

TURKEY

Improvement of health services. EEC contribution 5.8 mECU. Master plan, specialized medical equipment, scanner, vehicles. T.A. and supplies. Project in execution.
SEM TU A7ac

Fight against environmental pollution. Resp. Auth. Prime Minister's Office. Directorate General of the Environment. EEC contribution 2.8 mECU. Purchase of mobile system to measure water, air, surface and soil pollution. Supply of laboratory equipment, T.A. Project in execution.
SEM TU A8f

Vocational training programmes for tourism and mining. EEC contribution 5,4 mECU. Seminars, staff, trainers, supply of equipment, studies. Project in execution.
SEM TU A5c, A4a, A6d

Programme to brooden relations between EEC and Turkey. EEC contribution 3.6 mECU. Scholarships, supply of equipment for the University of Ankara and Marmara. Training centre and language laboratory in Marmara. Establishment of a Euro-Turkish 'Business Council'. Project in execution.
SEM TU A6b

Regional centre for training and development for the 'Union Internationale des villes (UIV)' for eastern Mediterranean countries and the Middle-East in Istanbul. EEC contribution 1.4 mECU. T.A. and supply of equipment. Project in execution.
SEM TU A1c

WEST BANK AND GAZA OCCUPIED TERRITORIES

Assistance to the Palestinian population in the Occupied Territories. EEC contribution 10 mECU. Various projects, lines of credit, supply of equipment, T.A. and training. Project in execution.
SEM OT 91 A8a, b, e

Exceptional Aid for the benefit of the Palestinian population of the Occupied Territories. 60 mECU. To counteract the negative consequences of the Gulf war. Grants to extend credit and to create revolving funds, supplies of equipment and other materials and contributions to operating costs, technical assistance and training. Project in execution.
SEM OT 91 E A5e, A8a, b. c

A.L.A. developing countries ASIA and LATIN AMERICA

BANGLADESH

Population and Health IV: Upazila Functional Improvement Pilot Project (UFIPP). Resp. Auth.: Ministry of Healt – Project Implementation Unit – P.I.U. and 4e Functional Improvement Teams – F.I.T. EEC contribution 18.75 mECU. Training, specialized T.A. supply of equipments, furnitures, vehicles, drugs and medical supplies, monitoring and evaluation. Project on appraisal.
ALA BD 9112 A7b, c

Population and Health IV: Contraceptiva Supply Project (C.S.P.). Procurement of approximately 840 million condoms during the period from January 1993 to December 1996. Phase I approximately 30 million pieces at the rate of about 10 million pieces a month, followed by eighteen subsequent shipments up to 1994. The total quantity for phase 1 is 210 million pieces. Second phase (210 million pieces) in 1995-96. The project would continue to supply the Social Marketing Company 'S.M.C.' with the existing 'Panther' and 'Raja' type condoms. Given the magnitude, complexity and specialised nature of the procurement and supply operation and in order to minimise risks of-delays or other supply problems, the project will be implemented with the assistance of a specialised European Procurement Agency (P.A.). Condoms will be procured by the P.A. through restricted tenders after prequalification of EC condom manufacturers as well as from India, Indonesia, Malaysia, Sri Lanka, Thailand and Vietnam. EEC contribution 20 mECU. Project on appraisal.
ALA BD 9113 A7c

Cylone Shelter-cum-Primary Schools Project. Resp. Auth.: Ministry of Education. EEC contribution 10.716 mECU. Constructions and equipment, of about 150 cyclone shelters-cum-primary schools. Work, by acc. tenders. Supply of equipments and radio communication equipments. T.A. Project on appraisal.
ALA BD 9116 A8g

Import and Internal Resources Support Project. Resp. Auth.: Bangladesh Bank. EEC contribution 16 mECU. The foreign exchange will be made available in ECU to and through the Central Bank to import by private importers vegetable oils, seeds and cement. T.A. for monitoring evaluation and audit. Project on appraisal.
ALA BD 9117 A1c

Cyclone Protection. Project II. Resp. Auth.: Bangladesh Water Development Board. Estimated total cost 78 mECU. EEC contribution 3.2 mECU. The EC will finance the existing T.A. composed by Kampsax International – BCEOM and Danish Hydraulic Institute. The investments costs of the project will be financed by: Bangladesh (2.4 mECU), I.D.A. (19.6 mECU), Japan (17 mECU), Saudi Fund for Development (11.3 mECU). Project on appraisal.
ALA BD 9118 A8g

BHUTAN

Support to the Ministry of Agriculture (MOA) on Human Resources Development. (HRD). Resp. Auth.: Ministry of Agriculture. Human Resources Development Unit. Planning and Policy Division. EEC contribution 55 mECU. T.A. to define the training structure and to implement the necessary action, to coordinate and assist and for management and administration locally and abroad. Overseas training. Project on appraisal.
ACA BHU 9105 A6c, i

Integrated Pest Management Development. *Resp. Auth.: Ministry of Agriculture-Dept. of Agriculture (D.O.A.) EEC contribution 2.6 mECU. Works by acc. tender. Supplies by int. tender. T.A. short and long term. Project on appraisal. Date foreseen for financing July 92.*
ALA BHU 9212 *A3a*

BOLIVIA

Potosi water supply. Resp. Auth.: Administraciòn Autonoma Para obras Sanitarias (AAPOS). EEC contribution 0.500 mECU. Connection works and renovation. T.A. Project in execution.
ALA BO 9108 A2b

'Quinoa Projects' — Potosi. Resp. Auth.: CORDEPO. EEC contribution 6.100 mECU. Actions to develop Andean crops. T.A., supply of equipment, works by direct labour, research, studies, lines of credit. Project in execution.
ALA BO 9109 A3a

BRAZIL

Pilot programme for the conservation of Tropical Forests. EEC contribution US$ 15 million (equivalent to approx. MECU 11.9. Contribution to Rain Forest Trust Fund. Project on appraisal.
ALA BR 92/4 A3c, A8f

CHINA (P.R.)

Intensification of crop production in Xinjiang Province. Resp. Auth.: Steering Committee: Provincial Foreign Economic and Trade Bureau, Agricultural Bureau, Changji Prefecture, Xinjiang Planning Committee and The Financial Bureau. EEC contribution .6 mECU. Supply of equipments by int. tender and T.A. (short and long term). Overseas training. Project on appraisal.
ALA CHN 9120 A3a

Land reclamation in Ningxia Hui autonomous region. Resp. Auth.: Coordinating Committee from Provincial Foreign Economic Relations and Trade Bureau, Agricultural Bureau, Water Resources Bureau and the Financial Bureau. EEC contribution 3.8 mECU. To reduce water infiltration in the fields, improve drainage, leach out the salt, improve the soils, water management and husbandry practises. T.A. and supply of equipment, training and evaluation. Project on appraisal.
ALA CHN 9132 A3e

COLOMBIA

'Job creation' for urban youth. Resp. Auth.: National Planning Dept. Consejeria de la Juventud, Mujer y Familia — Codirection with European expert. 6.3 mECU. T.A.: 3 European experts, supply of equipment, lines of credit and guarantee, operating costs and training. Project in execution.
ALA CO 9115 A8e

Silk production development. Resp. Auth.: Secretaría de Integración Popular and Unidad de Gestión composed by an european co-director and a colombian co-director. EEC contribution 8 mECU. Specialised T.A., supply of equipment for silk plants, revolving funds. Project on appraisal. Date foreseen for financing April 92.
ALA CO 9131 A3a

ECUADOR

Rural development in the Bolivar region. FOEDERUMA 2nd phase. Resp. Auth.: FODERUMA – Fondo de Desarrollo Rural Marginal. Central Bank and co-directors (ecuadorian and european). EEC contribution 8.7 mECU. Supply of T.A. (director-expert in integrated rural development programmes, civil works engineer and administrative expert), equipments for road maintenance, medicals, transport, infrastructures, line of credit. Supplies by int. tender, works by acc. tender. Project on appraisal. Date foreseen for financing December 91.
ALA EQ 9126 A3a

EL SALVADOR

Support programme to the micro-enterprises in the marginal areas. 7 mECU. Project in execution.
ALA SAL 9129 A5e

GUATEMALA

Rural development programme in the Huehuetenango department. Resp. Auth.: Ministerio de Desarrollo Urbano y Rural (MINDES) and local and european co-directors. EEC contribution 12 mECU. Supply of T.A., infrastructures, equipments and vehicles. Works by acc. tender. Supplies by int. tender. Project on appraisal.
ALA GUA 9121 A3a

HONDURAS

Credits and T.A. to the rural micro-entreprises (PROCATMER). EEC contribution 9.6 mECU. ***Project in execution.***
ALA HO 91/24 A3a

INDIA

Kerala Horticulture Development Programme. Resp. Auth.: GOK Chief Secretary and Steering Committee. 28.7 mECU. Supply of fertilizer, equipment (seeds and industry) works and T.A. (short-term and long-term). Project in execution.
ALA IN 9103 A3a

Kerala Minor Irrigation Project. Resp. Auth.: Irrigation Dept. of Kerala State. EEC contribution 11.8 mECU. Improvement of irrigation systems. Tank and lift schemes. Supply of equipment and T.A. Training, environmental impact studies. Project in execution.
ALA IN 9III A3a

Sidmukh and Nohar irrigation project. Resp. Auth.: Kajasthan State Government. 45 mECU. Extensive irrigation network. Works in irrigation and associated agro-forestry and livestock activities. Work, by acc. tender. Supplies (equipments and vehicles) by int. tender. T.A. for project monitoring, agricultural development, animal husbandry and forestry and evaluation. The EC financing, except for expatriate expertise and contingencies, will be transferred as counterpart funds of commodity aid in a fast disbursement procedure (38 mECU). Project on appraisal.
ALA IN 9135 A3a

INDONESIA

Irrigation and water supply programme in Bali North. Resp. Auth.: Directorate General of Water Resources Development (DGWRD), of the Ministry of Public Works. EEC contribution 10.300 mECU. Drilling works and supply of equipments. Specialized T.A. and training. Works by acc. tender. Supplies by int. tender. Project on appraisal.
ALA IND 9119 A3e

IRAN

Rebuilding of the Manjil and Abbar Tarum Hospitals. Resp. Auth.: Ministry of Health and Medical Education. 13 mECU T.A. for architectural and technical studies and work supervision. Building and equip-
★ ment by int. tender. ***T.A. by Studio Bichara ((I).*** Project in execution.
ALA IR A7a

MONGOLIA

Strengthening of the Veterinarian Services. *Resp. Auth.: Ministry of Agriculture. Dept. of veterinarian medecine. EEC contribution 2.3 mECU. Purchase of equipments by int. tender. T.A. and training. Project on appraisal. Date foreseen for financing May 92.*
ALA MNG 9209 A3a

NICARAGUA

Agricultural reform and integrated rural development in the Rio Blanco region. Resp. Auth.: I.N.R.A. Istituto Nicaragueño de Reforme Agraria. EEC contribution 13.500 mECU. Transport and communication infrastructures, rehabilitation and creation of built-up areas, schools, health centres, administrative and technical infrastructures. Supply of equipments, vehicles, materials. Line of credit. T.A. Works by acc. tender, supplies by int. tender. Project on appraisal. Date foreseen for financing December 91.
ALA NI 9136 A3a

PAKISTAN

Rural roads in the Buner Area. Resp. Auth.: Provisional Government's Construction and Work Dept. (C & W) and District Council. 5 mECU. Construction of new sections of rural roads, upgrading of existing roads. Works by acc. tender. Supervision by European Consultant. Project on appraisal.
AIA PK 9106 A2d

Rural Electrification in Punjab. *Resp. Auth.: WAPDA Project Management Unit. EEC contribution 21 mECU. Electrification of 540 villages. Equipments by int. tenders, T.A. and training. Project on appraisal. Date foreseen for financing May 92.*
ALA PK 9211 A2ai

PANAMA

Rehabilitation of Santo Tómas Hospital. Resp Auth.. Ministerio de Salud. EEC contribution 4 mECU. Works, supply of equipment and T.A. for maintenance, training and management. Project in execution.
ALA PAN 9017 A7a

PANAMA — COSTA RICA — NICARAGUA — HONDURAS — EL SALVADOR — GUATEMALA

Regional T.A. programme and development of the telecommunications sector in Central America. 13.800 mECU. Project in execution.
ALA REG 9123 A2c

Mother and child health programme. 16 mECU. Project in execution.
ALA REG 9125 A7b

Regional programme for the collection and treatment of the hospital waste. Resp. Auth.: Ministry of Public Health in each country. EEC contribution 4.900 mECU. For the town-capitals hospitals in each country. Supply of equipments, incinerators, vehicles and tools. Training and european T.A. Supplies by int. tender. Project on appraisal.
ALA REG 9133 A7a

Regional support programme to the Phyto-Sanitary Health. Resp. Auth.: O.I.R.S.A.-Organismo Internacional Regional de Sanidad Agropecuarias in San Salvador. EEC contribution 6.4 mECU. Supply of equipments, vehicles, tools by int. tender. Works by direct labour or acc. tender. T.A. long and short term. Training. Project on appraisal.
ALA REG 9137 A3a

PARAGUAY

Rural settlement. San Pedro and Caaguazu. Resp. Auth.: Instituto de Bienestar Rural. 10.4 mECU. Settlement of 4 000 families. Basic infrastructure, equiment, training and T.A. Project in execution.
ALA PAR 90/24 A3a

PERU

Micro-enterprises – Informal sector. Resp. Auth.: Banco Central de Reserva del Perù (BRC). EEC contribution 13.200 mECU. To improve capacities of the micro-enterprises. Lines of credit, revolving funds, T.A. and training. Project on appraisal.
ALA PE 9124 A8d, c

Drinking water / Pueblos jovenes / Lima. EEC contribution 7.8 mECU, France 2.350 mECU. Works by acc. tender. T.A. by France. Project on appraisal. Date foreseen for financing April 92.
ALA PE 92/7 A2b, A7

PHILIPPINES

Earthquake Reconstruction Programme (ERP) (July 90). Resp. Auth: Department of Agriculture, CECAP (Central Cordillera Agricultural Programme). Project Office. EEC contribution 20 mECU. Agricultural rehabilitation, works, supplies and T.A. Hospital rehabilitation: works for two hospitals, supply of equipment and supervision. Studies: 1) Alternative transport strategy study. 2) Urban planning studies for the cities of Bagnio and Dagupan. Project in execution.
ALA PHI 9021 A8a

Western Samar – Agricultural Resources Development Programme (WS-ARDI). Resp. Auth.: Department of Agriculture (DA). Department of Environment and Natural Resources (DENR). Department of Public Works and Highway (DPWH). EEC contribution 15 mECU. Works, supply of equipments, agricultural inputs, vehicles long term T.A., training, evaluation. Project on appraisal. Date fore-
★ seen for financing ***July 92.***
ALA PHI 9215 A3a

SINGAPORE

EC — Singapore Regional Institute of Environmental. Technology. *EEC contribution 2.7 mECU. T.A. and Staff: Director, 1 Head of Division, part-time expatriate services. Project on appraisal. Date foreseen for financing May 92.*
ALA SIN 9202 A8f

SRI LANKA

Minor and medium size irrigation systems in the North-Western province. Resp Auth.: Ministry of Land and Ministry of Agriculture. EEC contribution 6.3 mECU. Work, by direct labour, supplies by int. tender. T.A.. Project in execution.
ALA SRL 9016 A3a

National Irrigation Rehabilitation. Resp. Auth.: Project Coordination Committee. Total estimated cost 41.5 mECU. EEC 3.34 mECU, World Bank 24.67 mECU, counterpart funds from EEC Food Aid 7.59 mECU, local 5.9 mECU. Works, supplies and T.A. Project in execution.
ALA SRL 9107 A3a

YEMEN

Fourth Fisheries Development Project. Resp. Auth.: Ministry of Fisheries. EEC contribution 13.900 mECU. Construction of access roads, facilities for fish handling, supply of equipments, engines and fishing gear. T.A. Project in execution.
ALA ROY 9122 A

ASEAN

EC-ASEAN Radar Remote Sensing, ER S-1 Project. Resp. Auth.: European Space Agency (ESA). EEC contribution 3.9 mECU. To improve radar date acquisition for receiving stations. Supply of equipment by int. tender. T.A. for training and management. Project on appraisal.
ALA/ASN/REG 9128 A1g, A8f

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Ramsès 92 — Under the direction of Thierry de MONTBRIAL — Published by Dunod for the Institut français des relations internationales (IFRI), 6 rue Ferrus, 75014 Paris — 438 pages — 1991

Ramsès 92 is, as usual, a collective work directed by Thierry de Montbrial, Professor and Chairman of the Economics Department at the Ecole Polytechnique and Head of IFRI. This is the 10th annual report of the series and it is in three parts. The titles of parts one and two clearly illustrate the present international situation — an international order which cannot really be defined and a changing international economy beset with uncertainty. The third part deals with one major subject, Christianity and society. Lastly, the statistical analysis is a useful work of macroeconomic reference on the seven main industrialised nations, the European Community and the developing world.

There is so much information and food for thought here that a detailed account of it would be impossible. All the reader needs to know is that, despite the inevitable lag between the completion of writing and the immediate situation, this is a publication of an exceptionally high standard and we shall therefore confine ourselves to one or two particular remarks.

In the introduction, for example, traditionally devoted to a panorama of the world situation, Thierry de Montbrial wonders whether the UN is to become the nerve centre of the international system. 'The UN's job in the Gulf crisis was to legitimise US action...', he says. In fact, the UN only works properly in any given situation if there is a leader — the US in this case.

Another important development, and one which is rarely emphasised, is the situation of Turkey, whose economy and population are rapidly expanding. The collapse of the Soviet Union has opened the way East for the Turks — into that ribbon of territory which takes in most of the Moslem republics of the USSR and stretches to Sinkiang (the Chinese Turkistan). Competition is also developing with Iran.

Part three, on Christianity and society, is particularly interesting. It is a remarkably clear discussion of the main inspiration of Catholics and Protestants alike — a commitment to the spirit of the Gospels. The wide variety of geographical situations is lucidly explained. But the important thing is that the weight of Christianity, echoing the increase in the population of the planet, is shifting to the Third World. And what about Africa? More than ever before it is a place of mission where new faithful can still be found in so-called animist populations. There are an estimated 200 million faithful there belonging to Islam, Christianity and genuinely African religions — and this excludes the countries on the Mediterranean. And the Christian faiths south of the Sahara are coming into their own with native churches which back the move towards democracy...○

A. Lacroix

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'The New State of War and Peace: An International Atlas' M. KIDRON and Dan SMITH: Grafton Books, London: 127 pp.

This atlas charts, in both the literal and figurative sense of that word, the development of military power and political might in our troubled world. The authors scrupulously avoid espousing any particular political cause, be it of the Right or the Left, North or South, East or West. Nonetheless, there emerge two overall theses viz. (a) the monstrous waste represented by armed conflict and armaments and (b) that we are all involved, often more directly than we might think.

Thus the maps found herein make clear that violent conflict can also often have 'unofficial' origins such as terrorism or drug-smuggling, unleashing forces as lethal as any army in any country in the world. Nonetheless, the end of the Cold War and the developments in Eastern Europe and the ex-Soviet Union, already clearly identified by the authors at their 'deadline' in August 1990, offer great hope for the end of super-power confrontation and the spread of democracy, which is the only credible means for the resolution, other than by force of arms, of those apparently inevitable conflictual pressures seemingly endemic to the human race.

This book is thus worthwile reading for all those who seek to have some overall grasp of a world in rapid transition.○

○○○ A.B.

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The Courier team moved to new premises in early 1992. Visitors are welcome to call at our new offices. Correspondence should continue to be sent to the Commission's postal address.

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Back cover: ***African forests. Like the Antarctic, tropical forests are highly important for the world's ecological equilibrium. Their destruction gives rise to serious pollution problems, desertification and reduced photosynthesis (Photo Vivant Univers)***

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