

## Focus on Africa

**On the following pages a series of articles focus on the efforts being made to solve some of the problems facing the nations of the world's second largest continent — Africa**

### It costs as much to heat the pot as to fill it...

Clyde Sanger

Two years ago, at the height of the drought that wreaked such havoc in the Sahelian zone of Africa, the head of the forestry service of Niger, Najada Ibrahim, went visiting his mother in her village of Maradi. He took her a present: a small bundle of firewood.

Gilles Lessard, the IDRC's associate director for Forestry, who was with him that day, recalled afterwards: "She received it with great joy. It was like giving her a bunch of flowers."

There have been two years of good rain since then. At the research station at M'Bidi, in northern Senegal, they started planting out acacia seedlings in mid-July this year, a full month ahead of normal, because there had already been 100 mm of rain. Yet a crisis remains, and in fact grows worse each year, for the millions who need fuelwood to cook their meals, and to keep themselves warm on cool nights, in the dry areas of Africa verging on the Sahara.

The mathematics of the problem are stark. Each person living in a town or city in this area needs one cubic metre of stacked firewood (equivalent to a stère) per year. The annual growth in a hectare (2.47 acres) of natural forest is on average only half that amount; so every towns person needs two hectares of natural forest — somewhere.

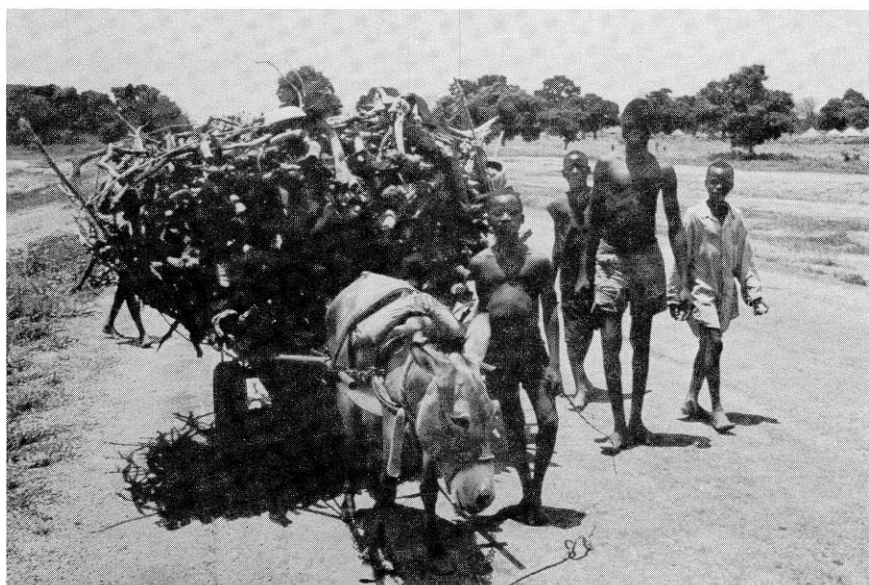


Photo: Gilles Lessard

*These boys may spend several days on the road hauling firewood over long distances for sale in the city.*

The "somewhere" gets more and more distant as cities grow. Until recently in Bamako, the capital of Mali with a population of 300,000, nobody used to haul firewood more than 50 kilometres; now it is common to go 100 kilometres, and by 1990 the radius will extend to 155 kilometres or further.

By 1990 the three largest cities in Upper Volta, even if their population only doubles to 550,000, will need

the amount of wood that can be produced from 75,000 hectares of plantations. The cost of planting 5,000 hectares a year for the next 15 years would mean an astronomical investment for such a small country: at present costs of \$7,000 per hectare, it would come to more than \$52 million. No government in the Sahelian zone of Africa is going to put that amount of investment into firewood production.

Meanwhile, at the level of the individual household, the cost of firewood is heavy; the price rises not just during the rainy season, but steadily now as it has to be hauled further distances, and more often by small truck than by donkey-cart or on someone's head. Many families spend up to 20 percent of their income on firewood. A recent survey carried out in Niamey, Niger, indicated that 25 percent of families have only one hot meal per day on account of the high cost of firewood. There is a common saying in West Africa: "Il coûte aussi cher de chauffer la marmite que la remplir" (It costs as much to heat the pot as to fill it").

It all sounds hopeless. Yet there are possible solutions, and African politicians and officials have listed them:

- substitution of gas (oil, butane) for fuelwood

- use of solar energy
- greater use of charcoal
- higher production of woodfuel in plantations, either dryland or irrigated.

Some words follow on each of these possibilities.

The Senegal Government has run a "butanization" campaign, but with little success. Foreigners and the wealthier Senegalese may use butane, but poorer people cannot afford to buy a new type of stove. Petroleum products might seem the natural substitute for wood in cities of northern Nigeria like Kano, where trucks now travel 100 miles for firewood; but this substitution has so far gone slowly throughout oil-rich Nigeria.

Use of solar energy is a relatively new idea in West Africa, although in Niger (for example) they are experimenting with it in water heating and distillation. A conference on the use of solar energy was held in Dakar last December, a first step down a long road.

The other two possibilities are exciting more immediate interest, and Canadian groups have been active in helping African governments explore both avenues.

There are strong grounds for promoting the greater use of charcoal in towns of Sahelian Africa. It is already the most common fuel in Senegal, where it is not only used by households but also by small industries (bakeries, brickworks, foundries) and also in the smoking of fish. It is similarly used in Mali, Upper Volta and Niger but to a far lesser extent.

The advantages to the user of charcoal are that it burns without smoke and is easily controlled in household or factory use; that it can be easily transported long distances (it is brought into Dakar from 300 kilometres away), being packed in jute sacks; and it keeps well, in rainy or any conditions. Also, only the simplest equipment is needed, since a stove can be made out of an old tin.

For the country as a whole there are other advantages. A great deal of wood goes to waste during cutting operations in the tropical high forests of West Africa. In many parts only about one-quarter of the forest is used for lumber, the rest consisting of unsuitable species that are burned or left to die and rot. If this wasted wood were converted instead into charcoal, the forests would be better managed, clearing operations would become profitable and thousands of jobs would be created from this industry. The charcoal would be trucked or railed up-country to the cities of the Sahelian zone.

It all makes for a pretty solution, but there are some blemishes. At present in some countries, like Ghana, the charcoal traffic goes the other way, from the needy north to the coastal cities where people can pay more for it. In Nigeria there is a general war-

iness towards charcoal, due to incidents of monoxide poisoning. The railways don't seem too keen on a large business in charcoal freight, and the rivers flow the wrong way - to the sea, not inland.

Nevertheless, a three-man study mission headed by Dr D. E. Earl, who years ago blazed a trail for charcoal-makers through the forests of Uganda, spent 10 weeks at the end of 1974 touring nine countries of West Africa and investigating opportunities to use charcoal in much greater quantities as low-cost fuel for households and industries, especially in the Sahelian zone.

Their report is still a confidential document in the Canadian International Development Agency, which recruited the team. But it breaks no confidences to say it is a generally optimistic document, and as a result of it may soon come CIDA support for some large-scale operations. One possibility scouted by the mission was a salvage operation on 40,000 hectares of forest in southern Mali which within a decade will be inundated by the waters of Selingue reservoir. A well-planned operation to make roads into this area, and to fell and carbonize the greater part of these forests over a five-year period, could provide Bamako with all the charcoal its people need for years ahead.

The fourth possible solution to the firewood crisis is to grow many hectares of new plantations in the Sahelian zone itself. Strangely enough, it is a very new idea. Nigerian foresters, who have been well organized for many years, have concentrated their work below a line to the south of Kano, in the so-called Soudan zone. Before 1967 there was little research done on forestry in the Sahel; such stations as there were usually were manned by a single, lonely forester who kept scanty records. In January



*Forestry nursery in Senegal: a scheme of reforestation designed as a model of integrated land use management.*



*Tiny acacia Senegal seedlings may provide hope for the future.*

1974, Gilles Lessard organized a meeting in Dakar of forest research scientists from six countries. It was the first time such a regional meeting had ever taken place.

That meeting of what was called a Savannah Forestry Working Group generated a lot of momentum and produced several proposals for action. Today the IDRC is supporting research projects in most of these countries along the lines set out in Dakar.

The participants were asked to assess what would be their priority projects on the basis of three criteria: financial rate of return, effect on the quality of the environment, and job creation. Their marks came down heavily in favor of research involving the establishment of shelterbelts, irrigated plantations and projects of soil restoration.

Their interest in irrigated plantations is based on the calculation that plantations of exotic species such as the Australian eucalyptus can produce 50 times the annual growth of the natural forest. One hectare could support the firewood needs of 25 townspeople, a heartening reversal of the figure quoted earlier.

But how can this be financially effective, if it costs governments \$700 for every hectare of plantation established? The only way is to make it worth the local villagers' while to do it on their own, in lots of small packages.

This is being tried in the Zinder district of south-central Niger. It is an area of fair farming land, and forest has been sacrificed to farming. A good deal of the wood still cut there is smuggled south into Nigeria for higher prices. But since 1974, after forestry officials sat down with village councils for long discussions, six villages have taken land out of farming to establish village woodlots that will provide firewood for the whole community. Within five years, it is hoped 70 villages will have such woodlots, which will save the women long walks for firewood. If these can be established in a mainly rural setting, they can also be tried inside a radius around larger cities and the villagers in that radius can earn an income providing wood for Niamey and other towns.

Desertification is not a uniform advance of the Sahara on all fronts. It is a blight occurring only in spots, like the barren area around large cities—or around waterholes where herdsmen and their livestock have destroyed the cover. In the "inner delta" of the Niger River, around Mopti and other fishing centres, the woodlands have been denuded for fuel with which to smoke the catches of fish.

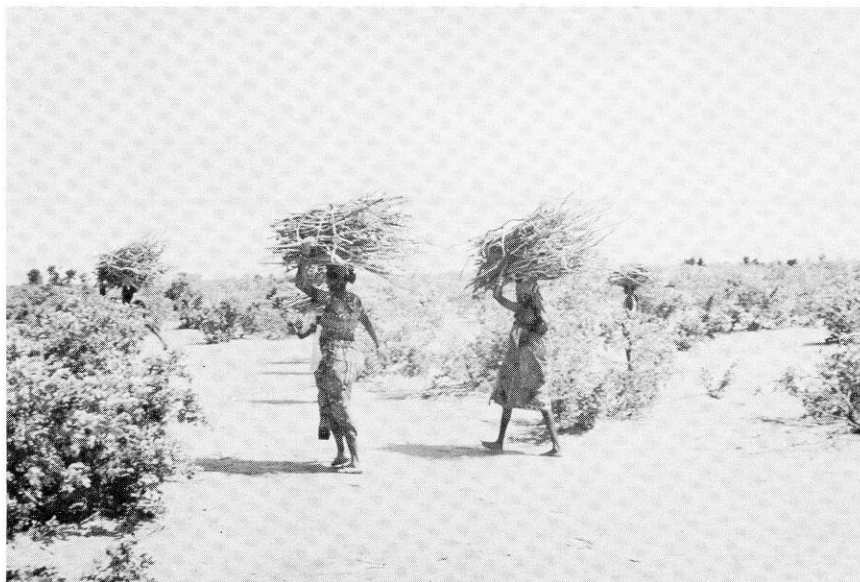


Photo: Gilles Lessard

The Mali Government is now experimenting to find the appropriate species for intensive plantation under irrigation near N'Doubougou in the inner delta area. They hope these plantations will provide not only wood for the use of the fishing communities but also a windbreak in the shelter of which vegetables can be grown.

At M'Bidi in northern Senegal the herds have grazed and stripped away the tree and ground cover around the well area. A scheme of reforestation, designed as a model of integrated land use management, is now under way on a 200-hectare site: not only wood for fuel, but land protected for vegetable gardens, and a better quality of gum arabic from the acacia trees. If the herdsmen can recognize such plantations as being a multiple source of income in these forms, they will be more likely to protect than destroy them.

Other research on how to establish shelterbelts, the best species to plant in various places and the best techniques to maintain them, is being carried out in northern Nigeria and in the Kerma Basin of northern Sudan.

This area of the northern Sudan used to be farming land when the Nile and its tributaries flooded into the depressions; but with the construction of dams the flooding ceased and sand blew over the furrows. Some species of eucalyptus (such as *Eucalyptus camadulensis*) have thrived in similar conditions in northwest Australia; so these and other species are being tested on a 100-hectare site north of Dongola, in hopes that within four years onions, peas and other vegetables can be grown in irrigated plots inside this shelter.

In Kenya the land suitable for agricultural crops is much smaller than all the films of lush countryside tend to suggest. In the last decade

thousands of hectares of land planted to forest in high rainfall areas during colonial days have been cleared for agriculture. Rather than try to fight the farmers on this issue, the forestry department is experimenting with species that may grow on marginal land near the coast and in western Kenya and provide the people with their woodfuel needs, while opening up more of the Rift Valley for farming.

These, and other research projects such as one concerned with improving the production of alfa grass in the semi-arid parts of Tunisia for harvesting for the pulp and paper industry, could be duplicated in other countries of Africa. The Sudan is as interested in improving the quality of gum arabic, used as a stabilizer in the manufacture of paints and pharmaceuticals, as in Senegal. What is important is that each country learns what is happening elsewhere, and benefits from the research.

It was a prime recommendation of the working group that met under IDRC auspices in Dakar in 1974 that a documentation and coordination centre for forestry research should be set up in the area. A regional group is now in the process of drawing up detailed plans. Such a centre will give momentum to the movement that has begun among scientists in Africa to solve their fuelwood and forest crisis.

But success depends on strong support coming from political leaders. This is where much uncertainty remains. Some leaders have learnt lessons from the seven-year drought; others, cattlemen by background, are mainly concerned to see the great herds reconstituted, regardless of the carrying capacity of the land and unconcerned about the needs of townspeople for fuel. Which view prevails is important for a large area of Africa.





Photo: Bob Stanley

## Senegal tackles land issues

Bob Stanley

At a first glance the two maps on the wall of the agricultural research station in rural Senegal appear identical. Each is a vivid patchwork of bright colours and bizarre shapes forming apparently random patterns. But a closer examination of the second map reveals a rather more orderly world than that depicted in the first, with fewer and more regular shapes, and less proliferation of colours.

In fact, the maps are a graphic illustration of the outcome of months of painstaking surveys and delicate negotiations. They show several villages and the surrounding farmland in a small area of the Siné Saloum region of Senegal: one of the more fertile farming areas in this former French African colony bordering on the drought-stricken Sahel.

Despite the vagaries of its climate, Senegal has a predominantly agricultural economy, and the government long ago established rural development as the main priority of its development plan. In 1968 the Institut sénégalais de recherches agricoles (ISRA), the national agricultural research institute, established two Experimental Units in the Siné Saloum region. These are villages and the surrounding farmlands where new agricultural techniques are introduced and tested under real conditions.

Researchers from the Centre national de la recherche agronomique (CNRA), the national agronomic research centre that is an agency of ISRA, have concentrated on farming techniques and the introduction of new crops or new varieties, together with improved storage methods, in the hope of stabilizing food supplies and increasing farmers' incomes.

Little in-depth work was done in the first years on questions of land tenure and usage. Yet, as the new techniques brought marked changes to the villages and the surrounding area, it became increasingly apparent that the complex questions of who owns what land, and how he uses it, had to be resolved. For the complicated tangle of land tenure issues – often resulting from several systems of land law being superimposed on customary or tribal law – was becoming more and more an obstacle to further progress, in spite of a national land policy enacted in the Loi du Domaine Nationale in 1964.

In 1973 the government of Senegal asked the IDRC to assist in an extensive in-depth study of land tenure problems in Senegal, based on the Experimental Units in the Siné Saloum. The objectives: to gain a clearer picture of the existing systems, from both the historical and the social perspective with a view to bringing about more rational and equitable land usage; to test new, simpler and less costly methods of surveying and identifying land titles; and finally to facilitate land regrouping favourable to the introduction of improved agricultural methods.

Madické Niang is a young Senegalese who joined the project team in August, immediately after graduating from Dakar University. He is something of a rarity in that he chose to work out here in the villages, rather than joining the majority of his peers among the comforts of Dakar. "This is where my heart is," he says. And he means it. Enthusiastically he jabs at the two maps, indicating the considerable progress that has already been made.

Farmer A was persuaded to cede a part of one of his fields to Farmer B, who in turn ceded part of another field to Farmer C, who in turn ceded part of another field to Farmer A. All three wind up with the same amount of land, but in parcels of a more manageable size and shape, and perhaps better suited to specific uses.

It all sounds very simple. A few adjustments here and there, and everyone is better off. But the ownership of land is a sensitive subject anywhere in the world, and Senegal is no exception. To allay the farmers' fears that they might somehow lose out, explains Jacques Faye, the senior Senegalese researcher on the project, strict criteria for the exchange of land have been drawn up. These govern such things as the minimum desirable size of field, types of soil, and location of fields (it is quite common for one farmer to have claim to a number of fields spread over an area of several miles).

In the course of reorganization many long standing disputes over land have been brought out into the open – and conflicts resolved. Jacques Faye says the farmers see this as one of the big advantages of the scheme: giving them "clean" titles to their land where before there was insecurity or conflict. In the process much has been learned about existing land tenure schemes, and Faye is confident that they will soon be able to make many recommendations to the government that will result in improvements in the national land policy legislation.

Driving through the countryside around the village of Thyse Kaymor, one of the Experimental Units, Madické Niang stops frequently to point out changes. Before reorganiza-

tion there were some 322 fields here with an average size of 2.7 hectares, covering a total area of 870 hectares. Now there are 248 fields with an average size of 3.2 hectares. The larger, more regular shaped fields are easier to work. Trees and other obstacles have been removed, and many more trees and hedgerows planted to mark new boundaries, roadways, trails and common grazing land. Efforts are being made, too, to prevent further soil erosion which is a serious problem during the rainy season. Crops new to the region, such as cotton and cassava, are being tried. All this has taken place in 18 months since the project began operating.

Another important aspect of the project is the work with rural councils. Although the land legislation of 1964 called for the creation of local government units, only recently have a few pilot rural councils come into existence. Now the project staff under Jacques Faye have begun a program of training the council members—usually elders, religious chiefs and landowners—who will eventually be expected to manage land questions in the area.

From the experience gained in settling land disputes they are able to advise the councillors on questions such as registry of titles and general management of the community. They are also providing training on such subjects as cooperative systems, preparation of budgets and land use management. In this way Faye hopes that



*Before and after: fewer fields, larger fields, and more regular shapes for easier working.*

the councillors will become qualified to help in finding solutions to the application of the national land policy.

What does it all mean in terms of production? J. F. Richard, a French researcher from the CNRA, points to a field where men are harvesting a good crop of millet. The yield from

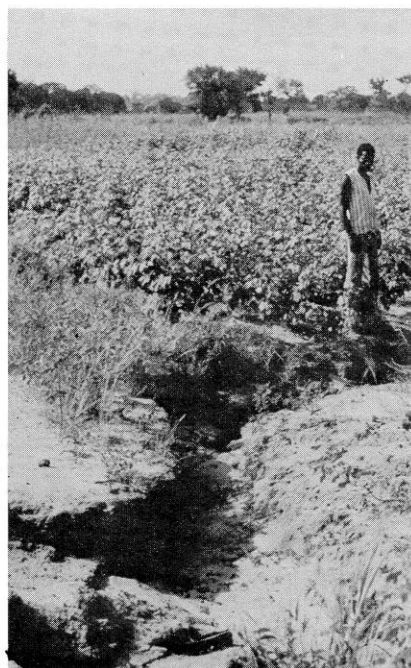
traditional crops such as millet, sorghum and groundnuts has been doubled, even tripled, he says. In addition they are able to introduce new crops. Corn, for example is yielding four tons per hectare. Ten years ago corn simply did not exist as a crop in Senegal. The improvement has also allowed the introduction of cash crops such as cotton, something new in a region where subsistence agriculture is the rule. But what really counts, says M Richard, is that at the end of the long dry season there will still be some grain in the storage bins.

What is happening here at the Experimental Units is unique. It is the first such land regrouping project attempted in Senegal, and as such it is attracting a great deal of interest, both from within Senegal—no less than five government ministers have visited the area since work began—and from other West African countries.

One of the institutions cooperating in the project is the Institut Fondamental d'Afrique Noire. IFAN draws its research staff from several countries, and through them the experience gained in the Siné Saloum could be spread to other West African countries which are facing similar problems.

*'IDRC Reports' editor Bob Stanley recently visited a number of projects in the West African region.*

*Land erosion during the rainy season is another problem.*



*Harvesting millet: improved fields combined with new agricultural methods can result in a doubling or even tripling of the crop.*



*Photos: Neill McKee*



## Focus on Africa



*No mass information campaign was used in the Mali program — the message was spread by word of mouth.*



*Photo: Neill McKee*

*Malian society has a long tradition of birth spacing, a factor that influenced the planners.*

## Mali's unique approach to family planning

Family planning is a sensitive issue anywhere in the world, but perhaps nowhere more so than in French-speaking West Africa, where all countries but one forbid by law the manufacture, sale or advertising of contraceptives.

The one country that has shaken off this hangover from the French colonial era is Mali. Recognizing the importance of social changes being brought about by such factors as increasing urbanization, educational and employment opportunities for women and a growing divorce rate, the Malian ministry of health in 1971 invited the IDRC to cooperate in a unique pilot family planning project.

The approach was to be strictly low-key, fitting within the framework of traditional values (Malian society has a long tradition of birth spacing) and with the emphasis on family planning for reasons of health and family welfare. The objective: to obtain data on traditional fertility control practices and the changes they are undergoing, with a view to the formulation of a national family planning program.

In 1972 a pilot clinic and four branch clinics were established in the capital, Bamako. In spite of the fact that there was no overt publicity for the program, the clinic received more than 2,000 clients in about 10,000 consultations during its first two years, representing about five percent of the child-bearing population of the city.

The study revealed that urbanization has weakened traditional birth spacing customs, often vital to the health of both mother and child. Some 68 percent of the



*Left: Bamako's clinics care for both mother and child. Above: the program's director Dr Faran Samaké with staff at the clinic.*

## the approach planning

clinic's clients expressed the desire to space their children, while only 22 percent wanted to stop having children.

Training was also an integral element of the project. Since the clinic opened eight doctors and 10 paramedics have been taking part in consultations every week. About 30 paramedics have been trained in this way, and in addition the data gathered has been widely used in lectures, seminars and even neighbourhood meetings on family planning.

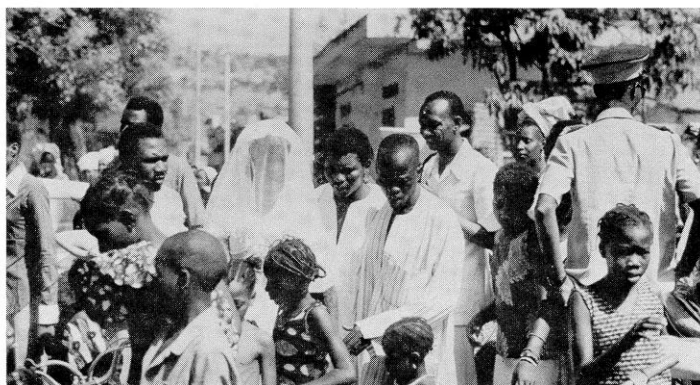
Now the ministry of health is moving to establish a further seven clinics (two more in Bamako and one in each of the country's regional capitals) making the program truly national. At the same time it announced the planned merger of maternal and child health services into a National Family Health Service.

Family planning in future will be one of the health services provided by the government—one element in a policy for improved health and social welfare. The program does not seek to create new needs for contraception, or to modify the aspirations of the population, there are too many other vital health needs.

By taking this uniquely non-demographic approach and avoiding any suggestion of using family planning as a means of population control, the Malians have demonstrated to their neighbours one solution to the family planning question. The Malian experiment has been closely followed by other governments, and its success is likely to have a considerable influence on policy for the entire region.



*The health of the child is a major concern — the infant mortality risk is doubled if a child must be weaned too soon.*



*Wedding Bamako style; women and families face new problems in a changing society.*



## Focus on Africa

# Global effort to combat tropical diseases

*Alexander Dorozynski, associate director, Publications Division, previews a major collaborative effort to eliminate crippling tropical diseases in Africa.*

At any time, up to a billion people may be suffering from one of the tropical diseases that represent a major obstacle to development. Three of the diseases – malaria, filariasis and schistosomiasis – affect 200-million or more each. In some tropical regions, people harbor several disease-producing parasites simultaneously, from childhood on to premature death. In many rural regions, it is taken for granted that children pass blood in their urine, that one in ten villagers is blind in the prime of life, that people are disfigured or crippled by leishmaniasis or leprosy, that epidemics of lethal diseases like measles or meningitis can strike at any time, and that every child in a community will suffer, at one time or another, the paroxysms of malaria fever.

Yet, since the Second World War, there has been an extraordinary explosion in biomedical sciences, that has revolutionized not only fundamental knowledge, but medical care in the industrial world. Huge investments in biomedical research have permitted the prevention of treatment of heretofore "incurable" diseases, such as certain types of cancer, Parkinson's disease, hypertension, poliomyelitis and many others.

But little of the knowledge, money or effort have trickled down to the poorer countries, where tropical diseases still close the door to a better and more productive life.

It is to help correct this situation that the IDRC is collaborating in a major effort undertaken by the World Health Organization (WHO), an intensive program to go on for at least 10 years, and to involve top researchers and a network of collaborating laboratories. Dr Halfdan Mahler, WHO director-general, describes the campaign as "a new adventure which sets itself completely within the context of the new economic order, or, as I prefer to say, the new development order."

Key requirement to get the campaign started is money. One of the reasons why the advances achieved in biomedical sciences have hardly been applied to the problem of tropical diseases is that the total research budget for all tropical infectious diseases has been pitifully low: the global investment is estimated at about \$30 million a year, about one-tenth of the annual cancer research budget of one single country (the US). Contributions will be sought from international agencies and developed countries, but also from the developing countries where the bulk of the research is to be carried out.

The initial approach involves an effort directed at six of the major tropical diseases: malaria, schistosomiasis, filariasis (including onchocerciasis, or river blindness), trypanosomiasis (sleeping sickness and Chagas' disease) and the different forms of leishmaniasis. These constitute the crux of the problem, and it is believed that the number of tropical diseases is too great to propose a single plan to encompass all of them from the start. Spin-off from intensive research on the major diseases, however, will undoubtedly advance knowledge in others. For example, the development of a vaccine against leprosy could lead to a method of developing other vaccines, and the study of the interaction between one parasite and human cells, to better drugs against all parasitic diseases. Malnutrition, a factor related to all tropical diseases, will be included in the program.

Two interlocking systems are proposed to tackle the problem:

- Task forces: these would be groups of top-notch scientists to be chosen for their qualifications to pursue this goal-oriented research. For the past two years, such a task force has been working as a pilot operation concentrating on the development of a diagnostic skin test and a vaccine for leprosy.
- Networks of collaborating laboratories. One of the problems in the past has been poor or non-existent coordination between various research and clinical centres. The network is to take advantage of existing organizations, establishing communications between them, and boosting staff when it is insufficient. A framework already exists: the East African Medical Research Council, with seven laboratories in Kenya, Tanzania, and Uganda; the Nigerian Medical Research Council; the Ndola Research Centre in Zambia and others, including the 25 university medical schools in tropical Africa and the European-supported research laboratories and organizations.

A major goal is the training of African scientists, but it is recognized that, for the time being, the necessary knowledge and skill is chiefly to be found in the industrial world, and that their involvement is crucial.

With initial financing of about \$2 million, to which the IDRC has contributed, the campaign is now being organized. Africa, the continent most affected by a majority of these diseases, will be the focus of the initial effort, but laboratories elsewhere will also play a role in a program that is not a continental but a global one. The next step will be to ensure continued financing as of next year.