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Report of the  
United States  
Presidential  
Agricultural  
Task Force  
to Zaire



February, 1985

Agency for International  
Development  
Washington, D.C. 20523

## Transmittal Letter

Dear Mr. President:

The Presidential Task Force to Zaire is pleased to submit to you this report which presents the findings and recommendations of the team.

Your charge to this Task Force was to develop an analysis of the constraints to Agricultural Development in Zaire, and to make concrete and specific recommendations to contribute to their resolution.

During the Cancun, Mexico meetings in 1981, and on the occasion of President Mobutu's visit to the United States in 1983, you emphasized the existing friendship between our two countries and the importance to the United States of a strong Zaire. In order to become and remain strong, a nation must continuously improve its social, economic and political institutions to provide to all its citizens a higher quality of life. The Presidential Task Force addressed the question of achieving these goals in Zaire. We appreciate the confidence you placed in us to undertake this task in your name.

We would like to stress the three main impressions of the team. First, as you know, the changes which the Government of Zaire initiated in 1983 towards creating a free market economy have begun to show positive results. Thus the timing for this exercise was excellent. Second, the Task Force was impressed with the great potential of the country on all fronts. Finally, the Task Force wishes to express its optimism in that potential despite a large number of problems confronted by Zaire in general, and by the agricultural sector in particular. We believe that these difficulties can be resolved, although it will take some time.

Two factors are most critical in determining the time frame in which measurable improvements can occur. The first factor is the resolve of the leadership of both the public and private sectors in Zaire to implement our recommendations and to continue to implement their own new economic policies.

In short, the leadership in Zaire must have the courage to make difficult decisions and accept the consequences of their actions. The next critical factor determining the development of Zaire in the coming decades is the resolve of the leadership in bilateral and multilateral donor organizations to increase their involvement in Zaire with particular emphasis on the agricultural sector and the needs of its infrastructure. The role of the United States will be critical.

The Task Force membership proved to be an excellent mixture of businessmen, academicians, scientists, and other professionals from non-government organizations. The team developed enormous synergy and enthusiasm, both among the members of the Task Force and among the groups and individuals they met in Zaire.

In conclusion, Mr. President, we are deeply grateful for the opportunity afforded us to serve both our country and the Government of an ally. Like you, we believe that the best path to social and economic development is one in which government protects the weak, ensures the development of basic infrastructure, provides for order and defense, but also allows the interplay of free market forces in rewarding individual incentives and initiatives.

Sincerely,

Benjamin F. Payton, Ph.D.  
President, Tuskegee Institute  
and  
Task Force Leader

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U.S. Presidential Agricultural  
Mission to Zaire  
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## Executive Summary

At the request of President Mobutu Sese Sekou, President Ronald Reagan appointed a U.S. Presidential Agricultural Task Force to help the people and the Government of Zaire (GOZ) clarify the policies, procedures, and resources needed to strengthen the agricultural sector in Zaire.

The Task Force visited this beautiful country from January 28 to February 9, 1985, in an effort to identify methods of increasing Zaire's agricultural production, to further its capacity for agricultural education, research and extension and to encourage creation of agricultural enterprises that generate employment. To sharpen the focus of this report the Task Force concentrated on aspects of the agricultural sector with greatest potential and on problems whose solutions are critical to the country's agricultural and economic development. The Task Force examined problems affecting several regions of Zaire and concentrated on issues for which the United States possesses expertise and complementary development assistance activities and which both governments have deemed important.

The potential for agriculture, forestry, and livestock in Zaire greatly impressed the Team. As a result of the visit, the Team came to share President Mobutu's belief that Zaire's rich natural resources make it potentially the "Breadbasket of Africa."

The Task Force also agrees with the "Agriculture Balance Sheet" President Mobutu spelled out in his Inaugural Address of December 5, 1984, which courageously stressed that:

- Food production falls short of people's needs;
- Export crops from aging plantations are reduced;
- Animal production, particularly of cattle, could be improved substantially;

- Development of rural areas is to be intensified;

- The Public Treasurer's financing for agriculture remains weak. The total budget does not meet needs, and allocations and disbursements get delayed.

The Task Force also applauds his statement that "Starting with my present term, agriculture must gain its priority position."

The Task Force's findings are consistent with President Mobutu's concerns. Zaire's agricultural sector reflects many years of neglect compared to other parts of the economy. The Task Force recognizes there are serious problems confronting Zaire's Government as it attempts to develop agriculture to meet its potential for the benefit of Zaire and all its people.

President Mobutu has assembled a fine team of competent professionals who understand the fundamental role agriculture plays in the country's economic development. The Task Force is encouraged by the GOZ's belief that agriculture will develop faster and with more resilience if private enterprise and market forces play a greater role. The economic policy changes that have been recently implemented or proposed will significantly enhance agricultural development. The steps taken toward instituting a free-market rate of exchange, limiting the growth of the public sector, holding down inflation, and improving the fiscal balance—all will inspire confidence in business and will reassure prospective investors.

It will take time to reduce the omnipresence of government in the agricultural sector. The challenge facing Zaire is to take agriculture from where it is now to where the President and the GOZ clearly want it to be. Members of the Task Force hope this report will be useful in achieving these goals.

## Conclusions and Recommendations

The U.S. Presidential Agricultural Task Force to Zaire addressed several aspects of agricultural development, including agricultural policy; finance; agricultural research, extension, and higher education; human resources development; production and input supply; forestry; livestock; and private investment. This summary highlights conclusions of the Task Force and recommendations regarding these topics. These issues are discussed in greater detail within the report.

### AGRICULTURAL POLICY AND FINANCE

#### Agricultural Policy

The Task Force compliments President Mobutu and his administration's emphasis on liberalizing the economy and attaching special importance to agriculture. Their efforts to establish free market exchange rates, to contain public sector expenditures, to reduce inflation, and to implement sound fiscal measures have reintroduced confidence in Zairian business.

The reduction of bureaucratic processes involved in importing or exporting products, acquiring credit, and establishing new businesses will reinforce the legislative measures undertaken to date for attracting new foreign investment and encouraging the productive use of the earnings retained by existing businesses.

Although Zaire's economic system has made tremendous strides in the past year and a half, private sector investment continues to face three major constraints. First, investors lack confidence in the Zairian economy as a result of years of mismanagement, the inconsistent implementation of recent

reforms, a history of constantly changing business regulation, and the perception that corruption remains in many areas.

Second, the poor state of the infrastructure, particularly transportation, discourages private investment in agriculture. Farmers have little incentive to expand production when they do not have access to markets, and agro-industries incur high costs due to shipping delays.

Third, inadequate levels of credit for the agricultural sector, combined with large public deficits and the weakness of savings institutions, have constrained private investment in agriculture.

Zaire also lacks a framework of integrated, government-wide policies regarding agriculture. Consequently, the actions of individual ministers sometimes contradict policies set by other ministers, which hinders the move toward free markets.

#### Recommendations

1. Increase agriculture's share of the Government of Zaire's ordinary budget from the current level, which is less than one percent, to three or four percent. Release funds more promptly in accordance with priorities specified in the 1986-1990 plan.

2. Make infrastructure development part of large-scale private investment in agriculture. Establish linkages between investment incentives, such as tax holidays, and investors' contributions to developing the infrastructure, such as building roads, operating barges, or improving wharves.

3. Eliminate transport surcharges on agricultural products carried by SNCZ, and balance the rates charged for mineral and agricultural products.

4. Consider establishing a Zairian-American Chamber of Commerce, possibly under the auspices of ANEZA or a similar organization, to promote

foreign investment and business opportunities in Zaire.

5. Emphasize direct public assistance to the traditional small farm sector for producing food crops and livestock, and emphasize private investment for developing non-food crops and larger, more modern enterprises.

6. Continue privatizing parastatals and employing private management of development projects.

### **Financial Support for Agriculture**

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Government expenditures have been declining steadily in Zaire for ten years, and new agreements with the International Monetary Fund (IMF) state that they will not increase. With a greatly reduced role the government will have even fewer resources to meet basic agricultural responsibilities.

The sources of funding for agriculture programs in Zaire are its national budget including counterpart funds, the Fonds de Convention, regional and local resources, and public sector credit institutions.

The national budget consists of current and investment budgets supplemented by counterpart funds obtained through donor-funded programs that generate local currencies. The current and investment budgets have declined steadily in recent years and will continue to be limited by the IMF agreement. Furthermore, over 50 percent of the current budget is allocated to debt servicing. Although some improvement is possible, even within these constraints, the Government of Zaire will continue to experience serious revenue shortages for its agricultural programs and for infrastructure rehabilitation and maintenance.

The situation with respect to the investment budget is even worse. There are virtually no local resources available for capital expenditures. This

also applies to the key public sector parastatals. Most major public sector investments needed for transport, electricity, telecommunications, and institution building will have to be funded externally, although contributions to infrastructure development could be made as part of production projects.

Counterpart funds, which are jointly allocated by donors and the Government of Zaire, are a major source of funding for the local costs of certain agriculture programs. The system should continue to work well as long as counterpart funds are not used to finance recurring costs that otherwise would be funded from the current budget.

The largest source of funds for agriculture programs is the Convention Funds [*Fonds de Convention*, FDC], which is financed by a tax on industrial enterprises. The FDC sets the rate subjectively based on its assessment of each company's ability to pay. This unfairly penalizes the more efficient and profitable enterprises within a given industry.

The FDC's most serious shortcoming occurs in the way it allocates funds. Because the FDC has no stated priorities for allocation and no standard criteria for evaluating project proposals, many contributors do not know how their money will be used or what constitutes an acceptable project. At the same time, FDC guidelines are very restrictive, excluding grant financing for many activities that address key constraints to increased agricultural production.

The FDC also fails to make the most of its resources. The interest rates it charges are ridiculously low, given Zaire's inflation rate. And the FDC deposits its funds in the *Banque de Credit Agricole* (BCA), where no interest is earned.

Although possibilities are extremely limited for increasing financing for agricultural development, much can be

done to increase local and regional financing. Infrastructure and supporting services can and should be linked to increased economic activity in rural areas. Whenever there is an increase in agricultural production, resources should be generated to pay for corresponding increases in infrastructure and services.

### Recommendations

1. Increase the availability of FDC funds for loans and grants for food crop production, especially to small farmers. FDC funds should not be used to finance recurrent costs of any programs in the public sector.

2. Insure that government services with direct benefits to recipients be paid for at full cost by the beneficiaries.

3. Earmark revenues generated at regional and local levels for maintaining physical infrastructure, especially roads, necessary for sustaining economic growth.

4. Increase the resources allocated for developing infrastructure, with special emphasis on land and water transportation. Obtain increases in the flow of funds from bilateral and multilateral donors as well as the private and public sectors in Zaire, and increase the budget of the *Office des Routes*.

5. Ask foreign donors to give top priority to financing investments in infrastructure if revenue is available to maintain the expanded infrastructure.

6. Establish a ceiling on the proportion of the current budget allocated to salaries. Because salaries of agricultural personnel must be increased, seriously consider reducing the number of personnel to remain within the budgetary limits. Continue programs to improve the skills of public sector employees.

### AGRICULTURAL RESEARCH, EXTENSION, AND HIGHER EDUCATION

The Task Force found serious deficiencies in the agricultural research, extension, and higher education systems in Zaire. Once considered one of the best in the tropical world for export crops, Zaire's agricultural research system now has a critical shortage of trained scientific staff and support personnel to address problems of either food or export crops. The country's facilities for research and education have deteriorated badly, and funding and logistical support for these activities are seriously inadequate.

Lack of coordination also appears to be a significant problem. Government, private voluntary organizations, and industry share responsibility for the agricultural extension service.

Authority for conducting research is divided among several government departments, none of which is adequately staffed or financed to carry out its responsibilities. The *Institute National pour l'Etude et la Recherche Agronomique* (INERA), headquartered at Yangambi, has largely abandoned its research programs. Although the Government of Zaire and numerous bilateral and multilateral cooperation agencies have encouraged the development of Yangambi as a site for major scientific agricultural research, various constraints have led to minimal coordination and support for this center. The Government has been unable to meet the material needs of the scientific community, morale is low and donor assistance has declined. Little research is taking place in Yangambi at the Institute of the Faculty of Agriculture (IFA)—the sole university-level agricultural program and faculty in Zaire.

Higher education in general seems to be in a deplorable condition. Buildings

need extensive repair and renovation and salaries and morale of the faculties are low. There appears to be no plan for developing the universities.

The Zaire Department of Agriculture's\* national research programs on principal food crops have achieved some successes, notably in the breeding of certain commodities for high-yield, and disease-resistance. Some of these programs have received technical assistance and financial support from the U.S. Agency for International Development (USAID), and counterpart funds on a limited basis. The major limiting factors, however, seem to be inadequate budgets and weak institutional structures. It is difficult to recruit and retain qualified technical personnel because of inadequate salaries. Without a coordinated framework for agricultural research, extension, and education, Zaire has no way to institutionalize an applied research system responsive to the country's needs. There is no suitable mechanism for establishing national research priorities, for allocating resources, or for evaluating and altering programs. Separate technical, administrative, and financial management makes coordination and control of research programs difficult and results in wasted effort and resources.

### Recommendations:

1. Restructure all agricultural research programs within the next three years, as suggested by the preliminary joint report of International Services for National Agricultural Research (ISNAR) and the GOZ. Develop mechanisms for assuring communication among government departments and for linking agricultural research to extension services and educational institutions.

\*Throughout this Report the Department of Agriculture and Rural Development of Zaire, *Department de l'Agriculture et du Developpement Rural*, is referred to as the Department of Agriculture.

2. Strengthen, extend, and integrate Zaire's national food crop programs under the auspices of a National Agricultural Research Administration linked to the Department of Agriculture.

3. Reorganize agricultural extension under a new Agricultural, Livestock, and Forestry Technical Outreach Service linked to the Department of Agriculture and responsible for coordinating the extension activities of national food crop programs, voluntary organizations, and the private sector.

4. Dissolve INERA and create a streamlined national agricultural research program based on existing national commodity programs. Otherwise carry out a thorough reorganization, reducing the number of former INERA stations and restricting their production activities to those necessary for the research and extension functions under the proposed new National Agricultural Research Administration and the Agricultural and Forestry Technical Outreach Service.

5. Develop agricultural faculties at the three major universities of Kinshasa, Lubumbashi, and Kisangani. The faculties of IFA and the School of Veterinary Medicine should form the nucleus of a strong faculty of agriculture at Lubumbashi as a top priority.

### HUMAN RESOURCE DEVELOPMENT

Zaire learned a painful lesson when it attempted to replace expatriates too rapidly with Zairian nationals, most of whom were not yet prepared to assume high levels of responsibility. To overcome this problem, the country has had to increase its attention to post-secondary education as a means for building human resources. Nowhere is this more apparent than in the agricultural sector.

Zaire now trains agricultural personnel at the secondary, technical, and university levels. All three are in need of long-term investment.

The Department of Agriculture, which directs funds for training projects, continues to address problems in ways that waste both human and financial resources. The problems include: inadequately defined priorities and unclear definitions of professional responsibilities; overlapping activities; inadequate coordination within the department and between this and other departments; a knowledgeable but inexperienced mid-level staff requiring professional support; an organization whose size and complexity are not warranted by available resources; and resources that are inadequate to support the program's goals.

When the Institute of the Faculty of Agriculture (IFA) moved to Yangambi it gained access to important resources, including the unique ecology of the equatorial forest and its potentially important genetic material; adequate rainfall and relatively constant temperatures; well built and numerous residential, academic, research, and administrative buildings; agricultural resources; a small but well trained professional staff; a select student body; and a beautiful rural setting perfect for academic achievement and hands-on experience. But the constraints seem to outweigh the advantages. There is no electricity, running water, or refrigeration. Laboratory equipment lacks gas, and books, journals and field equipment are in short supply, making professional development difficult. Low pay and the absence of transportation magnify the stresses for professional families. The paradox exemplifies the challenge facing Zaire as it seeks to develop its human resources.

At the lower levels of training, lack of professional standards for teacher certification, instructional programs, and student performance are especially

glaring. Long-term attention is required to correct this serious problem.

### Recommendations

1. Seek opportunities for Zairian educators to observe public and private agricultural institutions in other developing countries.

2. Evaluate the secondary school system in Zaire with a view toward improving the system over a 20-year period. The evaluation should focus on accreditation criteria, teacher preparation, teaching methods, curricula, and lesson plans. Conduct a similar exercise for the technical schools of agriculture, forestry, and livestock.

3. Consider establishing financially profitable teaching farms, which would teach technical school graduates basic farm management skills, including financial management.

4. Improve curricula in ecology, forestry, livestock, agricultural engineering, management, and extension education.

5. Because women play an important role in producing food in Zaire, government departments should be directed to cooperate more actively with the Ministry of Women's Concerns and Social Affairs to increase the education and participation of women as agricultural producers and professionals.

6. Establish appropriate linkages with U.S. institutions of higher education that have a history of professional collaboration and a capacity to assist.

### **AGRICULTURAL PRODUCTION AND INPUT SUPPLY**

Zaire has tremendous need for improved seed to increase its supply of food and fiber and the value of improved seed is recognized in many parts of the country. Research and extension programs have shown that producers of all types react rationally to

the availability of improved seed and other inputs, including a willingness to pay for them.

Several factors limit the use of improved seed: demand now outstrips supply; production is too localized and distribution too limited; quality control is lacking; and seed prices, which are heavily subsidized, do not reflect the true value of the seed.

Fertilizers are not widely used in Zaire, but their benefits have been clearly demonstrated in donor-funded projects and there is strong demand for fertilizer.

All synthetic fertilizers presently used in Zaire are imported. A previous feasibility study ruled out establishment of a fertilizer production plant on economic grounds. A factor in that case was that production would far outstrip demand, and no ready export market could be identified. Inability to transport fertilizers effectively throughout the country was also a factor.

Given the enormous hydroelectric potential of Zaire, technology should be sought to produce fertilizers domestically using this energy resource. As long as infrastructure remains a major constraint to the transport and distribution of fertilizers, regional production of fertilizer is recommended by using smaller-scale production technology near consumer areas.

### **Recommendations**

1. Provide specific training and experience in all aspects of seed production, including agronomy, field techniques, labor organization, harvesting and conditioning processes. It is particularly important to teach workers how to maintain the purity of each variety.

2. Improve harvesting, conditioning, and storage facilities.

3. Seek private companies and PVOs which have the expertise, resources, and interest to produce seed for resale to farmers.

4. Establish a national seed policy and set minimum quality control standards for the industry.

5. Seek technology to produce fertilizers in Zaire.

6. Produce fertilizer on a small scale and distribute it regionally.

7. Review high technology inputs for use in Zaire. Emphasize practical applications, which can be introduced at the field technician level, so that prompt improvements can be achieved.

8. Develop and promote a small farmer credit system to ensure the ability to purchase necessary inputs.

9. Price seeds to include real costs and profit.

### **FORESTRY**

Zaire has significant forestry resources, including 65 to 80 million hectares of exploitable forests. The country has the beginnings of a good species identification and forest inventory system. The Government of Zaire is interested in developing forestry, and markets for the wood that exists. There are qualified, dedicated forestry personnel as well as existing companies with many years of experience in Zairian forests.

At the same time, there are stumbling blocks to forestry development. The weak or non-existent transportation systems make it difficult to haul the wood to market. The per-hectare volume of currently marketable timber is very low compared to areas like Southeast Asia. Zaire's lumber mills critically need capital for improvements. There is a significant gap between the expectations of the government and the ability or willingness of industry to meet these expectations. Slash and burn

agriculturalists are destroying forests and wildlife habitats, but little is being done to counter these activities or to reforest denuded and eroded land. Supplies, tools, and spare parts for forestry equipment are difficult to import. Furthermore, the fact that forestry is separated from the agricultural sector, rather than integrated as a subsector, diminishes its potential contribution to the Zairian economy.

### **Recommendations**

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1. Address quickly and decisively the problems caused by slash and burn agriculture. The Ministries of Agriculture and Environment, Conservation, and Tourism must work closely together to accomplish this and should consider a national watershed management program as a part of the restoration of forestlands.

2. Continue to improve the climate for private investment in forestry by streamlining the taxing procedure; creating incentives for developing markets for lesser species that, as in Brazil, encourage industry to invest in forestry; providing longer-term leases on forest land; and reducing disagreements by engaging in dialogue with forest industry officials before taking governmental action.

3. Seek additional donor country support for practical research and education in forestry, with an emphasis on reducing shifting agriculture in forested areas and establishing reforestation of land already denuded and eroded. In time, Zaire's universities will have to provide education in forestry and forest engineering.

### **LIVESTOCK**

Although cattle dominate the livestock industry in Zaire, and a World Bank study suggests that the country

could support 30 million head, only 1.2 million exist there today. Meat is in critically short supply. Market potential is great. The process for improving livestock production, however, is inextricably linked to improving the total agricultural enterprise. This process includes conserving and protecting the land, vegetation, and water resources; and improving grazing and cropping systems. Therefore, a national livestock development strategy needs to be articulated, taking into consideration Zaire's development objectives, technical capabilities, institutional structure, and available economic resources.

The principal constraints to livestock production in Zaire are feed supply, management, genotype improvement, control of disease and pests, and marketing. Important contributing factors include credit availability, human resources, and sociocultural practices.

### **Recommendations**

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1. Create a comprehensive strategy for developing livestock within the context of a plan for agricultural/economic development. The plan should address the issues of markets, transportation, credit, land-tenure, human resources, government policies, sociocultural values, institutional strengthening, animal nutrition, and breeding strategies.

2. Consider applying state-of-the-art technology for improving cattle by such means as embryo transplants, controlling tsetse flies, and developing disease-resistant strains of livestock.

3. Increase efforts to improve pasture management and livestock genotypes.

4. Undertake a comprehensive study of the potential contribution of poultry, small ruminants, and swine operations to the protein requirements of the Zairian population.

5. Emphasize protection of the environment. Extend invitations to the World Wildlife Federation, the International Union for the Conservation of

Nature and Natural Resources, and the SWIDEL Foundations to assist in appropriate conservation planning and wildlife management.

## Introduction

Zaire is often called "the heart" of Africa because of its strategic location and immense size, being the third largest country on the continent. Its central location and its rapidly increasing population of more than 30 million people, combined with substantial natural resources in copper, gold, cobalt, diamonds, forestry, arable land, and one of the world's largest rivers—mark Zaire as a country of unusual historical interest and current geopolitical concern.

The area became known to western Europe in 1482 when the Portuguese navigator, Diogo Cao, arrived at the mouth of what was designated as the Congo River after the great Bakongo Kingdom which the early seafarers found then in existence. This complex and organized society included parts of present day Congo, Cabinda, Zaire and Angola.

Following Henry Stanley's exploration of the area in the last half of the 19th century on behalf of King Leopold II of Belgium, King Leopold claimed the area as his personal possession. At the Berlin Conference of 1885, when the European powers partitioned Africa, Leopold's claim was recognized. "The Congo Free State" became his personal possession while, at the same time, being identified as a sovereign state. However, in reality, "The Congo Free State" was almost entirely an economic rather than a political entity and had no institutional links to Belgium. International criticism mounted in the wake of revelations of the harshness of executive exploitation of the area, and the Government of Belgium, with considerable external prodding, took the region over in 1908 as one of its colonies and renamed it The Belgian Congo.

Following its transformation into a colony under the administration of

Belgium, considerable success was achieved by the Belgians in providing opportunities for Africans in the fields of health and urban planning. But, at the same time, the Belgians denied opportunities for important civil rights.

Zaire's current agricultural and economic situation has been influenced considerably by its colonial heritage of, first, being treated as the personal preserve of a European monarch and, secondly, as a consequence of the benign paternalism expressed by the Belgian colonial administration. In both instances, opportunities for political and economic development were significantly more limited than were those of earlier European colonies whose colonial policies had been influenced—at least to some degree—by 18th Century theories of human rights.

Perhaps in no other African colony were local needs for education, food crops, African political expression, and broad infrastructure to serve African needs given such little attention, or was political independence granted so reluctantly. Consequently, when independence came in 1960, few Congo Africans were college graduates. Colonial policy thwarted their aspirations for higher education and limited their education to training for low level administrative and clerical positions. Some assert that Africans in the Belgian Congo were less prepared for the independence they were granted in 1960 than was any other African colony.

The nation's first five years of independence were characterized by political unrest and civil war. This ended after Lt. Gen. Mobutu, commander in chief of the national army, assumed power in 1965. He has since been elected president three times for successive 7-year terms and has brought a welcome end to the fighting and political upheaval. This tranquility was disturbed in 1977 and again in 1978, however, by Angolan-based rebel invasions of Shaba Province.

Zaire's political system since independence has moved from a federal structure, which gave considerable power to the provinces, to a unitary system with a strong central government. As the result of the 1974 constitutional changes, the President of the one-party government, the Popular Movement of the Revolution (MPR), is automatically President of Zaire.

A key challenge faced by independent Zaire was the development of a sense of national identity among the 250 or more ethnic groups. Although precise statistics do not exist, knowledgeable observers estimate that no single group exceeds 10% of the total population. The largest group, the Kongo, may include as many as 2.5 million persons, followed by the Luba, Lunda, Bashi, and Mongo. The official language is French, introduced by the Belgians. But Lingala, Swahili, Kikongo, Tshiluba and numerous other tribal languages are also spoken in varying degrees.

It is estimated that three-quarters of the Zairian population are Christians. Approximately three-quarters of these are Roman Catholic and most of the remainder are orthodox Protestants. Both Catholics and Protestants are being challenged by a rapidly growing group of evangelical and syncretic sects. In addition, traditional African religions remain strong.

As part of his effort to forge a sense of national identity from this multitude of ethnic groups, languages and religions, President Mobutu drew upon the African heritage to de-Europeanize the country, beginning with the 1971 name change from the Congo to "Zaire" (meaning river in the Kikongo language). African modes of dress have been strongly encouraged and towns and cities have been redesignated: Leopoldville to Kinshasa; Stanleyville to Kisangani; and Elizabethville to Lubumbashi. Individuals were required to replace their foreign names with

African ones, and all public ceremonies make references to African ancestors. A new flag and a new national anthem were also adopted.

Zairianization had many positive effects as a cultural and political phenomenon, but lacked success in the economic arena. In November, 1973, the Government moved too rapidly to place all business and commerce exclusively in the hands of Zairians and to nationalize all large firms. These actions nearly wrecked the national economy. As skilled technical and managerial expatriates departed, they left a major professional void in the private and public sector. Fortunately, President Mobutu responded quickly and rescinded economic Zairianization in 1976. With the help of the International Monetary Fund (IMF) a promising, progressive economic stabilization program was launched in early 1983. Economic liberalization and serious efforts at policy reform are now underway to support a free market economy. These changes have positive implications for development of agriculture, Zaire's major industry. Approximately 70% of the people live in rural villages, and although most of this population cultivate small plots with traditional methods, Zaire's agricultural potential is immense. The Task Force believes Zaire's leaders and its people are ready for the assistance that can cause that potential to be realized.

Development of agriculture is of fundamental importance to the future of Zaire. At a minimum, food supplies will need to increase 60 percent in the next 15 years to meet the needs of a rapidly growing population. Improving the nutritional standards of the population will require an even greater effort.

Development of the agriculture sector is essential not only for providing minimal human requirements for food, but also for increased employment, incomes, and savings, and improving the standard of living of the entire population. Without sustained agricultural

growth, dependency on imported food will grow at an accelerating rate. This will require ever-increasing use of foreign exchange which is needed for development of all sectors of the economy. As President Mobutu has stated, the development of agriculture must be the "priority among priorities" in the immediate future of Zaire.

The requirements for agricultural development are numerous and complex. The first of these requirements appears to have been met in the recognition of the magnitude and potential severity of the long-term "food problem". The second requirement, commitment to accelerated agricultural development, has been made by President Mobutu himself.

What remains to be done is transforming these commitments and goals of development to appropriate policies, priorities, and actions within a realistic framework of the physical, economic and social resources available to the country.

Recent reforms and policy changes to stimulate development, particularly those to encourage and support the role of the private sector, are to be commended. However, these reforms and policy changes merely set the stage for accelerated development. Achieving economic development will require constancy of effort and collaboration between the public and private sectors over many years to come.

## PART I

# Agricultural Policy and Finance, A New Stress for the Private Sector

## Stimulating Private Investment

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The Zairian Government has taken several important actions, beginning in 1983, to improve the climate for private investment for agriculture development. These include the freeing of foreign exchange controls, full implementation of the national investment code to permit repatriation of profits and elimination of quantitative restrictions on imports of most products. The partial decontrol of agricultural prices, the move toward privatization of parastatals, and privatization of the management of government-supported development projects have further contributed to a climate more conducive to private investment. We commend these changes in policy and urge their continuation. But more can be done to stimulate domestic and foreign private investment.

Lack of investor confidence that the current economic reforms will be maintained in the future is a major obstacle to renewed private investment. This results from the inconsistent implementation of some of these reforms and the general history of constantly regulating changes in Zaire, which have made potential investors reluctant to commit additional resources in Zaire. Because of the history of investment problems in Zaire, investor confidence will be slow to recover, despite appropriate policy changes. One factor that contributed to negative attitudes toward investment has been the lack of consultation by government officials with existing private investors before making policy changes.

Although the recent economic reform policies are aimed at assuring the long-term economic viability of Zaire, the

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short-term disruptions caused by these policies have sapped investment demand by reducing consumers' purchasing power from the artificial levels created by overborrowing during the previous decade. This dislocation will temporarily keep capacity utilization rates in domestic industries below the levels needed to spur new investment until further along in the economic recovery cycle. Expectations of faster economic growth in the year ahead should allow many businesses to recover from the liquidity problems brought on by the devaluation of the Zairian currency in 1983. However several factors add to the lack of investor confidence: a history of financial mismanagement, the perception that official corruption persists, previous difficulties in obtaining payments for goods and services provided, and the continued need in many areas to provide free and low-cost goods and services to local officials in order to expedite government services.

The inadequate infrastructure of Zaire is a major constraint to private investment and nearly every other aspect of agricultural development. Farmers have little incentive to produce more than subsistence levels when poor roads substantially raise the cost of moving excess produce to markets. Agro-industries face long delays, both in acquiring agricultural products for processing and in shipping to distant markets, due to the lack of maintenance of existing roads and rail transport. Agro-industries in eastern Zaire note that export shipments or import of raw materials and spare parts often take 3 to 6 months to go from their facilities to ocean ports or vice-versa. These delays put Zairian agro-industries at a significant disadvantage in export markets and in competing with imports, as working capital and finance requirements are substantially higher than in other countries. In many instances agro-industries have to provide their own infrastructure, which

adds significantly to initial investment costs and operating expenses.

The poor state of rural electrification and communications forces agro-industries to locate in major urban areas, which often increases investment and transportation costs while limiting employment opportunities elsewhere. The lack of storage facilities in rural areas also limits the potential for agricultural expansion by increasing the seasonality of shipping and processing and reducing the overall prices received by small farmers. Agro-industries dependent on perishable food products, such as meat, fish, or vegetables, are significantly hampered by transport delays and the lack of adequate cold storage facilities.

Another major obstacle to private agricultural investment in Zaire is the difficulty in obtaining credit. Although progress has been made, large public sector deficits remain a problem and have limited the credit available to the private sector. Non-inflationary growth requires overall control of the supply of credit, as laid out by the International Monetary Fund, but high public sector demand for credit is severely limiting private sector credit availability.

Weak institutions for encouraging savings mobilization among the rural populace and for serving small-scale credit needs have limited the credit available for food production activities in rural areas. In fact, virtually all special lending for agriculture outside of the credit ceilings imposed by the Bank of Zaire has been made for marketing purposes to food processors rather than to small producers. Given the current farming structure in Zaire, marketing credit is essential to expand food availability in the near term. However, long-term food production expansion will require increased credit for purchased inputs by producers to improve agricultural productivity.

Overall credit markets also have

allocated credit for private investment due to sectoral credit ceilings, negative real interest rates on many agricultural loans, and limits on the term of loans, especially for agricultural marketing. Agricultural loans provided outside the credit ceilings imposed through the Bank of Zaire are subsidized to rates only about one-half of commercial rates, and as a result the loans provide a significant income transfer to those receiving them. This has encouraged the use of these funds for purposes other than the intended food production and marketing. It also has resulted in credit allocations based on political influence. In many instances this tended to concentrate loans in the hands of large borrowers. These policies, especially the subsidized interest rate provisions, tend to favor trade credit over longer-term investment as it forces lending institutions to finance high turnover activities to earn the highest returns.

A number of other constraints apply to specific industries due to regional differences in regulation, tariff policies, lack of skilled manpower, land tenure arrangements, and other factors. In some cases, these obstacles are as serious as the three more general constraints outlined above. However, the pervasiveness of these general problems overshadow the specific problems of individual industries. These general difficulties must be resolved first in order to encourage more investment in the agricultural sector.

### **Fonds de Convention**

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The FDC established by the GOZ to enlist the private sector in raising funds for privately designed and implemented projects that pursue both the economic and social goals of agricultural and rural development, and the private interests of firms that are dependent on the agricultural sector for their work forces, inputs and markets.

The largest source of FDC funds is a tax on industrial enterprises and is used exclusively to finance projects in the agricultural sector.

With respect to the contributions, the main issue is how to set the tax rate. At present, the rate is set subjectively by the FDC based on its assessment of each company's ability to pay. This can unfairly penalize the more efficient and profitable enterprises within a given industry. The tax rates should instead be set for each industry on the basis of the economic health of that industry. In setting tax rates the two main factors to be considered should be: (1) the impact of the tax on the competitiveness of the industry relative to imports, and (2) the impact on consumers in the form of higher prices and increased hardship. Within a given sector, it may be appropriate to give a preferential rate to small businesses.

The most serious shortcomings of the FDC are in the allocation of its funds. First, although there are strict guidelines in the allocation of resources, the lack of prioritization has hampered the appropriate use of FDC funds. It is important that the largest source of funds for agriculture be used in ways that are consistent with Government priorities. Second, the FDC does not have a standard set of criteria for evaluating project proposals. Many contributors are unclear regarding how their contributions are to be used or what constitutes an acceptable project. The FDC needs to spell out in writing the criteria that it uses in its project approval process. These criteria should relate specifically to development impact and economic viability.

There are also issues related to how the FDC should be used as a source of development finance. FDC guidelines are restrictive with respect to the types of projects it finances. It provides loans for agricultural production projects. Grant financing of socio-economic services and infrastructure associated with production projects is

available for up to 20 percent of total costs. These guidelines specifically exclude the grant financing of activities that address key constraints to increased agricultural production such as rural roads, applied research, or small farmer extension, unless they are part of income-generating production projects. As the largest single source of funds for agriculture, it is inappropriate that the FDC be limited to the loan financing of production projects. There are many urgent needs in the agricultural sector that will only be financed if the scope of FDC activities is broadened to include grant financing of any activity that addresses a key constraint to increased agricultural production or marketing.

However, care is needed to assure that the FDC not be used as a mere extension of the Government of Zaire or regional current budgets. The many budgetary shortfalls in Zaire assure that if the FDC begins to be used to finance the recurrent costs of ongoing government programs, no funds will be left for the important development initiatives that this agency was meant to encourage.

Finally, there is the issue of interest rates. The FDC deposits its funds in the *Banque de Credit Agricole* (BCA) where it earns no interest. Thus, in an inflationary situation the real value of its assets declines rapidly over time. The interest rates charged by the FDC are ridiculously low given the inflation rate in Zaire. Even if we accept that FDC's role is to stimulate agricultural development, loans to agro-industry and commercial farms should be subsidized only for the short term when there is a strong justification. Interest rates on loans related to small farmer production should be at least equal to inflation.

### Agricultural Marketing

We have noted the critical need for development of the nation's transporta-

tion and communication infrastructure to facilitate the development of markets. It is of little avail to encourage producers to expand output if transportation and other marketing facilities and services are unavailable to deliver essential production inputs and efficiently deliver farm products to consumers, local and urban. It would be advisable to explicitly incorporate a marketing component in each production project to ensure coordinated, parallel development.

Other needed initiatives include technical assistance to encourage and facilitate the formation of local producer cooperatives or other forms of association for development of marketing services as well as for receiving and managing credit from the agricultural credit bank. As such institutions are established and demonstrate adequate management capacity, SOFIDE. The Agricultural Credit Bank and commercial banks should all be encouraged to provide investment and operation credit. At the present time, credit is simply not being directed to local, small farms in adequate amounts to stimulate development.

As development occurs, consumer incomes increase, and the urban population expands, the demand for income sensitive food products (livestock, fruits and vegetables, processed foods, and the "value-added" products) can be expected to grow, particularly in urban centers. Private investment to develop such products and the necessary marketing services (storage, processing, etc.) should be selectively encouraged, perhaps by tax or special credit incentives.

Finally, the Department of Agriculture and regional and local governments should be encouraged to provide more extensive and timely market information about prices or the availability of food products, for example on a local or market area basis.

Such information is essential to the efficient and equitable operation of markets. But it is important that indicative price information not become de facto price controls as has sometimes happened in the past.

### **Public Financial Support**

The issues facing the Government of Zaire with respect to financial support for the agricultural sector are: (1) how much to allocate to the sector, and (2) how to allocate the funds within the sector. For an optimal allocation of resources, these decisions should be made in the context of a well defined long-term strategy and investment program. The discussion of the allocation of public sector resources in this section of the report is based on a two-part strategy for Zairian agriculture.

The first part concerns the development of modern, large-scale agriculture, and has three basic elements: (1) a good investment climate, which essentially means the continuation of the macroeconomic policies that were started in 1983; (2) a strong program to improve infrastructure, especially roads but also electricity and telecommunications; and (3) a steadily increasing base of qualified technical personnel available to the private sector.

The strategy for developing the large-scale sector can be presented as a long-term program with ambitious objectives and a clear commitment to take whatever actions are necessary to achieve them. The bulk of the resources would come from private foreign investment and the main role of the government would be to provide the appropriate policy framework and supporting infrastructure. In time, an increasing number of Zairian entrepreneurs may also find it profitable to make such investments.

The second part of Zaire's agricultural strategy focuses on small farmers and has two basic objectives:

increased food production, and increased rural incomes and standard of living. The main elements of the strategy for developing modern agriculture are also needed for small-farmer production plus special efforts in the area of extension, input distribution, marketing, credit, cooperative development, and in some cases, community development.

The other key consideration is the role of the public sector in agricultural development. The present policy of the Government of Zaire is that it will not assume direct responsibility for any activities that can be carried out by the private sector. This means that, in principle, government programs relating to agriculture will be limited to: (1) policy, planning and statistics; (2) agricultural support services (research, extension, education, conservation); (3) monitoring of small-farmer production programs; and (4) infrastructure development and maintenance, mostly roads. This list specifically excludes commercial undertakings and subsidy programs, although a small amount of subsidized credit continues to be available from public sector financial institutions.

The sources of public sector funding for agriculture programs are: (1) the national budget, including counterpart funds; (2) the *Fonds de Convention*; (3) regional and local sources of revenue; and (4) public sector credit institutions.

### **The National Budget**

The Government of Zaire's budget consists of the current and investment budgets supplemented by counterpart funds obtained through donor-funded programs that generate local currencies. The current and investment budgets adjusted for inflation have declined steadily in recent years and will continue to be severely limited by the IMF agreement. Furthermore, over 50 percent of the current budget is going to debt servicing. However, within

these constraints, some improvements are possible. First, as noted above, several expensive, ineffective programs have been discontinued. The savings can be reallocated to the remaining programs. Second, the share of the current budget going to agriculture should be greatly increased, at least tripled. These budgetary changes must be accompanied by improvements in the management of agricultural programs to assure that the increased funds are used efficiently. Whatever improvements occur, however, it is certain that the Government of Zaire will continue to experience serious revenue shortages for its agricultural programs as well as for road rehabilitation and maintenance.

The situation with respect to the investment budget is even worse. There are virtually no local resources available for capital expenditures. This also applies to the key public sector parastatals including the National Cotton Society of Zaire (SNCZ) and the Transportation Office (Office des Routes). The major public sector investments that are needed for transport, electricity, telecommunications and institution building must be mostly externally funded. The major source of funds will continue to be foreign aid, but there is no reason why private foreign investors in agriculture and forestry could not contribute to infrastructure development as an integral part of their production projects. Specifically, investments in the interior of Zaire will almost always require improvements in road and river transport. A link could be established between investment incentives including tax holidays, and private sector contributions to infrastructure development or rehabilitation.

Although not directly a part of the national budget, counterpart funds generated by donor projects are a major source of funding for the local costs of certain agricultural programs. These

funds are jointly allocated by the donor and the Government of Zaire, and in general the system is working well. The main point to make with respect to counterpart funds is that they should not be used to finance recurrent costs that would otherwise be funded from the current budget. The operating costs of donor funded projects are an appropriate use of counterpart funds as long as the costs are related to the project itself and will terminate when the project ends.

### Local and Regional Revenue

Although possibilities for the increased financing of agricultural development programs from the national budget are extremely limited, much can be done to increase local and regional financing. Infrastructure and supporting services can and should be linked to increased economic activity in rural areas. Whenever there are increases in agricultural production, either commercial farms or small farmers, resources are being generated to pay for corresponding increases in infrastructure and services. If this is not occurring, the expenses of infrastructure and services are not economically justified and can be sustained only with subsidies. Needless to say, under present conditions in Zaire such situations are to be avoided.

When economic growth is occurring, two steps are needed to assure that the beneficiaries pay for the necessary infrastructure and services. First, all services that have a direct and immediate benefit to the recipient should be paid at full delivered cost. This includes input distribution (fertilizer, seeds, tools), credit and marketing services. Second, increased economic activity should be taxed to pay for services that do not lend themselves to being paid directly by recipients. For example, rural roads are needed to sustain the increased maize production

in North Shaba. A two percent tax on maize at the two main railheads in North Shaba would be sufficient to cover the maintenance costs of these roads. The key is to resist pressures to: (1) reallocate these earmarked taxes to other underfunded programs that might have a higher political priority; and (2) set the tax rate too high, thereby creating disincentives to increase production.

These two steps will greatly reduce the need for national budgetary resources at the regional and local levels and would have the important side-effect of improving the overall quality and effectiveness of agricultural development programs. It should be noted, however, that small farmer production projects will continue to require special efforts (in such things as extension and input distribution) that will not result in sufficient short-term production increases to cover their full costs. These programs will have to be funded from the national budget, counterpart funds and, in some cases, the FDC.

### **Making The Transition To Private Sector Leadership: The Case of the North Shaba Project (PNS)**

The Task Force was impressed by progress of the AID-sponsored Project North Shaba (PNS). The Task Force believes that PNS is a development approach for which AID should be commended and that the format of PNS could be utilized, with certain modifications, as a model for development elsewhere.

Project implementation started in 1977 when AID and the GOZ selected Development Alternatives, Inc. (DAI) of Washington, D.C., to be the primary contractor for this rural development project. PNS's goals, which have been successfully achieved, include:

1. Developing and rehabilitating roads and bridges in North Shaba;

2. Increasing production of food, particularly maize, by seed multiplication and demonstration/extension training;

3. Improving farmer income and quality of life.

Road building activity has rehabilitated over 700 kms and this road network is being maintained. More than 50 culverts and bridges were built in the last year. Without this road network, it would be virtually impossible to deliver inputs to local farmers or to provide extension services and marketing of crops.

Food production in the PNS area increased from 5,000 tons of exported maize in 1977 to 50,000 tons of maize exported in 1984 (according to preliminary estimates). Other production, such as palm oil, rice and peanuts, also increased dramatically in North Shaba. High quality seed multiplication and extension training were primary causes for increasing maize production.

On the Ngaba farm, seed of an improved maize called Kasai I is produced in seed multiplication blocks and then distributed to contract growers selected by project staff. This seed is harvested by growers and purchased by the PNS, which dries, shells, cleans and treats the seed for resale to farmers.

In order to insure that improved seed is properly utilized, a staff of 120 trained extension agents show farmers how to grow the crop. These agents are trained at Ngaba and are provided with small motorcycles or bicycles so they can go to the field. They are also paid a good salary and seem highly motivated.

Peasant farmer income increased greatly in the PNS zone, despite inflation and devaluation of the local currency. Maize prices increased from one-half zaire per kilo in 1980 to more than seven zaires per kilo in the off-season in 1983. This increased income

improved rural living standards and consumer purchasing power. In addition, the Government of Zaire noted the benefits of a free-market economy and removed maize price controls and abolished limitations on shipments of agricultural products from one region of the country to another.

AID is in the process of transferring future administration of PNS to an agribusiness company in the region. The Task Force supports bringing private enterprise into the management of this activity. The Task Force notes that AID is phasing the transfer of responsibilities and funding to the firm over a three year period. We agree that such phasing is essential to an orderly transition.

The Task Force recommends that AID consider emulating the PNS model elsewhere, but with the suggestion that private entrepreneurs be invited to participate in such projects in the beginning, rather than at the end, of AID's financial supporting role. This would allow for the entrepreneurial thinking to be infused into the planning stages and throughout the project's implementation. Charges to peasant farmers would, of course, be minimal in the beginning, but as farmer incomes improve, so would their ability to pay for services.

In order to insure proper use of AID-provided resources, AID should consider imposing certain conditions on private partners, such as: a) private entrepreneurs would be required to reinvest all profits into the project as long as AID provides any assistance to the project; b) local companies would be required to accept U.S. companies as investment partners in any joint venture in which U.S. funds are being utilized to stimulate development; c) AID would have the right to appoint any well-known, private accounting firm of international standing to audit the joint venture books until AID's role in the project is completed.

## Planning for Development

The 1986-1990 development plan will be crucial to the future of Zaire including the agricultural sector. It will be the first concrete expression of long-term development plans since recent reforms in macroeconomic and agricultural policy were announced in 1983-84. As such it will be carefully scrutinized within Zaire and by potential foreign private and public investors for evidence of the tone and priorities for development in the remainder of the decade. It will be, in essence, a test of the Zairian government's commitment to agricultural development and particularly its commitment to market-oriented development policies.

It is essential that the new plan be an analytical document disciplined by the realities of a constrained national budget and sound macroeconomic policy. The new plan must go beyond a mere listing of broad development objectives and recitation of the obstacles to development, unlike some past planning efforts. It should set forth realistic, attainable objectives. When approved it should clearly set forth carefully chosen, specific priorities that will become the basis for subsequent allocation of development funds from the public sector and a meaningful basis for investment planning in the private sector. Even at the expense of delaying its release, the plan should be developed as an operationally meaningful foundation of future commitments to development.

Finally, the planning process should be linked to the budgetary process. It is of little value to develop plans unless those plans are to be the basis of subsequent budget-allocation decisions.

Beyond the immediate issues of developing the 1986-1990 plan, steps should be taken to improve the capacity of the Zairian government to develop and execute future plans for

agriculture. First, in the spirit of relying more heavily upon the private sector, future plans should be developed not for the purpose of "command and control" but as "indicative" plans to facilitate program execution in the public sector and subsequent planning in the private sector. Public goals, priorities and commitments should be clear and explicit, leaving to the private sector the many specifics of implementation. Second, it is important for the long run development of Zaire that serious efforts be made to gradually decentralize decision-making and to develop workable administrative structures involving the regional and central governments. Third, it is essential that agricultural sector planning occur in the broader context of general economic planning. Sound agricultural policy and meaningful agricultural plans cannot be formulated outside the larger context of macroeconomic policies and general economic plans which set priorities for development among all sectors of the economy.

Three basic steps should be taken to improve public sector capacity for effective agricultural planning. First, high priority should be given to further upgrading the capabilities of staff in the Zairian Government, particularly in the Departments of Agriculture and Planning. That will necessitate continued investment in improving the professional skills of staff as well as providing salaries and promotion opportunities to attract and retain skilled personnel.

Second, and related, is the necessity of improving the scope and quality of statistics and economic analyses throughout government, but particularly in the Departments of Agriculture and Planning. An improved data and information base is essential to more effective planning. Better statistical information and economic and policy analyses are essential to improving the capacity of the Department of Agri-

culture to monitor and assess developments in agriculture and to provide reliable, timely information for policy makers and for the private sector.

Third, the capacity of staff and programs at the regional level should be strengthened as resources are available. These initiatives need not increase the number of government employees; they will require reform and strengthening of current government employment and promotion systems.

### **Coordinating Development Plans and Programs**

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Development of the agricultural sector involves numerous government departments, private voluntary organizations as well as bilateral and multilateral project agencies. For private foreign investors, this maze of organizations, sometimes with seemingly overlapping responsibilities, can be a formidable deterrent to investment.

Within government itself the diffused structure of responsibility makes it difficult to develop integrated, coordinated policies and programs. For example, the Department of National Economy and Industry and the Department of Agriculture share interests and responsibilities on agricultural price policies. Development and maintenance of transportation facilities, services so critical to agricultural development, are shared by the *Office des Routes*, SNCZ, ONATRA, and the Department of Agriculture. Each of the Departments of Planning, Finance, and Agriculture has responsibilities for planning, and each maintains an agricultural policy and planning unit. The provision of operating and investment capital for agriculture is shared by the Department of Agriculture, *Fonds des Conventions de Development*, SOFIDE, the Agricultural Credit Bank, bilateral and multilateral donors, private voluntary

groups, commercial banks, parastatals, and private agribusiness firms.

We have noted previously the need for an integrated plan for agricultural development linked to the budget allocation process. One agency, possibly the Department of Planning, should have a clearly assigned responsibility for leading the development of plans. Approval should rest with an interdepartmental cabinet-level organization, possibly the *Comité de Conjoncture*, and the President. To assist the Minister of Agriculture to adequately represent agriculture in this process, resources in the Department of Agriculture planning unit should be augmented. Further consideration should be given to revitalizing the External Resources Coordinating Committee to enhance coordination among international donors of development assistance and national agencies involved in development.

Agricultural development in Zaire has been planned and executed on a project basis—commodities, regions or areas, and functions. Several positive results have ensued. However, it is important that these projects be viewed in the larger context of national needs and priorities. Projects should lead to integrated national programs. Unless that is so, there is danger of creating a series of isolated, unconnected “pockets” of development which ultimately may fail to achieve their potential. The Departments of Planning and Agriculture bear responsibilities together with donors to ensure progress in project-centered development.

*The task force recommends that the Government of Zaire should:*

- Discontinue subsidy programs and disengage itself from activities that can be performed by the private sector.
- Insure that government services with direct benefits to recipients be paid for at full cost.
- Increase agriculture's share of the Government of Zaire's ordinary budget

from the current level, which is less than one percent, to three or four percent, and release funds more promptly in accordance with priorities specified in the 1986-1990 plan.

- Establish a ceiling on the proportion of the current budget allocated to salaries. Because salaries of agricultural personnel must be increased, the GOZ should seriously consider reducing the number of personnel to remain within the budgetary limits. Continue programs to improve the skills of public sector employees.

- Earmark revenues generated at regional and local levels for maintaining physical infrastructure, especially feeder roads necessary for sustaining economic growth.

- Increase the resources allocated for developing the infrastructure, with special emphasis on land and water transportation. Obtain increases in the flow of funds from bilateral and multilateral donors as well as the private and public sectors in Zaire, and increase the budget of the *Office des Routes*.

- Ask foreign donors to give top priority to financing investments in infrastructure if revenues will be available to maintain the expanded infrastructure.

- Set the tax rate for contributions to the FDC for each industry (maize milling, breweries, textiles) rather than for each business. Base the rate on the economic health of the industry and the impact on consumers.

- Increase the availability of FDC funds for loans and grants for food crop production, especially to small farmers. FDC funds should not be used to finance recurrent costs of any programs in the public sector.

- Set priorities for allocating FDC funds by subsector, based on government priorities. Set clear, widely publicized, and uniformly applied criteria for approving projects for FDC funding.

- Make FDC funds available in the form of loans or grants for any activity that addresses a constraint to increased agricultural production and marketing. Consider setting a limit on the percentage of total FDC funds to be used for grants.

- Following the upcoming World Bank study of the FDC, prepare a complete set of guidelines incorporating all changes officially approved by the FDC Management Committee, and widely distribute the guidelines. Clearly differentiate the grant and loan programs of the FDC, providing separate objectives and guidelines for each.

- Deposit FDC funds in interest-bearing accounts, and charge close to market rates on FDC loans to commercial farms and agro-industries. On loans related to small farmer production, charge rates approximating the anticipated inflation rate during the period of the loan.

- Develop the 1986-1990 national plan as an integrated, comprehensive, analytical document; require a clear statement of operationally meaningful priorities; link the approved plan to the budget allocating process.

- Enhance the capabilities of regional governments for effective planning, policy formulation, and execution as resources permit; gradually decentralize the planning and decision-making processes as workable administrative structures are developed involving the regional and central governments.

- Improve coordination in planning, policy formulation and execution across government through the *Comité de Conjoncture* and by revitalizing the External Resources Coordinating Committee; provide each with a small but highly competent staff. Ensure decisions are implemented by linkage to budget allocation and planning process.

- Ensure that development of agricultural production is accompanied by development of markets and market

facilities by requiring explicit, integrated components of each in future development projects.

- Provide more technical assistance to small-scale producers to form cooperatives or other producer associations for marketing of inputs, particularly credit, and local agricultural production.

- In collaboration with local and regional governments, initiate activities in the DOA to provide more extensive and timely market information. This is essential to efficient and equitable operation of markets.

- Maintain macroeconomic and agricultural policies conducive to stable, long term growth and otherwise provide a more stable economic and policy environment.

- Remove restrictions on import and local production and marketing of agricultural production inputs; remove restrictions on interregional movement of Zairian agricultural products.

- Eliminate taxes and other restrictions on exports of Zairian agricultural products.

- Provide selective tax incentives and encourage use of capital from the *Fonds des Conventions* as matching funds with foreign investment capital for development of high priority production and marketing projects.

- Make infrastructure development part of large-scale private investment in agriculture. Establish linkages between investment incentives, such as tax holidays, and investors' contributions to developing the infrastructure, such as building roads, operating barges, or improving wharves.

- Emphasize direct public assistance to the traditional small farm sector for producing food crops and livestock, and emphasize private investment for developing non-food crops and larger, more modern enterprises.

- Continue privatizing parastatals and employing private management of development projects.

- Eliminate transport surcharges on agricultural products carried by SNCZ, and balance the rates charged for mineral and agricultural products.

- Consider establishing a Zairian-American Chamber of Commerce, possibly under the auspices of ANEZA or a similar organization, to promote foreign investment and business opportunities in Zaire.

- In order to assure adequate credit availability for private sector investments in agriculture and agro-industries; (1) continue efforts to reduce the size of the public sector deficit, (2) reform interest rate policies on agricultural loans; and (3) encourage savings among private individuals and businesses.

- Maintain the allowance for food

production and marketing credit outside of the central bank ceilings, but raise interest rate ceilings on agricultural loans to market levels above the rate of inflation to better insure that these loans are used for the intended purposes and to allocate this scarce credit to those agricultural uses that have the highest returns.

- Encourage the development of small-scale cooperative and other types of lending institutions in rural areas in order to increase credit available to small agricultural producers. Increase the rates of interest on time deposits to levels above expected inflation rates to provide proper incentives to save for future purchases and to attract the deposits necessary to start small-scale lending institutions in rural areas.

## PART II

## Agricultural Research, Extension, and Education

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33	<u>Higher Education</u>

The history of successful agricultural development throughout the world reveals that a nation must develop: (1) the capacity to conduct a vital and relevant program of agricultural research; (2) a system to communicate the results of this research and to assist farmers through education and demonstration to apply these results; and (3) a system of higher education that will provide for the preparation of highly trained individuals who will conduct the nation's research, education and extension programs.

In as much as a highly developed, adequately funded, appropriately staffed and equipped agricultural research system is fundamental to agricultural development, the task force focused this portion of its review primarily on the nature of the agricultural research system in Zaire. Once considered to have one of the best agricultural research systems in the tropical world, Zaire is now critically deficient in trained scientific staff and supporting personnel and has badly deteriorated research facilities, grossly inadequate logistical support and severely deficient funding. Authority and responsibility for conducting research is now divided among several departments of government. Extension services are divided among government, private voluntary organizations and private industry.

The *Institute National pour l'Etude et la Recherche Agronomique* (INERA), operating under the authority of the Department of Research (DSR), is the autonomous governmental body responsible for agricultural research. However, because of inadequate staffing and severely inadequate financing, INERA's research programs have been largely abandoned. Its physical infrastructure has been maintained in a

minimal state of repair and equipment has gradually deteriorated. The principal activities at INERA's 22 research stations (of which only about seven are currently operating) have been focused on the maintenance of genetic stocks of perennial and some annual crop species, limited multiplication of seed and plant materials, and crop and livestock production to supplement meager salaries. INERA is neither adequately staffed nor adequately financed to carry out its current responsibilities for agricultural research in Zaire.

The Institute of The Faculty of Agriculture (IFA) at Yangambi is the only university-level agricultural institution in Zaire. The Institute was moved from Kinshasa to Yangambi in 1973 and was granted a substantial part of the infrastructure of the INERA Research Station located in Yangambi. The Institute offers the degree of *Ingenieur Agronome* at the end of a 5-year program. In the past few years, IFA graduated about 50 students annually. With a staff of 12 permanent professors with PhDs or their equivalent and approximately 15 assistants with *Ingenieur Agronome* degrees, IFA has the potential to carry out good agricultural research.

Being conscious of the presence of IFA staff in close proximity to the INERA Station, and aware of the national significance and past research achievements of the Yangambi Center, the Government of Zaire and numerous bilateral and multilateral agencies have encouraged the development of the site for conducting scientific research on constraints to agricultural development in Zaire. So far there has been little coordination of support. For its part, the Government of Zaire has not been able to meet the material needs and raise the morale of the scientific community. As a result, the staff is discouraged, donor assistance has dropped considerably, and only limited research work is taking place at IFA.

The task force did not visit the Research Institute for Agronomy and Animal Sciences (IRAZ), which was established recently as the research coordinating body for the great lakes community (Eastern Zaire, Rwanda, Burundi). Reports of serious lack of financial resources, insufficient manpower, and little regional coordination, however, indicate that IRAZ has not yet contributed to agricultural research in Zaire.

### **Research on the National Food Crops**

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Following failures in the efforts to improve production of the main food crops of the people of Zaire and in response to recommendations provided by the "Consultative Group for Zaire" at its 1982 meeting in Paris, the Zaire Department of Agriculture (DOA) organized and implemented its own national research programs on the principal food crops—maize, manioc, rice, and food grain legumes. The USAID provided valuable technical assistance and financial support to two of these programs, manioc (PRONAM) and food grain legumes (PNL) since 1979. Some support through counterpart funds have been provided on a limited basis to DOA's National Maize Research Program (PNM), which was initiated in 1972 with the assistance of CIMMYT.

### **National Maize Program (PNM)**

The research on maize being carried out in the national food program of the Zaire Department of Agriculture was reviewed in some detail. This plant improvement program of the National Maize Program (PNM) is under the supervision of Dr. Mulamba Nandu, Director of PNM who, following his undergraduate work at Kinshasa, received his M.S. and Ph.D. degrees at

Iowa State University in plant breeding and quantitative genetics. The principal maize programs of PNM are being conducted at Kaniama, Kaniameshi and Gandajika. With these as the primary centers for the research and appropriate tests at outlying locations, presumably the main regions for maize production are represented in the breeding program.

The research on breeding of improved maize is largely directed toward the development of high yielding open-pollinated populations that are relatively disease resistant and acceptable to the people of Zaire. The breeding methods and much of the material being used are attributed to CIMMYT which provided assistance to the Government of Zaire between 1971 and 1981.

Prior to the involvement of CIMMYT, the maize improvement work was done by the National Institute of Agriculture Research (INERA). The three main varieties, all of low yielding characteristics grown in the North Shaba and Kasai regions, were products of INERA efforts. Otherwise, it seems that farmers grew the Old American Hickory King variety of maize.

PNM and the preceding work of CIMMYT have produced three varieties—Shaba I, Salongo 2, and Kasai I—which are major improvements over the previous material. Where recommended technology is utilized these varieties yield 9 to 12 metric tons per hectare in recommended regions.

Present breeding efforts by personnel of PNM are directed toward further improving the open-pollinated varieties. A wide array of the material being used has come from CIMMYT, IITA, USA, and other countries and agencies. The techniques being used in the improvement work are well chosen and utilized. These activities include: (1) Creation and testing of synthetics;

(2) evaluation of introduced populations intercrossed with the best locally adapted populations; (3) production of inbred lines for possible use in the development of commercial hybrids and improved synthetics; (4) early generation testing of new lines; (5) observation of commercial hybrids imported from the U.S. and other locations; (6) disease resistance evaluations, especially for maize streak virus and downy mildew—the two widely prevalent diseases of maize; and (7) a range of crop production and management studies involving variables of fertilizers, plant spacings and environments encountered at different locations.

The major limiting factor in the PNM program is the financial support available for personnel and the operational budget. Extremely low salaries pose a very serious problem in recruiting and retaining qualified technical personnel.

For example, in 1980 there were three technical staff of PNM with Ph.D. degrees from major U.S. universities. In addition, the technical staff included nine members with M.S. degrees; eight of whom had received their degrees in the U.S. Today, the only PNM staff member with a Ph.D. degree is Dr. Mulamba. One other staff member, Cit. Asanzi, an entomologist, has an M.S. in entomology.

### ***National Manioc Program (PRONAM)***

The project was started by DOA in 1974 and has been assisted by USAID since 1980. We reviewed the work of PRONAM at M'vuazi, which is the main center for the manioc research. We understand that satellite locations for manioc research exist at Kiyaka, Bandundu, Gandajika, Kasai Oriental, and Mulungu in Kivu.

Excellent progress in improving the

yield of manioc was observed in selections recently released or being increased for distribution to the farmers. Efforts to improve resistance to diseases also were successful.

PRONAM technical assistance from 1979 consisted of long term research agronomists and extension scientists from the International Institute of Tropical Agriculture (IITA) of Ibadan, Nigeria in cassava plant, breeding, biological control, pathology and extension, training and farming system research. Two improved cassava varieties have been released for use.

### ***National Legume Program (PNL)***

The task force had only a limited opportunity to observe the National Legume Program, the third national program being assisted by USAID in the so-called RAV project. The headquarters for this research is Gandajika with a satellite station located at Mulungu, Kivu. We were not able to visit Gandajika due to mechanical problems with the transportation equipment.

We attempted to review the research plans and results being achieved in the legume crops, especially soybeans, peanuts, beans, and to a lesser extent, cowpeas. The soybeans we observed at the M'Vuazi station and some other stations were not impressive. We noted very acceptable production at several locations in Shaba and were told that better growth is also achieved on the large private farms in Bas-Zaire.

Apparently, some introduced varieties of soybeans are providing much more favorable responses on the commercial farms in the vicinity of M'Vuazi. Perhaps continued work with soybeans, principally with plant exploration, will yield material showing greater promise. For soybeans to contribute to food availability, however, issues of processing will have to be addressed.

Among the legume food crops, peanuts seem to be eaten widely by the people of Zaire, forming an important component in their diet. Peanuts being grown on the station at M'Vuazi appear to yield good forage and nut production. Much greater attention could be given to improving peanuts for use in rotation with maize and for providing dietary protein.

Beans are a popular food in various areas of Zaire. Attention to research in this area could increase its potential for contribution to the food supply and to soil nutrition. To a limited degree, research with cowpeas could also add to the resource.

### ***National Rice Program (PNR)***

The task force did not review the National Rice Program, which DOA commenced in 1974 with the assistance of China. Although we had no opportunity to see the products of the research, we understand that improved varieties have been produced and are being distributed to the people. Here again, reports of lack of sufficient financial support and qualified personnel seem to be the major constraints for effective work.

### ***High Technology Research***

The national food crops programs necessarily focus on adaptive, production-oriented research. But at least one institution in Zaire, Kinshasa Center for Nuclear Research (C.R.E.N./K.), has the personnel and equipment to conduct more basic studies in support of agricultural development. C.R.E.N./K. could apply its skills in microbiology, biotechnology, and plant and microbial molecular genetics to appropriate research targets for Zaire that are unlikely to be addressed in the major biotechnology research programs of the industrialized nations. Appropriate

research targets include: maximizing benefits of biological nitrogen fixation; enhancing protein content of cassava; enhancing symbiotic phosphorus uptake; and biologically controlling plant diseases.

### Organization of Research

Agricultural research is conducted as a support to agricultural production enterprises. Therefore, the organization and substance of agricultural research in Zaire ought to reflect the research support needs of the agricultural sector.

At risk of oversimplification, there are two classes of agricultural enterprises in Zaire: "Traditional" agriculture in Zaire typically is that of small holders and concentrates on food crops; and "Modern" agriculture, on the other hand, includes both food crops and cash crops. The task force believes research is necessary to upgrade the cropping systems of traditional farmers, as well as those functioning in more modern systems. In the case of the largest modern maize production enterprise in the country (GECAMINES, Shaba), farm managers expressed keen interest in a publicly-supported, production-oriented, research effort. Although large agribusinesses currently conduct their own internal research and development, they freely acknowledge that it could be better performed by trained professionals in institutions specializing in research. They would also appreciate a publicly supported research institution to fall back on in the future when new insects, diseases, weeds, or other constraints to production inevitably occur.

The dimension of such an investment in research should take account of the critical level of effort required to tackle identified technical problems, but also must be in proportion to the financial resources available.

The present size of the institutional

framework for agricultural research in Zaire, comprised of INERA and the National Programs, is much larger than is justified to support research on production constraints of traditional and modern farmers. Even with tripling of the agricultural research budget it is much more extensive than Zaire can afford.

The improved germplasm and cultural practices that the task force encountered in Zairian agriculture have emerged predominantly from the programs of the International Agricultural Research Centers, with adaptation by the national food crop programs. Thus, if the opportunity existed to establish afresh a National Agricultural Research Program, a structure based largely on the existing national commodity programs would seem most in scale with actual demand for research support, and most in keeping with the financial resources available.

Although the current National Programs have been effective in providing research support to their respective commodities, they do not constitute a sufficiently comprehensive program to tackle the broad array of critical issues for agriculture in Zaire.

The food crop and outreach programs supported by USAID have produced useful results now finding application, and have provided training for a nucleus of research personnel. Linkages, however, are minimal among these programs at the management and technical levels. Each program remains under independent direction, management and budgets within the DOA.

These discrete programs individually do not provide a basis for the institutionalization of an applied research system that is responsive to the needs of the country. They do not provide suitable mechanisms for establishing national priorities in research programs, for allocating budgetary resources that are consistent with priorities, or for continuing evaluation

and reprogramming. Separate technical, administrative, and financial management makes coordination and control of research programs difficult and results in the dispersion of scarce managerial and technical resources.

Agricultural research in Zaire is not coordinated. The three major institutions actively or potentially responsible for agricultural research are in different governmental departments. The Department of Scientific Research (DSR), created in 1982, is officially responsible for all national agricultural research activities and has direct authority over INERA.

The situation concerning DOA's National Programs and the Institute of the Faculty of Agriculture (IFA) is less clear. Theoretically, the DSR has the authority over the National Programs, in so far as these programs are concerned with research. The DOA, however, has operational control of applied and adaptive agricultural research being performed by the National Programs and is seeking to rationalize the national agricultural research system. The relationship between IFA and the Department of Higher Education (DHE) is an equally cumbersome situation.

Given the lack of a rational, effective institutional setting for agricultural research in Zaire, a subgroup on agriculture of the Consultative Group for Zaire met in Paris in June 1982 and recommended the following:

(1) that a course of action be defined under which a "Project for the Reorganization of Agricultural Research in Zaire" would be developed;

(2) that an "Organization Structure for Agricultural Research" be defined; and

(3) that a policy providing for sufficient financial autonomy and management flexibility concerning agricultural research activities be adopted.

Anticipating the direction in which implementation of these recommendations appears to be headed, the DOA has adopted a course of action focusing on the continuation of the national food crop commodity programs with USAID providing assistance under the new Applied Agricultural Research and Outreach Project RAV. This project provides support for the three national food programs (PRONAM for cassava, PNL for legumes and PNM for maize). RAV will coordinate and integrate the three foodcrop research programs which currently represent most of the effective agricultural research in Zaire. RAV, however, is not intended to complete the establishment of a self-sufficient agricultural research organization. It is but the first step in a long term process to build the institutional capacity essential to undergird a National Agricultural Research Program.

To identify the necessary institutional reforms and linkages, the USAID project funded a nine-month study by the GOZ and the International Service for National Agricultural Research (ISNAR). The resulting Provisional Report by the Zairian Study Group concluded that INERA should be drastically restructured; that the integration of all agricultural research programs be accomplished within the next 3 years; that a mechanism assuring systematic interdepartmental communication for developing and carrying out a research program on a national level be achieved; that effective articulation between research and extension be established; and that adequate funding for the reorganization, rehabilitation, reequipping and operation of the system be assured. The Task Force supports these major conclusions of the ISNAR Report. The ISNAR study is silent, however, on the nature of the organization that would coordinate agricultural research, extension and teaching.

Although INERA is currently ineffectual in the conduct of research, certain of the INERA network of experiment stations would be of some value to a National Agricultural Research Program. But the value is in physical facilities rather than of research performed, and even this is diminished by years of neglect and deterioration. The research support needs of the agricultural sector in Zaire would be best served by the dissolution of INERA and the creation of a streamlined National Agricultural Research Program built around the national commodity programs and attached to them within the Department of Agriculture.

### Extension Services

As with research, the delivery of extension services is very weak and ineffective. Inadequately trained personnel; low salaries; a shortage of transportation, materials, supplies and especially technology is the rule. Large growers do not use existing extension systems, nor do they anticipate needing them in the future. Promotional materials of agrochemical companies and package labels on their products are relied upon, and have proven reliable, for use at the production level by these growers.

The case of smallholders is somewhat different, however. There is heavy reliance on extension services provided effectively through National Programs such as PRONAM; successful bilateral programs like the North Shaba Project; and the commendable effort of private voluntary organizations.

There is no scope for a U.S. type extension program in Zaire. Human and financial resources are simply too limited. There is need, however, for an organization to perform *functions* that the U.S. system provides—information, organizational assistance, training, and

assistance to research in demonstrating new technologies.

The Task Force believes that these functions can best be performed by restructuring the extension program under a new Agricultural, Livestock and Forestry Technical Outreach Service linked to the Department of Agriculture. This organization would have responsibility for coordinating extension activities of the national food crop program, voluntary organizations and the private sector. Its relationship to the National Agricultural Research Administration would be guided by the Agricultural Research Advisory Board.

### Higher Education

Although the next section of the Task Force's report discusses education more broadly and in greater detail under the heading, "Human Resources Development," it is appropriate especially to review institutions of higher learning in this section as well. We are absolutely convinced that institutions concerned with higher education must progress in quality and stature if a strong research capability is to contribute to an improvement of the quality of life in Zaire.

We were unable to complete an in-depth review of the universities, but we did see and hear enough to convince us that, in general, higher education needs considerable reform. Buildings urgently need major repair and renovation, faculty morale is low because of inadequate or unpaid salaries. Also, there does not appear to be an adequate plan for future development of universities.

Existing universities have strengths upon which to build. Lubumbashi, in particular, offers many features that would complement a College of Agriculture. These include: the existence of university facilities, support services and programs necessary for teaching and research in a college of

agriculture; availability of a faculty in veterinary medicine to participate in the formation of the animal science component of a college of agriculture; the proximity of the university campus to experimental farms and fields; the location of the university in a major ecological region suitable for food crop and animal teaching, research, and demonstration; the proximity of a major city to the university; and the amenities and infrastructure that this contributes to university life.

With regard to extension, research and higher education the Task Force recommends:

- Restructure all agricultural research programs within the next three years, as suggested by the preliminary report of the GOZ and the International Services for National Agricultural Research (ISNAR).

Develop mechanisms for assuring communication among government departments and for linking agricultural research to extension services and educational institutions.

- Expand the scope of the National Agricultural Research Program and create a single administrative and planning entity—a National Agricultural Research Administration to supplant INERA attached to the Department of Agriculture. Elevate the program's status and give it relative autonomy from bureaucratic encumbrances of the Department of Agriculture.

- Provide for technical and policy input to the National Agricultural Research Administration by both the Department of Scientific Research and the Department of Higher Education through the vehicle of an Agricultural Research Advisory Board. Consider providing for participation of private voluntary organizations and delegates representing farmers' interests in the Agricultural Research Advisory Board.

- Strengthen, extend, and integrate Zaire's national food crop programs under the auspices of the National Agricultural Research Administration.

- Adapt a "farming systems" approach in all applied research programs. This would place greatest emphasis on cropping systems, including agroforestry, but could also include subprograms on forage and livestock production. Later, forage and livestock production could become a separate program if justified.

- Encourage research on non-food crops by private interests. As an example, the national legume program should conduct only such soybean research as is justified by the use of soybeans for protein enrichment of foodstuffs. Some soybean research could be justified in the "farming systems" approach to applied research when it is used for the residual benefits of the nitrogen it fixes biologically. A public investment in research on soybeans for oil production would be difficult to defend, however, since other oilseeds are produced in quantity in Zaire.

- Reorganize agricultural extension under a new Agricultural and Forestry Technical Outreach Service linked to the Department of Agriculture and responsible for coordinating the extension activities of national food crop programs, voluntary organizations, and the private sector.

- Reduce the number of former INERA stations and restrict their production activities to those necessary for the research and extension functions under the proposed new Agricultural and Forestry Technical Outreach Service.

- Upgrade the academic preparation of extension agents. Provide adequate travel funds for extension workers, and relieve such workers of their current responsibility of collecting taxes.

- Obtain the commitment of the highest officials of Zaire to plan for viable, functioning institutions of higher learning and to build agriculture into the curriculum offerings of the universities at Kinshasa, Lubumbashi, and Kisangani. Assign top priority to

the development of a strong faculty in agriculture at Lubumbashi with emphasis on crops and animal science.

The faculty from IFA and the School of Veterinary Medicine should form the nucleus of this faculty.

## HUMAN RESOURCE DEVELOPMENT

Human resource development for Zaire in the agricultural sector is the foundation of long-term national development. Agricultural research, extension and commerce depend heavily on available levels of expertise. A painful lesson was learned after efforts were made in 1973 to replace all high-level foreign personnel in the country with Zairian nationals, most of whom were not prepared to assume these responsibilities. If Zaire were to progress beyond its pre-independence condition, greater attention had to be given to post-secondary education as a way of building additional enterprises led by Zairians rather than immediately replacing existing ones led by foreigners. Nowhere was this more apparent than in the agricultural sector. Zaire continues to address this concern.

The Task Force reviewed backgrounds of selected Zairian professionals in relation to their current responsibilities and performance. The GECAMINES Corn Production Operation, enormous even by U.S. standards, is overseen by a Zairian national educated overseas to the M.S. level. Each of the three major farms of GECAMINES is run by a Zairian manager trained to the B.S. level at IFA, Yangambi. Clearly then, major enterprises like GECAMINES are not presently constrained by a lack of trained personnel.

But since current undertakings are only scratching the surface of Zaire's true agricultural potential, new steps must be taken to assure a continuing and adequate supply of appropriately trained agricultural professionals. Education for agricultural professionals should include a skill-based curriculum and a technical problem solving approach.

Two departments of the Government of Zaire participate in the development of human resources for agriculture: the Department of Agriculture and Rural Development and the Department of Post-Secondary and Higher Education (Department de l'Enseignement Supérieur et Universitaire). A third department, the Department of Scientific Research (Department de la Recherche Scientifique), newly separated out of the latter above will likely continue to have potential for contributing to agricultural resource development.

The Department of Agriculture directs internal and external funds for training projects, many of which include scholarships for study abroad and human resource development in Zaire. In addition, various of its eight divisions cooperate with those of the Department of Post-Secondary and Higher Education. Still in a state of flux, the Post Secondary and Higher Education Department is presently addressing problems contributing to wasted human and financial resources. These problems are:

- (1) inadequately defined priorities and unclear definitions of professional responsibilities,
- (2) overlapping activities, resulting in wasted human and financial resources,
- (3) inadequate coordination within the department and between this and other departments,
- (4) a young and knowledgeable mid-level professional staff requiring more experienced professional support,
- (5) inappropriate size and complexity of organization given available resources; and
- (6) inadequate resources to support program goals.

The Department of Post-Secondary and Higher Education has the major responsibility for training the expertise needed throughout the agricultural sector. It consists of a departmental administration with five divisions; three universities plus a separate

faculty of agriculture; a Board of Directors (*Conseils d'Administration*) for each of the three universities; eighteen technical schools (*Institutes Supérieurs Techniques*); and fourteen teacher training schools (*Institutes Supérieurs Pédagogiques*). Certain designated post-secondary technical schools are responsible for training agricultural teachers for agricultural secondary schools and for training of extension workers for the Department of Agriculture and Rural Development. Thus, the total system trains three levels of agricultural personnel: agricultural leaders trained in its Faculty of Agriculture, agricultural technicians trained in designated technical schools, and support workers trained in agricultural secondary schools.

Like much of the rest of the government, higher education in agriculture has been undergoing a series of changes. In 1971, three colleges of agriculture located at each of the three universities in Zaire (Kinshasa, Kisangani, Lubumbashi) were merged into an Institute of the Faculty of Agriculture (IFA) at Kinshasa. Subsequently in 1973 this unit was moved to the equatorial forest at Yangambi occupying a portion of the physical facilities of the *Institute National pour l'Etude et la Recherche Agronomique* (INERA), the national institute responsible for agricultural research. With this move to Yangambi, IFA was originally organized under the administration of the closer University of Kisangani located 100 km from Yangambi. In 1976, IFA became an administratively autonomous unit.

The tranquil rural setting at Yangambi provides IFA with significant resources, including:

- Equatorial Forest with its unique ecology. Distinctive plants, animals, soils, insects, fungi, and other forms of life provide an outstanding natural laboratory for research and education.

Such disciplines as entomology, pathology, and bio-chemistry find this laboratory a significant resource.

- Potentially important genetic material, which may in the future be able to support commodity production and important plant symbioses including biological nitrogen fixation and fungal control of insects.

- A climate which offers adequate rainfall even in the dry season, and relatively constant temperatures.

- Physical infrastructure, including 60 large brick homes and well built academic, research and administrative buildings with room to expand if needed.

- Agricultural infrastructure, including such resources as 125 fish culture ponds averaging  $\frac{1}{4}$  hectare in size and such well-established perennials as palm, rubber and coffee trees.

- Small but well trained professional staff at both IFA and INERA who cooperate easily in the face of incredible problems.

- A student body of 430, admitted at the rate of approximately 150 per year from an annual applicant pool of 500.

- A beautiful, non-distracting rural setting, the atmosphere of which can be controlled to provide the best environment for academic achievement and hands-on experience.

These enviable resources are indeed promising. The constraints, however, are fundamental and devastating. The lack of electricity, for example, means no running water or refrigeration. There is a lack of gas for laboratory equipment, and few professional materials such as books, journals and field equipment. The absence of transportation to bring in basic family supplies or to get to the outside world encourages a feeling of oppressive isolation. Add these problems to the system-wide extremely low salary scale and it is clear why the many professional personnel who would like to stay

find it impossible. This puts even more stress on those who remain. Without electricity, and social and educational facilities, options after 7:30 p.m. are limited for professional families, excluding even evening recreation, reading or study. Professionals are further frustrated by loss of potentially productive time in the evening which could be used to do significant research or writing for publication.

The task force questions whether the public sector should make additional investments to improve the Yangambi site, or whether the faculty of Agriculture should be located in a more amenable area, perhaps closer to a population center. It was clear to the Task Force that the present situation should not continue.

*The Task Force recommends:*

- Seek opportunities for Zairian educators to observe agricultural institutions in other developing countries. Examples of such institutions include Escuela Agricola Panamericana in El Zamarano, Honduras; Egerton College in Kenya; and Bunda College of Agriculture in Malawi.

- Invite an international team of experts to evaluate the secondary school system in Zaire with a view toward improving the system over a 20-year period. The evaluation should focus on accreditation criteria, teacher preparation, teaching methods, curricula, and lesson plans.

- Seek linkages with appropriate U.S. institutions which have the interest and capacity to provide assistance, especially the 1862 and 1890 land grant colleges and universities.

- Conduct a similar exercise for the technical schools of agriculture, forestry, and livestock.

- Improve curricula in ecology, forestry, agricultural engineering, management, and extension education.

- Consider identifying financially profitable teaching farms, which would teach technical school graduates basic farm management skills, including financial management. Existing farms such as those run by missionary groups may be appropriate for this purpose.

- Continue to expand the USAID funded in-country training course implemented by the *Centre National de Formation* (CENACOF) which includes basic and intermediate level courses

conducted by the USDA in such subjects as project and research management, implementation and evaluation and other useful skills of technicians and administrators.

- Because women play an important role in producing food in Zaire, government departments should be directed to cooperate more actively with Ministry of Women's Concerns and Social Affairs to increase the education and participation of women as agricultural producers and professionals.

## PART IV

# AGRICULTURAL PRODUCTION AND INPUT SUPPLY

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  - Zairian Private Sector Involvement
  - Organization of Seed Industry
  - Quality Control
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Zaire has a vast natural resource base, but agricultural production lags. In part, this is due to lack of technology, supporting infrastructure, and incentives. Limited input supply is also a problem. For example, the country needs improved seed and fertilizer. An additional problem is deforestation caused by slash and burn agriculture which has led to soil erosion, and conservation techniques must accompany development.

### Seed Production

Zaire has a tremendous need for improved seed to increase its supply of food and fiber. The value of improved seed is recognized in many parts of the country, and research and extension programs have shown that producers of all types respond to the use of improved seed in a rational, economic manner. Moreover, they are willing to pay for it.

Several factors hinder the use of improved seed: Demand now outstrips production; production is too localized and distribution too limited; quality control is lacking; and seed prices, which are heavily subsidized, do not reflect the true value of the seed.

### *American Private Sector Involvement*

An American firm coming into Zaire would have to pursue markets in those few areas where the volume would justify the investment.

It is unlikely that an American seed firm would enter into a service contract to produce public Zairian varieties. The firm would rather impart

their knowledge to a producer/distributor that would produce the company's proprietary variety.

Expertise could be hired through international consulting firms. Alternatively, American companies that produce only public American varieties might undertake a consulting role in Zaire.

### ***Zairian Private Sector Involvement***

One way to meet Zaire's need for quality seed industry without a huge investment in a national seed production company would be to have individual private companies undertake seed production on a regional or territorial basis. Such companies could turn to international consultants or to the *Zairian Bureau National de Semences* for technical assistance in starting production.

The production of high quality seed requires attention to each step of the operation. No single facet is hard to perform but close supervision is necessary. The level of education to effectively manage a seed production program is not as important as being able to pay attention to detail. Private seed companies have to maintain high standards of purity and at the same time try to maximize yields. The reputation of the company and its profitability depend to a large degree upon customer confidence.

There are a number of Zairian companies that, if shown how to profitably produce quality seed, would undertake the investment. If primary seed farmers were set up with private companies in the various regions of the country, seed production, marketing, and distribution costs could be reduced.

Possible companies to approach might be: GECAMINES in Lubumbashi; Ferme de Mbali and Domaine d'IRI in Kinshasa; Estagrico in North

Shaba; PLANKUMU in Kisangani; and African Coffee Company in Kivu.

Private Voluntary Organizations (PVO's) would also be possible contacts, although they might be better distributors of seed than producers.

Working with larger, well-financed private agricultural companies in Zaire has the following advantages: (1) the staff is usually well trained; (2) modern production practices are already used; (3) access to foreign currency helps to finance the equipment necessary; (4) the transportation channels have already been worked out; and (5) the companies have a profit motive.

In order to undertake seed production, each company would need to: (1) be introduced to modern seed production technology by study tours to other countries or by bringing in outside help; (2) begin training its staff by undertaking pilot production of various crops; and (3) develop in-house demonstration or extension programs to show farmers how to best use the new varieties.

To sustain its operations and keep abreast of the latest technology the companies would have to: (1) continue to test new varieties developed by national and international research programs; (2) develop the most economical production procedures through a production agronomy program; (3) be able to keep production costs as low as possible without jeopardizing quality; (4) develop a proportional pricing system, which would be fair to the farmer while insuring a reasonable return on investment; and (5) construct a distribution system that would insure a timely delivery of seeds to growers.

### ***Organization of Seed Industry***

National research programs would have the responsibility to develop new cultivars, varieties, and hybrids.

The breeder seed would be handed

over directly to the seed companies for bulking up. (This seed could be purchased to defray research expenses.)

The seed company would undertake multiplication of successive generations of seed. The seed would be harvested, conditioned, stored, and distributed to dealers within the territory of each company.

### **Quality Control**

The National Seed Bureau (Bureau National de Semences—BUNASEM) would set the minimum standards for quality control for each step in the seed production process. Among these could be: isolation distances; percent of off-types in field; percent of non-seed material in bag; percent varietal purity; germination percentage; and size limits.

BUNASEM would have inspectors visit the fields and check the quality of work and state if the government standards have been met.

During or after conditioning, samples of the seed would be taken for purity and germination checks. If the seed passed all inspections it would be certified and sold by the company.

Each company would carry out its own quality control program parallel to the government's. In fact, the company should try to set its standards higher than the government.

The Government might want to charge a fee for its field inspection and conditioning inspection. This could be on a "per hectare" or "per bag" basis.

Each company would be responsible for marketing its own production as best it could. Prices would reflect the real economic conditions within the territory. The Government would not intervene through price controls. If a company were unable to sell its seed at a fair price, it would bear the consequences. Since different companies might be producing the same varieties

(assuming all are government-released) there would be very little price differential between them.

Consumer preference for seed produced by different companies would be built up by making available a higher quality seed and by providing support services, such as extension service, technical assistance, or credit facilities.

### **Fertilizers**

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In addition to direct benefits from enhanced yield, fertilizer availability at the small farm level could contribute to reducing slash and burn forest destruction by sustaining yields year after year at a fixed location. This brings the additional advantage that production remains close to, and justifies, development of infrastructure.

Ultimately, small farmers should have ready access to chemical fertilizers and the yield increases possible through their use.

Biofertilizer technologies can substitute for chemical fertilizers to a certain extent. These involve strategic use of legume crops and trees in multiple cropping systems. Biofertilizers, such as rhizobial inoculants, are much lighter and less bulky than chemical fertilizers and do not present the same distribution problem. And more importantly, they are very inexpensive. Further effort to develop various types of biofertilizers is recommended.

As long as infrastructure remains such a constraint to agricultural production, any steps taken to recover or enhance the soil fertility of the abandoned agricultural lands around centers of population (markets) seems desirable. Careful economic analysis within the context of detailed feasibility studies of the low fertility areas should be considered using locally available fertilizers.

## High Technology and Production

Modern scientific discoveries have resulted in greatly improved agricultural methods and vastly increased productivity. A majority of these agricultural miracles have occurred during the past generation, and further scientific breakthroughs are now occurring routinely.

Several new agricultural techniques and products might be appropriate for Zaire: (1) genetic engineering and embryo transfer techniques, which could improve the quality of livestock herds; (2) improvement of cultivars through selection of superior performing genotypes and modern plant cell and tissue culture technology; (3) biofertilizers and enzymes that can accomplish nitrogen fixation, phosphorus absorption and soil conditioning; (4) biocontrol through the employment of microbes used to fight plant diseases; and (5) chemical preservation techniques that can keep meats, fish and other products fresh for extended periods without freezing.

### *The Task Force recommends:*

- Develop and promote a small farmer credit system to ensure the ability to purchase necessary inputs.
- Provide specific training and experience on all aspects of seed production, including agronomy, field techniques, labor organization, harvesting and conditioning processes. It is particularly important to teach workers how to maintain the purity of each variety. Improve seed harvesting, conditioning, and storage facilities.
- Seek private companies and private voluntary organizations that have the expertise, resources, and interest to produce seed for resale to farmers.
- Establish a national seed policy and set minimum quality control standards for the industry.
- Price seeds to include real costs and profit.
- Seek technology to produce fertilizers in Zaire.
- Produce fertilizer on a small scale and distribute it regionally.
- Review high technology inputs for use in Zaire. Emphasize practical applications, which can be introduced at the field technician level, so that prompt improvements can be achieved.

45	<u>Constraints to Development</u>
	<u>Infrastructure</u>
	<u>Taxes</u>
	<u>Environmental Concerns</u>
	<u>Soil Conservation</u>
	<u>Lack of Incentive</u>
	<u>Slash and Burn Agriculture</u>
48	<u>Long-Term Strategy</u>

Zaire has significant forestry resources, including 65 million to 80 million hectares of exploitable forests. The country has the beginnings of a good species identification and forest inventory system. The Government of Zaire is interested in developing forestry, and markets for the wood that already exists. There are qualified, dedicated forestry personnel, as well as existing companies with many years' experience in Zairian forests.

At the same time, there are stumbling blocks to forestry development. The weak or non-existent transportation systems make it difficult to haul the wood to market. The per-hectare volume of currently marketable timber is very low compared to areas like Southeast Asia. Zaire's lumber mills critically need capital for improvements. There is a significant gap between the expectations of the government and the ability or willingness of industry to meet these expectations. Slash and burn agriculturists are destroying forests and wildlife habitats, but little is being done to counter these activities or to reforest denuded and eroded land. Supplies, tools, and spare parts for forestry equipment are difficult to import. Furthermore, the fact that forestry is separated from the agricultural sector, rather than integrated as a subsector, diminishes its potential contribution to the Zairian economy.

### Constraints to Development

Zaire has nearly 50 percent of Africa's forests, yet it harvests less than a half million cubic meters of wood per year. The government would like to see six million cubic meters cut each year. With proper management, the forest will sustain many times that level.

## ***Infrastructure***

There is a strong feeling among the forest industrialists of Zaire that current constraints on transportation will preclude more than a half-million cubic meters per year being moved through the system. Primary constraints include not enough space at the port of Matadi, insufficient rail cars to move logs, and preferences to other commodities and countries in the usage of ONATRA's barges.

The cooperative forest inventory system with Canada is an excellent start in understanding the nature of the Zairian forests. The procedures for follow-up surveys and application for concessions seems reasonably well thought out and explained in a recent document. However, the procedures should be somewhat flexible and adjusted as experience dictates.

## ***Taxes***

There appears to be a significant gap between the expectations of the government and the ability or willingness of industry to meet these expectations. In addition to concerns about transportation, members of the forest industry feel that taxes on forest products are the highest in Africa. Some current taxing schemes are cumbersome and actually work against the further development of forest industry. For example, the taxes on furniture manufactured in Zaire are greater than those paid on imported furniture.

The reforestation tax proposal needs further thought. First, the roles of industry and government need clear definition. Given adequate incentives and controls, private industry seems to do a better job on reforestation than government agencies. Nevertheless, government-set standards and followup inspections and actions are essential to see that the job gets done.

Currently the prime cause of deforestation is shifting agriculture, accelerated following access provided by logging. It seems unfair to put the full burden of reforestation onto the forest industry when the areas in most need of reforestation are outside the concession areas. In the interim, perhaps the government should take a role in establishing test plantations of various species on various soil types. However, in the long run the forest industry with its infrastructure and production orientation should be used where possible. Other alternatives include contracting reforestation with companies specializing in reforestation or giving tax or timber incentives to industry in trade for plantation establishment. However, industry would have to hire qualified regeneration specialists to accomplish this.

## ***Environmental Concerns***

Zaire has the potential to become a world leader in the conservation effort while pursuing rapid development of its resources. The country's huge size and relatively small population provide a unique opportunity for development to satisfy today's needs while also harbouring an environmental reserve for the future.

Zaire has one half of the forest reserves of Africa and a high percentage of the undisturbed tropical plant and forest area of the world. It also has the last major reserve of certain wildlife species, especially African elephants, which have been drastically reduced in numbers elsewhere.

If the development of Zaire's natural resources is coupled with conservation techniques, the resource base will be available for future generations.

## ***Soil Conservation***

Deforestation, slash and burn agriculture, and pasture deterioration

are accelerating degradation and loss of soils country-wide.

Development projects could meet this crisis by offering cropping systems approaches, rather than single commodity production in monoculture systems.

Adoption of a cropping systems approach presents a greater input and market development challenge, since inputs and markets are required for several production outputs. But attention to cropping systems, particularly those including legumes have clear benefits, including: sustained soil fertility; retained soil physical structure; retained organic matter; yield and income stability; reduced soil loss and erosion; moderation of the drought-flood pendulum; and diversification of the nutritional base of the farmer's diet.

Systems employing deep-rooted perennials, including multipurpose arboreal species and fruit trees have particular promise to offer these benefits.

### ***Lack of Incentives***

Current tax systems do not give sufficient incentive for using lesser-known species. Regarding the use of these lesser-known species, the Government has a much more optimistic idea of what can be done than has industry. More cooperation is needed to develop new uses for second and third class species.

The Government feels that existing companies are failing to modernize their plants but rather are milking them for profits. But industry says it doesn't have the money to modernize the mills that have been allowed to deteriorate in the period following Zairian independence. In order to interest other companies in coming to Zaire, it is essential that every reasonable effort be made to help existing forest products companies grow and prosper. One common concern of

industry is the sudden changes made by the government without consultation or inputs by industries. Governmental forestry personnel are making sincere efforts to correct this and have asked industry to review several recent proposals.

Concerns over import inefficiencies run throughout all industries. Whatever can be done to improve this will help the forest industry as well.

### ***Slash and Burn Agriculture***

As in all tropical forests, the problem of slash and burn agriculture is a serious and immense one; most of the forests of Bas-Zaire, along with many of the forests in Bandundu and Kasai-Occidental, have been destroyed by slash and burn agriculturalists. In many areas of these regions, the farmed-out soils are eroding badly and are being abandoned. It is questionable whether or not these lands will ever return to forests naturally because of repeated fire and lack of seed source.

When the virgin forest is logged, slash and burn agriculturalists quickly move in along the roads and remove the residual forests by cutting and burning. Logging only removes 2-3 trees per hectare; the remaining 50 or so are felled by the farmer or killed by his fire. The Government expects the forest industry to protect forests from farmers. This has not been effective elsewhere. It seems unfair to expect industry to try to accomplish what should be the duty of the government. In order to develop agriculture and forestry in a planned way, the government must take the lead role in establishing and enforcing policies of land classification and ownership or tenure.

Industry can help by providing jobs and by cooperating with government policies, but it cannot be expected to keep the people off the land opened for logging. Industry should cooperate

with the Government to help develop agricultural systems that include annual and perennial legumes and multipurpose tree species that reduce the need for nomadic agriculture by sustaining soil fertility, improving soil structure, reducing soil erosion and providing a more diversified diet. Voluntary groups can play an important part in making these more permanent cropping systems work.

### Long-Term Strategy

Zaire should not let the presence of its immense forest assets blind it to the need to begin reforesting some of its vast areas of denuded, eroding land. It should study the experiences of countries like Brazil to see if reforestation incentives as used there will help Zaire achieve similar results. At Aracruz, Brazil, for example, plantations of Eucalyptus produce 50 cubic meters per hectare per year and are cut on an 8-year cycle to produce raw material for a world-class pulp mill. Several million hectares of plantations have been established in Brazil on denuded lands as a result of plantation incentives offered industry. Government forestry officials place reforestation of denuded areas in second priority because of factors such as land tenure problems, population problems, lack of money and poor soils. Some companies in Zaire would undoubtedly be willing to follow the Brazilian example given a balance of incentives that includes tax concessions, longer term tenure or land ownership, and preferential treatment relative to existing forest resources. Although it is too soon for Zaire to invest in a pulp or paper mill, the government should start now to develop several industrial-sized plantations near good water transportation with this option in mind.

In addition, local people should be encouraged to plant trees for fuelwood, fruit crops, animal feed and soil protec-

tion in all localities. This will not be easy to achieve because of traditions and customs developed over the years relative to the forest. A look at what the People's Republic of China has done would be worthwhile.

A research and extension program in silviculture (both industrial and rural) is essential to achieve the potential of Zaire's forest resource. Donor nations should be encouraged to support this effort.

Forests can be a renewable, controllable resource. Countries like Zaire that have immense forests sometimes fail to realize this and do not give the attention to forest industry that they do to more lucrative, non-renewable resources such as petroleum or minerals. This is a mistake that will lead to significant problems and lost opportunities later on. Forestry in its usual definition includes not only production of wood, but also protection of soils and watersheds, wildlife protection and production of food from trees for humans and domestic animals.

Considering the importance of the remaining timber crop of Zaire along with the need of forests to protect and rehabilitate soils and watersheds, it seems that forestry should receive attention. Some countries, such as Indonesia, have a ministry of forestry. The word "forestry" does not even show up in the title of the Zairian ministry in which it is administered. It is certainly possible that forestry is properly located, but it would be worthwhile for Zaire to examine how other countries, including Brazil, have organized their forestry departments to achieve similar objectives.

#### *The Task Force recommends:*

- Give full consideration to forest industry needs in any action taken to improve the transportation system of Zaire.
- Look at countries with strong forest industries to see how they have

organized their forestry departments in order to achieve desired results.

- Expand current efforts to encourage private investment in the forestry sector. Special emphasis should be placed on helping existing forestry enterprises succeed and prosper. This will be an incentive for other companies to invest in Zaire.

- Re-examine current tax policies and procedures in light of results desired. Current tax policies seem cumbersome. The proposed forest regeneration tax and procedure will not accomplish the Government's objective of reforestation.

- Study the forest incentives systems used by Brazil to see if similar incentives would be useful in strengthening the forest industry in Zaire.

- Link forestry closely with agriculture and rural development in order to develop policies and practices to cope with the slash and burn issue. The forest industry can help implement policies, but cannot be expected to govern people who have been using this practice for centuries.

- Seek additional donor country support for research and education in forestry with emphasis on reforestation of denuded, eroded lands. In time it will be essential for Zaire to have forestry and forest engineering education at the university level.

- Provide further incentives to encourage markets for wood of non-traditional species, including support for manufacturing and export of secondary forest products such as railroad ties and furniture blanks.

- Evaluate benefits and risks of long-term licenses for forest concessions in order to encourage more permanent attitudes towards forestry and land management.

- Continue to improve efforts to discuss planned changes of regulations in order to arrive at policies and procedures that are workable.

- Practice conservation techniques to preserve Zaire's natural resources.

- Stop the poaching of elephants, which has achieved tragic proportions for relatively modest amounts of ivory, and initiate a rational program for hunting and utilizing wildlife for economic return.

- Invite the World Wildlife Fund (WWF), the International Union for the Conservation of Nature (IUCN) and the Educational Foundation of the Safari Club International (SCI) to provide educational programs and funds to promote conservation objectives.

- Address quickly and decisively the problems caused by slash and burn agriculture. The Ministries of Agriculture and Environment, Conservation, and Tourism must work closely together to accomplish this.

- Develop cropping systems including deep-rooting perennials to stabilize deforested soils, and offer farmers sustainable production systems as an alternative to shifting cultivation and slash and burn agriculture. Consider fast growing, multipurpose leguminous trees and fruit trees for inclusion in such sustainable production systems.

52	Traditional Subsector
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In Zaire, food crop production dominates the agricultural sector, but increased emphasis is now being placed on livestock production. This field has excellent potential for development but it must be placed within the context of a national development strategy. Beef cattle production dominates the traditional and commercial operations. Goats, swine, and poultry production are confined primarily to subsistence farms. It is estimated that livestock contributes only six percent of the value-added in agriculture, and only 3 percent of the rural population is engaged in this industry.

In general, livestock husbandry is practiced inefficiently in traditional farming systems. In Zaire there are approximately 600,000 to 650,000 head of cattle raised under traditional systems. Herd sizes range from a few animals to 70 head. The well developed commercial ranches, established prior to Zaire's independence, have declined in both number and total output. Presently, approximately 400,000 to 450,000 head of cattle populate the large commercial operations, which include private ranches, state and mixed companies, as well as missions. Since 1977, livestock production has grown slowly due to factors encompassing the total agricultural sector. Improvement of livestock production efficiency must be approached within a total farming system context, considering both the traditional and commercial subsectors.

Traditional livestock activities are practiced throughout the country. However, the largest concentration is found in the Haut-Zaire, Shaba, Kasai-Occidental and Kivu regions. Although 34 percent of Zaire's land area, most of it in the savanna belt, is classified as natural grasslands, only 10 percent

of pastures are now productively exploited. Diseases, particularly trypanosomiasis, endemic in most of Zaire, play a major role in confining livestock development to certain regions. The modern sector's principal ranches are located primarily in the Bas-Zaire, Bandundu and Shaba regions.

Any national livestock development strategy must include: (1) conserving and protecting the land, vegetation, and water resource base upon which livestock production depends; and (2) improving grazing and crop-livestock systems in which livestock are found. A comprehensive livestock development strategy with clearly stated goals and objectives must be designed and articulated as a reference point, if livestock production potential is to be reached.

Livestock development involves a complex interaction of technical, economic, and sociocultural factors leading to considerable uncertainty as to response to innovations. The important constraints to the expansion of Zaire's agricultural sector and thus the livestock area can be inherently found in the larger sphere of economic development. These include, but are not confined to, land tenure, markets and transportation, credit, human resources, government policies, and sociocultural values and institutions. The development of such a national policy requires also the institutional capability to carry out the strategy, and must be keyed to other national research and educationally related programs. An important ingredient in the design must include a two-way flow of technology: from the researcher to the extension agent to farmers, and then a feed-back loop from farmers to the extension agent to the researcher. Such a strategy approaches the farm as a whole and thus recognizes that livestock is an integral component of the total farm ecosystem.

The general national strategy toward livestock not only must take into con-

sideration country development objectives, technical capabilities, institutional structure, but also its economic resources. The livestock development strategy of Zaire must incorporate both the traditional and modern livestock subsectors with the establishment of an appropriate administrative agency given the responsibility of implementing policies which equally affect both subsectors.

The success or failure of the livestock development process in any developing country depends heavily on its policy framework and the initiatives taken by government leaders, decision makers and planners. Sound policy relies on free markets and the provision of adequate production incentives. At the heart of those constraints which affect livestock development in Zaire is the lack of the basic infrastructure essential to maximum land utilization.

Infrastructure requirements include water supply, roads, bridges, feeder livestock routes, a communication network and transport equipment. Of highest priority for developing the agricultural enterprise (and thus the livestock sector) is the need for the Zairian government to focus on the rehabilitation, maintenance, and expansion of the existing infrastructure. Priority considerations should be given to geographically targeted areas having the highest potential for livestock development.

### **Traditional Subsector**

The North Kivu region was visited by members of the Presidential Agricultural Task Force (PATF) and provided an opportunity to assess livestock activities in farming systems ranging in size from a few head of cattle to a 3,000 head operation. Although the constraints are examined as discrete factors, it is recognized that interaction among them is the rule and their effects are often multiplicative. The

North Kivu region contains approximately 280,000 head of cattle and an active livestock development program. Several programs designed to assist the traditional livestock producers are being undertaken by the Food and Agriculture Organization of the United Nations (FAO), the Government of Zaire, the Canadian government and the Peace Corps. FAO emphasizes pasture improvement, animal health and production. The Canadian Government emphasizes institutional development, extension service in animal health, and marketing strategies including the construction of a slaughterhouse. The Government of Zaire contributes technical and basic infrastructure via its Directorate of Animal Production in the DOA, and the Peace Corps is assisting in the provision of veterinary services.

### **Pasture Productivity and Management**

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Task Force members were impressed by the apparent abundance of standing pasture in areas such as M'Vuazi, Shaba, and elsewhere. Pasture issues were only examined closely in North Kivu, a main area of livestock production in Zaire. Some legume and grass species were observed in a plant introduction garden at the INERA M'Vuazi station, but it was not clear whether these went forward to a testing and evaluation program.

The North Kivu area is one of the principal livestock production areas of Zaire. Production is based on five types of pasture lands, which correspond to variation in altitude, moisture availability and soil type. The most productive pastures are found at altitudes greater than 1,800 meters. These are relatively new grazing areas, almost all of which were developed within the last 30 years. The original bamboo forest was stripped, and an entirely exotic mixture of landino clover

and kikuyu grass was planted in the rich volcanic soils.

Most pastures of this type are found in the Masisi area, which is northwest of lake Kivu and the town of Goma. A small amount of pasture land of this type can be found in the Lubero area. Rainfall in the Masisi is high, averaging 2,487 mm per year. Carrying capacity is approximately one large animal per hectare if no improvements are made. Maintaining the clover content can drop the amount of land required to between .6 to .7 hectares per animal. About 25,000 hectares of this type of pasture are found in North Kivu, and most are privately held.

In roughly the same area, there are also stands of pure kikuyu grass. On these pastures, about 1.5 hectares are required for each large animal. Pastures of this type are generally found on common or rented grazing land, explaining the lack of improvement. Estimates of the area of unimproved, highland pasture are not precise, but the Zairian Department of Agriculture believes that 48,000 hectares of this type exist.

At altitudes lower than 1,800 meters, a third type of grazing land is found. The areas of Rutshuru and Lubero and virtually all of the Beni area have some of this type of pasture (rainfall between 1,300-1,500 mm). Found on good soils is a procession of *Digitaria*, *Paspalum conjugatum*, *Cynodon dactylon*, and *Brachiaria*. In its natural state, 2 to 3 hectares are needed to support each large animal unit. Increasing the amount of *Brachiaria* and introducing *Stylosanthes* would bring capacity close to one hectare per animal.

At altitudes of less than 1,700 meters, an additional low quality pasture is encountered. Loss of soil fertility through erosion and persistent burning will result in higher nutritive value grasses being replaced with *Lymbopogona*, *Imperata*, and *Hyparhenia*

*species*, especially in areas where the dry season is two months long. Carrying capacity drops dramatically, with 5 hectares per animal required. About 50,000 hectares of this type of degraded pasture are found in Southern Lubero, Ikobo, Bulindi, Ishasha, and Mutwanga. Introduction of *Chloris*, *Cenchrus*, *Brachiaria* and *Stylosanthes*, and suppression of burning could restore capacity back to 2 to 3 hectares per animal.

A further type of pasture is limited to the area of Mitumba in the south of Kanyabayoy. This mixture of ferns, heather, and *Eragrostis* carries only one large animal on 5 hectares. Introduction of *Melinis minutiflora* can reduce this requirement to 4 hectares.

A French-Canadian agronomist working with FAO in the North Kivu area said that pasture degradation is a socio-economic problem. Burning is done by migrating herders who rent land. Once the pasture is degraded, young shoots of *Cymbopogon* that result from burning make the best forage, resulting in continued degradation. He also pointed out that: (1) expansion of pastures would have to be done in the 30,000 hectares of low altitude forest which are outside of the park system; (2) the concentration of grazing areas near roads is hastening erosion and land degradation; and (3) the FAO program emphasizes protection and improvement of pastures.

A 1,000 hectare communal pasture near Goma was being improved with Macharin plantings and *Glycine wightii*. Propagation was by material grown in an FAO nursery and planted by volunteer herders who would use the pasture. Seasonal shortages of planting material was reported to be a problem.

## **Nutrition**

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Production potential of the livestock sector is dependent upon adequate nutritional intake from grazed forages,

particularly during the dry season. The availability of water is a major factor in nutrition and is often a serious limitation in the Goma Region. Cattle are being driven 12 to 15 kilometers for water once a week. A pilot effort to alleviate this problem is being undertaken by the FAO group.

## **Health**

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The incidence of diseases, which can pose a major impediment to livestock production, is unknown. An appropriate disease surveillance and diagnostic service is not operational in North Kivu, and apparently nonexistent at the national level. Although substantial progress has been made worldwide in technology for prevention and treatment of animal health problems, the means to deliver this technology are not present in North Kivu and throughout Zaire. Ticks and tick-borne disease are especially prevalent in the North-Eastern region. Of major significance are theileriosis, prioplasmosis, anaplasmosis, foot and mouth disease, tuberculosis, brucellosis, and anthrax.

Another important health factor noted in North Kivu, apart from diseases and undernutrition, is the presence of numerous internal and external parasites. Although not normally cited as directly resulting in the death of adult animals, parasites inflict mortality and morbidity to young livestock and contribute largely to the course of other diseases. The importance of these parasites to nutrition and disease is not fully recognized by livestock owners or by the paraprofessionals working with the owners.

## **Breeding**

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Efforts to improve genetic potential by the introduction of Brown Swiss into the region as meat/milk type is proving successful in the higher

altitude regions. Similar successes for the South Kivu region have not taken place. Two interrelated factors must be considered in livestock genotype improvement programs, genetic potential for adaptation and genetic potential for improved productivity. The genetic potential for adaptation must take precedence over improved productivity.

### Livestock Management

High density livestock populations in Ituri and North Kivu regions require further attention to range and livestock management practices. The livestock management constraints of this region are multifaceted and are largely of sociocultural origin. As an example, nonproductive animals are not routinely culled and thus consume limited feed needed for maximum livestock productivity. Many cattle are kept in the herd without regard to calving records and/or other reproductive history.

### Marketing and Production

The most pressing marketing problems noted in North Kivu are the lack of cost reducing infrastructure such as roads, bridges, local and central marketing facilities, and market information. The availability of credit for the traditional livestock producer is virtually nonexistent. SOFIDE (a development finance institution) personnel in the region indicated that only medium to large producers are considered for credit with low priority being given to all livestock producers versus the other agricultural segments. Livestock production is a long-term process and is a high-risk venture. Because of their limited resources, a workable credit system is imperative for limited resource farmers.

The inadequacy of livestock processing and marketing facilities is evident.

Livestock production areas are quite removed from, and in some instances, totally inaccessible to slaughtering plants. Cattle driven long distances to market lose weight and become less profitable. The establishment of a network of small local slaughtering plants located near the source of cattle supply must be an integral component of any long-term marketing development strategy.

### Veterinary Services

It is well known that the status and decision-making power of the veterinary services in developing countries are generally linked to the impact of diseases on livestock in the respective countries and to the importance of the economic losses that these impacts produce. Due to the fact that the livestock industry is so severely underdeveloped in Zaire, veterinary services have not received sufficient attention by the Government of Zaire.

Establishment of a comprehensive and effective veterinary service is essential for livestock development to take place. Veterinary service provided by the Government of Zaire in the North Kivu region, while advanced compared to other regions, was very inadequate. Lack of basic inputs to undertake appropriate animal health programs prevented any substantial veterinary public health activities from taking place. Problem areas identified include: absence of a disease surveillance program; absence of a functional comprehensive diagnostic laboratory; absence of a quarantine system; and absence of an effective veterinary public health program (e.g., meat and dairy inspection).

### Livestock Cooperatives

The development of the livestock cooperative, Acogenoki (Cooperative Association of North Kivu Livestock

Growers), has had a major positive impact on livestock development in this region. The co-op represents 10,000 livestock owners with a cattle population of 350,000. The overall objectives of the co-op are to: (1) provide appropriate veterinary services to its members; (2) address specific problems of the members (e.g., land tenure, marketing; access roads); (3) develop pasture and range lands; (4) improve herds through the introduction of new genotypes; and (5) improve extension services.

Through the provision of support group activities (Government of Zaire, Canadian Government, FAO, Peace Corps), the co-op provides veterinary products to its members at a reduced cost and is able to obtain revenue; the latter is then used to expand services provided.

### **Modern Subsector**

The number of pastoral companies (private ranches, state and mixed companies, and missions) with operations of a few hundred up to 42,000 head of cattle has decreased significantly within the last two years. The factors contributing to the depression of the modern livestock (cattle) industry are the result of the macroeconomics of Zaire. Currently, locally produced beef products are approximately 25 percent more expensive than imported ones.

Modern livestock producers are responsible for more of the total market end-product than traditional producers. Recent trends reflect a decrease in the number of producers who can be classified as having major ranch operations; they face urgent marketing and production economic problems. These operators have invested heavily in pasture development and genotype improvement techniques in the past. Because of the availability of range land, limitations in breeds

with trypanotolerant characteristics, and current marketing economics, less effort has gone into improvement of range and livestock management programs in recent years.

The problems experienced by this livestock subsector are in general similar in nature to many cited above. Of particular note is the lack of basic infrastructure, including processing, storage and transport capacity. Ranching companies are represented in the Association National d'Enterprises Zairoises (ANEZA) and therefore have a voice in addressing issues of concern to the Government of Zaire. There is no comparable representation on the part of the traditional farmers. These large livestock operators have consistently incorporated good animal health, nutritional and management programs into their highly intensified operations. The principal issues noted have been: competition from imported meats, taxes, credit, and theft.

During the past several years, demand for meat greatly exceeded supply. Livestock product imports, therefore, have been substantial. Official estimates show that approximately 22,000 tons of beef are imported each year. Most of the imported meat is country-origin subsidized and is cheaper than locally produced beef. This differential has been estimated to be 25 percent. Large producers continue to emphasize the need to place an import tax on the imported meat. Without such, this segment of the industry will continue to have serious difficulty surviving.

Current tax laws on essential livestock production inputs which are imported place a heavy burden on the producers. Many supply items, such as fencing materials and veterinary drugs, have sizeable import taxes.

Livestock production requires long-term investment. Therefore, the price and availability of capital are important ingredients in an intensified livestock

production system. Currently, financial institutions in Zaire provide few long-term loans and give livestock development a low priority.

Particularly prevalent in large operations is the loss from theft. The JVL Company, a major ranch operation in Zaire, estimates a theft loss of four percent. This can be a significant factor in determining profit and loss.

### **Small Ruminants, Poultry, and Swine**

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Little opportunity was provided to assess the production economics of these species. Livestock production (live weight) data show large increases in swine, sheep/goats and poultry production over the last three years. A careful analysis of these livestock industries would be a timely exercise.

### **Training**

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Well-trained agricultural personnel in Zaire are limited. This is due in part to the lack of agricultural training programs and to the fact that facilities such as the School of Veterinary Medicine at Lubumbashi are relatively new. Provision of appropriately trained human resources is critical as a part of the long-term livestock development strategy. Trained personnel must be available at three principal levels: policy-making, managerial and technical. The importance of trained personnel at all levels, if livestock development in Zaire is to take place, cannot be overemphasized. The training must be both formal and nonformal and must encompass the broad areas of animal production, husbandry and veterinary medicine.

### **Research**

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An assessment of research activities related to livestock development was

undertaken. Of the 21 INERA stations, one station, located in Nioka, Haut-Zaire, is involved in livestock development activities. There is a 4,000 head cattle ranch associated with these research activities. Two veterinarians and one agricultural engineer are engaged in this activity. The veterinarians are graduates of the University of Lubumbashi.

Research activities include studies on the classical diseases; theileriosis and brucellosis along with some studies on selection and cross-breeding. Among the local breeds being studied are Bohema, Alur and Luguare; the imported breeds are Brown Swiss, Red Sindhi and Sahieval.

The research activity ongoing at the Natural Science Research Center (CRSN Lwira), Kivu, includes work in the area of ticks and tick-borne diseases in cattle. Scientific staff at this station include one veterinarian and one biologist. This program primarily involved a systematic inventory of ticks in the region.

It is apparent that the type of research needed to alleviate livestock production constraints is not ongoing in Zaire. Farming systems based research (multidisciplinary), both applied and adaptive, should be ongoing at national and regional levels. Additionally, problem-oriented research to generate new technology is needed. Such research should include the incorporation of desirable production and disease and pest resistance traits in animals, improved biological control methods of major livestock pests and strategies for the marketing of livestock.

The transfer of appropriate high technologies involving livestock should be an objective of Zaire's agricultural development process. Modern scientific discoveries result in greatly improved livestock methods and vastly increased productivity. A

majority of such "agricultural miracles" occurred during the past generation and further scientific breakthroughs occur routinely.

These new agricultural techniques and products should be reviewed in a conscious manner to determine which of them could be applied successfully to the Zairian situation. The emphasis should be on practical applications, which can be introduced at the field technician level, so that prompt improvements can be achieved.

Specifically, the following high technology procedures might be considered in detail:

- a) Genetic engineering and embryo transfer techniques to improve the quality of livestock herds.
- b) Chemical, packaging and other preservation techniques to keep meats, fish and other products fresh for extended periods without freezing.

*The Task Force recommends:*

- Design of a comprehensive livestock development strategy within the context of the larger agricultural economic development plan. Issues to address include markets and transportation, credit, land tenure, human resources, government policies, and sociocultural values and institutions. Emphasize improving animal nutrition and genotypes to increase production efficiency.
- Establish an effective disease and parasite control program including disease surveillance, improved

diagnostic capability, adequate quarantine services, and appropriate veterinary preventive measures.

- Undertake a national animal research disease program that identifies and addresses priority livestock-production system constraints. Such a program should complement ongoing regional and international laboratory activity, such as ILCA, ILRAD and ICIPE.
- Gear training activities to providing suitably trained personnel at decision-making, managerial, and technical levels.
- Re-examine the current policy of a lack of an appropriate tax on imported meat.
- Undertake a comprehensive study of the potential importance of developing national strategies for the expansion in production of small ruminants, poultry, and swine.
- That training, research and extension in livestock should include small ruminants, particularly goats, which play an important role as food in most villages.
- Improve pasture production and management as part of any endeavor to increase livestock production. Consider adopting legume-based pasture systems and discouraging the practice of burning. Establish strong linkages between the national pasture program and specific International Agricultural Research Centers to take advantage of pasture technology that is already available and could be appropriate to Zaire with minimal adaptive research.

## Appendices

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**Statement of Appreciation to President Mobutu  
And Presentation of the George Washington Carver Medallion  
by Benjamin F. Payton**

Place: Presidential Palace  
Kinshasa, Zaire

Date: February 4, 1985

Mr. President:

It was my privilege and pleasure to accept the invitation of the President of the United States to serve as Team Leader of this Presidential Agricultural Task Force to Zaire. On behalf of the entire Task Force, I wish to express our deep appreciation for this magnificent reception you have given in our honor. The warmth and cordiality of this occasion have been matched only by the receptivity and openness of the people of Zaire whom we have had an opportunity to meet since we have been here. We know that such receptivity by the people, symbolized and replicated in this grand event tonight, was made possible primarily because you wished it to be so. For all of this, we are most grateful.

On behalf of our entire Task Force, I wish to present you this token as an expression of both our gratitude and our hope for what will result from our work here. I can think of no more fitting symbol for our mutual hope for agricultural and economic development in Zaire than this Medallion, struck in the image of one of America's most distinguished agricultural scientists, who was also a son of Africa—Dr. George Washington Carver. Educated at Iowa State University, Dr. Carver's research, teaching, and extension activities were major factors in developing agriculture in the southern part of the United States into a diverse, vibrant, and productive enterprise.

It is my honor to serve today as President of the university where Dr. Carver carried out his work—Tuskegee Institute—and to give leadership there to the continuance of the tradition he began. That tradition, even more important today for a hungry and famished Africa than it was for a depleted agriculture in the southern United States when Dr. Carver lived, stresses the inherent linkages among teaching, research and extension.

George Washington Carver understood as you do, Mr. President, that economic development cannot occur without agricultural development; that agricultural development cannot occur without a substantial investment in research, and in the application of research results, to the end that people are fed, jobs are created, and a stable and vibrant political economy is developed.

Mr. President, it is with great pleasure and high esteem that I present you the George Washington Carver Medallion on behalf of the entire American higher education, research, and extension community.

Thank you Mr. President.

Forest Plantation Experience  
in ZaireObservations of Dr. Norman  
Johnson

Zaire would not be starting from zero should it desire to start forest plantations. In my travels I observed the following:

*Agrifor* in Bas Zaire has experience with *Limba* (*Terminalia superba*) and *Ceiba* (*Ceiba pentanda*). Some of their trees are 50 years old and have achieved diameters of up to a meter. Their method of planting is to clear lines 12 meters apart and plant either potted or bare root seedlings two meters apart. The lines are weeded each 6 months, the first couple of years and less frequently later on. By cleaning whole areas and planting at closer spacings I believe yields of 20-30 M<sup>3</sup>/ha/year could be attained.

*Kisantu Botanical Gardens*: Trees at the botanical gardens at Kisantu (120 km from Kinshasa) were started in the early 1900's. Although it is not possible to get yield figures from arboretum plantings, individual tree performance can give some useful information. Some of the impressive trees observed were:

1. *Agathis loranthifolia*: Very straight, up to a meter in diameter. Also noted growing along streets in Kinshasa. An excellent, long fibered member of the pine family. Wood sought after in Japan.
2. *Araucaria bidwillei*: Straight, up to a meter in diameter. Has wood properties similar to *Agathis*.
3. *Hopea odorator*: Over a meter in diameter.
4. *Khaya ivorensis*: A native mahogany, was growing very well there. Some trees were over 150 cm in diameter.
5. *Bertholletta excelsa*: A meter plus in diameter.
6. *Cleistopholis glauca*: A meter plus in diameter.

7. Several unidentified species of *Eucalyptus*.

8. An unidentified species of pine that was nearly a meter in diameter.

I could find no one who knew when each of the plantings had been made, but assuming that they were put in when the arboretum was first started, one would put their ages at 50-75 years.

*Pine Plantations:* About 20 km out of Kinshasa on the road to Kisantu, I [the team] noted a small pine plantation. On checking with Forestry, I learned that there were 3 species there: *P. Caribaea*, *P. Oocarpa* and *P. Kesiya*. *P. Caribaea* is apparently doing the best. They were planted in 1973 and are now 12 years old. Survival and form

are good. Foxtailing is less than I've noted elsewhere in the tropics.

CPA, a batik company, has experimental plantations of a number of pine species with resin production as the objective. Some useful information is available from these plantings.

At the Centre Technique Forestier Tropical across the river in The Republic of Congo there are extensive plantations of various species of *Eucalyptus* and *Pinus*. They have achieved yields of up to 50 M<sup>3</sup>/ha/yr with *Eucalyptus* and up to 30 M<sup>3</sup>/ha/yr with *Pinus Caribaea* and *P. Oocarpa*.

Other plantation results are summarized in the FAO report: Tropical Forest Resources Assessment Project: Forest Resources of Tropical Areas, Part I. Rome 1981.

## Example of Forest Industry Proposal—

### Observations of Dr. Norman Johnson

Concession in cuvette central large enough to produce about 400,000 M<sup>3</sup> per year.

100,000 hectares of land near navigable water, reasonably good soil. Lease or ownership for at least 60 years.

Industry pays government for half of wood that comes from concession in cuvette central.

For each hectare of bare land that is successfully reforested a hectare of free timber will be allowed to be cut and exported.

Plantations must be 2 years old and meet agreed upon standards before free timber will be given in exchange.

Company will be willing to work with agriculture to develop cropping systems in concession area to help reduce the effects of shifting cultivation. In turn the Government will provide protection of plantations in the plantation area.

Company will abide by manufacturing requirements on wood paid for and logged from the cuvette central concession, but will be free to export the wood given in exchange for plantations.

Plantation area should be within reasonable distance of phosphate deposits because the soils are likely to be phosphate deficient.

Company will be given authority to develop forest industry on plantation site or be allowed to sell their rights to others.

This kind of proposal would be attractive to some of the larger forest industries and would develop further the existing forest plus providing a way to establish an industrial sized plantation near a port.

## Successful Small Farmer Extension Programs

### Observations of several PATF members

Within Zaire there has been a long history of extension/demonstration programs. Today the entities conducting these programs have changed but their methodologies and success are comparable.

Task Force Team members were able to visit three such programs and each has unique characteristics worth examining.

### North Shaba Project (PNS)

The PNS has been a USAID Project since 1977. The primary contractor is Development Alternatives Inc. (DAI) of Washington, D.C.

The project as now structured has three components:

1. Upgrading and maintenance of roads.
2. Seed multiplication.
3. Demonstration/extension and training.

### **Roads**

The rehabilitation of the road system within the project area (over 700 km) is fundamental and crucial to the project's success. Without them it is virtually impossible to get inputs to the farmer, provide extension services, and to market the resultant crop.

### **Seed**

The seed multiplication is carried out in two ways. On the Ngaba farm, seed of Kasai I is increased in seed multiplication blocks. The resultant seed is then distributed to contract growers selected by project staff. This seed is harvested by the grower and purchased by the PNS. PNS then dries, shells, cleans and treats the seed for resale to farmers.

## ***Extension***

To insure the seed is properly utilized, a staff of 120 trained extension agents show farmers how to grow the crop. These agents are trained at Ngaba and are provided with small motorcycles or bicycles to insure they can get into the field. They are also paid a good salary and seem highly motivated.

The PNS has been very successful in producing and marketing its seed. Remaining problems are the need to increase the quality control of production, and to price the seed to reflect the true cost of production (gradually increasing seed prices to include costs of expatriate technical assistance is necessary to end subsidies which currently result in unrealistically low seed prices).

## ***C.E.P.S.E.***

The CEPSE program (Centre d'Exécution des Programmes Sociaux et Economiques) is located in Lubumbashi. CEPSE carries out social programs but also has an agricultural program.

CEPSE provides a group of farmers with all the necessary inputs to produce one-half hectare of maize. The farmer is given seed (Hybrid SR-52), N-P-K and Urea fertilizer, and a hoe.

At harvest time the farmer is required to repay CEPSE 4 bags of maize from the 1/2 hectare, (about 300 kg). This represents a fairly high sub-

sidy but it does get the farmer interested in improving his production.

## ***U.S. Consul-General Program***

The U.S. Consul General in Lubumbashi has a program similar to CEPSE.

About 300 farmers, each with a one hectare plot, are given 300 kg of 18-12-12 and 150 kg of Urea fertilizer, 20 kilos of SR-52 maize seed and a hoe.

The average yield for these fields is 6 metric tons per hectare. Some growers report after-expense profits of Zaires 220,000 per hectare.

It is the intention of the Consulate General Program to promote the upgrading of the local production, not to introduce a subsidized program. Now that the precedent has been established, it is hoped that local development funds will be forthcoming to promote farmer credit schemes.

Such programs as these, and others carried out by P.V.O.'s (Private Voluntary Organizations) are necessary to demonstrate the methodology of modern farming techniques and the value of the necessary inputs.

However, such programs should avoid subsidies after the initial introduction of the techniques. Farmers must be made aware of the market economy if they are to be pulled into the modern sector.

The establishment of production loans or credit unions are fundamental to the farmer if he is to fully realize the benefits of modern agricultural technology.

## Proportional Pricing Structure for Seed

### Observations of Dr. Michael Colegrove

Pricing of seed is a volatile issue in most developing countries. The first steps in developing a seed industry are usually taken by a governmental body. Far too often the price of the seed charged to the grower is below the cost of actual production.

Farmers (traditional and commercial) will respond to pricing mechanisms if they are convinced that the return on investment justifies the cost. Seed is an input and farmers will pay a reasonable price for it.

The question is: How to calculate a high enough price to entice private companies to enter into seed production?

Below is a concept to place a value on seed which accounts for the yield potential of improved seed within a given environment, and which also adjusts for prices paid to the farmer for his crop.

### Calculations

1. A series of plots containing all the varieties of the various crops are planted in the region in which the improved seed is to be introduced and sold.

2. The plots are managed in a way to get the full genetic expression and yield from the cultivar. All the necessary inputs are used: fertilizer, herbicides, insecticides. No calculation is made of the cost of inputs, nor their relationship to yield.

3. These plots are not research plots but rather small commercial fields so that the results are what a producer using inputs can reasonably expect.

4. The yield from the plot is then calculated, and the fair farm gate price to the grower is used to obtain the gross revenues per hectare.

5. A decision is made as to what percentage of the gross revenues would be a fair return for the seed used to generate the increased yield. This is usually between 5% and 15%. Gross receipts are calculated and multiplied by the return percentage.

6. The value of the seed on a per hectare basis (above No. 5) is reduced to a per kilogram base by dividing it by the recommended planting rate.

7. The formula for this procedure is derived as follows:

Yield Potential (YP) expressed as Kg/Ha

Farm Price (FP) expressed as Z/Kg (variable)

Percent Return (PR) expressed as % (variable)

Seeding Rate (SR) expressed as Kg/Ha (variable)

Seed Value (SV) expressed as Z/Kg

$$\frac{YP \times FP \times PR}{SR} = SV$$

8. Examples:

A. SR-52 maize grown in Lubumbashi

Yield at 5000 Kg/Ha

Farm Price 7 Z/Kg

Percent Return at 5%  
Seeding Rate of 25 Kg/Ha

$$\frac{5000 \times 7 \times .05}{25} = \underline{70 \text{ Z/Kg}}$$

B. North Shaba area using Kasai I maize

Yield at = 3000 Kg/Ha

Farm Price = 6 Z/Kg

Percent Return = 5%

Seeding Rate = 20 Kg/Ha

$$\frac{3000 \times 6 \times .05}{20} = \underline{45 \text{ Z/Kg}}$$

### Conclusion

The above technique is one way for a value to be established for seeds of newly introduced cultivars. It allows for pricing structures to be developed which reflect both yield potential of a cultivar in different environments, and the local market values of the farmers crop.

It is an easily calculated formula which a seed producer can use to estimate the margin between his cost of production and selling price.

## Potential Private Enterprise Initiatives With Game Animals

### Observations of Mr. Kent Crane

Protein deficiencies in the daily diet of Zairians could be addressed with innovative concepts, such as ranching with game animals, in connection with upgrading domestic breeds.

Wild game animals have been a traditional source of protein throughout the world and they are still a preferred source of meat in many developing countries. Techniques for raising game animals under controlled circumstances have been developed and successfully used elsewhere in Africa. These animal husbandry techniques should be applied in Zaire. Attempts to enhance domestic livestock production under difficult environmental conditions often involve costly efforts to match the right breed to the environment. This implies expensive fencing, veterinary attention, water and vegetation management. The use of more resilient wild species (particularly indigenous) would be more economical while serving to preserve unique faunal assemblages in natural ecosystems; provide a local protein source in areas where people currently consume less than the minimum maintenance requirement (e.g. 80% in Africa 20 years ago and much worse today with, for example, the population of Kenya doubling every 17 years); the need for exportable protein to reduce land conversions to livestock operations which feed fast-food chains; the preservation of wild animals as tourist attractions.

To place stock and game ranching in perspective in Africa, livestock ranching constitutes a \$10 billion a year industry, cereal production \$8.5 billion and game \$3.5 billion (70% from tourism and trophies, 30% from meat and skins). Yet Africa must now import 100,000 tons of meat each year.

Cattle are an introduced species, which often do not adapt well in the tropics and which can cause considerable environmental damage, as in the Sahel and Ethiopia. Cattle are very selective users of grasses; however, they are not selective within the grass stratum. They eat most grass species and often generate overgrazing, causing the desertification seen in much of Africa. This is because cattle are not indigenous and have not evolved the same finely-tuned mechanisms to prevent erosion of their habitat that native game possess. Much of the natural biomass is left unused by cattle. Game animals can convert a much higher portion of plantlife into protein, because some wild animals are browsers while others are grazers. Thus, they can share the same habitat without competing. Finally, certain game animals can be run on the same lands along with cattle without interference between species, thus doubling the potential for protein production. For example, the productivity of several species of wild herbivores on one African ranch was more than 400% above that of cattle.

Zaire's vast natural resource base can be developed for the benefit of its people, but development must be coupled with conservation techniques so that the resource base remains for future generations.

Zaire has the potential to become a world leader in conservation efforts while still pursuing rapid development of its natural resources. The country's huge size and relatively small population provide a unique opportunity to satisfy today's needs while enhancing environmental reserves for the future.

Zaire has one half of the forest reserves of Africa and a high percentage of the undisturbed tropical plant and forest area in the world. It also has the last major reserve of certain wildlife species, especially African

elephants, which are drastically declining in number elsewhere.

The world community would do well to select Zaire for special conservation efforts, both in terms of economic aid and educational efforts to help create a conservation ethic in the minds of the Zairians. They can assist the Government to enforce its laws to protect its future resource base. Particularly insidious is the poaching of elephants, which has achieved tragic proportions for relatively modest amounts of ivory. This hunting should be stopped and replaced by a rational program for hunting and utilizing wildlife.

### Game Ranching Concepts

Game farms have been established and operated successfully for a number of years. The scientific techniques for capturing and relocating wild animals have been thoroughly tested and the management methodology for rapidly increasing herd numbers and raising quality individuals are well established.

Wild animals are owned by game farmers and raised under controlled circumstances on lands enclosed by 8-foot-high, game-proof fences. In Africa and the United States, game ranches normally emphasize the use of natural environments, although some improved pastures and supplemental feeding have been added on certain American properties to increase game herd development. In Asia, where deer antlers have been prized for 3,000 years as aphrodisiacs, deer are raised in artificial circumstances like any other livestock animal.

Game ranching is conceptually interesting from a number of points of view. Game animals and birds survive and prosper on lands of marginal economic value. Even land where big trees have been cut for commercial timber is useful, because secondary brush growth or reforested areas provide ideal habitat for game animals.

Thus, game animals can generate supplemental income on timber or mining properties. Moreover, game ranching can be an excellent use of lands being "warehoused" awaiting the proper moment for development.

The carrying capacity of land for game animals is higher than for domestic animals. A conservative rule of thumb for safe carrying capacity in dry areas of the American Southwest is 1.5-2 game animal units for every 1 cow unit. Various game animals eat different vegetation; some are grazers which only eat grass and others are browsers which only eat shrubs and trees. Thus, they do not compete, even when using the same territory, except for water. The best example of "non-competition" is the giraffe, which grows to over 2,000 pounds and browses at the top of acacia trees 18 feet high.

Game animals generally do much less damage to their environment than cattle, even when fenced into a restricted area. Cattle have large, round hooves and they walk in lines, thus compacting the soil. Cattle linger near water holes to ruminate and thus kill all vegetation nearby. Antelope and deer have pointed hooves that aerate the soil, and they rarely walk in lines or lie at a water hole, because that would make them easy prey for predators.

Today, top conservationists realize that game animals can only survive the human population explosion if wild creatures have economic value. If game can produce income, as it has traditionally done in Europe, land-owners will protect habitats and nurture game animals. If game has no commercial value, its habitat will be destroyed to make way for other income earners. Fortunately, raising

game under controlled circumstances has proven to be a very lucrative use of relatively inexpensive, marginal land. Moreover, experts, such as Marlin Perkins of TV's "Wild Kingdom," are publicly saying that properly managed game farms provide important gene pools for the more common animals and a vital safe haven for endangered species.

It appears likely that extremely rare animals may actually be saved from extinction by rapidly multiplying them in game ranching situations. Genetic engineering and embryo transfer technology make it possible to develop a large number of baby animals from a small amount of "donor" females of rare species, if a near relative, common species is available to use as "recipient" mothers. Recently, an American zoo used a horse as the surrogate mother to produce a baby zebra (International Wildlife magazine, November-December 1984). Zaire has an unusually high number of rare animals which might be saved from extinction through embryo transfer technology and game ranching techniques.

It is becoming increasingly clear that private land owners have a vital role to play in preserving habitat and wildlife for future generations. Heritage Foundation's "Policy Review" for spring 1982 contains a lead article entitled, "Privatizing the Environment," and The New York Times and Forbes magazines have described the positive economic and environmental impact of game ranching.

All environments are dynamic and ever changing. The "great outdoors" can be made more productive for wildlife if it is properly managed. Wildlife cannot be stockpiled for the future.

## Members of the Task Force

**Personal Biodata****Benjamin F. Payton (Task Force Leader)**

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Dr. Payton is the President of Tuskegee Institute, a national land grant university located in Alabama. He has a long-standing interest in Africa expressed first in his Ph.D. dissertation at Yale University—A twenty year study of de-colonization and development in British West Africa. Prior to becoming President of Tuskegee, he served ten years as Senior Program Officer for higher education and research at the Ford Foundation. He was a member of the U.S. delegation to the Bilderberg conference in Belgium in 1973, and served as a member of the Board of Directors of the East-West Center in Hawaii from 1973-76. In 1982 he served as educational advisor to Vice President Bush on a trip to seven African countries where he first met the President of Zaire. He was appointed by President Reagan to serve as team leader of the Presidential Task Force to Zaire and to serve as a member of the Board for International Food and Agricultural Development (BIFAD).

**Rifat Barokas (Team Counsel/  
Executive Secretary)**

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President of the International Phoenix Corporation in Herndon, Virginia. Dr. Barokas has 19 years of international and domestic experience as a businessman and consultant to top management in the private and public sectors. His expertise includes resource development, marketing, agriculture, health, development economics, manpower development, and evaluation. During two decades he worked in more than 25 countries in the design, implementation and evaluation of a wide range of economic development projects. He is President

of the United States—Third World Trade Council and a founding member of the Association of Small Business in International Development.

### **Daniel G. Aldrich, Jr.**

Acting Chancellor of the University of California, Riverside. Dr. Aldrich served as the first Chancellor of the University of California, Irvine for 22 years and built the institution to its present size and status. A soil chemist by training he was chairman of a national study on World Population and Food and is former President of the National Association of State Universities and Land Grant Colleges. He currently serves on that group's Policy and Issues Committee. Dr. Aldrich is also Chairman of AID's Research Advisory Committee.

### **Russell C. Barbour**

Agronomist at Tuskegee Institute. Mr. Barbour has extensive experience in integrated rural development and small farmer assistance in developing countries. He has designed and implemented extension activities and ancillary programs in such technical areas as irrigation, grain storage, and crop improvement. He recently designed an extension program in irrigation agriculture as part of an AID sponsored refugee resettlement project in Chad and evaluated the extension activities of a rice production program in Zambia.

### **Patricia W. Barnes-McConnell**

Director of the Bean/Cowpea Collaborative Research Support Program in East Lansing, Michigan. Dr. Barnes-McConnell facilitates and monitors work of cross-cultural research teams on projects to increase bean and cowpea production and consumption in developing countries through access to

resources of U.S. land grant institutions. Dr. Barnes-McConnell is an associate professor at Michigan State University and a member of the Board of Directors of the Association of U.S. University Directors of International Agricultural Programs. She previously served as Director of the Office of Women in International Development at Michigan State University.

### **Walter C. Bowie**

Dean of the School of Veterinary Medicine at the Tuskegee Institute. Dr. Bowie's academic career spans nearly 40 years, during which he has taught physiology, pharmacology, and veterinary medicine at several colleges and universities. In addition, he served as a veterinary consultant on numerous international projects and participated on boards and committees of organizations such as the National Science Foundation, the National Academy of Sciences, the National Research Council, National Association of State Universities and Land Grant Colleges and with the U.S. Department of Agriculture.

### **Terrence Brown**

Vice President/General Manager of the Construction Control Services Corporation in Durham, North Carolina. Mr. Brown works as a linguist, economic development consultant, and program manager for organizations ranging from the U.S. Department of State to the Booker T. Washington Foundation (Washington, D.C.). For the Foundation, he directed a development project to stimulate economic growth in Cameroon by using resources of local small- and medium-sized businesses. As a Peace Corps volunteer in the Ivory Coast, Mr. Brown assisted local entrepreneurs seeking to create or expand businesses.

### **Michael L. Colegrove**

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Regional Manager for Africa at Pioneer Overseas Corporation in Johnston, Iowa. Dr. Colegrove has more than 10 years of international experience in seed production. His agricultural work, which spans more than 20 years, included serving as an international agronomist for DeKalb Ag'Research, Inc., a project specialist for the Ford Foundation, and an instructor and training consultant for the U.S. Peace Corps.

### **Kent Bruce Crane**

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President and Managing Director of the Crane Group, Limited in Washington, D.C. Mr. Crane's company manages investments for closely-held, offshore companies. He was co-chairman of the Africa Subcommittee of the Republican National Committee from 1978 to 1980 and served the U.S. Government in many capacities, including national security affairs advisor to the Vice President from 1969 to 1972 and project director at the U.S. Commission on the Organization of Government for the Conduct of Foreign Policy in 1974 and 1975.

### **Kenneth R. Farrell**

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Senior Fellow and Director of the National Center for Food and Agricultural Policy, Resources for the Future, in Washington, D.C. Dr. Farrell has more than 25 years' experience in agricultural research, teaching, extension, and administration in land grant universities, the U.S. Department of Agriculture, and non-profit organizations. Dr. Farrell serves on several Presidential commissions and task forces, the National Academy of Sciences, and numerous professional and administrative committees. He is a director, president, and fellow of the

American Agricultural Economics Association.

### **Jake Halliday**

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Director, Battelle-Kettering Research Laboratory, Yellow Springs, Ohio. Dr. Halliday is a specialist in biological nitrogen fixation and has extensive experience in low input production systems for the tropics. He previously directed the USAID/University of Hawaii NifTAL project on tropical legumes and also spent four years conducting research on tropical pasture legumes at CIAT in Colombia. Dr. Halliday is an International Editor of the journal, *Tropical Agriculture*, and has been a consultant to the FAO, World Bank, UNEP, NAS and the Office of Technology Assessment of the U.S. Congress.

### **Norman E. Johnson**

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Vice President of Research and Development for Weyerhaeuser Company in Tacoma, Washington. Dr. Johnson oversees Weyerhaeuser's activities in forestry, wood products, fiber products, energy, environment, and corporate research and development. He serves on advisory boards for several universities and the International Editorial Board of the Journal of World Forest Research Management and was a member of President Reagan's Agriculture and Forestry Mission to Honduras.

### **Roger J. Poulin**

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Senior Staff member at Development Alternatives, Inc., in Washington, D.C. In 18 years as an international development economist, Mr. Poulin reviewed development strategies, designed development projects, and analyzed the economic impact and viability of individual development initiatives. He

combines strong macroeconomic skills with expertise in agricultural development issues and microeconomic analysis.

### **Charles Riemenschneider**

Vice President and Senior Agricultural Economist (Economic Resources Department), Chemical Bank, New York. Prior to his current post Dr. Riemenschneider was Senior Analyst for the Physical Resources Group, Majority Staff, Committee on the Budget, The United States Senate. He previously taught public affairs management and conducted research in agricultural economics, policy and marketing for the U.S. Department of Agriculture.

### **Harold Robinson**

Director, Office of University Studies, and Chancellor Emeritus,

Western Carolina University, Cullowhee, North Carolina. Dr. Robinson started his career as a seed specialist. He was Professor of Experimental Statistics and Genetics, Director of the Institute of Biological Science, Assistant Director of the Agricultural Experiment Station and Administrative Dean for Research at North Carolina State University. He served as the Executive Director of the President's Science Advisory Committee on World Food Supply and had the position of Vice Chancellor of the University System of Georgia. At Purdue University he served as Provost and Professor of Biological Sciences and Statistics. For the past ten years he was Chancellor and Professor of Biology and Mathematics of Western Carolina University.