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STAFF APPRAISAL REPORT

ZAIRE

SEEDS PROJECT

May 14, 1985

**Central Agricultural Division
Eastern and Southern African Projects**

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CURRENCY AND EXCHANGE RATE a)

Currency = Zaire (Z)
1 Z = \$0.033
1\$ = Z 35

WEIGHTS AND MEASURES

<u>Metric</u>	<u>English/American Equivalen</u>
1 hectare (ha)	2.47 acres
1 kilometer (km)	0.624 miles
1 kilogram (kg)	2.2 pounds (lb)
1 metric ton (t)	2,204 pounds

CROP CONVERSION RATES

1 kg paddy	0,63 kg rice
1 kg cassava	0,35 kg cosettes
1 kg groundnuts unshelled	0,70 kg shelled groundnuts

a) As of 12/20/84. Average exchange rates previous years:
1984 - 33.75; 1983 - 12.89; 1982 - 5.75; 1981 - 4.38.

ZAIRESeeds ProjectACRONYMS

BUNASEM	Bureau National de Semences National Seed Bureau
CIMMYT	International Center for Maize and Wheat Development Centro Internacional de Mejoramiento de Maíz y Trigo
CEDERIM	MWEKA Rural Development Project Centre de Développement Rural Intégré de Mweka
CODAIK	Compagnie de Développement de l'Agriculture Intégré de Kikwit The Kikwit Company for Integrated Rural Development
CS	Compagnie Sucrière de Kwilu Ngongo The Kwilu Ngongo Sugar Company
DADR	Département à l'Agriculture et du Développement Rural Ministry of Agriculture and Rural Development
DAGP	General Direction of Project Administration Direction d'Administration Générale de Projets
DES	Département de l'Enseignement Supérieur et de la Recherche Scientifique Department of Higher Education and Scientific Research
DPV	Directorate for Plant Production of the Ministry of Agriculture Direction de Production Végétale du Département à l'Agriculture et du Développement Rural
FAO	Food and Agriculture Organization
FAC	French Ministry of Cooperation Fonds d'Aide et de Coopération
FCD	Fonds de Convention pour le Développement Development Agreement Funds
EDF	European Development Fund Fond Européen de Développement
IDA	International Development Association Association Internationale pour le Développement
IITA	International Institute for Tropical Agriculture Institut International de l'Agriculture Tropical
INERA	National Institute for Agricultural Research L'Institut National pour l'Etude et la Recherche Agricole
ISNAR	International Service National Agricultural Research
PRAF	Applied Research and Training Program. Projet de Recherche Appliqué et Formation
PAT	Technical Assistance Project Projet d'Assistance Technique
PMKO	Maize Project in East Kasai Projet Maïs au Kasai Oriental
PNE	National Fertilizer Program Programme National d'Engrais

PNL	National Grain Legumes Program Programme National de Legumes
PNM	National Maize Program Programme National du Maïs
PNR	National Rice Program Programme National du Riz
PPF	Project Preparation Facility
PRONAM	National Cassava Program PROGRAMME National de Manioc
UNDP	United Nations Development Program Programme des Nations Unies pour le Développement (PNUD)
USAID	United States Agency for International Development

ZAIRE

SEEDS PROJECT

STAFF APPRAISAL REPORT

Table of Contents

	<u>Page No.</u>
<u>CREDIT AND PROJECT SUMMARY</u>	iv
Definition of types of seeds and cuttings	vi
<u>I THE AGRICULTURAL SECTOR</u>	
A. Introduction	1
B. Agricultural Sector	2
C. Agricultural Services	4
D. Government Strategy for Agricultural Development	6
E. Bank Group Support for Agriculture	7
<u>II THE EXISTING SEED PRODUCTION AND DISTRIBUTION SYSTEM</u>	8
A. General	8
B. Cultivar Improvement	9
C. Cultivar release and Quality control	10
D. Seed production	11
E. Seed Marketing and Promotion	12
F. Sub-sector Issues and Policies	12
<u>III THE PROJECT</u>	14
A. Project Concept and Rationale	14
B. General Description	15
C. Detailed Features	16
D. Project Costs	22
E. Financing	23
F. Disbursements	24
G. Procurement	25
H. Accounts and Audits	26
I. Environmental Impact	26
<u>IV PROJECT IMPLEMENTATION</u>	27
A. General	27
B. Organization	27
C. Management of Project Components	29
D. Reporting	33
E. Monitoring and Evaluation	34

	<u>Page No.</u>
V <u>SEED PRODUCTION AND DISTRIBUTION UNDER THE PROJECT</u>	35
A. Demand for Seeds	35
B. Production of Seeds	36
C. Distribution of Seeds	39
VI <u>FINANCIAL ANALYSIS</u>	39
A. Market and Prices	39
B. Financial Projections	40
C. Farmers' incomes	41
D. Cost recovery and fiscal analysis	42
E. Credit	43
F. Budgetary System	44
VII <u>ECONOMIC JUSTIFICATION</u>	44
A. Justification and Benefits	44
B. Economic Analysis	46
C. Risks	47
VIII <u>AGREEMENTS TO BE REACHED AND RECOMMENDATIONS</u>	48

Supporting Tables and Annexes

Tables

1. General information per region	51
2. General climatic data of main regions	52
3. Project cost summary by category and component	53
4. Disbursements from IDA credit and co-financier grant	54
5. Annual estimated costs by category and sources of finance	55
6. Estimated disbursement schedule	57
7. Procurement distribution	58
8. Summary of training activities	59
9. Area planted for controlled seed production including outgrowers	60
10. Volume of production per seed farm, including outgrowers	61
11. Estimated yield levels	
Farm budgets and relation of seed prices to return to labor per day	62
12. Estimated cost of production and seed prices	
Economic Analysis	63
Cash Flow Statements and Rate of Return Analysis for:	
13. Kwilu Ngongo	64
14. Pindi	65
15. M'Poy	66
16. Shaba	67
17. Haut-Zaire	68
Return to Farmers Family Labor for:	
18. Maize	69
19. Rice	70
20. Groundnuts	71
21. Beans	72

	<u>Page No.</u>
22. Soybeans	73
23. Project Cash Flow	74
24. Government Cash Flow	75
25. Economic Rate of Return Analysis	76

Annexes

Annex I	Production of Major Foodcrops	78
Annex II	Cultivar Improvement	80
Annex III	Selected Documents and Data Available in the Project File	83

Charts

1.	Department of Agriculture and Rural Development	85
2.	Structure of Agricultural Research	86
3.	Bureau National de Semences	87
4.	Project Structure	88
5.	Organizational chart seed farms	89
6.	Project Implementation Schedule	90

Maps

IBRD 18447	Development structures major foodcrop areas
IBRD 18448	Seed production and agricultural research centers
IBRD 18449	Rainfall and elevation

ZAIRE

SEEDS PROJECT

CREDIT AND PROJECT SUMMARY

Borrower: Republic of Zaire

Beneficiary: Department of Agriculture and Rural Development

Amount: SDR 15.10 million (US\$14.88 million equivalent)

Terms: Standard IDA terms.

Project The project would be the initial five year time slice of a long term effort to establish a viable seed industry in Zaire with increasing participation of the private sector. The project would increase the production, diffusion and quality of controlled seeds of the main food crops in Bas-Zaire, Bandundu, Kasai Oriental, Shaba and Haut Zaire. Project activities would include: (i) establishment and operation of a National Seed Bureau; (ii) assistance to research stations for the production of base-seeds; (iii) establishment and operation of five seedfarms; (iv) assistance to other existing seedfarms; (v) development of a seed quality control system; (vi) training; (vii) special studies and pilot projects and (viii) the employment of expert services.

Project Benefits: The project would improve yields of food producing farmers directly by providing seeds and cuttings of higher production potential and indirectly by increasing the cost-effectiveness of other inputs such as fertilizer and labor. Production of maize, cassava, rice, peanuts and grain legumes would increase significantly, thereby assisting Zaire in its goal of achieving food self-sufficiency. The Project would also improve the annual income of about 10% of the small farmers in Zaire. The project would assist in developing a self sustaining seed industry and a seed quality control system, train the required technical staff, and initiate the necessary seed legislation.

Risks: The project's main risks are those associated with the overall situation of Zairian economy, including shortage of local professional staff and of local financial resources, and the proper coordination of all agencies participating in the establishment of a seed production structure. The impact of such risks on Project implementation would be reduced to a certain extent by the requirement that seed production units would be managed by agencies acceptable to IDA; Government would appoint a qualified expert as Director of the National Seed Bureau; and that Government continues to improve resource allocation and financial management in the agricultural sector. An intensive staff training and technical assistance program would also support project implementation. At project level the major risk is the adequate supply of base seeds needed for seed multiplication and the farmer's receptivity to the use of improved seeds at commercial price levels. Consequently, specific provisions are made under the project to assist research stations responsible for the production of base seeds and to promote seed sales based on regional marketing strategies, with strengthening of on-going extension and rural development efforts.

(v)

Estimated Cost:

	(US\$ million)		<u>Total</u>	<u>% of Total Base Costs</u>	<u>% of Foreign Exchange</u>
	<u>Local</u>	<u>Foreign</u>			
National Seed Bureau	0.79	0.66	1.45	9	46
Seed Farms	3.56	3.56	7.12	43	50
Assistance to Other Seed Farms	0.05	0.18	0.23	1	78
Seed Quality Control	0.57	0.49	1.06	7	46
Assistance to Research Centers	0.77	1.32	2.09	13	63
Professional Training	0.37	0.97	1.34	8	72
Studies and Pilot Projects	0.11	0.39	0.50	3	78
Technical Assistance	0.40	2.15	2.55	16	84
Total Base Costs	<u>6.62</u>	<u>9.72</u>	<u>16.34</u>	<u>100</u>	<u>60</u>
Physical Contingencies	0.40	0.52	0.92	6	56
Price Contingencies	<u>1.78</u>	<u>2.21</u>	<u>3.99</u>	<u>24</u>	<u>56</u>
Total Project Costs (of which Taxes and Duties)	8.80 (0.06)	12.45 -	21.25 (0.06)	130 (0.3)	59 -

Financing Plan

	(US\$ million)		<u>Total</u>	<u>% of Total Costs</u>
	<u>Local</u>	<u>Foreign</u>		
Government	2.01	-	2.01	9.5
Sales of Controlled Seeds	2.47	-	2.47	11.6
IDA	3.75	11.13	14.88	70.0
UNDP	0.57	1.32	1.89	8.9
Total (including taxes)	<u>8.80</u>	<u>12.45</u>	<u>21.25</u>	<u>100.0</u>

Estimated Disbursements

IDA Fiscal years	(US\$ million)					
	<u>FY86</u>	<u>FY87</u>	<u>FY88</u>	<u>FY89</u>	<u>FY90</u>	<u>FY91</u>
Annual	1.5	2.4	2.8	3.1	3.0	2.1
Cumulative	1.5	3.9	6.7	9.8	12.8	14.9

Rate of Return: 44 percent (over 100 percent of total project costs)

Maps: IBRD 18447, 18448, 18449.

ZAIRE

SEEDS PROJECT

DEFINITIONS OF CATEGORIES OF SEED

The terms used to describe seed produced at different stages of the multiplication process vary considerably between countries and authorities. The following definitions apply only to this project:

1. Breeder Seed. Seed produced under direct control of the plant breeding institution and used as the source for all following generations. The process involves maintaining, through selection, the types of plants defined and registered in the catalogue of cultivars. Production is carried out by the agricultural research stations and national crop programs.

2. Base Seed or Foundation Seed. The progeny of breeder and prebase seed produced in such a way as to maintain a satisfactory level of genetic purity and identity, under sanitary conditions judged satisfactory by the controlling agency. It is seed propagated on a sufficiently large scale to enable certified or commercial seed to be produced at the final stage of the process. Production is carried out by qualified specialists either geneticists or experts in seed production and mostly by the national crops programs and research institutions by or by central seedfarms under close control by these institutions.

3. Controlled or Commercial Seed. The progeny of foundation seed, handled to maintain satisfactory genetic purity and identity, and grown under acceptable sanitary conditions. This, the last link in the chain, is used to produce the seed sold to growers of food crops. Production is carried out by seedfarms or selected skilled farmers, instructed and supervised by the technical staff of seed farms. As a temporary measure, and in view of conditions in Zaire and the need to supply the market until an adequate certification system can be established, the seed produced by the Government-approved agencies can be officially labelled as a controlled seed, if they meet the precise production standards of the National Seed Bureau with respect to varietal characteristics and seed quality, particularly as regards humidity, germination capacity and purity.

DEFINITION OF CATEGORIES OF CUTTINGS

4. Breeder Cuttings. Cassava cuttings produced under the direct supervision of the cassava research centers. They will be used to produce all future generations of cuttings. In particular, these cuttings will be produced by the National Cassava Program (PRONAM) at its M'Vuazi station.

5. Base Cuttings. The progeny of breeder cuttings grown to be satisfactorily vigorous and produced under acceptable sanitary conditions. They will be produced at research institutes or central seed farms under PRONAM supervision, using production techniques disseminated by that agency.

6. Controlled Cuttings. These are the progeny of base cuttings grown to be satisfactorily vigorous and produced under acceptably sanitary conditions satisfactory to the controlling agency. This category refers to cuttings produced at seed farms and by selected skilled farmers using PRONAM techniques, and under control of personnel of seed farms.

SEEDS PROJECT

STAFF APPRAISAL REPORT

I. BACKGROUND

A. Introduction

1.01 The proposed Seeds/Research project is one of several IDA-supported projects designed to improve the foodcrop situation in Zaire. The project would increase production of the main foodcrops cassava, maize, rice, groundnuts and grain legumes through the provision of seeds and cuttings of higher production potential and the control of seed quality. Project activities would aim to integrate the private sector in seed production with the ultimate goal to assist the Government of Zaire in establishing a self-sustaining seed-industry.

1.02 The proposed project was presented in June 1982 by the Government of Zaire at a Consultative Group meeting in Paris, exclusively dedicated to agricultural development. Subsequent to FAO and IDA identification and preparation missions a project proposal was prepared in March 1984, by a consultant preparation team financed under an IDA Project Preparation Facility. Government, giving the highest priority to the revitalization and improvement of seed-production, invited IDA to appraise the proposed project promptly thereafter. This report is based on the findings of an IDA - appraisal mission which visited Zaire in June/July 1984, composed of E. Los, L. Truong, Y. Karmokolias, (IDA) and M. Couillaud (Consultant). Representatives of the Zairian Government and of the UNDP/FAO also participated in mission activities.

1.03 Important adjustments made to the original proposals in the preparation report are aimed at securing the adequate provision of base-seeds from the research centers to the seed farms and at strengthening the promotion and marketing function of the seed farms and the coordinating role of the National Seed Bureau, in order to create a sound economic basis for future development. In addition, at the request of the Zairian Government, the number of seed-farms was increased from 4 to 5 by including provisions for establishing a seed-farm in the north of the country in the Haut-Zaire region. Specifically, these adjustments involve increased support for the production, processing and storage of base-seeds at a number of research stations, and the inclusion of studies for the formulation of site specific seed marketing policies. The changes have been discussed and accepted by Government.

1.04 The proposed project would be the twelfth project financed in the Zairian agricultural sector by the Bank group for a total of US\$124.7. Total costs of these projects, including co-financing, amount to US\$343.5. In addition, the Bank Group has financed six lines of credit to a local development finance company, SOFIDE, which included about US\$17.0 million for approximately US\$24.0 million worth of agricultural investments. Information on implementation experience with the agricultural portfolio is provided in para 1.20.

B. The Agricultural Sector

General

1.05 Zaire covers about 2.3 million km², and has considerable agricultural potential. It is estimated that about 30-35% of the total land area is suitable for agricultural development, although only about 5% is currently under cultivation or developed as ranches. Straddling both sides of the equator, the country falls into four major ecological zones: (i) rain forest; (ii) mixed forest and savannah; (iii) savannah belts; and (iv) tropical uplands. Rural population density is highest in the savannah belts and tropical uplands, and the population growth rate is estimated at between 2.2-2.8% per annum. Rural per capita income, about US\$110 (1982), is among the lowest in Africa. A wide variety of agricultural commodities are grown in Zaire. The major staple food crops are cassava, maize, rice, bananas, and beans. The most important industrial crops are cotton, palm oil and sugarcane, while export crops include coffee, tea, rubber and cocoa. The livestock sub-sector comprises cattle as well as small ruminants and poultry. Zaire's forestry resources are considerable but largely untapped. Further information on the regions in Zaire is given in Tables 1 and 2 and Maps IBRD 18447-18449.

Agricultural Production

1.06 Agriculture provides direct employment to about 75% of the labor force, as well as to an additional 10% employed in agro-industrial processing. However, its share of GDP has stagnated recently around 30%, and its share of exports fell from 39% (1959) to about 10% (1981). During the same period agricultural imports increased. The disappointing performance is caused by various factors, including: (i) difficult transport conditions; (ii) inadequate or unclear marketing, pricing and monetary policies; (iii) limited budgetary resources devoted to the sector; and (iv) weak agricultural institutions. Recognizing the adverse impact of these factors on sector performance, the Government began implementing an Agricultural Recovery Plan in 1982 (para 1.18), which intended to address the major problems outlined above. Although too early to draw firm conclusions, it appears that agricultural production is recovering, albeit slowly. For foodcrops, cassava production increases in proportion to population increase and demand, but yields remain low. Maize, the second most important foodcrop, is cultivated in an expanding area and yields are slowly improving in some areas. However, the annual maize deficit remains around 200,000 tons. Rice cultivation is also expanding, but annual rice deficits remain (currently about 60,000 tons), due to increasing consumption. Further details are given in Annex I. The level of technology deteriorated since the early 1970's due to economic difficulties. Applied technology in food-crop cultivation remains below levels already obtained in the past, due to the lack of inputs, particularly fertilizer and seeds of good quality, and lack of price incentives for small farmers. In areas with better agricultural services and input supply, farmers have reacted strongly by improving husbandry techniques. A sustained growth in the agricultural sector needs the support of agricultural research and the supply of improved seeds, both now given high priority in Government planning.

1.07 Modern (large farm) and traditional (small farm) production systems coexist in Zaire's agricultural sector. About 40% of agriculture's share of GDP is contributed by the modern sector and about 60% by the traditional/subsistence sector. The modern sector is composed of large, corporation-owned plantations as well as individually owned farms and ranches, mainly interested in industrial crops, and also in some foodcrops, principally for food supply of their laborforce or to secure the raw material supply to agro-industries. In the small farm sector (with about 3-4 million farming units) a bush-fallow production system predominates and farming techniques rely on hand labor and simple tools. The principal crops grown are cassava, maize, rice, groundnuts, beans, and cotton. The small farm sector also accounts for about 60% of the national cattle herd.

Sector Issues

1.08 In the past the Government attempted to regulate and control the marketing and prices of many agricultural products in order to guarantee that the large consumption centers received adequate food supplies at reasonable prices that would also be attractive to producers. However, misapplication of these Government measures has often had a negative effect on marketing and production, and their aims, though often reasonable, have been difficult to achieve. Recognizing the costs of incompletely implemented policies in this area, the Government began a gradual liberalization process in 1981, culminating in 1983 in complete deregulation of producer prices, abolition of local authorities' right to intervene in this field, and elimination of regional barriers to trade. While these measures and the degree to which they are applied have yet to be evaluated, preliminary experience shows a positive impact on foodcrop production mostly for maize and cassava. The continued expansion of inter-regional trade is expected to play an important role in stimulating production increases and adoption of better production methods in the major food producing areas.

1.09 Another issue having particular significance for agricultural development is the inadequate links between agricultural research, the supply of improved seeds and the agricultural extension service. These three are closely interrelated and now receive greater attention from government, mainly through improvement of the National Commodity Programmes (para 2.03), the initiation of the formulation of an agricultural research strategy (para 1.13), the proposed seeds project and the support for rural development projects. Seed production deteriorated due to the difficult economic situation in the mid 1970's and the lack of a consistent and long-term seed production policy. The agricultural extension service has yet to overcome the aversion of farmers to dealing with extension agents as a result of the previous practice, known as "imposed cultivation". It has persisted in various degrees in different parts of the country, particularly where there is competition between cash and foodcrops. As a result, farmers are often reluctant to accept technical packages extensionists try to promote. Part of the solution may be found in making extension services more farm than crop oriented. The National Commodity Programs can contribute to this reorientation, as they are also engaged in farm systems research. Other important issues are the weak sector

management and the uncertain project funding. Government is aware of these problems and has taken steps, since 1982, to improve the management systems in the sector (para 1.11, 1.12, 1.18). Also an action program has been initiated to improve its financial management (para 6.16). These efforts are being supported in the context of the IDA financed Technical Assistance Project (para 1.19).

C. Agricultural Services

1.10 The principal Government agencies which provide services to support agricultural and rural development include: the Department of Agriculture and Rural Development; the Department of Higher Education and Science; a number of parastatal and mixed-capital companies; the Department of Public Works; and regional and local authorities. The meager public resources allocated to the agricultural sector hampered the development of a firm institutional framework of agricultural services. Since 1980 Government has redefined the roles of the public and private sector and encouraged private sector participation in agricultural development. Consequently, the private sector is playing an increasingly important role in rural development, particularly in providing extension, marketing and road maintenance services.

Sector Management

1.11 The Department of Agriculture and Rural Development (DADR) is responsible for agricultural policy; extension, veterinary, and part of research services; and technical supervision of parastatal institutions in the sector. It has broad responsibility within the Government for sector planning and for the preparation, implementation and supervision of agricultural projects. The DADR employs directly about 600 employees and numerous personnel in governmental institutions and projects. Services provided have generally been weak, due to the lack of trained staff, low salary levels, insufficient funds, and weak management systems. To address these deficiencies and to make DADR a more effective and efficient agency for planning and managing key services and projects, a number of important steps have been taken since June 1982, including: (i) reorganization of DADR along department lines at headquarters and definition of responsibilities for each of these units; (ii) reduction in DADR personnel rolls by 7,000^{1/}, combined with salary increases and performance bonuses; and (iii) reorganization of regional staff, focusing on the coordination of sectoral activities at the regional and sub-regional levels. Implementation of these measures is underway.

1.12 In an effort to strengthen sectoral planning and resource management capabilities in DADR, several additional steps have been taken, including: (i) establishment of an organizational structure responsible for overall policy analysis; (ii) creation of working groups to review key sector issues, propose action measures, and monitor the impact of reforms undertaken; (iii) institution of a regular review system for on-going projects, linked to periodic updating of the agricultural investment

^{1/} DADR's staffing now totals about 9,000.

program; and (iv) introduction of functioning of financial and budget these groups and activities is be Technical Assistance Project (Cre

Agricultural Research

1.13 The National Institute is an autonomous institute within Scientific Research (DES) and it on food crops, perennial crops, a stations, six of which are main s after independence, because most neither the personnel nor the fun inherited from the National Agric Congo (INEAC), which was one of t tropics (para 2.01). INERA suffer inadequate salary structure, and Staffing is also unbalanced, with non-research personnel. In such extremely limited. The DADR oper Programs(para 2.03), which are er with international research insti results in collaboration with dev experience with these programs has (in particular for maize), due to turnover. Government has recentl, programs with USAID assistance.

1.14 In 1982, INERA was trans the Commodity Programs run by DAI management responsibilities on the an agreement to this effect has b INERA. However, the division of DES is still under discussion. An established early 1984, which, will for National Research (ISNAR), has development plan for agricultural gradually invigorate and harmonize the country, possibly in one singl

Agricultural Extension

1.15 The extension service and largely ineffective, due to staffing, and unresponsiveness of extension work is a vital factor institutions and projects have in these services in the areas of t extension is mainly provided by maize growing private companies the national commodity programs

agricultural chemicals) and only minimally by the state extension service. These services occasionally duplicate and overlap each other. Attempts to coordinate them have had limited results. However, in some areas (e.g. Kasai and N. Shaba) improvement of extension activities are underway. Such areas will become centers of improved seed production (para 2.15).

Agricultural Credit

1.16 Agricultural credit is not well developed in Zaire. Agricultural credit for large operators is currently extended by six commercial banks and by the Société Financière de Développement (SOFIDE), an IDA supported development finance company established in 1970. The eligibility criteria applied by the commercial banks and SOFIDE deny most smallholders access to formal credit. With the clear intention to address the credit requirements of small-scale agriculture, the Government established a new Agricultural Credit Bank (BCA) in October 1982. So far it has no involvement in the provision of credit to small farmers. Another source of funds for agricultural investment is a para-fiscal system known as "Development Agreement Funds" (FCD). FCD funds are raised through special sales tax on agro-industrial products, and levies on food-imports, and are used to finance productive and infrastructure investments, mainly on projects, agreed upon between government and private firms.

Transport and Marketing

1.17 The state of Zaire's vast road network (145,000 km) is critical to effective marketing operations and agricultural production incentives. The key government institution in this area is the Department of Public Works, with the Roads Authority (OR) as its operating arm. Due to limited funds and operational capacity, OR concentrates its activities only on selected national roads. As a result many regional and rural roads are in poor condition and deteriorating. Local authorities are officially responsible for maintaining local roads, but they have neither the funds nor the technical capacity to carry this out effectively. To address the rural road problems, DADR has financed and operated a Rural Road Maintenance Program for the last three years; it has relied primarily on sub-contracting arrangements with private firms or individuals. After the nationalization measures in the mid-1970s the trade network in the rural areas was practically destroyed. The lack of efficient traders at the local level and of retail outlets is, after difficult transport conditions, the major marketing constraint for input supply as well as sales of surpluses of agricultural products. Until recently wholesale traders, development projects, and the cotton companies tried to fill this gap by rehabilitating a trade network and supplying some inputs. The trade and price liberalization of 1983 has given a new impulse to the revival of a retail trade network.

D. Government Strategy for Agricultural Development

1.18 The Agricultural Recovery Plan(1982-84), constituted at the time the basic government strategy for agricultural development in Zaire. The chief objectives of the strategy were: (i) to make the country

self-sufficient in food crops; (ii) to increase the production of crops used as raw materials by local industries; and (iii) to increase export crop production. Measures designed to achieve the Government's objectives in the sector have focussed on establishing clear procedures for cabinet level coordination of agricultural policy, reinforcing the capacity of DADR to plan, prepare, implement and monitor projects more effectively, and reinforcing its capacity to address key policy issues more systematically. Priority was given to foodcrop development through recovery of smallholder production and rehabilitation and maintenance of existing production capacity. Actions on many of these issues have been described earlier. The Plan represented realistic and significant steps to address the most important institutional and policy issues which have impeded production in the past. Evaluation of the Agricultural Recovery Plan is currently underway and is expected to provide valuable inputs for the preparation of the forthcoming five year global plan (1986-1990).

E. Bank Group Support for Zairian Agriculture.

1.19 Bank support has included sector work, project financing, and a sustained dialogue with the Government to define and address more coherently key policy issues (such as pricing, marketing, incentives for private sector development, credit, and training). The Bank Group has also played an important role in helping the Government coordinate the activities of external financing agencies in the sector by taking a leadership role in setting up cofinancing arrangements^{2/} and by organizing and chairing, under the aegis of the Consultative Group (CG), the 1977 Working Group on agriculture and the 1982 Special Meeting on agriculture. The Bank Group has financed a total of eleven projects in the agricultural sector. Past lending operations have addressed the rehabilitation and expansion needs of modern agricultural enterprises (both private and mixed-capital companies) as well as the development of basic services for smallholders. The Bank Group's agricultural portfolio has concentrated on several subsectors: livestock (Livestock I, Ituri Livestock Development, Ituri Northeast Rural Development), cotton (Cotton Rehabilitation I and II), industrial crops (Kwilu-Ngongo Sugar, Oil Palm Rehabilitation), and smallholder agriculture (Kasai Oriental Maize, Kwango Kwilu Technical Assistance, Lulua Agricultural Development Project). Technical assistance support for institutional strengthening and policy reform has also been provided through a free-standing T.A. project. Bank Group support for agricultural development in Zaire over the next few years will continue to have two main goals: (i) to help improve the policy and institutional framework so as to create an environment conducive to increased investments, better management and increased outputs; and (ii) to help increase the production of foodcrops as well as industrial and export crops through the financing of production-oriented projects (para 1.04).

1.20 Performance Evaluation. The Paris meeting of the CG for Zaire in December 1983, reviewed among others, the progress made with the implementation of the Agricultural Recovery Plan 1982-1984. In general satisfaction was expressed with measures taken by GOZ to improve financial

^{2/} Nine out of eleven IDA supported projects have involved co-financing.

and budgetary management, strengthening of the organization of the Ministry of Agriculture, the liberalization of prices and encouragement of the private sector and the support in developing research and seed production strategy. While there were no reasons to alter the plan's underlying strategy, more attention was asked for transport-agriculture linkages and coordination of externally financed projects. The implementation experience with Bank assisted projects has been mixed. On the one hand area development projects have commonly suffered from management problems, inadequate budget allocations and shortage of qualified staffing. On the other hand, crop oriented projects, with less direct government involvement and with autonomous or private sector management, performed generally much better. So far only one Project Completion Report (Report No. 4863, dated December 30, 1983) has been prepared for the first Livestock Development Project (cr. 398 ZR), IDA's first agricultural operation in Zaire. The project objectives were to increase beef production, and improve range management. The Project's achievements fell short of expectations due to unusually difficult external circumstances (e.g military upheaval in the Project area), and rapid shifts in Government policies (e.g. zairianization, nationalization, privatization) which led to continuous management and staffing problems, and delays in project funding.

II. THE EXISTING SEED PRODUCTION AND DISTRIBUTION SYSTEM.

A. General

2.01 Background. Before independence the research structure focused mainly on export crops. Only in the fifties did foodcrops became a subject of interest and some lasting results were achieved. The research stations produced at that time the base-seeds for multiplication and controlled the limited seed production. Between 1960-1964 the research structure became inoperative, and efforts thereafter to revive it failed (para 1.13). In the seventies the Government, with Belgian assistance, designed a network of seed production centers (Centre Agronomique de Production de Semences Améliorées, CAPSA's) which never came to full development due to political events. Another seed production effort has been undertaken in 1976 in the Shaba province at the "Domaine Kaniama Kasese", a large scale integrated project (with Belgian bilateral aid), with the objectives to cultivate maize as a mechanized plantation crop, produce seeds, develop cattle ranging and small and medium sized farms in the surrounding areas. After 1980 seed production and seed quality dropped sharply (para 2.09).

2.02 With the demise of the seed production centers, the area development projects started to include in their programs seed production activities. These seed components are operating on a small scale (10-50 ha), servicing a small area and the quality of their seeds depends on the quality of the base-seeds provided to them by the research centers or the national commodity programs, and on the quality of their field control and seed processing. Both are currently in need of improvement. Due to continuing operational difficulties of INERA, the DADR established in the 1970's National Commodity Programs, to ensure development support for the main foodcrops (para 1.13 and 1.14).

2.03 The Four National Commodity Programs are currently the main guardians of the seed-stock in Zaire, except for rice seeds which are also preserved at the INERA station at Yangambi). The National Maize Program (PNM) was established in 1971, and was operated with International Center for Maize and Wheat Improvement (CIMMYT) assistance until 1981. Thereafter PNM went through a difficult period with frequent staff changes and lack of resources. Since its inception PNM has developed varieties for different ecological conditions in Zaire (para 1.05). The National Cassava Program (PRONAM) established in 1974 and operating with IITA assistance focuses on the selection and diffusion of cassava varieties resistant to the main diseases and pests (particularly bacterial blight and mealy bug). PRONAM has identified various cultivars and is on the point of releasing some improved varieties. The National Rice Program (PNR) established in 1974 and receiving Chinese bilateral assistance for the promotion of irrigated rice, has developed various rice multiplication centers. PNR faces however enormous financial and technical difficulties. Although several irrigated and upland rice varieties have been imported, no headway has been made in improving or diffusing new rice cultivars. PNR mainly multiplies the R66-upland rice variety selected before 1960, and has difficulty maintaining its genetic purity. The National Legume Program (PNL) was initiated in 1979 under a USAID assisted project to assist INERA, without having a formal structure as a free standing program. Its performance has been mixed and its main achievement has been the identification of suitable soybean varieties for the different ecological regions of Zaire. The national programs will be integrated in a USAID assisted, Programme de Recherche Appliquée et Formation (PRAF), which would coordinate their activities, and maintain relations with the INERA-structure, until a long-term strategy has been accepted to harmonize research efforts (para 1.13). Three programs (PNM, PNL and PRONAM) would be managed with assistance from IITA, while PNR would possibly receive support from the Italian Government.

B. Cultivar Improvement

2.04 Before independence the research stations began in the fifties to focus on the selection of food crop varieties. The main achievements are the selection of the GPS-5 maize composite; 02864 bacteriose resistant cassava; R-66 rice variety; and the S14 and S17 soya varieties. After independence cultivar improvement has been interrupted and widespread diffusion of results seriously hampered. Currently these varieties are still in use. Since the 1970s new varieties were imported, mainly for selection purposes in Zaire. Only maize seeds are imported for productive purposes, notably the simple hybrid SR52.

2.05 Conscious of the importance of seeds of good quality for agricultural development and recognizing the deficiencies of the national structure to provide better seeds, the Government took steps for improvement (para 2.01 and 2.02). The PNM produced and distributed maize composites: a highland variety, Shaba, and varieties for medium altitude (500-1000m) the Kasai I and Salongo I. For planting in the second season the GPS-5 is still preferred for its better disease resistance. The PNM did not initiate the production of maize hybrids, on the grounds that they

responded best to the maize growing conditions on small farms. (Annex II). However, the interest for maize hybrid is increasing, particularly by commercial farmers. Since all maize hybrids have to be imported, Government supports developments leading to selection and production of maize hybrids in Zaire (para 3.21 and 4.20). The PRONAM program has selected in 1981 at M'vuazi two highly productive (30 tons/ha) cultivars of manioc, with resistance to bacteriosis: Kivuvu (30074/2) and Kinuani (30085/28). PNR has focused its activities on testing imported varieties for their suitability for Zairian conditions. Selection of new suitable varieties for grain legums is in its initial phase. Further information is provided in annex II.

2.06 The degree of use of improved seeds is difficult to quantify. The first research results in the 1950-1960 were not yet widely distributed, and after 1960 further diffusion was interrupted due to political events. After renewed activities in the seed production sector, no accurate records were kept. Estimates can be made only for the use of improved maize seeds. The maximum production of new maize composites has been reached in 1980 with about 1,500 tons of seeds. The import of maize hybrids amounted at the time to about 300 tons. The total amount represented the seed requirement of about 50,000 hectares. Since maize is often planted during two seasons the seed supply only met during that period around 5% of the requirements of the total cultivated area. Since 1980 the production of improved maize seeds has dropped and currently improved seeds (of unknown quality) are probably used on not more than 4% of the total cultivated area.

C. Cultivar release and quality control.

2.07 The DADR has no regulations pertaining to variety release to farmers. Zaire has no seed legislation, does not keep a seed register, and does not have a seed certification structure. In practice the National Commodity Programs release the cultivars after testing at the research centers, and the programs define their own systems of genetic purity control. The PNM has elaborated a procedure for the production and selection of base seeds for the main cultivars. Procedures for seed multiplication are not formally prepared, and field control at the seed production centers is carried out under PNM supervision. Control records, however, are not systematically kept.

2.08 Import of seeds or planting material requires an authorization of the DADR, but in practice seeds are also imported without proper control. The immense border, the lack of adequate legislation and the absence of a skilled staff make quality control of imported seeds difficult and expensive. Quality control of seeds produced in Zaire is not carried out by an independent organization. Currently the seed producers themselves carry out some quality control, mostly in the field, while consumers sometimes check the germinating capacity. Seeds are seldom treated for protection against diseases or pests. In practice, most damage to the physical condition of seeds is incurred during storage and transport, and the germination power often drops to extremely low levels (down to 20%).

D. Seed Production

2.09 Before 1960 seed was mostly produced by private companies for industrial crops and at government research stations. After the initial effort to organize seed production in special centers (para 2.01) Government started maize seed production at the "Domaine Kaniama-Kasese". It started in a promising way in 1977 and produced 1,450 tons of improved composite maize seeds in 1980 (mostly Kasai I). After transfer of management to Zaire, insufficient funds were made available for project operations and activities slowed down since then, and the production dropped in 1983 to about 200 tons and in 1984 to 500 tons of unknown quality. To respond to the increasing demand for better seeds, multiplication is now carried out by rural development projects, religious institutions, some cooperatives, and some private companies engaged in food production for their labor force. The agencies involved (currently about 20) operate at varying stages of development and in varying size (from only a couple of hectares to 200 in Kasese). During the 1983/1984 season in total 500 ha were planted for seed production (about 70% maize, 20% rice, 6% grain legumes, and 4% cassava). Yields in seeds, after field selection and cleaning varied considerably, showing a possibility for significant improvement. The total amounts of available seeds were about 700 tons (maize 600 tons; rice 60 tons; others 40 tons). The production for the 1984/85 is expected to increase slightly.

2.10 Seed production is currently limited by the production capacity of the seed production centers, and is not based on a market analysis, because it is felt that the demand exceeds actual production capacity as shown below:

	Cultivated area* (Ha)	Seeding rate (Kg/Ha)	Quantity of seeds required for plant- ing (tons)	Assumed Period for re- newal of seeds (years)	Quantity of improved seeds requi- red per year (tons)
Maize	800,000	28	22,400	4	5,600
Rice	300,000	80	24,000	5	4,800
Ground- nuts	500,000	100**	50,000	5	10,000

* estimated area planted in 1983.

** unshelled

It is not known whether effective demand will be equal to the need for seeds, if they are offered at realistic prices needed to produce seeds of good quality. But even if this demand falls well below the above mentioned quantities it will take a major effort to produce the necessary quantities of good quality. With the improvement in seed quality and seed marketing the demand will probably increase, because the farmer might then reduce the period of seed renewal. The continuing expansion of the cultivated area, will also contribute to a growing demand for seeds.

E. Seed Marketing and Promotion

2.11 Seeds are marketed through a variety of channels because there is no trade infrastructure for commercial seeds. Locally produced seeds are mostly distributed or sold through rural development projects, agro-industrial organizations or commodity traders, combining seed distribution with the supply of other inputs (e.g. fertilizer) or purchase of produce. In some cases the production centers sell directly to the farmers (e.g. about 50% of the Kasese production). Imported seeds (500 tons per annum) are sold by international seed-companies to large commercial farmers or supplied by agro-industrial companies to contract-producers. In general the marketing of seed does not operate effectively due to unreliable supply and a fragmented marketing network. The establishment of a better commercial network for seed-marketing appears to be as important as the improvement of the seed production structure.

2.12 The following policy measures were taken in the 1970s to encourage the use of improved seeds: (i) promotion of the use of improved seeds through extension services; (ii) promotion through the PNE: (iii) free distribution of seeds in the early 1970s; (iv) later on subsidizing seed prices by distributing seeds at a low (price about 30-40% of costs); and (v) financing transport costs from production site to farmgate. This policy did not produce the expected results, because the supply of seeds of good quality decreased continuously over the last years, and it created the misleading expectation in the farmers community that the Government should be responsible for free seed distribution. Following the recent economic measures, the Government intends to reverse its policy and aims to increase seed production and promote seed supply at cost price.

2.13 There are some encouraging examples of successful marketing by development projects where its management tried to build in some incentives combined with improvement of extension services. In the Bank-assisted PMKO project the combined supply of fertilizers and seeds contributed substantially to production increases and made the farmers responsive to the use of improved seeds. The PNS project promoted seed sales at harvest time, when farmers had cash available and the EDF supported CEDERIM project introduced payment in kind, laying the groundwork for a gradual acceptance of payment in cash once a better market mechanism had been established. The marketing and extension experience of such projects could very well serve as reference points for the promotion of controlled seeds in new areas, although the systems are expensive because of the number of extension workers and technical assistance involved. In a national seed program the thrust should be towards assistance to existing extension networks, better information, and continuity of the supply of quality seed.

F. Sub-sector Issues and Policies

2.14 Major constraints in the development of a seed production structure. Seed farms in Zaire are faced with a number of problems in their operations, mainly the inadequacy of budgetary, technical and human resources and the lack of a seed quality control system, seed legislation

and a descriptive catalogue of varieties. The seed farms also face an uncertain supply of base seeds. Moreover, there are serious constraints on agriculture in Zaire, which any seed production plan must take into account if it is to be realistic. They are:

- a) the weak traders network at the local level (para 1.17);
- b) serious problems of transportation and communication (para 1.17); and
- c) inexperience in the management of public institutions (para 1.12).

Faced with these problems Government initially looked for short-term solutions, but gradually realized that the formulation of long-term objectives should accompany yearly action programs to improve seed production.

2.15 Government policies in the sub-sector. Government adopted in its original proposal for a national seed plan (at the 1982 CG meeting, para 1.19) the following principles in order to address constraints mentioned above, with full knowledge that the strategy should be continuously adjusted in accordance with progress made during implementation of its policies:

- a) to locate seed farms in regions where rural development agencies have achieved genuine progress, in view of the need for an organized effort to stimulate demand through strengthened extension activities.
- b) the decentralization of seed multiplication centers, in order to limit the cost and risk associated with shipment of large quantities of seeds over long distances;
- c) the need to integrate the private sector in the seed production structure, with a view to ensure efficiency and continuity of management, and to reduce dependence on public funds; and
- d) the need to establish a central agency which would be responsible for quality control and coordination of efforts during the initial development phase.

These objectives cannot be realized quickly, given the lack of trained personnel and infrastructure and the integrated character of such an undertaking. However, given the importance of the objective of food self-sufficiency for the country, Government attaches very high priority to the development of a seed program, even if resources are initially limited.

2.16 IDA involvement in the sub-sector. IDA supports seed multiplication activities in four agricultural development projects: Kasai Oriental Smallholder Maize, (Cr.1040 Zr); North East Ituri Rural

Development (Cr. 1325 Zr); the Lulua in the Kasai Occidental, Cr. 1540-Zr.); and the Kwilu Ngongo Sugar Project, (Cr. 660 Zr) where the Compagnie Sucrière (CS) develops part of the Luala valley in order to secure food supply for its labor force. The seed farms produce mainly maize seeds for small farmers, and the activities are limited to multiplication, without special quality control measures. Implementation experience is limited because seed production is hampered by the irregular supply of base seeds and the lack of funds and expertise. Also the scale of operation has been too small to allow setting up the necessary structure for a quality seed production operation. Although all projects aim to recover operating costs, the pricing policies adopted vary from partial to gradual and to immediate full recovery. The proposed Project would support activities to improve the supply of base seeds, seed farm operations and seed quality control, as well as to promote a better marketing policy.

III. THE PROJECT

A. Project Concept and Rationale

3.01 The proposed Project is of vital importance for Zaire. It aims to increase food production through increased supply of controlled seeds of major foodcrops and it would benefit mostly small farmers. It is, therefore, crucial to the implementation of Government's agricultural strategy which gives top priority to increased food production. Also, the proposed project is an important consequence and complement of the country's recently completed Agricultural Recovery Plan (para 1.18). Actions undertaken during the recovery plan, such as farmer training and modernization of cultivation techniques, will be severely limited in their impact if farmers cannot obtain sufficient seeds of acceptable quality. Increased production resulting from the farmers acceptance of the use of controlled seeds produced under the project will gradually substitute for imports which would otherwise be necessary and will move Zaire closer to its goal of food self-sufficiency. The project aims to reach about 20% of small farm holders in the areas of influence with a supply of controlled seeds.

3.02 The Project would be the initial time-slice of a long term effort to assist Government in developing a self-sustaining and commercially viable seed industry. The proposed Project responds to the Government's request in 1982 for assistance to increase improve seed production in Zaire (paras 2.01 to 2.15). The Project deals with the production of seeds for the major foodcrops (maize, rice, groundnuts and other edible legumes) and cassava cuttings, in accordance with the Government's strategy to achieve food self-sufficiency. It focuses on technical, managerial and institutional aspects of seed production and aims to maintain the necessary flexibility to adjust its policies to experiences gained during implementation and to adapt to local conditions. It is designed to deal not only with seed multiplication and quality control issues, but also to address the upstream problems of the supply of base seeds (para 3.16 and 4.09), and the downstream questions of seed promotion and distribution (para 3.10 and 5.10). The Project will be implemented by the recently constituted National Seed Bureau (BUNASEM) which would play an active role

during this first phase of the national seed program. However, the Project will seek to further integrate the private sector in the seed industry, and BUNASEM will then gradually limit itself to a regulatory role, mostly of quality control and technical assistance when needed. This approach requires that seed farm management develop its own administrative and marketing structure with the objective to facilitate participation, including participation in ownership, by the private sector and to permit BUNASEM to maintain the minimum administrative structure necessary to limit Project's reliance on budgetary support.

B. General Description

3.03 The Project would be the first phase of a long term effort. It would be implemented over a five year period, covering the agricultural seasons from mid-1985 to mid-1990. It would include the following components:

- (i) support for the operation of a National Seed Bureau;
- (ii) development and operational support for five central seed farms including development of seed marketing and support to extension service in the area of influence of each seed farm;
- (iii) development of seed quality control capacity, including establishment and operation of seed testing laboratories;
- (iv) assistance to secondary seed farms;
- (v) improvement of the production capacity of base seeds at major agricultural research stations;
- (vi) a training program, both overseas and in Zaire;
- (vii) special studies and pilot projects related to the development of the seed industry; and
- (viii) technical assistance to support the management of the National Seed Bureau and of the seed farms, and to develop the training program.

3.04 BUNASEM, responsible for project implementation, as part of the DADR, would have considerable administrative and financial autonomy. The Government intends ultimately to establish BUNASEM as an independent seed authority (paras 3.06 and 4.07). Other institutions would also participate in the implementation of project activities. These additional participants include the research institutes and the National Commodity Programs for the production of base seeds (para 2.03 and 2.07), Rural Development Projects and Private Enterprises for the provision of farm management services and the strengthening of marketing structures. BUNASEM would coordinate these project activities by entering into agreements with the participating institutions with the objective to arrive at annually agreed upon work

programs and budgets (paras 4.09 to 4.12). BUNASEM would also actively promote further participation of the private sector in seed production, among others, by studying in collaboration with the private sector, the issues involved in such a development (para 3.21 and 4.20).

C. Detailed Description

3.05 National Seed Bureau. The Project would support the strengthening and operation of BUNASEM. The absence of an entity exclusively responsible for the improvement of seed production has been a major constraint to the effective use of scarce resources available for seed production and distribution activities. In May 1984 the Government established BUNASEM to implement the National Seed Program and carry out the proposed Project. The Project would provide BUNASEM with the technical, human, and financial means to organize its activities and operations, set up its management systems, determine its role and relations vis-à-vis the other institutions involved in seed production, such as the research programs, the seed farms, the development projects and the private sector and develop its work programs and budget estimates to implement the project. BUNASEM would first start a three pronged action program: on the operational side, the coordination and development of seed production; on the administrative side, the organization of logistical services for seed farms, and the necessary internal communication and monitoring system and assistance to the introduction of proper accounting and control systems at seed farms; and finally on the promotional side, the promotion of effective marketing policies and training programs geared to the needs of seed farms. BUNASEM would also have a monitoring and evaluation unit, and a training unit, initially under direct control of the director (para 4.19). After production start up BUNASEM would gradually organize a quality control system and initiate the drafting of seed legislation and the preparation of a variety catalogue (para 3.14).

3.06 BUNASEM forms a part of the DADR, albeit with its own annual work program and a high degree of autonomy, particularly in the technical field. It is expected that BUNASEM will evolve into an independent authority (office), with its own separate budget and personnel policy (para 4.07). The organization of BUNASEM would be developed in stages, in accordance with the progress made at the seed farm level. The initial staff would include one Director, three Service Chiefs and nine support staff including chauffeurs. Chart 3 indicates the organization of BUNASEM during project implementation. Assurances were obtained at negotiations that the Government would employ a qualified professional as Director of BUNASEM, in consultation with the Association.

3.07 Major investment items under the BUNASEM component would include the construction of offices in Kinshasa in conjunction with the central seed laboratory, vehicles, office equipment and furniture, radio communication systems with seed farms, audio-visual training equipment and incremental operating costs (including salaries, bonuses, office material and public utility services). Total component costs, including price and physical contingencies, are estimated at US\$1.9 million.

3.08 Improved seed production. This component aims at expanding the seed production capacity by supporting existing seed production centers or seed farms in Bas-Zaire and Kasai Oriental, and by establishing new ones in Bandundu, Shaba and Haut-Zaire. All farms are located in the major foodcrop production areas. The major seed varieties to be produced will be for maize, Kasai I, Salongo, Shaba and GPS5; for rice, R66 and R46; for groundnuts G17; and for cassava PRONAM released cultivars (para 2.05 and annex II). The seed farms would obtain their base seeds from the research centers or the National Commodity Programs (paras 3.16 and 4.09) and produce controlled seeds on their own farms and on the farms of out-growers. Due to the presently limited expertise in seed production technology, the outgrowers program would be expanded gradually after each seed farm has established satisfactorily its own organization (para 5.08). The distribution of cassava cuttings of new, improved cultivars poses a unique problem: the prohibitively high cost of transporting thousands of tons of cuttings over long distances excludes the option to produce improved cuttings at central production centers. The Project would therefore provide funds to produce at seed farms base-cuttings for distribution to progressive farmers selected in consultation with extension agents. They would produce controlled cuttings under supervision by qualified staff of PRONAM and the seed farms. The satellite farmers would distribute controlled cuttings to the farmers. Since income from sales of tubers and leaves would substantially cover production costs of cassava-cuttings the farmers would only have to pay a low price for improved planting material. Newly released cultivars could be distributed rapidly with this type of decentralized system of production.

3.09 In view of the Project's goal to assist the Government to develop a self-sustaining and commercially viable seed industry with an increasing participation of the private sector (para 3.02), organization and management of the seed farms would be contracted, wherever possible, to private enterprises, or, in their absence to regional development organizations (para 4.11). The private sector is still reluctant to invest in seed producing enterprises until the market and profit potential of such ventures are sufficiently certain. Thus the nature of the contracts would vary depending on the interest and structure of the participating agencies (para 4.02). It could range from the administration of seed farm operations, to a concession to produce and market seeds or to a full management contract for the exploitation of a state owned seedfarm. While assets remain in the public sector until transfer to the private sector, seed production operations would, however, in all cases, be organized along commercial lines and the seed farms would be comparable to wholly owned subsidiaries of commercial enterprises (private, public or mixed) with respect to organizational structure (para 4.11), cost-accounting (para 4.11) and marketing (para 3.10). Marketing decisions would be made at the seed farm level (paras 6.04 and 6.09) and profits, when obtained, would normally be retained by the seed-farms (paras 3.11 and 6.09), with a view to enhance prospects of transfer of the seedfarms to the private sector. BUNASEM would supervise the execution of such management agreements to assure continuous production and distribution of quality seed to the farming population. The Project would provide the necessary management and technical assistance (para 3.23) to facilitate the transfer of operations

to the private sector (para 3.21 and 4.20). An important constraint to this transfer would be the shortage of marketing channels and the weak extension services. Development of market potential would be undertaken by BUNASEM at the central and by the seed farms at the regional level. Costs of the latter would be recovered through seed sales. Chart 5 shows the organization of a seed farm at full development.

3.10 At present farmers in various areas are insufficiently aware of the value and importance of improved seeds, or are reluctant to use seeds due to uncertain quality and availability. The Project would need not only to produce quality seeds on a sustained basis, but should also ensure their availability when needed. Finally, it would provide assistance in starting up extension in the use of improved seeds and marketing programs where these do not exist (e.g. Bas-Zaire with the Compagnie Sucrière) or in strengthening those which are on-going (e.g. Kasai-Oriental with PMKO). The project would provide funds for necessary services and studies (para 6.02). With respect to extension the project would make provisions for the establishment and operation of demonstration plots and on-farm test plots, as well as for the training of staff and selected farmers. The long-term objective is to expand the market for improved seeds through a price structure based on seed farm costs and local market focus rather than on central government regulations.

3.11 Investment costs would include the initial costs of establishment of the organization and infrastructure, construction of houses, industrial buildings, offices, laboratories and storage facilities; farm and seed processing equipment; vehicles and radio communication, and on-farm and access roads. Operating costs would include incremental salaries, administration production costs, maintenance and other recurrent expenses including working capital (para 3.30). The IDA credit would finance part of the investment and operating costs for the five seed farms. In addition to the IDA credit, seed farm operations would be financed through seed sales and, if necessary, short-term borrowing from other sources (i.e., commercial banks or Government parastatal credit institutions). It is expected that the seed farms will become self-financing during the period of implementation, and profitable operations in the medium or long run. Assurances were obtained at negotiations from Government that full operating costs would be recovered within the project implementation period and that adequate accounting procedures permitting the accurate calculation of cost prices would be installed at the seed farms no later than December 31, 1986 (para 6.04). The total costs of this component, including extension and marketing services, would be US\$9.3 million including contingencies.

3.12 Assistance to other seed farms. This component would provide financial and technical assistance for the development of seed farms not directly financed and supervised by the project. These facilities - private enterprises, rural development projects and religious centers with agricultural development programs - have already initiated or are planning to start seed production activities. These farms would be gradually covered by the seed quality control system and the project could thereby help them identify and eliminate production constraints, such as inadequacy

of expertise and deficiencies in seed processing and storage. Assistance to these farms would further decentralise the system of seed production. The cost of seed transport would be reduced, thus making seeds more affordable to a greater number of farmers.

3.13 Support would be in the areas of training, improvement of on-farm seed quality control and financial assistance for the procurement of seed processing and storage equipment, in cases where major improvements are expected from such financing. The component would also finance staff travel for visits to these farms. The support would be provided only upon request by the interested farm or project and possible financing would be contingent upon the conclusion of an agreement, satisfactory to IDA, between BUNASEM and the farm, specifying conditions of financing, improvements to be achieved and the type of equipment or services to be provided under the project (para 4.14). The total cost of this component would amount to US\$0.3 million, including contingencies.

3.14 Seed quality control. The Project would support BUNASEM and the seed farms to fully develop a capacity for seed quality control. Existing control activities are mostly limited to controlling the germination capacity of seeds, and in a few cases to field control on genetic purity. For the certification of seeds by an independent agency (para 2.07), it is essential that crop varieties be registered and described in an officially approved catalogue and that the certifying agency be empowered to conduct varietal tests during subsequent years under various ecological conditions, and to carry out field and factory inspections at seed production centers. Such a system does not exist in Zaire at present, and it would take several years for it to become operational. However, the project would provide funds for the preparation of such a system, since unbiased quality control is essential for raising and maintaining quality of seeds and in gaining farmers confidence. But, before the system is in place, the quality level could be improved by elementary laboratory control tests and the standardization of field controls. The Project would provide funds for the establishment of a quality control unit of BUNASEM, which would ultimately develop into a seed certification unit.

3.15 The component would finance: the construction and outfitting of a seed testing laboratory for the BUNASEM, and five small laboratories at the five seed production centers; salaries, transportation and equipment/material and technical assistance required for laboratory operation and shipping and handling of samples. It would also finance the preparation of a preliminary inventory of food crop varieties widely used in Zaire and the drafting of seed legislation. Assurances were obtained sought at negotiations to complete these documents no later than December 31, 1988. Total estimated cost for this component is US\$1.6 million, including contingencies.

3.16 Assistance to research stations would focus on improving the production capacity for base seeds, as their assured supply is the most vital issue for the seed production centers. The Government is currently improving the agricultural research structure and strengthening the National Commodity Programs. However, these programs make provisions

mainly for the personnel to produce breeder seeds and some base seeds, but do not provide sufficiently for the necessary infrastructure to produce and store base seeds in the quantities and of a quality needed by the proposed project. BUNASEM would enter into agreements with the research institutes and these programs to provide the necessary supply. The agreements would define the obligations of each party to ensure the production of the required base seeds (para 4.09). The National Rice Program would, under the proposed project, receive assistance to strengthen the activities for rice seed multiplication at the Mavunzi station. This assistance would be coordinated with the efforts now being undertaken by the Italian Government to support rice research. Similar research programs for cassava, maize and grain legumes are currently assisted by a USAID funded project (para 2.03). In addition, assurances were obtained at negotiations from Government, that it would prepare and present to the Association, no later than June 30, 1986, an action plan to implement the recommendations contained in the report of the research study group, prepared with assistance from ISNAR (para 1.14).

3.17 Investment items for this component would be made at the research stations of Gandajika (maize, grain legumes), Kaniama, M'vuazi (cassava, maize) and Mavunzi (rice). They would include the construction of houses, and storage buildings; seed drying facilities and equipment; rehabilitation of energy and water supply facilities (Kaniama and Mavunzi), laboratory facilities (Mavunzi), vehicles and radio communication equipment. For the assistance proposed for Mavunzi, the component would also provide for salaries and operating costs during the run in period of about two years, after which these costs would be expected to be covered by seed sales. Total component costs including contingencies are estimated at US\$2.6 million.

3.18 Professional training. The limited number of individuals experienced in the management of seed farms, seed production, and seed technology, constitutes a major constraint to the development of an adequate seed production structure. In the past training programs have only been undertaken by PNM, but these were more oriented to research work or general agronomy, and less to seed technology or seed farm management. Also, there has been a great turnover in personnel and most of the trainees have found careers in other government functions or the private sector. Training programs for other crops were not systematically undertaken.

3.19 The provision of training opportunities would be a major feature of the project, as the ultimate objective is to develop an indigenous capacity to manage the seed industry in Zaire. Apart from on-the-job learning which would occur during activities jointly carried out with consultants, opportunities for in-country and overseas training would also be made available for all major project activities. A total of 44 man months consultancy is provided for training. About 620 persons would be trained over a five-year period in farm management, financial management, farm administration, technology of seed production and processing, use and maintenance of equipment, laboratory operation, and seed marketing. This component would include the training of 25 individuals overseas, 23 courses

in Kinshasa or at local training centers; and 32 mobile training courses. Refresher courses would also be organized in order to establish a continuous training system and to update the knowledge of the specialists involved in the seed industry. Further details are given in Table 8.

3.20 The component would finance the cost of overseas training, and for local training the cost of instruction, equipment, salaries, travel and housing of faculty and participants. It would also provide six manmonths of consultants to prepare the format and curricula of local courses as well as the instruction material. An evaluation and updating of courses every two years would also be financed. A total cost of US\$1.7 million is estimated for this component, including contingencies.

3.21 Studies and pilot projects. This component would finance short-term studies to define marketing strategies, determine the potential for producing maize hybrid seeds and its possible impact for the seed industry in Zaire (para 2.05), and analyze the conditions and make recommendations for incorporating more rapidly the private sector into the production and marketing of seeds. It would also carry out (under supervision of the staff of the Kaniama research station) a pilot test on plot A of the Kasese farm to establish the appropriate techniques to continue seed production at this farm (para 2.01 and 2.09); and a test of production and sale of farmers packages (minikits) consisting of fertilizer, controlled seeds, herbicides and pesticides, in order to promote the regular purchase and use of improved seeds by small farmers.

3.22 This component would provide funds for short-term assistance by outside consultants to put in place a cost accounting system for BUNASEM and the seed farms, to establish a monitoring system, and to carry out evaluation studies of the project impact. This component would also finance all preparatory work for a second phase of the program as well as for a possible change of BUNASEM's status into an independent regulatory body (para 4.07 and 4.20). Finally, funds would be provided for auditing the accounts of BUNASEM and the project related accounts of the participating agencies (para 3.33). The total cost of consultants, agricultural inputs, operating costs and study materials for the various tests and pilot projects is estimated at US\$0.7 million, including contingencies.

3.23 Technical assistance. The provision of technical assistance under the project would aim at alleviating some of the constraints described in previous paragraphs (2.07 and 2.15; 3.05 to 3.21). The project would finance international specialists to assist BUNASEM and the seed production centers in seed production technology, institutional and farm management, seed quality control and seed market development. At BUNASEM headquarters, three specialists would be employed: a seed production technologist, a management/financial specialist and a seed marketing specialist. Together and separately these specialists would work with BUNASEM's Director and his senior staff to: (i) develop a central structure capable of coordinating and supporting seed production activities undertaken by research stations and seed farms; (ii) establish management

and accounting systems that would facilitate the transfer of the full seed production responsibility to the private sector; and (iii) develop a seed quality control system and legal framework conducive to the development of an independent seed industry in the long run. At the level of the seed production centers, the assistance of a seed production specialist is envisaged until the key staff of each center is sufficiently experienced to carry out its management task. A total of 214 man months is provided for such assistance. In addition 13 man months, to be financed by UNDP, would be provided for ad hoc assignments to be decided by the director of BUNASEM in consultation with FAO. The component would finance salaries, travel and lodging costs for the consultants employed while on mission in Zaire. The total cost is estimated at about US\$3.1 million, including contingencies.

D. Project Costs

3.24 Total costs are estimated at about US\$21 million (Z 770 million), including US\$0.9 million (Z 31.5 million) of physical contingencies and US\$4.0 million (Z 140 million) of price contingencies. Of the total costs about US\$12.5 million, or 59%, would be in foreign exchange. Project costs by component are summarized in the table below:

Project Cost Summary (per component)

	<u>Zaires (million)</u>			<u>US\$ (million)</u>			<u>Percent of Total Base Costs</u>	<u>Percent of Foreign Exchange</u>
	<u>Local</u>	<u>F.E.</u>	<u>Total</u>	<u>Local</u>	<u>F.E.</u>	<u>Total</u>		
A. National Seed Bureau	27.6	23.1	50.7	0.79	0.66	1.45	9	46
B. Central seed farms:								
1. Kwilu-Ngongo	10.9	17.1	28.0	0.31	0.49	0.80	5	61
2. Pindi	22.8	28.3	51.1	0.65	0.81	1.46	9	55
3. Mpoy	45.8	36.8	82.6	1.31	1.05	2.36	14	44
4. Shaba	23.1	23.8	46.9	0.66	0.68	1.34	8	51
5. Haut Zaire	22.1	18.5	40.6	0.63	0.53	1.16	7	46
C. Assistance to other seed farms	1.8	6.3	8.1	0.05	0.18	0.23	1	78
D. Seed quality control	20.0	17.1	37.1	0.57	0.49	1.06	7	46
E. Assistance to research centers	26.9	46.2	73.1	0.77	1.32	2.09	13	63
F. Professional training	13.0	34.0	47.0	0.37	0.97	1.34	8	72
G. Studies/pilot projects	3.9	13.6	17.5	0.11	0.39	0.50	3	78
H. Technical assistance	14.0	75.2	89.2	0.40	2.15	2.55	16	84
Total Project Base Costs	231.9	340.0	571.9	6.62	9.72	16.34	100	59
Physical contingencies	14.0	18.2	32.2	0.40	0.52	0.92	6	56
Price contingencies	62.3	77.3	139.6	1.78	2.21	3.99	24	56
Total Project Costs	308.2	435.5	743.7	8.80	12.45	21.25	130	59

Time phasing and a breakdown of Project Costs by component and by category are shown in Table 3.

3.25 Project costs have been estimated on the basis of 1985 prices^{3/} and include estimated taxes and duties of U.S.\$62 thousand (Z 2,170 thousand). Physical contingencies of varying percentages (from 0 to 11%) were applied to each cost category to reflect uncertainties regarding detailed quantities and the possibility of design changes. All calculations were carried out in foreign currency (US\$) on the assumption that the Government's floating exchange rate regime would maintain the local currency's purchasing power parity over the Project implementation period, annual inflation rates for foreign currency were used, as shown below:

	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Foreign	7.5	8.0	8.0	8.0	8.0

E. Financing

3.26 The financing of project costs would be as follows:

	<u>Z millions</u>	<u>US\$ millions</u>	<u>%</u>
Government of Zaire	68.25	1.95	9.2
Controlled seed sales	86.45	2.47	11.6
IDA	520.80	14.88	70.0
Co-financier (UNDP)	66.15	1.89	8.9
Total (without taxes)	741.65	21.19	99.7
Taxes and duties	2.10	0.06	0.3
<u>Total (with taxes)</u>	<u>743.75</u>	<u>21.25</u>	<u>100.0</u>

UNDP has already agreed to provide financing on a parallel basis, and FAO would be its executing agency. The Italian Government has expressed interest to finance rice research activities, also on a parallel basis. Arrangements are currently being worked out by the two Governments. Upon conclusion of an agreement cofinancing would be coordinated with the proposed project.

3.27 The contribution of Government (including taxes) would consist of budgetary allocations for the operation of BUNASEM and part of the investments required to develop seed production (para 6.16). In addition, assurances were obtained at negotiations that, in the event that seed farms experience cash shortages during the early years of development, the Government would take the necessary steps for the seedfarms to have access to credit extended by parastatal credit institutions such as the Fonds de Convention de Development and BCA. The contribution of farmers would consist of payments for seed purchases from the project's seed farms. Although the Project financial plan calls for farmers' contribution to represent 11.6% of total project costs, this is a conservative estimate and actual seed farm revenues could be higher. If so, the Government contribution in later years could be reduced correspondingly. However, in

^{3/} Data was collected between March and July 1984 and increased uniformly by 9.1% except for salaries which were adjusted at the end of 1984.

view of the high degree of uncertainty concerning seed farm revenues in the early developmental years it is best to adopt a conservative approach and limit estimated contribution from seed farm revenues to about 11% of total project costs.

3.28 The proposed IDA credit of SDR 15.10 million (US\$14.88 million) would be granted to the Government under standard IDA terms and conditions. A UNDP grant of US\$1.89 million to be administered by FAO, would be made to the Government on terms and conditions described in the project agreement signed February 13, 1985. The IDA credit and the UNDP grant together would cover about 79% of project costs, including 100% of foreign exchange costs and 48% of local costs. The Government of Zaire would cover about 10% of project costs. The Project costs that would be co-financed by IDA and UNDP are expenses for the National Seed Bureau (para 3.05), seed quality control (para 3.14), training (para 3.18) and technical assistance (para 3.23). Government would transfer the proceeds of the credit and grant, as well as its own contribution, to the Department of Agriculture, which would transmit these funds via BUNASEM to the participating agencies on the basis of agreements and yearly work programs which would be reviewed and approved by IDA in advance, (para 4.11 and 4.12).

F. Disbursement

3.29 Disbursements from the credit account and the co-financier grant account would be disbursed as presented in Table 4. BUNASEM's annual work program would contain the annual work programs of each participating seed farm and research station. These work programs, which would in fact be signed contracts or agreements between BUNASEM and the respective parties, would specify, among other items, the amounts to be financed during the year by the IDA credit. IDA would disburse against these annual work programs after they have been approved by IDA (paras 4.09-4.12 and 4.22-4.23). Disbursement for assistance to other seedfarms would also be made against signed agreements (paras 3.12 and 3.13). The UNDP co-financier would finance on a parallel basis with IDA and Government the components of establishment and development of the BUNASEM with substantial involvement in the financing of technical assistance and the operation of regional bureaus. The Government would finance primarily construction of buildings and office equipment. Seed farms would finance part of the recurrent costs through sales of controlled seeds to farmers. Further details are given in Table 5. Disbursements under category H of Table 4 would be against statements of expenditures (SOE) certified by the financial counselor of the Department of Agriculture. Disbursements against all categories would be fully documented. However, documentation pertaining to SOE would be retained at the offices of BUNASEM for inspection in the course of normal supervision by IDA and by independent auditors. BUNASEM would be responsible for the preparation and presentation to IDA of withdrawal applications on behalf of BUNASEM and the participating agencies, and it would present withdrawal applications only for the expenses contained in the annual workprograms as approved by IDA.

3.30 Working capital and IDA special account. It is estimated that working capital requirements correspond to three months of all recurrent cost categories, except for the seed production category where advance purchase of farm inputs, not always readily available, requires an average of a six-month inventory. Sources of working capital consist of: (i) sales of improved seeds for each of the seed farms; (ii) IDA and UNDP financing; and (iii) Government contributions. However, sales of improved seeds would not be effected until late in the first year and cash shortages may occur at other times due to the cyclical nature of sales and to possible delays in Government disbursements. Thus, it would be necessary to establish a revolving fund (special account) in order to pre-finance at least part of the project's working capital requirements. A revolving fund of US\$0.4 million, financed under the project, would be established in an account to be opened in the Central Bank for this purpose and would be operated under terms and conditions acceptable to IDA. The revolving fund would cover all eligible expenditures. The revolving fund would be replenished monthly upon receipt of documentary evidence to be provided by Project Management. Should any disbursements be made from the revolving fund which would not be acceptable to IDA, the Government would deposit the corresponding amount into the special account. Terms and conditions for using the special account would be agreed upon during negotiations.

3.31 Disbursement schedule. The estimated schedule of disbursements is presented in Table 6. It is estimated that the IDA credit will be fully disbursed within a period of seven years. This is somewhat shorter than the 10-year period indicated by the Disbursement Profile for agricultural projects in Zaire, covering the 1973-1983 period. The shorter disbursement period is justified and realistic for the following reasons: (i) disbursements for agricultural projects in Zaire over the last five years have been occurring at a faster rate than indicated by the profile, due to a more stable agricultural policy, increased project experience and Government's awareness of the need of quick disbursements; (ii) the seed farm components of this project will be managed by ongoing projects or private sector firms on contract and are expected to be more efficient than the Government; (iii) the PPF has enabled Project staff to become familiar with IDA disbursement procedures; and (iv) the establishment of a revolving fund is expected to alleviate some of the constraints hampering disbursements in the past.

G. Procurement

3.32 Buildings, including civil works for site preparation, amount to an estimated cost of US\$4.6 million, and would be procured through local competitive bidding. Although the total amount involved is substantial, it consists of many individual components dispersed over various times at eleven sites, (all but one of which are in the interior of Zaire). Thus, the amount for each component would be small and, therefore, unlikely to interest foreign firms, which would nevertheless be allowed to bid. For the same reasons farm infrastructure works and equipment (US\$0.9 million) would also be executed following local competitive bidding. Equipment and

material financed under the IDA credit would be procured observing the following: (i) office equipment and materials (US\$0.30 million) through local or international shopping procedures; (ii) heavy equipment and vehicles (US\$2.1 million) through international competitive bidding following IDA guidelines; and (iii) farm and laboratory equipment (US\$1.4 million) through international shopping procedures. All consultants would be selected following IDA guidelines except for those funded directly by UNDP/FAO who would be selected under UNDP/FAO guidelines. Materials under the Marketing, Training and Technical Assistance components would be purchased following local or international shopping procedures for a total cost estimated at US\$5.0 million under IDA and US\$1.3 under UNDP guidelines. The existing guidelines for local procurement vary for each region or province. Following the economic measures and devaluation of the Zairian currency of September 1983, these guidelines are being reviewed. In addition, the annual work plans to be prepared by BUNASEM and the seed farms would detail an annual procurement plan (including procedures) which would be reviewed and approved by IDA. Under this plan procurement of less than US\$50,000 may be carried out through local or international shopping procedures. Procurement methods by cost category are summarized in Table 7. BUNASEM would be responsible for procurement of goods under International competitive bidding and would provide the management agencies of the seed farms support in procurement matters (such as preparation of bidding documents and evaluation) and logistical assistance. IDA would review and approve bid documents and bid evaluation for items procured under local or international competitive bidding, terms of reference and evaluations of consultant selection and bid evaluations for items procured under shopping procedures.

H. Accounts and Audits

3.33 A consultant acceptable to IDA would be recruited as Advisor for the Chief of Administration and Finance of BUNASEM for the duration of the project. Among other duties he or she would be responsible for setting up BUNASEM's accounting and internal control systems, provide follow-up support and assist BUNASEM in consolidating the annual budgets of the seed farms and prepare annual financing plans. Manuals would be prepared to help accounting staff of BUNASEM and of the seed farms in applying the systems. Accounting and Finance Service personnel would participate in training courses. Short term consultants might also be hired to assist him or her in this task and in setting up similar systems in each of the seed farms. Assurances were obtained at negotiations that BUNASEM and the seed farms would (a) maintain records and accounts (commercial accounts would be required for each seedfarm) to explain all project activities; (b) have these accounts and statements of expenditures, if any, audited each year by external independent auditors acceptable to IDA; (c) submit the audit reports to IDA no later than six months after the close of the financial year; and (d) allow IDA to review the accounts and records.

I. Environmental Impact

3.34 Project investments would not have an adverse environmental impact. In the medium and long-run, they are expected to have a beneficial effect, particularly in areas where agriculture with reduced fallow periods

degrade the soils. In those areas farming systems will have to evolve using adequate crop rotations and production systems, and the availability of good and appropriate seeds could help introduce effective systems. The promotion of the use of better seeds would also be an incentive to upgrade cultivation techniques such as the observance of the correct planting time and plant populations. This would lead to more vigorous crops, covering soils early on in the growing period, and thus reduce soil degradation.

IV. PROJECT IMPLEMENTATION

A. General

4.01 The Department of Agriculture and Rural Development would have overall responsibility for the project. (The Organization of the Ministry of Agriculture is shown in chart 1). A National Seed Board would be the key consultative body, providing advice to the State Commissioner on all aspects related to the seed sub-sector. The National Seed Bureau (BUNASEM) would be the executing agency of the project. BUNASEM would contract the production, processing and distribution of controlled seeds with qualified enterprises of the private sector or capable management units of regional development projects (para 4.11). It would also enter into agreements with the relevant research stations or national commodity programs to produce the base seeds required by seed farms (para 4.09). BUNASEM would supervise the implementation of the contracts made with the various participating agencies, take necessary steps to adjust the contracts to new developments, coordinate all seed producing activities in Zaire and develop gradually a seed quality control system.

4.02 The Project would be implemented over a five year period, which would allow building nationwide a better insight into the operational concept of a seed industry, identifying institutional constraints and developing more effective marketing practices with a view to further integrate the private sector in seed production. In addition it would create a local capability for planning and implementing further developments. The major agencies participating in the implementation of the project would be BUNASEM, the Commodity Crop Programs (para 2.03), some research stations (para 5.06), and the prospective management agencies for seedfarms. These agencies are private or mixed enterprises: Compagnie Sucrière (Bas-Zaire); CODAIK (Bandundu); an affiliate of GECAMINES or a private agricultural enterprise (South Shaba); SOTEXCO (Haut Zaire) and a management unit of a successful rural development project PMKO (Kasai-Oriental). An overview of the project's structure is given in chart 4.

B. Organization

The National Seed Board (NSB)

4.03 This Board of about 10-15 members, to be established in the Department of Agriculture and Rural Development, would have advisory functions initially (para 4.01), but could become a statutory board when seed legislation is enacted. The chairman and members of the Board would be chosen and appointed by the State Commissioner for Agriculture among those nominated by the agencies and segments of the population interested

in the supply of controlled seeds. The Director of BUNASEM, a member of the Board ex-officio, would serve as the Secretary of the Board. Since the success of a seed program depends both on those taking part in its implementation and on the beneficiaries at various levels the following sectors and organizations would also be represented on the Board: Planning Department; research institutions; private seed producers; cooperatives or farmer organizations; private traders; agricultural credit institutions; agricultural development organizations and agricultural inputs supply organizations.

4.04 The Board would advise Government with respect to release of new varieties, seed importation and multiplication targets, quality standards, improvement of marketing procedures and would advise the Government on financial support required by the seeds industry. It would establish ad hoc working committees which would prepare technical matters for consideration by the Board. The technical committees would be organized and guided by the Director of BUNASEM, as appropriate. The Board should preferably meet before every production season and at least twice a year, including the time when the Board would meet to comment on the annual report of BUNASEM. Assurances were obtained at negotiations that Government establish no later than December 31, 1986 a Board along the lines described in this and the preceding paragraph.

National Seed Bureau (BUNASEM)

4.05 BUNASEM was established recently as a semi-autonomous unit within the Department of Agriculture and Rural Development (DADR), primarily to carry out the proposed project, and is still at the organizing stage. Its mandate includes (a) overall responsibility for the implementation of a seed production and distribution program through contracts with other agencies, and (b) quality control. The structure of the Bureau is to evolve gradually to reflect the progressive switch from the present situation to the time when an effective seed industry is operated by the private sector, at which time BUNASEM would become primarily a regulatory agency. A Director was appointed in May 1984 and staffing is underway (Chart 3 gives the organizational chart of BUNASEM). Its structure consists of three major units: (a) the technical operational unit, (b) the administrative and financial unit, and (c) the promotion and marketing unit during the first phase of implementation of a National Seed Program. It would be a condition of effectiveness that the director, three section chiefs and the procurement officer be in place. BUNASEM's workplan would be available by October for approval by IDA.

4.06 During the implementation period, BUNASEM would be ultimately responsible, but not directly involved in, the production, processing and storage of controlled seed. Actual field operations, also including distribution and marketing of seeds, would be carried out by private enterprises or project management units under contract (paras 3.09 and 4.11). Technical Assistance to prepare and update such contracts will be provided, as appropriate, by ad-hoc assistance contracts. Such agencies would receive support from specialised staff or consultants in the three units of BUNASEM. Production of base seeds would be carried out by research centers or National Commodity Programs under contract (paras 3.16

and 4.09). In view of the vital importance of training during the first phase of the National Seed Program (para 3.19), a training unit (eventually to become part of the administrative department) would be placed directly under control of the Director of BUNASEM. The quality control of seeds will ultimately develop in an independent unit. However, during the initial phase it will remain part of the operational unit because it has to be developed in close cooperation with seed production activities. In view of the difficult and expensive travel conditions in the country BUNASEM would, as appropriate, appoint regional supervisors to represent it locally. The supervisors would initially work closely with the participating agencies (e.g. using their existing laboratory facilities). It is expected that in a follow-up phase, the supervisors would develop regional bureaus of the quality control system.

4.07 BUNASEM was established as a unit of the DADR. It is DADR's intent to give BUNASEM an independent legal status with financial and administrative autonomy (para 3.06). Due to lengthy procedures involved in the creation of a public enterprise and the uncertainty regarding BUNASEM's initial development and performance, DADR has given BUNASEM the status of a departmental unit, to be funded as a project, with an adequate measure of autonomy with respect to budget execution and accounting procedures, and flexibility in personnel management. BUNASEM's legal status would, however, be closely reviewed during the first two years of project implementation, and assurances were obtained at negotiations that Government would take all reasonable steps to enhance BUNASEM's independent status.

4.08 In order to assist BUNASEM in building an effective organization capable of properly spearheading the creation of a private seed industry, the project would finance internationally recruited consultants and special studies (paras 3.21 and 4.20) on terms of reference acceptable to the Association (para 3.23) and a comprehensive training program which would include in-country as well as overseas training of BUNASEM's staff (paras 3.18 and 4.19).

C. Management of Project Components

Production of Base Seed

4.09 Base seed production would be carried out by the relevant research stations or commodity program under contract with BUNASEM. A master contract or agreement would be signed by BUNASEM with each program/station specifying the broad obligations of each party. These would include (i) a commitment on the part of the research institutions to make sure that the related regional research stations would provide base seeds to central seed farms in the amount, types, and quality to be agreed annually; (ii) the types of supports needed by the related research program/station that BUNASEM would agree to provide together with an estimation of their costs; (iii) an agreement by the research program/stations to maintain separate accounts for the utilization of staff, equipment, and funds provided by BUNASEM and to accept that these accounts would be subjected to BUNASEM's audit; and (iv) the type and frequency of control to be carried out by BUNASEM. A model master contract

would be reviewed at negotiations and signature of such agreements with the participating research institutes would be a condition of effectiveness.

4.10 Execution of each master contract would be by annual addendum to the contract, which would describe in detail the annual work program, the type and amount of base seeds to be provided by research stations, the categories and levels of support to be given by BUNASEM, as well as a detailed time schedule for these mutual obligations. It would also describe services to be given by the research stations to the seed farms for control of production quality. Due to funding uncertainties which tend to affect all projects in Zaire, the two parties would also work out alternative options regarding their levels of performance and support. Draft annual work programs would be available by October each year for approval by IDA. Disbursements for each separate research agency would be made against these yearly approved work programs (paras 3.29 and 4.22).

Production of Controlled Seeds.

4.11 Implementation of this component would be carried out in the field by the enterprises and project management units under contracts or agreements (paras 3.09 and 4.02). The interest of the identified management agencies varies, depending on their special objectives: Regional rural development structures recognize the need of regional seed production as a prerequisite for attaining their development objectives; and private enterprises understand the value of the use of controlled seeds at their agricultural projects for assuring the food supply for their laborforce, or the supply of raw-materials for agro-industrial industries, or the incentive is to obtain experience in a potential profitable enterprise. The services to be rendered by the agencies will be in principle at cost or, in case of difficulties in proper recording, on the basis of a predetermined fee. A master contract would be signed by BUNASEM with each managing agency specifying the broad obligations of each party. These would include (i) the general and administrative or organizational structure of the seed farm (ii) the commitment on the part of the agency to produce, process, store and distribute controlled seeds; (iii) the types of support and finances to be received from BUNASEM together with an estimation of costs; (iv) planning of financing; (v) an agreement by the agency to maintain separate accounts for the utilization of staff, equipment, materials and services used for seed production and to apply a cost accounting system; (vi) the format of presentation of annual work programs and budgets; (vii) the procurement procedures and planning to be observed; and (viii) the type and frequency of reporting and controls, including seed quality control and auditing. A model master contract would be reviewed at negotiations and signature of such contracts with at least three agencies acceptable to IDA would be a condition of effectiveness.

4.12 Execution of the master contract would be by annual addendum to the contract, which would describe in detail the type and amount of seeds to be provided by the regional farm, the category and levels of support to be given by BUNASEM, as well as the time these obligations would be due, and a specification of BUNASEM's field inspection planning. Seed farms would also prepare three-year forward production plans to secure proper operations; prepare realistic annual work programs and budgets; provide the required information for base seed production; and enable the seedfarms to

divulge seed availabilities and prices before the start of the season. Draft annual work programs would be available by October for approval by IDA. Disbursements for each separate seedfarm would be made against these yearly approved work programs (paras 3.29 and 4.22).

4.13 Extension and marketing would receive detailed attention in the above mentioned agreements. Support for extension of the use of improved seeds already undertaken by the agencies would be intensified, initially through local marketing studies, and later on by financing training courses, demonstration plots and farmer field days. The routine marketing costs (e.g. storage, transport, promotion), to be based on the recommendations of the initial studies would be part of the annual budget of the seed farms. BUNASEM would provide advice and technical assistance in the field of marketing in order to achieve a harmonious development of seed distribution by project and non-project farms. However, BUNASEM's role would be phased out as soon as warranted and transferred fully to the seed production centers (paras 3.02, 4.06 and 6.05).

Assistance to other seed farms

4.14 BUNASEM would be responsible for the implementation of this component. It would function as the main liaison between project and non-project farms and it would try to coordinate overall production planning. Measures to achieve this goal are described in paras 3.12 and 3.13. Agreements regulating financial assistance would be reviewed during supervision and investments above US\$10,000 would require previous IDA approval (para 3.30).

Seed Quality Control

4.15 Responsibility for implementing this component would rest with BUNASEM in collaboration with the National Commodity Programs, INERA and the seed farms. BUNASEM would in the first year focus on establishment of facilities and training of personnel. Procurement of laboratory equipment would be coordinated with progress made in the construction of laboratories, while training of personnel and simple field control could start in the first planting season. Initially the central laboratory of BUNASEM would function as the main control center. It would, however, decentralize this function to the regions and the seed farms as soon as laboratories at the farm and research stations became operative and trained personnel were available (expected by year three).

4.16 Quality control of seeds would ultimately be provided at three different levels. At the farm level, quality control would consist of field control and simple laboratory analysis tests. The test would be given to seeds produced at the farm or by outgrowers. At the regional level, control would be exercised on base seeds and controlled seeds, and would be done through both field tests and laboratory tests for all seeds produced in the area. Field tests would be made by research staff and authorized technicians, while lab tests would be performed at research stations or on regional seed farms and in the long-term, in follow-up phases by some field offices of BUNASEM. At the central level, control would be limited to lab analysis performed on all types of seeds. This is the final control point serving to confirm the results of the tests made at

the regional and local levels. BUNASEM would prepare guidelines for field control, sample taking, frequency of testing, establish control standards and maintain reference files.

4.17 The drafting of a seed legislation and the establishment of a variety catalogue of approved varieties of food crops might not begin until later in the project implementation period both to be completed by mid 1988. However, a preliminary inventory of existing varieties and field control techniques would be prepared earlier on with a view to give BUNASEM a framework for the preparation of its preliminary guidelines of seed quality control. During project implementation these guidelines would be tested on their practicality and effectiveness, giving a sound basis for drafting the final proposals of seed legislation. Since legislation takes time to be enacted, planning for its enactment would begin as soon as possible. Formal enactments would, however, likely be realised in a follow-up phase of the proposed project (para 3.05 and 3.15).

Technical Assistance

4.18 BUNASEM would be responsible for implementing this component, by employing various specialists (para 4.08). Each of them would develop an annual work program jointly with Zairian collaborators. These work programs would help guide the specialists' activities and at the same time monitor project performance. In total there would be three positions at BUNASEM, and one position at each seed farm (para 3.23). Technical specialists would play the varying role of catalysts, as well as executive agents, depending on the requirements of the specific circumstances. In addition the specialists would take active part in the training activities. The costs of time and travel spent in training activities would be imputed to this component. The primary objective for their presence would be to help build BUNASEM's and the seed farms' institutional capacity in the long run, which would require that they be able to impart appropriate technologies and approaches to their Zairian counterparts. The terms of reference and work program of each specialist would clearly indicate this competency and attitudinal requirement. The need for short-term consultancies would be identified by the Director of BUNASEM in consultation with his advisors. The employment of a technical, and a financial advisor would be a condition of effectiveness.

Training

4.19 Primary responsibility for implementing this component would rest with BUNASEM initially under direct control of the Director of BUNASEM, and on medium term under control of the administrative unit (para 3.05). In close collaboration with the managers of contracting agencies BUNASEM would develop a master training plan for each of the specialized activity areas under its purview. The plan would be made operational annually by including the training actions in BUNASEM's work program and budget. The master plan would indicate not only the number of persons to be trained and the subject areas but also information on eligibility conditions, criteria and procedure for selection, binding obligations upon training completion if necessary, and provisions for replacement of staff during the training

period as well as for their utilization upon return to work. Training actions would be evaluated periodically to ensure that the programs would respond to needs (Table 8).

Studies, Pilot Projects.

4.20 BUNASEM would have the responsibility to implement this component. It would determine the need and develop the terms of reference for these studies and interventions, screen the candidates, employ staff or consultants to execute the studies and supervise and evaluate their work. The market studies (para 3.10) would be carried out by ad hoc consultants; the cost accounting and the internal monitoring systems would be established during the first project year; and the mid-term evaluation study by the end of the second year (para 4.26). Preparatory work for changing BUNASEM's status into an independent public office (para 4.07) would start in the second year, while preparation for the next phase would start in the fourth year. The study on further integration of the private sector would be carried out as soon as possible under the aegis of the Director of BUNASEM by a team including representatives of the Government, private agricultural enterprises in Zaire, international seed enterprises and an independent expert in seed technology (para 3.21). The study on the possibility to produce economical maize hybrids in Zaire would be contracted out by BUNASEM later on in the project period to a qualified institution. The pilot projects (e.g. Bloc A at Kasese and "minikits") would be contracted out by BUNASEM. The pilot at Kasese would be implemented through a tripartite agreement with the Kasese project and the Kaniama research station, whereby the Kaniama station would be responsible for day-to-day supervision of activities. The "minikit" pilot would be contracted with one of the seedfarms (para 3.21). Such contracts would be incorporated in the annual work programs of BUNASEM and the concerning seed farm or research institute. Disbursements for these activities would be made against the approved work programs (paras 4.10, 4.12, and 4.22).

D. Reporting

4.21 BUNASEM would be responsible for implementing and supervising reporting responsibilities. The Project would be implemented on the basis of annual work programs and budgets. These documents would serve as a planning, implementation and monitoring tool. Each would include a statement of objectives (quantified) and specify detailed investment and staffing needs; estimated operating expenses indicating financial and physical resources to carry out the proposed program; and a financing plan indicating the source of funds for the investment and operating budgets (IDA credit categories, co-financier funds, government counterpart funds, sales and special loans). The programs and budgets proposed for the seed farms should be compatible with the multi-annual production policy of the Seedfarms (para 4.12) and the developed marketing strategy for each region, and should be reflected in the annual agreements to be concluded between BUNASEM and the participating agencies (para 4.23). BUNASEM should consolidate the separate programs and budgets in an overall financing plan (para 4.12) and a procurement plan of purchases and works and including type of bidding and timetables.

4.22 Preparation of the annual work program would follow the Government's budget cycle in order to reduce risks of major discrepancies between the figures proposed in the program and official government allocations. The preparation timetable would therefore respect the following schedule: (i) the first draft work program would be prepared during April by the seed farms and BUNASEM; (ii) a consolidated draft for the whole project would be transmitted to IDA at the beginning of May for preliminary review and comments; (iii) a final proposal would be presented by BUNASEM to the Commissaire d'Etat, for his review, through the Department of Project Administration, mid-June; (iv) DADR would incorporate Project financing needs in their respective budgetary requests presented to the Departments of Finance and of Planning end June; (v) the annual program would be submitted to the National Coordinating Committee and Parliament by the end of October. IDA's approval of the revised annual program would be the basis of disbursement for the activities to which the work program applies. Assurance were obtained at negotiations that the annual work Program would be submitted to IDA according to the timetable outlined above.

4.23 Project funding would be provided by the Government through budgetary allocations and loans, IDA, UNDP and possibly the Italian Government in quantities and on conditions as described in paras 3.25 to 3.30. BUNASEM would annually prepare before December 31 a financing plan of BUNASEM and the seed-farms, based on approved budgets. This plan would be reflected in the annual contracts with the research institutions (para 4.09) and the organizations managing the seed farms (para 4.11). The financing plan would be regularly updated on the basis of the quarterly financial reports of the seed farms in order to enable the BUNASEM to inform the Government in advance of possible changes and the need for seasonal credit arrangements.

4.24 Progress reports. BUNASEM would prepare semi-annual reports describing progress in achieving work program targets, comparing actual costs with budget estimates, and explaining variations between actual and planned results in these areas. Comparisons between actual results and appraisal estimates would also be provided for selected project indicators. Another important function of the semi-annual reports would be to analyze major problems encountered, propose solutions to these problems, and identify decisions and/or actions required by the Government. The reports would be made available in June and December in order to provide timely input into the annual work program exercise. Assurances to the above were obtained at negotiations.

E. Monitoring and Evaluation

4.25 Monitoring activities would be carried out by a Monitoring Unit, reporting directly to the Director of BUNASEM. The unit would collaborate with BUNASEM's administrative and financial unit, and seed farm managers in

order to establish an effective system of data collection. Monitoring activities would provide project management and Government with information on key Project indicators, laying the basis for evaluation of implementation progress and impact of project activities on farm families. Information collected would be analyzed and reported to management on a regular basis, and would constitute a critical input into semi-annual progress reports (para 4.24) and the annual work program (paras 4.21, 4.22). Short-term consultant support would be provided as appropriate (BUNASEM's advisors or ad hoc consultancy) during the first year of project implementation to assist with the establishment of monitoring activities. Monitoring Unit staff would initially consist of a chief and assistant, and expanded according to needs.

4.26 Project evaluation would be made in two steps: a mid-term evaluation and an ex-post evaluation carried out at the conclusion of the project implementation period. The mid-term evaluation would be carried out as an independent exercise by short-term national or international consultants who would be responsible to the State Commissioner of Agriculture and the National Seed Board. The mid-term report would provide also inputs for the annual progress reports and the completion report. The report would be made available no later than December 31, 1987 to the Ministry of Agriculture, the National Seed Board, participating agencies, and external funding agencies. BUNASEM would prepare a Project Completion Report (PCR) by the project completion date, and would submit this report to IDA no later than six months after the credit closing date. The PCR would summarize project performance, evaluate its impact on agricultural production and underline lessons to be taken into account for the implementation of a follow up phase and similar projects. Assurances to this effect were obtained at negotiations.

V. SEED PRODUCTION AND DISTRIBUTION

A. Demand

5.01 The total requirement for planting seeds depends on the area planted, the applied level of technology and the type and quality of seeds used. Farmers may meet their requirements from their own harvest or by purchasing seeds from neighbours or from seed farms. The yield potential of farmers' own seeds decreases more or less rapidly depending on the type of seed or crop. Hybrid maize seeds, for example, have to be purchased annually in order to maintain their yield level; composite maize seeds degenerate sharply after three or four years, while rice seeds can be replanted for about four to five years. Farmers generally observe a certain renewal period, depending on the availability and quality of commercial seeds and the level of technology applied. Thus, the demand for commercial seed may be considerably less than the requirement for planting material (para 2.10).

5.02 In view of the difficulty and cost of transporting seed over long distances in Zaïre, the demand for controlled seed has been analyzed separately for each of the five seed farms to be established by the project. The analysis is based primarily on the following variables: (i) farmer population in each seed farm area^{4/} (see also para. 6.02); (ii) the

^{4/} It is defined as an area of 100 km radius surrounding each seed farm.

price of improved seeds; (iii) the farm gate price of the crops; (iv) the incremental return to labor with controlled seeds in relation to common seeds; (v) the existence and efficiency of extension services in disseminating relevant information and (vi) the availability and quality of imported improved seeds. The details of the analysis are presented in Annex 3 of the implementation volume. The conclusion is that the demand for seeds significantly exceeds the production volumes projected at the seed farms and, in the absence of alternative sources of supply of comparable quality, (with the possible exception of small quantities of imported hybrid seeds), the seed farms should be able to sell their production subject to certain qualifications with regard to seed quality and marketing policies (paras. 5.03 and 5.04 below).

5.03 It would be necessary for BUNASEM and for each seed farm to delineate a marketing strategy and undertake an intensive marketing campaign aimed at smallholder farmers many of whom are probably not fully aware of the benefits resulting from the proper use of controlled seeds. Initially, this would consist of market studies to analyse market potential and to establish sales strategies (para 3.10). The marketing personnel of the seed farms would be expected to work closely with extension services as well as other entities such as traders, missions, development projects and agro-industrial concerns. Although the analysis of return to farmers' labor (para. 6.08), indicates that the farmer would be better off using improved seeds priced at or above full cost recovery cost levels, it may be appropriate in certain areas to adopt an initial "promotional pricing" strategy designed to facilitate introduction of controlled seeds to first time users (para. 6.03).

5.04 The demand for seed would also depend on the quality of seeds marketed by the seed farms. Experience in ongoing project indicate that farmers are interested in buying seeds at the expectation of a production increase of about 25%. However, a sound marketing policy should aim at a 50% yield margin between improved and traditional seeds (para 5.12). The utilization of the full production potential of improved seeds depends also on the quality of cultivation practices of the farmers buying the seed. The project would therefore provide funds for a pilot project, producing inputs packages containing seeds, fertilizers and pesticides aiming at improvement of cultivation techniques. Such package deals have proven to be successful elsewhere and if successful in Zaire, they would increase demands for seeds (para 3.21). Based on available data and the above considerations a likely demand has been estimated per seed farm. Initial farm and production development has been based on this likely demand and on possible seed production developments by other seed production centers. The estimates by crop are given in para 5.07.

B. Production and Yields

5.05 Production of base seeds. The production of base seeds would in the first place be geared to the forward production planning of the seed farms (para 4.12), in order to avoid any shortfall in base seed which would have a serious impact on the quality of commercial seed. There is no risk of overproduction because any surplus can always be sold as commercial seed. In the second place, the production of base seed should be much more

concentrated, preferably at the research centers in order to facilitate control of genetic purity and seed quality. The cost factor of base seed plays an insignificant role in the price structure of commercial seeds, and any quality risks should therefore be avoided. A major constraint at present is the seed processing and storage capacity at the research centers. The project would provide funds to eliminate such bottlenecks at the research centers (para 3.16).

5.06 Base-seeds would be produced mainly by the following stations:

- Maize: Kipushi, Kaniama, Gandajika and M'poy and Mulungu for high altitude varieties;
- Rice: Yangambi and Mavunzi; and
- Grain legumes: Gandajika, and Mulungu for high altitude varieties;
- Cassava: M'vuazi and the main seed production centers (for elite cuttings);

With the development of the seed production structure, other research centers could be included in the network of stations producing base-seeds (e.g. Bambesa).

The total projected quantities of base seeds are relatively small (e.g. about 30 tons for maize, 15 tons for rice, 30 ton for groundnuts).

5.07 Controlled seed would be produced at the seed farms financed under the project, and on other seed producing units operated elsewhere by rural development projects or non governmental organizations (mainly religious centers). The total projected production for controlled seeds in Zaire is at year five:

	<u>Project assisted seed farms</u>	<u>Out-Growers</u>	<u>Other seed producing units</u>	<u>Total</u>
(tons/year).....			
maize	872	750	1,000	2,622
rice	78	33	150	261
groundnuts	327	16	150	493
beans	56	16	600	672
soya	76	15	--	93
cassava cuttings (in 000 meters	560	4,840	n.a	5,400

The total planted area per seedfarm ranges from 120 to 240 hectare at year five of the project, while the area planted by outgrowers is expected to increase to about 400 hectare in total (tables 9 and 10).

5.08 Outgrowers. Controlled seeds would also be produced by outgrowers, to be selected and trained by personnel of the five seed farms. The degree of participation depends on the level of development of the small farmers in each seedfarm area. In those areas where farmers have

already been exposed over a long period to intensive extension service, the production by out-growers could be initiated rather quickly. Elsewhere it may take some years to train farmers in this type of production. The seed farm would enter into agreements establishing the farmers' obligation to sell its produce to the seed farm, specifying standards of cultivation, use of inputs, and farm gate price of approved production. Seed production by out-growers would be controlled by trained field-inspectors. The seed farm would supply to outgrowers, base seeds, fertilizers and chemicals, which costs would be subtracted from the price to be paid at harvest time. Average operating costs of outgrowers seed could be above the costs at the seed farm depending on (i) the need to pre-finance inputs; (ii) extra transport costs; and (iii) rate of rejection. However, it would reduce the fixed costs at the seed farm and would help promote the use of controlled seeds among the farmers. The ultimate objective is to produce the majority of seeds through outgrowers and limit the area of seed farms to about 200 ha, to ensure minimal seed production and, carry out verification tests. The entire production of outgrowers would be processed at the seed farm plant. Estimates of controlled seed production at the seed farm and by outgrowers are presented in Tables 9 and 10.

5.09 Yields. Yields of controlled seeds at the seed farm level are normally below those of yields of grains produced on well cultivated farm land, because of losses due to rejection during field inspection, and losses during drying, processing and storage. It is assumed that such losses amount to 20%. However experience with seed production in Zaire is limited and losses during the initial period could be higher. Although the quality of data collection has been weak, experience in ongoing development projects show an average increase potential for maize of 20% to 100%, depending on cultivation practices applied by the farmer. In general, yield increases at farm levels due to the use of improved seeds are more pronounced in areas where the introduction and distribution has been supported by a systematic extension effort. A comparison of present and expected yield levels are given below and in table 11:

	<u>Range of yields using currently available seeds (ton/ha)</u>	<u>Range of expected yields using improved seeds seeds (or cuttings) ton/ha</u>
maize	0.7 - 1.0	1.2 - 2.6
rice	0.7 - 1.0	1.0 - 1.5
groundnuts	0.5 - 0.8	0.8 - 1.2
beans	0.4 - 0.6	0.8 - 1.2
soybeans	0.4 - 0.6	0.8 - 1.0
cassava	6.0 - 10.0	10.0 - 15.0

Actual yield depends on growing conditions, i.e. rainfall, soil, farming techniques, etc. In many circumstances, the use of improved seeds trigger other husbandry improvements and the use of fertilizers. It is often difficult to separate the impact of individual factors. For calculations of the economic impact, the following yields, to be obtained in year 5, were applied: maize (1,500 hg/ha); rice (1,000 kg/ha); groundnuts (1,100 kg/ha); beans (900 kg/ha); soybeans (900 kg/ha); and cassava (11.3 tons/ha).

C. Distribution of Seeds

5.10 The distribution system may vary significantly among seed farms, depending on market characteristics, the diversity of seeds, the efficiency of extension services, the impact of development projects and the state of transport and communications infrastructure. Initially, the seed farms would undertake the distribution of seeds and the project would make provisions to acquire adequate means of transport. The cost of seed distribution will be integrated in the sales price. Costs have been estimated on the main assumption that a seed farm would serve a distribution area with a 100 km radius, supplying up to 40,000 farmers. During the initial phase distribution would be made up to the level of farmer groups, and after development of a better trade network up to the level of retail outlets or stockist. The distribution costs would vary between 0.20 and 0.25 Z/kg of seed. It is expected that the private sector will gradually increase its role in seed distribution (paras 6.01 and 6.02).

VI. FINANCIAL ANALYSIS

A. Market and Prices

6.01 Marketing channels for seeds as for most other commodities are not well developed in the rural areas of the country. This is a result of the lingering effect of the Government policies of the seventies (paras 1.07, 1.08 and 1.11) and of the great difficulty in setting up an effective marketing system due to lack of adequate transportation and communication infrastructure, lack of information and, until the recent liberalization of prices, counterproductive intervention by the Government. Although the market potential for improved seeds is substantial, a special effort will be needed to translate market potential to actual sales and revenues for the seed farms.

6.02 Although the situation varies from one seed farm to another, the market is generally characterized by two groups of potential consumers. The first consists of those who are aware of improved seeds and of their value in increasing crop yields, and the second of those who do not yet fully appreciate the value of good seeds. Marketing of seeds would initially be concentrated on the first group while at the same time intensive efforts would be undertaken to promote sales to the second group who in the longer term are expected to constitute the bulk of controlled seed users. The Project would provide funds and technical assistance to organize marketing units in each of the seed farms as well as a support group within BUNASEM (para 3.05 and 3.10). In addition, marketing efforts by the project would have to be closely coordinated with extension services, particularly with respect to smallholder farmers.

6.03 Prices. In the past, seeds in Zaire have been distributed free or at heavily subsidized prices (para 2.12). Although the Government recently curtailed seed subsidies, those produced in Government seed farms are often underpriced in relation to their cost of production. Prices for maize seed vary from 6-30 Z/kg, as compared to the variation in grain-prices of 4-15 Z/kg. The price of high quality seed under further

developed circumstances is normally a multiple of the grain price. In south Shaba, for example, farmers have been paying about 30 Z/kg for hybrid seeds while the farmgate price for maize is about 4-6 Z/kg, and elsewhere good composite seeds may be found for 20 Z/kg. The situation for rice and peanuts is less clear, due to the lack of good seeds. Rice seeds are offered for 4-15 Z/kg and peanuts from 10-20 Z/kg. Although information on farmgate prices is not very reliable, they probably vary between 3-8 Z/kg for rice, and 6-10 Z/kg for peanuts. This illustrates that knowledgeable farmers accept realistic prices for seeds of good quality.

6.04 Pricing policy would be based on the principle that the seed farms should become self-financing operations. Seed prices, therefore, should cover all costs, while at the same time, taking market forces into consideration. Furthermore, to the extent possible, revenues should be increased through greater volume rather than greater profit margins. In this analysis, it is assumed that for the first three years prices will be set equal to estimated production cost, thus making controlled seeds somewhat more expensive than those currently produced at Government seed farms and about the same as imported hybrid seed in the Shaba region. Similarly, it is assumed that by year five of the project, prices would be about 20% above cost. A breakdown of projected prices by type of seed in each seed farm is presented in Table 12. In practice, prices would be set by the management of each seed farm in line with the principles and considerations cited above. Thus, they may decide to accelerate or decelerate bringing prices of individual crop seeds into line with costs, depending on the particular circumstances and market characteristics for each farm. Assurances were obtained at negotiations that the Government would agree for pricing policy and seed prices to be established at the seed farm level. These would be part of the Annual Work Program which would be reviewed and approved by IDA (paras. 4.10, 4.12 and 4.22).

B. Financial Projections

6.05 The financial analysis was conducted for each of the five seed farms, which are expected to become financially self-sufficient and eventually be transferred to the private sector. The financial operations of seedfarms are expected to result in deficits during initial years of operations and in positive net revenues for years 5 through year 20, and for some at an earlier stage. Cash flow statements, financial rates of return, and related net present value and sensitivity analyses are shown in Tables 13 to 17.

6.06 The financial rate of return for each of the seed farms has been calculated as shown below:

<u>Seed Farm</u>	<u>FRR (%)</u>
Kwilu Ngongo	15
Pindi	13
Mpoy	18
Shaba	11
Haut-Zaire	8

These rates represent conservative overall assumptions with respect to seedfarm development and the particular circumstances present at each location. For example, it is assumed that only half of the annual production of controlled seeds would be sold within the same year and the remainder would be sold the following year. The sensitivity analyses, (Tables 13-17), indicate that FRR's are rather sensitive to lags in revenues and if the time period between production, sales and revenue collection is shortened, profitability would increase significantly. Similarly, it has been assumed that sales prices during the first three years would be equal to production costs. Whereas this may be realistic for certain farms, i.e. Pindi and Kwilu-Ngongo, it probably underestimates potential revenues for the other farms. Finally, the FRRs reflect the relatively high proportion of fixed costs to total costs. Thus, those farms expected to reach productive capacity levels relatively soon, such as Mpoy and Kwilu-Ngongo, also have the higher FRRs. On the contrary, Shaba and Haut-Zaïre, where, due to lack of existing infrastructure, development and production are expected to occur more slowly, the respective FRRs are lower. However, once the initial start-up period is completed, both Shaba and Haut-Zaïre seed farms should be able to attain higher levels of profitability, particularly since farmers in those areas are knowledgeable of the value of good seeds and market potential is high.

C. Farmers' Income

6.07 Farmers' incomes would depend on many variables including crop mix, quality of seeds, and cultivation techniques applied by the farmer. Late planting, for instance, can easily eliminate any potential yield increase obtainable from the proper use of better seeds, whereas the use of fertilizer would enhance the effect of better seeds. Seed farms should make sure that its product performs well in the particular region where it is sold, otherwise the enterprise would not become successful. Therefore, it should continuously verify the impact of the use of its seeds on farmers' income, in order to ensure that the regular purchase of seeds is profitable for the farmer. Since the seed farms would be located in various distinct regions of Zaire, it would not be feasible to prepare farm models representation of all regions. Thus, an analysis of the financial impact from the use of controlled seeds on the farmer has been done by estimating the impact on return to labor for each crop per hectare, using estimated average yields, seed prices and crop prices. (Tables 18-22).

6.08 Use of controlled seeds instead of farmer's own seeds would result in higher cash returns to family, as shown below:

	<u>Maize</u>	<u>Rice</u>	<u>Groundnuts</u>	<u>Beans</u>	<u>Soybeans</u>
Cost of controlled seeds (Z/kg)*	20	20	20	30	25
Producer price	7	5.5	8	16	8
Increase in return to family labor (in percent)	28	33	44	43	33

* Based on the average cost of production of the five seedfarms for year 1.

On the basis of assumptions concerning prices, yields and farm costs presented in tables 18-22, it is estimated that the minimal yield increase to induce farmers to buy controlled seeds instead of common seeds ranges from 16% for maize to 39% for rice. Under the same assumptions, the average maximum prices which farmers would be willing to pay for controlled seeds have been estimated at about 27 Z/kg for maize, 20 Z/kg for rice, 27 Z/kg for groundnuts, 60 Z/kg for beans (if storage is available, or 40 Z/kg if it is not), and 35 Z/kg for soybeans.

D. Cost Recovery and Fiscal Analysis

6.09 The seed farms are expected to be financially viable in the long run so that they can be transferred to the private sector. To this end agreement was reached at negotiations to the principle that improved seed prices would be set by the management of each seed farm to cover operating costs; which includes seed production, purchase from outgrowers, conditioning and marketing costs and linear amortization charges at full development in year five. The farms would thus become self-sustaining, capable of renewing its assets. The objective would be to ensure the profitable operation of the seed farm in the long run as well as a wide distribution of seed sales to all farmers in the surrounding areas (paras 3.09 and 3.10). Several factors could cause difficulties for full cost recovery at the initial stage of development of the seed farm. One is past experience when farmers were given seeds for free, or at subsidized prices. Another is the lack of farmers' confidence and appreciation of commercial seeds, because in the past seed quality has at times been poor or unavailable at planting time. As a result some seed farms may use promotional prices at the early stage of development (para 6.04).

6.10 Quality control will incur operating costs of Z 2.1 million (US\$ 0.061 million), which would not be recovered, since the control service will still be in its development phase during the implementation period. In a follow-up phase however seed certification charges could be levied, as soon as a control services becomes fully independent. The Assistance to research component incurs Z 4.9 million (US\$0.141 million) operating costs, mainly consisting of operational cost at the Mavunzi rice station. After Project completion the station should have become self-sufficient in the production of base seeds, and would not create a budgetary burden. At the other research stations the price of base seeds would recover within one or two years full production costs (para 5.05).

6.11 BUNASEM is expected to incur operating costs of almost Z 61 million (US\$1.8 million) in the five year project period, including physical and price contingencies. These costs would not be recovered and would be considered a public service cost. Assuming that year five of the project would be representative, the Government would need to make available about Z 19 million per year (in 1990 prices) for BUNASEM's operations, plus additional amounts to replace equipment and vehicles. Part of operating costs would be offset by increased duties on fuel, vehicles, spare parts as well as taxes on seed farm payrolls and on seed farm profits after they are transferred to the private sector.

6.12 During the project period the Government would be expected to contribute to the Project the equivalent of about US\$2.0 million, primarily for buildings and civil works, and pay commitment and service charges to IDA. Seed sale revenues during that period, amounting to about US\$2.4 million would be used exclusively for seed farm operations, but would technically constitute Government revenues until the farms are transferred to the private sector. Once the seedfarms are sold to the private sector, the Government would continue its support to BUNASEM which would require annual budgetary allocations of about Z 28-31 million (U.S.\$800-900 thousand). In addition the Government would need to meet its obligations to IDA. The Government would rely primarily on tax receipts from the profits of seedfarms to offset at least part of these costs, (tables 23 and 24). Additional Government revenues would occur from the sale of the seedfarms and other contributions in the form of private sector payments to Government public welfare programs (workers insurance, etc.).

E. Credit

6.13 It is not anticipated that BUNASEM and the seed farms will need credit other than that provided through the project. During the first year, all costs would be covered by IDA, UNDP and the Government. During the same period, the seed farms would be expected to accumulate the equivalent in Zaires of about US\$100 thousand. That would be used as working capital for subsequent years for the seed farms, along with a portion of the revolving fund to be set up as a Special Account (para 3.30). Working capital for BUNASEM would be provided through the Special Account (Project Cash Flow is presented in Table 23). The Special Account to be set up under this project is expected to meet working capital requirements during the project period. If in the course of the preparation of annual financial plans, (with the help of the Financial Advisor to be recruited through the Project), it is foreseen that additional credit would be necessary the government would undertake to facilitate for lines of credit to become available from commercial banks or from Government lending institutions such as the Agricultural Credit Bank, the Fonds de Convention de Developpement, or others.

6.14 The purchase of controlled seed represents a small proportions of the farmers' total production cost. In most cases, farmers would be able to finance purchases through their own resources. However, there may be instances when credit would be necessary, as for example in the case of the small farmers when they need to buy seeds at the time when school fees must be paid: Whereas medium scale farmers (15 ha, and above) normally have access to credit through commercial banks or suppliers' credit, small scale farmers rarely have access to formal sources of credit, but must rely on informal sources, such as traders, local lenders, relatives etc.

6.15 In view of the multi-component nature of the project and the fact that production of controlled seeds at the scale and level of quality envisaged would be a new venture in Zaire, a credit program is not included as part of the project. Such a program would greatly burden the administrative capacity of BUNASEM, would incur substantial costs leading to excessive seed prices, and would constrain the implementation of other Project components.

F. Budgetary System

6.16 Government budgetary procedures are complex and not well understood within the technical ministries. This has been a particular problem for the agricultural sector, as DADR's budgetary requests have traditionally not been well prepared and allocations have fallen far short of needs. Obtaining release of approved allocations has also been a problem, due to Government efforts to respect agreed ceilings under IMF programs and to unfamiliarity of DADR and projects staff with procedures to follow. Inability to obtain funding in a timely manner has had a particularly adverse effect on agricultural projects, as activities must be undertaken in conjunction with the cropping calendar or not at all. The Government is aware of the weaknesses in the functioning of the budgetary system and is now establishing an action program for improved financial management, including DADR budget elaboration and staff training. To support continued action in this area agreement was reached at negotiations that the Government's budgetary allocation for the Project would be released in accordance with the improved management system.

VII. ECONOMIC JUSTIFICATION

A. Justification and Benefits

7.01 Increased supply and proper use of improved seeds in Zaire would be one of the most effective and economical ways to improve agricultural production. This would best be accomplished by establishing a seed production capacity within the country rather than rely on seed imports. The latter would be more expensive, in-country transport cost would be very high and the scarcity of foreign exchange could severely hamper availability. The Project would, concentrate on the production of food crop seeds and would therefore constitute a very important element in the Government's policy to achieve food self-sufficiency. Increased production would substitute for food imports, improve nutrition, and could, in the long run, allow Zaire to regain its earlier position as a food exporter. The project would generate additional revenues for the rural population, mainly smallholder farmers, in some of the poorer areas of the country. Substantial quantities of the incremental production would be marketed locally or interregionally. This would help rehabilitate the rural marketing network which is still recovering from the effects of earlier Government policies (para. 1.17). It would also contribute significantly to the institutional development in the country and to the training of a number of Zairians in various disciplines. Since one of the basic principles would be to operate the seed farms on a sound financial basis and eventually have them operated by the private sector, the Project would have a positive impact on the effort to reduce Government intervention in the economy and strengthen private sector operations.

7.02 Quantifiable benefits. The Project would result in substantial incremental production of several food products as shown overleaf:

Estimated Annual Incremental Production

Crops:	Year	1	2	3	4	5	6	7	8	9	10
	(Tons) ^{a/}										
Maize	—	—	—	3,196	11,967	17,695	20,727	23,182	25,145	26,727	
Soybeans	—	9	83	178	518	836	946	1,055	1,300	1,409	
Groundnuts	—	89	263	756	1,337	2,144	2,788	3,282	3,813	4,244	
Beans	—	2	16	72	267	400	545	722	944	1,128	
Rice	—	—	40	190	394	416	529	653	832	1,012	
Cassava, cosettes	—	—	105	720	4,050	15,000	33,000	52,500	75,000	102,000	
Cassava, leaves	—	—	80	552	3,105	11,500	25,300	40,250	57,500	78,200	
Cassava, cuttings ^{a/}	—	—	140	960	5,400	20,000	44,000	70,000	100,000	136,000	

^{a/} Cassava cuttings denoted in '000 meters.

Increased food production would be partly consumed by the rapidly growing rural population, with remaining quantities marketed to urban centers including Kinshasa, Matadi, Mbuji Mayi, Kananga, Kisangani and the urban centers of the Shaba mining area. Most of the incremental production would be in cassava, a basic staple of the rural population's diet throughout Zaire except in the Shaba and Kasai provinces where maize is preferred. The incremental production of cassava (cosettes) due to the project is projected to reach about 100 thousand tons by year 10. As a point of reference, it is noted that in 1980, Zaire's production was estimated at 3 million tons. Incremental maize and paddy production would substitute for imports of these commodities and result in an estimated foreign exchange savings of US\$3.3 million by the fifth year of the Project and about US\$27.9 million by the tenth year.^{5/}

7.03 Non-quantifiable benefits. In addition to the benefits described above, the project would have a positive impact in many other ways. These include training of government and non-government employees, improved nutrition for urban and rural population, an improved marketing network which would open up opportunities for trading non-project commodities, rural employment opportunities (about 1,000 new jobs in year 5 in the seed farms and additional jobs in the marketing and processing activities), incentives for improvement of agricultural research, promotion of private sector activities in the rural areas and strengthening of government and non-government institutions.

7.04 Beneficiaries. It is estimated that about 200,000 farmers, mostly smallholders, would benefit directly from project activities by having access to controlled seeds and cuttings. Others would benefit indirectly by following better husbandry techniques or obtaining better seeds from neighbors. Many more of the rural population would benefit indirectly through increased food consumption and improved nutrition.

^{5/} Assuming 1985 import parity prices and continued imports of maize and rice which in 1984 amounted to 200,000 and 60,000 tons, respectively.

B. Economic Analysis

7.05 For the purpose of the economic analysis, Project costs include all investment and operating costs for years 1-5 and all capital equipment replacement costs and recurrent costs for years 6-20. Additional costs include incremental farm labor costs. Since the majority of controlled seed users would be smallholder farmers, farm labor is mostly unpaid family labor valued at a shadow wage of Z 7.0 per day, which is about 50% of the estimated average market wage in rural areas. An additional cost would be for bags to package the marketable output. It is assumed that 50% of the incremental output would require new bags, the remainder being consumed on the farm or packed in used bags. Incremental output would be transported an estimated average distance of 100 km by truck or by rail.^{6/} Storage costs represent the estimated cost of constructing silos for yearly incremental production, except for cassava leaves and cuttings which are perishable and are not stored. All costs are at 1985 prices and include physical contingencies.

7.06 Prices for the various crops represent an estimated average of farm gate prices, except for maize and rice which were valued at import parity prices.

Import Parity Prices (Z/kg)		Farm Gate Prices (Z/kg)					
<u>Maize</u>	<u>Rice</u>	<u>Soybeans</u>	<u>Groundnuts</u>	<u>Beans</u>	<u>Cassava Cosettes</u>	<u>Cassava Leaves</u>	<u>Cassava Cuttings</u>
9	11	8	8	16	12	11	1 Z/m

The incremental production of each crop attributable to the project is but a small portion of the total annual production of the country and is not expected to have a significant impact on price levels. An exception may be in cassava leaves which due to perishability may experience a drop in price if the supply increases. However, even if the prices were to drop by 50%, the impact on the project's economic rate of return would be negligible (table 25).

7.07 Estimated incremental production for years 1-10 valued at the prices, (held constant), described in para 7.06 represent the project's quantifiable benefits. Other benefits described in para 7.03 and secondary benefits have not been quantified due to lack of reliable data. It is assumed that planting with controlled seeds would not start until the second year of the Project. Furthermore, start-up delays in timely distribution, proper utilization and other factors would not allow full productivity to be achieved until year 5 of the project. Thus, harvests in years 2, 3 and 4 are 70%, 80% and 90%, respectively, of the full yield expected when using controlled seeds.

^{6/} 67% by truck and 33% by rail or boat.

7.08 The Project's economic rate of return (ERR) was calculated over a twenty-year period. A standard conversion factor of 1.0 was applied as it was assumed that the Government would continue to apply exchange rate and tariff policies which would eliminate distortions between international and domestic price levels. On the basis of these assumptions, the project's ERR was calculated at about 44% and the present value of the net benefit stream at about US\$70 million with a discount rate of 13.5% (Table 25). The high overall rate of return reflects the significant impact of controlled seeds which result in substantial yield increases even in the absence of other inputs such as fertilizers. Thus a relatively modest stream of investment costs generates a substantial flow of benefits. Even though a conservative approach has been adopted in the design and analysis of this project, i.e. slow development of the seed farms (para 5.07) and phased yield development, the ERR is quite satisfactory although not as high as that calculated for similar projects in other countries^{7/}.

7.09 Sensitivity analysis. The economic rate of return was tested for its sensitivity to changes in cost and benefit levels from 10% to 50% and in phasing from 1 to 3 years. The rate of return does not drop below 15% unless benefits are reduced by 50% or costs increased by 50% and at the same time benefits decreased by over 20%. Thus the Project should result in a satisfactory rate of return unless extreme, and unlikely, cost increases or time lags or both are experienced. The analysis also shows that the rate of return is somewhat more sensitive to variations in benefits than to that of costs. Consequently, attention should be given to maintain production, quality, sales and proper usage of controlled seeds. Switching values analysis indicates that benefits would have to be reduced by about 51% or costs increased by over 100% for the present value of net benefits to be equal to zero (Table 25).

C. Risks

7.10 The introduction of the production of controlled seeds at the proposed scale is a new venture in Zaire. Thus there are risks with respect to management of the seed farms, the quality and dedication of technical personnel, the timely development of a quality control system, the marketing and distribution of seeds and the receptivity of the farmers. With respect to these risks, the project is ensuring that qualified consultants are retained to assist in the management of the seed farms, quality control and marketing of the product and control of seed quality, and it would be a condition of disbursement that the seed farms would be managed by capable institutions. As to the technical capability of personnel, the Project would give high priority to a systematic implementation of the training program. With respect to product acceptability and proper usage, the marketing personnel of the seed farm will work closely with extension services to ensure to the extent possible that farmers utilize the seeds appropriately.

^{7/} A 1979 FAO study of controlled seed production projects in developing countries reports that ERRs range from 30% to 100% or more.

7.11 Other risks relate to timely execution of the Project with respect to three aspects: (i) possible delays of agreement between BUNASEM and the management agencies for each of the seed farms: (ii) possible delays in the allocation and allotment of the Government's share of financing; (iii) timely procurement of farm equipment; and (iv) the adequate supply of base seeds. With respect to these risks, acceptable agreements have been identified and discussions on drafting required agreements are underway. Also assurances would be sought for timely budgetary allocation and BUNASEM would employ a special procurement officer. The implementation of the Project to revitalize the research programs (with USAID assistance) responsible for the supply of base seeds is well underway and signature of contracts between BUNASEM and these programs would be a condition of effectiveness.

7.12 The most important risk factor would, however, be the proper coordination by BUNASEM of all participating agencies, in particular, that with the agricultural research structure, which would be responsible for the supply of base seeds. It is the quality of BUNASEM's performance that would define overall progress in the implementation of the project. To this end, the project would ensure that qualified experts would be available to assist BUNASEM's management in carrying out its central coordinating and regulatory role, and IDA would put great emphasis on maintaining a highly qualified officer as director of BUNASEM.

7.13 The innovative and integrated character of the project would require a high degree of flexibility during project implementation from participating public and private enterprises. This may cause additional risks, but the high priority given by the Government to the development of self-sustaining seed production industry and the importance of food self-sufficiency would be important factors to minimize such risks to the extent possible.

VIII. AGREEMENTS REACHED AND RECOMMENDATIONS

8.01 During negotiations, agreement was reached on the following points:

a) Policy Issues

- (i) the sales prices would recover full operating costs within the project implementation period (paras 3.09 and 3.11);
- (ii) the Government would prepare a draft law for the regulation of varietal registration, and seed quality control before December, 31, 1988 (para 3.15);
- (iii) the Government would take all necessary steps to facilitate the provision of development loans to the seed farms (para 3.27);

- (iv) the Government would review the legal status of BUNASEM within two years after effectiveness and take steps to grant BUNASEM an independent legal status providing it with management autonomy (para 4.07);
- (v) the market prices of controlled seeds would be established by the Seed production units in accordance with sound managerial and marketing practices (paras. 6.04 and 6.09);
- (vi) the Government would release budgetary allocations for the project in accordance with the improved DADR financial management systems (para 6.16).

b) Managerial Issues

- (i) the Government would employ a qualified expert as Director of BUNASEM, in consultation with the Association (para 3.06);
- (ii) adequate accounting procedures permitting the accurate calculation of cost prices at the seed farms would be in effect no later than 31 December 1986 (para 3.11);
- (iii) the Government would establish a National Seed Board no later than December 31, 1986 (para 4.04);
- (iv) terms of reference and qualifications of technical assistance personnel would be acceptable to IDA (para 4.08).

c) Implementation Issues

- (i) participating agencies would maintain separate records and accounts for project activities executed under their responsibility, have them audited by external independent auditors and submit them to BUNASEM for consolidation within six months of the end of the fiscal year (para 3.33);
- (ii) BUNASEM would maintain separate records and accounts for project activities, have them audited and consolidated by external independent auditors acceptable to IDA, and submit them to IDA. Within six months of the end of the fiscal year (para 3.33);
- (iii) the annual work programs, budgets and procurement plans for BUNASEM and the seed farms, including draft annual contracts with the participating agencies for research and farm management, would be submitted for IDA approval by October 31, each year (para 4.22);

- (iv) an action plan for the implementation of the recommendations, contained in the report of the interministerial study group for the formulation of a long-term development plan of agricultural research, would be prepared and presented to the Association no later than June 30, 1986 (para 3.16).

d) Reporting Issues

- (i) BUNASEM would prepare semi-annual progress reports on Project implementation and submit the reports to Government, IDA and the National Seedboard, in the month of June and December (para 4.24);
- (ii) a mid-term report reviewing implementation experience would be prepared by independent consultants no later than December 31, 1987 (para 4.26); and
- (iii) BUNASEM would prepare a Project Completion Report by the Project Completion date and DADR would review and submit a final version of the report to IDA within six months after credit closing date (para 4.26).

8.02 Conditions of effectiveness would be:

- (a) key personnel of BUNASEM (Director and Section heads and procurement officer) would be in place (para 4.05);
- (b) the signature of agreements between BUNASEM and the participating agencies for research (para 4.09), and of three seed farm management agencies (para 4.11);
- (c) the recruitment of a technical and a financial advisor, (para 4.18);

8.03 Subject to the above agreements being reached and conditions of effectiveness being met, the proposed Project would be suitable for an IDA credit of SDR 15.10 million (US\$14.88 million) to the Government of Zaire.

ZAIRE

PROJET D'ASSISTANCE AU PLAN SEMENCIER NATIONAL/SEEDS PROJECT

SOMMAIRE DES DONNEES GENERALES DES REGIONS/GENERAL INFORMATION PER REGION/PROVINCE

	Superficie/ Extension/ km ²	Population		Altitude/ Elevation m	Période sèche dry season mois/month	Pluviosité/Rainfall moyen/mean mm/year	Proportion superficie cultivée de la superficie totale/Area cultivated as % of total area	Superficie cultivée par petits paysans/ Average area cultivated by small farmers	Aire moyen cultivée cultivée par ferme/ Average farm area (ha)	Nombre estimé de petits paysans/number of small farmers .000
		nombre ¹ /number million	densité/ density no/km ²							
Kinshasa	9,965	2.3	230	—	—	1,400	—	—	—	—
Bas Zaïre	53,920	1.6	30	700	3-5	1,200-1,600	15	50	1.2	250
Bandundu	295,658	3.5	12	350-1,000	2-4	1,500-1,800	3	80	1.6	410
Équateur	402,293	2.9	7	200 -500	1-2	1,800-2,200	3	60	1.8	360
Haut Zaïre	503,239	3.8	8	500-1,500	2-3	1,500-2,200	2	75	1.1	570
Kivu	256,662	4.5	18 ^{2/}	500-5,000	2-3	1,600-2,200	4	90	1.4	530
Shaba	496,965	3.6	7	1,000-2,000	4-6	1,000-1,600	3	40	1.4	410
Kasaï Occ	156,967	1.9	12	500-1,000	3-4	1,200-1,800	6	75	1.8	340
Kasaï Or	168,216	1.9	12	500-1,000	3-4	1,200-1,800	5	70	1.9	300
ZAIRE	2,344,885	26.0	11 ^{3/}	—	—	—	3.5	65	1.5	3,170

^{1/} Estimation DAIR Septembre 1982 "Situation Actuelle de l'Agriculture Zaïroise", page 46

^{2/} Au Nord Kivu

^{3/} 40 per km carré de terrain arable

^{1/} Estimate DAIR September, 1982

^{2/} In north Kivu 24

^{3/} 40 per square km of arable land.

ZAIRE

SEEDS PROJECT

Projet d'assistance au Plan National Semencier

Rainfall and climate in the regions of the seedferas (in mm)

Pluviométrie et climat des régions des fermes semencières (en mm)

MOIS	Kwilu Ngongo ^{2/} Bas Zaire	Kikwit Bandundu	Kananga Kasai Occ	Gandajika Kasai Or	Lodja Kasai Orient	Kanilama N. Shaba	Kongolo N. Shaba	Lubumbashi S. Shaba	Kindu Kivu	Bata ^{7/} Haut Zaire	Bumba Equateur	Kinshasa	MONTH
Janvier	129	166	136	159	161	199	150	252	178	23	62	135	January
Février	122	112	125	140	144	182	137	268	152	68	77	140	February
Mars	169	204	205	193	169	228	158	207	202	121	127	172	March
Avril	240	227	177	162	154	182	158	54	156	178	154	204	April
Mai	110	101	77	50	114	32	53	3	109	162	168	132	May
Juin	10	8	18	4	38	5	11	-	31	120	141	6	June
Juillet	5	11	16	7	43	5	7	-	32	153	168	2	July
Août	5	38	50	37	110	40	30	-	71	195	137	2	August
Septembre	20	155	127	102	185	77	59	3	111	179	172	36	September
Octobre	98	198	172	137	204	154	116	27	156	228	228	131	October
Novembre	227	221	234	213	225	223	177	164	197	133	155	237	November
Décembre	183	163	232	217	202	243	164	261	219	49	68	156	December
TOTAL													TOTAL
ANNEE	1,318	1,604	1,569	1,421	1,749	1,570	1,220	1,239	1,614	1,567	1,657	1,353	YEAR
Jours de pluviosité		133	144	143 ^{3/}	151	146 ^{4/}	112	120	156	165	135	95	rainy days
Saison sèche en semaines ^{1/}													dry season in weeks
A	21	16	15	14	16	16	18	-	8	15	2	20	
B	2	2	2	-	2	-	2	-	-	2	2	-	
Temperature													Temperature
moyen °C	25.5	24.1	23.7	24.4	24.1	24.0	24.2	20.3	24.4	24.3	24.3	24.9	Average
max °C	30.6	36.5	35.2	34.2	37.6	32.0	37.0	36.9	36.1	36.0	37.4	35.6	Maximum
min °C	20.4	12.3	13.2	13.2	12.2	16.9	14.8	3.3	15.0	10.0	11.1	11.7	Minimum
Humidité													Humidity
moyen %	93	83	80	75	84	66	77	66	85	na	85	84	Average
minimum %		23	19	40	31	40	14	10	30	na	18	32	Minimum
Insolation													
heures/jours	3.9 ^{5/}	5.8	5.9	6/	5.2	-	6.4	6.1	5.4	na	6.0	4.6	
^{1/} Juillet - Août/Sept = A Fin Janvier = B													^{1/} July - August = A season End January = B
^{2/} Avec une irrégularité extraordinaire													^{2/} With very erratic rainfall
^{3/} Moyen 39 ans													^{3/} Average 39 years
^{4/} Moyen 20 ans													^{4/} Average 20 years
^{5/} Evaporation annuelle = 1,541 mm													^{5/} Yearly evaporation = 1,541 mm
^{6/} Evaporation 1,250 mm/an													^{6/} Evaporation = 1,250 mm
^{7/} Région de Bumba, moyen 9 ans													^{7/} Near Bumba average 9 years

November 15, 1984

ZAIRE

SEEDS PROJECT

Summary Account by project Component
(US\$ '000)

	SEED FARMS					BUREAU NATIONAL DE SEMENCES	QUALITY CONTROL	RESEARCH ASSISTANCE	ASSISTANCE TO OTHER FARMS	STUDIES PILOT PROJECTS	TECHNICAL ASSISTANCE	PROFESSIONAL TRAINING	TOTAL	Physical Contingencies	
	KVILU NGONGO	MPOY	SHABA	PINDI	HAUT ZAIRE									Z	AMOUNT
I. INVESTMENT COSTS															
Buildings and Office Materials	43.6	342.2	375.8	487.9	200.0	410.0	888.6	703.0	-	-	-	-	3,651.1	8.7	319.3
Heavy Equipment and Vehicles	220.1	342.2	237.9	245.5	200.0	210.9	-	233.3	-	-	-	-	1,689.9	5.8	98.0
Farm Infrastructure	4.4	158.0	146.1	149.7	150.0	-	-	79.6	-	-	-	-	687.5	8.5	58.6
Processing/Lab. Equipment	75.8	216.7	103.9	117.0	97.0	-	70.9	153.3	202.2	-	-	-	1,036.6	8.2	83.4
Extension and Marketing	33.7	48.0	23.8	30.4	59.0	-	-	-	-	-	-	-	215.0	11.4	24.5
Technical Assistance	-	-	-	-	-	-	5.5	535.7	21.6	505.8	2,550.8	-	3,619.4	2.3	89.8
Training	-	-	-	-	-	-	-	-	-	-	-	1,347.6	-	2.7	4.0
Total Investment Costs	377.6	1,307.0	687.6	1,050.4	706.0	620.9	965.0	1,774.8	223.7	505.8	2,550.8	1,347.6	12,247.2	5.8	711.7
II. RECURRENT COSTS															
Incremental Salaries	16.2	47.8	23.9	45.9	38.1	265.7	56.4	18.3	-	-	-	-	512.3	1.3	6.7
Per Diem Visits	-	7.9	6.6	5.9	6.7	57.3	31.2	1.0	-	-	-	-	116.6	6.2	7.2
Maintenance Operations	92.2	164.6	153.2	171.3	70.5	112.2	9.9	365.2	-	-	-	-	1,139.1	7.8	88.7
Monitoring and Control	-	-	-	-	-	336.2	-	-	-	-	-	-	336.2	6.4	21.5
Regional Bureaus	-	-	-	-	-	60.0	-	-	-	-	-	-	60.0	0.0	0.0
Extension and Marketing	44.0	50.7	24.4	37.8	24.1	-	-	-	-	-	-	-	182.2	2.9	3.2
Production of Seeds	269.2	783.6	243.7	142.7	316.3	316.3	-	-	-	-	-	-	1,754.9	6.3	73.9
Total Recurrent Costs	461.6	1,054.6	451.6	403.1	456.6	831.3	97.5	384.5	-	-	-	-	4,100.7	5.0	205.1
Total Baseline Costs	799.2	2,361.4	1,339.3	1,453.4	1,162.6	1,452.2	1,062.5	2,089.3	223.7	505.8	2,550.8	1,347.6	16,347.9	5.6	916.8
Physical Contingencies	48.5	152.0	88.8	101.7	51.9	89.4	103.4	148.6	10.7	52.4	33.1	36.3	916.8	0.0	0.0
Price Contingencies	159.3	587.6	366.6	330.3	323.7	347.9	423.6	404.5	69.4	117.9	510.2	347.3	3,988.2	5.4	216.6
Total PROJECT COSTS	1,007.0	3,101.0	1,794.7	1,885.4	1,538.2	1,889.5	1,589.5	2,642.4	303.8	676.1	3,094.1	1,731.2	21,252.9	5.3	1,133.4
Foreign Exchange	605.1	1,362.9	907.0	1,036.5	707.9	848.5	731.0	1,645.2	239.3	522.8	2,602.4	1,237.4	12,446.0	5.1	634.7

103

104

ZAIRE

Seeds Project

Disbursements from IDA credit and Co-financier Grant
(US\$ 000)

<u>Category</u>	<u>UNDP Grant</u>	<u>Total cost excluding UNDP Grant</u>	<u>Amount</u>	<u>IDA Credit Percent of Total Cost Excluding UNDP Grant</u>
A. Buildings and office Equipment	70	4,479	2,469	52
B. Heavy Equipment/Vehicles	103	1,857	1,857	100
C. Farm Infrastructure	-	833	833	100
D. Processing/Lab. Equip.	136	1,120	1,120	100
E. Extension and Marketing	45	209	209	100
F. Training	186	1,499	1,499	100
G. Technical Assistance	1,150	3,201	3,201	100
H. Recurrent Costs				
1. Incremental Salaries	-	787	536	68
2. Operation and Maintenance	130	1,311	435	33
3. Monitoring/Control	-	430	430	100
4. Regional Bureaus	70	-	-	0
5. Extension/Marketing	-	218	101	46
6. Seed Production	-	2,286	1,059	46
I. Unallocated Amount	<u>-</u>	<u>1,133</u>	<u>1,133</u>	<u>100</u>
Total	1,890	19,363	14,882	77

1/ The UNDP grant would provide financing on a parallel basis. FAO would administer the grant.

ZAIRE

Seeds ProjectAnnual Estimated Costs by Category and Sources of Finance a)
(\$ 000)

<u>Cost Category/ Source of Finance</u>	<u>Years</u>					<u>TOTAL</u>	
	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Amount</u>	<u>% of Cost Category</u>
<u>INVESTMENT COSTS</u>							
A. Buildings/Office Equipment	158.4	1013.2	1170.2	983.2	1224.0	4549.0	100
IDA	48.2	580.7	689.0	511.8	639.7	2469.4	51
UNDP	60.0	10.0	-	-	-	70.0	2
Government	50.2	400.5	434.2	449.4	503.3	1837.6	45
Seed farm sales	-	22.0	47.0	22.0	21.0	112.0	2
B. Heavy Equipment/Vehicles Farm Equipment	422.7	698.9	421.2	212.4	205.1	1960.3	100
IDA	319.7	698.9	421.2	212.4	205.1	1857.3	95
UNDP	103.0	-	-	-	-	103.0	5
C. Farm Infrastructure	47.3	266.3	213.4	170.9	135.2	833.1	100
IDA	47.3	266.3	213.4	170.9	135.2	833.1	100
D. Processing/Lab Equipment	79.5	349.2	363.4	297.4	167.3	1256.8	100
IDA	79.5	299.2	313.4	261.4	167.3	1120.8	89
UNDP	-	50.0	50.0	36.0	-	136.0	11
E. Extension/Marketing	81.1	41.6	33.7	47.6	49.5	253.5	100
IDA	81.1	11.6	18.7	47.6	49.5	208.5	82
UNDP	-	30.0	15.0	-	-	45.0	18
F. Training	108.7	352.8	318.0	369.0	536.7	1685.2	100
IDA	89.2	275.6	288.2	309.0	536.7	1498.7	89
UNDP	19.5	77.2	29.8	60.0	-	186.5	11
G. Technical Assistance	523.2	1065.0	1209.3	1019.7	533.8	4351.0	100
IDA	423.2	565.0	759.3	919.7	533.8	3201.0	74
UNDP	100.0	500.0	450.0	100.0	-	1150.0	26
<u>Subtotal</u>	1420.9	3787.0	3729.2	3100.2	2851.6	14888.9	
IDA	1088.2	2697.3	2703.2	2432.8	2267.3	11188.8	
UNDP	282.5	667.2	544.8	196.0	-	1690.5	
GOV'T	50.2	400.5	434.2	449.4	503.3	1837.6	
SEED FARM SALES	-	22.0	47.0	22.0	21.0	112.0	

a) The UNDP grant will be administered by FAO.

Cost Category/ Source of Finance	Years					TOTAL	
	1986	1987	1988	1989	1990	Amount	% of Cost Category
H. Recurrent Costs							
1. Incremental salaries ^{b/}	69.6	118.2	163.3	204.1	213.3	786.5	100
IDA ^{c/}	51.5	70.1	106.4	139.5	168.7	536.2	68
Seed farm sales ^{d/}	-	48.1	56.9	64.6	62.6	232.0	30
Government ^{d/}	18.1	-	-	-	-	18.1	2
2. Maintenance	62.0	204.7	332.8	398.9	442.9	1441.3	100
IDA	12.0	59.3	100.9	122.2	140.2	434.6	30
UNDP	26.5	26.0	26.0	26.0	26.0	130.5	9
Seed farm sales	-	119.4	205.9	250.7	276.7	852.7	59
Government	23.5	-	-	-	-	23.5	2
3. Monitoring/control	16.7	58.1	99.1	78.7	177.1	429.7	100
IDA	16.7	58.1	99.1	78.7	177.1	429.7	100
4. Regional bureaus	10.4	22.4	36.2	-	-	69.0	100
UNDP	10.4	22.4	36.2	-	-	69.0	100
5. Extension/marketing	49.6	32.5	57.6	35.0	43.3	218.0	100
IDA	24.1	14.9	26.1	16.3	19.8	101.2	46
Seed farm sales	-	17.6	31.5	18.7	23.5	91.3	42
Government	25.5	-	-	-	-	25.5	12
6. Seed Production	87.9	177.4	338.5	635.7	1047.0	2286.5	100
IDA	42.1	83.3	156.2	292.6	485.0	1059.2	46
Seed farm sales	-	94.1	182.3	343.1	562.0	1181.5	52
Government	45.8	-	-	-	-	45.8	2
Subtotal Recurrent Costs	296.2	613.3	1027.5	1352.4	1941.6	5231.0	100
IDA	146.4	285.7	488.7	649.3	990.5	2560.9	49
UNDP	36.9	48.4	62.2	26.0	26.0	199.5	4
Seed farm sales	-	279.2	476.6	677.1	924.8	2357.7	45
Government	112.9	-	-	-	-	112.9	2
I. Unallocated Amount ^{e/} IDA						1133.0	100
						1133.0	100
TOTAL	1717.1	4400.3	4756.7	4452.6	4793.2	21252.9 ^{f/}	100
IDA	1234.6	2983.0	3191.9	3082.1	3258.1	14882.7 ^{f/}	69
UNDP	319.4	715.6	607.0	222.0	26.0	1890.0	9
Government	163.1	400.5	434.2	449.4	503.3	1950.5	10
Seed farm sales	-	301.2	523.6	699.1	945.8	2469.7	12

a/ Further details of items financed by the UNDP/FAO grant are presented in Implementation Volume.

b/ Includes per diem expenditures for field visits.

c/ Does not include salaries of seed farm personnel.

d/ Consists of salaries for seed farm personnel.

e/ Available to meet physical contingencies as may arise.

f/ Includes unallocated amount of US\$1,133 thousand for physical contingencies.

Note: Individual numbers may not exactly add to totals due to rounding.

ZAIRESeeds Project
Estimated Schedule of Disbursements 1/

<u>IDA Fiscal Year and Quarter</u>	<u>Quarterly Disbursement</u>		<u>Cumulative Disbursements at End of Quarter</u>	
	<u>\$000</u>	<u>%</u>	<u>\$000</u>	<u>%</u>
<u>1985</u>				
September 30, 1984 ^{2/}	25	A	25	A
December 31, 1984 ^{2/}	116	1	141	1
March 31, 1985 ^{3/}	159	1	300	2
June 30, 1985 ^{3/}	200	1	500	3
<u>1986</u>				
September 30, 1985	200	1	700	5
December 31, 1985	250	2	950	6
March 31, 1986	250	2	1200	8
June 30, 1987	300	2	1500	10
<u>1987</u>				
September 30, 1986	548	4	2048	13
December 31, 1986	576	4	2624	17
March 31, 1987	656	4	3280	22
June 30, 1987	656	4	3936	26
<u>1988</u>				
September 30, 1987	650	4	4514	30
December 31, 1987	651	4	5092	34
March 31, 1988	794	5	5999	40
June 30, 1988	795	5	6754	45
<u>1989</u>				
September 30, 1988	684	5	7438	50
December 31, 1988	685	5	8123	54
March 31, 1989	836	5	8159	55
June 30, 1989	837	5	9796	65
<u>1990</u>				
September 30, 1989	760	5	10556	71
December 31, 1989	760	5	11316	76
March 31, 1990	760	5	12076	81
June 30, 1990 ^{4/}	760	5	12836	86
<u>1991</u>				
September 30, 1990	660	5	13496	90
December 31, 1990	660	5	14156	95
March 31, 1991	374	3	14530	97
June 30, 1991 ^{5/}	350	2	14880	100

A. Less than 1.0%.

1/ Based on cost estimates and recent experience with agricultural projects.

2/ Disbursements to date under PFF.

3/ Estimated disbursements under PFF.

4/ Project completion date.

5/ Credit closing date.

ZAIRE
Seeds Project
Procurement Distribution ^{a/}

(US\$ million)

<u>Category</u>	<u>ICB</u>	<u>LCB</u>	<u>Other</u>	<u>N.A.</u>	<u>T.A. Guide Lines</u>	<u>Total</u>
Buildings and office equipment ^{b/}		4.60	0.35			4.95
Heavy equipment/vehicles	2.07					2.07
Farm infrastructure		0.90				0.90
Processing and lab Equipment			1.36 ^{c/}			1.36
Extension and marketing ^{d/}			0.20		0.08	0.28
Technical assistance ^{d/}					4.46	4.46
Training ^{d/}					1.73	1.73
Operating costs				5.50		5.50
Total						<u>21.25</u>

^{a/} Including physical and price contingencies.

^{b/} Civil works and construction of buildings would be done on the basis of local competitive bidding and procurement of office equipment and material, on the basis of local or international shopping procedures. In addition, \$69,000 worth of office equipment would be procured directly by UNDP/FAO.

^{c/} Local or international shopping procedures.

^{d/} Work to be done by consultants would be awarded on the basis of the Bank's relevant guidelines. Other material through local or international shopping procedures.

ZAIRE
SEEDS PROJECT
Projet Assistance au Plan Semencier National
Training Schedule/Schema de Formation

	Number of Course	Unit costs per course 1/	Persons per year					Total number of persons	Duration of course	Number of participants per course	
			Personnes par année								
			1	2	3	4	5				
Nombre cours	Coût unitaire EU\$ par personne 1/						Nombre total de personnes	Durée de cours Mois/Month	Nombre participants par cours		
I. Formation a l'exterieur											
	Gestionnaire	15000	1	1	1	1	1	5	3-4	1	Management
	Cadres de l'administration	15000	1	1	1	1	1	5	3-4	1	Administration
	Techniciens semenciers	25000	1	1	1	1	1	5	5-6	1	Seed production
	Techniciens laboratoire semencier	25000	1	1	1	1	1	5	5-6	1	Seed laboratory control
	Technicien conditionnement	20000	1	1	1	1	1	5	5-6	1	Technician seed conditioning
Semaine/week											
II. Formation au Siege BNS											
	Gestionnaire	4 1200	-	5	5	10	10	30	2	5-10	Management
	Cadre de l'administration	4 1200	-	5	5	10	10	30	2	5-10	Administration
	Techniciens semenciers	4 1200	-	10	10	10	10	40	2	5-10	Seed production
	Mechaniciens	3 1500	-	-	10	10	10	30	4	5-10	Plant maintenance
	Animateur commercialisation	4 1500	-	10	10	10	10	40	4	5-10	Marketing
III. Formation au Centre Regional (MPOV)											
	Techniciens semenciers	4 1000	-	10	10	10	20	50	3	10-20	Seed production
	Techniciens laboratoire	4 1000	-	10	10	10	20	50	3	10-20	Seed laboratory control
	Mechaniciens	4 1000	-	10	10	10	20	50	3	10-20	Plant maintenance
	Vulgarisation	4 1000	-	10	10	10	20	50	3	10-20	Seed extension work
IV. Formation Itinerante											
	Techniciens semenciers	8 400	3	6	12	12	12	45	3-4	2-3	Seed production
	Techniciens laboratoire	8 400	2	4	8	8	8	30	3-4	2-3	Laboratory control
	Mechaniciens	8 400	3	6	12	12	12	45	3-4	2-3	Plant maintenance
	Comptables	8 400	3	6	12	12	12	45	3-4	2-3	Accounting
V. Preparation Emploi du Temps											
	Preparation initiale	1 80000	0.5	0.5	-	-	-	-	-	-	-
	Mise a jour	2 30000	-	-	1	-	1	-	-	-	-
VI. Recyclage											
	Gestionnaire	2 600	-	-	-	15	15	30	1	10-20	Management
	Cadres administratifs	2 600	-	-	-	15	15	30	1	10-20	Administration
	Techniciens semenciers	2 600	-	-	-	15	15	30	1	10-20	Seed production
	Techniciens laboratoire	2 600	-	-	-	15	15	30	1	10-20	Laboratory control
	Mechaniciens	2 600	-	-	-	15	15	30	1	10-20	Plant maintenance
	Vulgarisation	2 600	-	-	-	15	15	30	1	10-20	Extension/monitoring
Total Personnes Formées			16	17	129	229	279	740	Total Persons Trained		

1/ Y compris: voyages, per diem, coûts professeurs, matériel éducatif.

1/ Includes travel, lodging, costs of instructors and teaching materials.

ZAIRE
SEEDS PROJECT

Area Planted for Controlled Seed Production, by Seed Farm including Outgrowers, Years 1-5
(Ha)

<u>Seed Farm/Crop</u>	<u>Year 1</u>			<u>Year 2</u>			<u>Year 3</u>			<u>Year 4</u>			<u>Year 5</u>		
	<u>Farm</u>	<u>Outgrowers</u>	<u>Total</u>	<u>Farm</u>	<u>Outgrowers</u>	<u>Total</u>	<u>Farm</u>	<u>Outgrowers</u>	<u>Total</u>	<u>Farm</u>	<u>Outgrowers</u>	<u>Total</u>	<u>Farm</u>	<u>Outgrowers</u>	<u>Total</u>
<u>Kwilu Ngongo</u>															
Maize	30	-	30	30	-	30	28	-	28	33	-	33	38	-	38
Soybeans	5	-	5	12	-	12	11	-	11	11	-	11	12	-	12
Groundnuts	10	-	10	20	-	20	40	-	40	60	-	60	80	-	80
Beans	2	-	2	5	-	5	10	-	10	25	-	25	40	-	40
Cassava	2	-	2	1	-	1	1	-	1	1	-	1	1	-	1
Total All Crops	49	-	49	68	-	68	90	-	90	120	-	120	171	-	171
<u>Pindi</u>															
Maize	3	-	3	10	-	10	15	-	15	19	5	24	68	10	78
Soybeans	1	-	1	1	-	1	2	-	2	2	-	2	5	-	5
Groundnuts	5	-	5	8	-	8	13	-	13	20	5	25	33	5	38
Beans	2	-	2	2	-	2	4	-	4	4	-	4	4	-	4
Rice	-	-	-	1	-	1	2	2	4	2	4	6	4	4	8
Cassava	4	-	4	4	-	4	4	-	4	4	-	4	4	-	4
Total All Crops	15	-	15	26	-	26	40	2	42	51	14	65	118	19	137
<u>M'Boy</u>															
Maize	30	-	30	50	40	90	80	80	160	100	140	240	150	200	350
Soybeans	2	-	2	5	-	5	7	-	7	10	5	15	14	10	24
Groundnuts	10	-	10	20	-	20	28	5	33	28	5	33	55	5	60
Beans	2	-	2	5	-	5	7	5	12	10	10	20	14	20	34
Rice	2	-	2	4	2	6	6	4	10	8	6	14	8	8	16
Cassava	4	4	8	4	6	10	4	8	12	4	8	12	4	8	12
Total All Crops	50	4	54	88	48	136	132	102	234	160	174	334	245	251	496
<u>Shaba</u>															
Maize	10	-	10	20	-	20	20	-	-	40	40	80	60	60	120
Rice	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Groundnuts	-	-	-	-	-	-	5	-	5	5	-	5	10	-	10
Soybeans	-	-	-	-	-	-	-	-	-	10	-	10	40	-	40
Beans	-	-	-	-	-	-	4	-	4	6	-	6	12	-	12
Cassava	-	-	-	-	-	-	-	2	2	-	4	4	-	4	4
Total All Crops	10	-	10	20	-	20	29	2	11	61	44	105	122	64	186
<u>Haut-Zaire</u>															
Maize	10	-	10	20	-	20	40	10	50	80	20	100	80	30	110
Rice	10	-	10	20	-	20	30	10	40	40	10	50	40	10	50
Groundnuts	10	-	10	10	-	10	20	-	20	20	-	20	40	-	40
Soybeans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cassava	1	-	1	1	-	1	2	2	4	3	4	7	4	4	8
Total All Crops	31	-	31	31	-	50	2	22	104	143	34	177	164	44	208

ZAIRE
SEEDS PROJECT

Volume of Production, by Seed Farm, including Outgrowers, Years 1-5
(Tons)

Seed Farm/Crop	Year 1			Year 2			Year 3			Year 4			Year 5		
	Farm	Outgrowers	Total	Farm	Outgrowers	Total	Farm	Outgrowers	Total	Farm	Outgrowers	Total	Farm	Outgrowers	Total
<u>Kwilu Ngongo</u>															
Maize	48.0	-	48.0	54.0	-	54.0	56.0	-	56.0	75.9	-	75.9	95.0	-	95.0
Soybeans	6.0	-	6.0	15.6	-	15.6	15.4	-	15.4	16.5	-	16.5	18.0	-	18.0
Groundnuts	12.0	-	12.0	26.0	-	26.0	56.0	-	56.0	90.0	-	90.0	120.0	-	120.0
Beans	1.0	-	1.0	3.0	-	3.0	8.0	-	8.0	24.0	-	24.0	32.0	-	32.0
Cassava	20.0	-	20.0	20.0	-	20.0	20.0	-	20.0	20.0	-	20.0	20.0	-	20.0
Total All Crops	87.0	-	87.0	113.6	-	113.6	155.4	-	155.4	226.4	-	226.4	285.0	-	285.0
<u>Pindi</u>															
Maize	4.8	-	4.8	18.0	-	18.0	30.0	-	30.0	43.7	11.5	55.2	52.5	25.0	77.5
Soybeans	1.2	-	1.2	1.3	-	1.3	2.8	-	2.8	3.0	-	3.0	7.5	-	7.5
Groundnuts	6.0	-	6.0	10.4	-	10.4	18.2	-	18.2	30.0	7.5	37.5	49.5	8.0	57.5
Beans	1.0	-	1.0	1.2	-	1.2	3.2	-	3.2	3.2	-	3.2	3.2	-	3.2
Rice	-	-	-	1.2	-	1.2	2.8	2.8	5.6	3.0	6.0	9.0	6.0	6.0	12.0
Cassava	80.0	80.0	160.0	80.0	160.0	240.0	80.0	200.0	280.0	80.0	200.0	280.0	80.0	200.0	280.0
Total All Crops	93.3	80.0	173.3	112.1	160.0	272.1	137.0	202.8	339.8	162.9	225.0	387.9	198.7	239.0	437.7
<u>M'Poy</u>															
Maize	48.0	-	48.0	90.0	72.0	162.0	160.0	160.0	320.0	230.0	322.0	552.0	375.0	500.0	875.0
Soybeans	2.4	-	2.4	6.5	-	6.5	9.8	-	9.8	15.0	7.0	22.0	21.0	15.0	36.0
Groundnuts	12.0	-	12.0	26.0	-	26.0	39.2	7.0	46.2	42.0	7.0	49.0	82.5	8.0	90.5
Beans	1.0	-	1.0	3.0	-	3.0	5.6	4.0	9.6	8.0	8.0	16.0	11.2	16.0	27.2
Rice	2.0	-	2.0	4.8	2.4	7.2	8.4	5.6	14.0	12.0	9.0	21.0	12.0	12.0	24.0
Cassava	80.0	80.0	160.0	80.0	120.0	200.0	80.0	160.0	240.0	80.0	160.0	240.0	80.0	160.0	240.0
Total All Crops	145.4	80.0	225.4	210.3	194.4	404.7	303.0	336.6	639.6	387.0	513.0	900.0	581.7	711.0	1,292.7
<u>Shaba</u>															
Maize	16.0	-	16.0	36.0	-	36.0	40.0	40.0	80.0	92.0	92.0	184.0	150.0	150.0	300.0
Soybeans	-	-	-	-	-	-	-	-	-	15.0	-	15.0	30.0	-	30.0
Groundnuts	-	-	-	-	-	-	7.0	-	7.0	7.5	-	7.5	15.0	-	15.0
Beans	-	-	-	-	-	-	3.2	-	3.2	4.8	-	4.8	9.6	-	9.6
Cassava	-	-	-	-	-	-	40.0	-	40.0	80.0	-	80.0	80.0	-	80.0
Total All Crops	16.0	-	16.0	36.0	-	36.0	90.2	40.0	130.2	199.3	92.0	291.3	284.6	150.0	434.6
<u>Haut-Zaire</u>															
Maize	16.0	-	16.0	36.0	-	36.0	80.0	20.0	100.0	184.0	46.0	230.0	200.0	75.0	275.0
Groundnuts	12.0	-	12.0	13.0	-	13.0	28.0	-	28.0	30.0	-	30.0	60.0	-	60.0
Rice	10.0	-	10.0	24.0	-	24.0	42.0	14.0	56.0	60.0	15.0	75.0	60.0	15.0	75.0
Cassava	20.0	-	20.0	20.0	-	20.0	40.0	40.0	80.0	60.0	80.0	140.0	80.0	80.0	160.0
Total All Crops	58.0	-	58.0	93.0	-	93.0	190.0	74.0	264.0	334.0	141.0	475.0	400.0	170.0	570.0

ZAIRE

Projet d'assistance au Plan Semencier National/Seeds Project

Estimated Yield levels (tons/Ha)

Rendements estimés (tonnes/Ha)

	Cassava Manioc	Maize Maïs	Rice Riz	Groundnuts Arachide	Beans Haricots	Soybeans Soja	
1. Variety	various and 02864	Kasai Salongo Shaba	R66	G17	Various	S17	1. Variété
2. Estimated Potential	20-25	6-8	1-3	2-3	1.5-1.8	1.5-2	2. Rendement potentiel
3. Product	cuttings (boutures) fresh tubers (tubercules)	grain	paddy ^{1/}	unshelled en coque	grain ^{1/}	grain ^{1/}	3. Produit
4. Yields:							4. Rendements:
a. farm level with local seeds	6-10	0.8-1	0.7-1	0.5-0.8	0.4-0.6	0.4-0.6	a) niveau d'agriculteur, semences locales
b. farm level with controlled seeds	10-15	1.2-2.6	1-1.5	0.8-1.5	0.8-1.2	0.8-1,-	b) niveau d'agriculteurs avec semences
c. seeds at seedfarm for year:							c) semences contrôlées à la ferme semencière pour année:
1	25 ton	1.6	1.-	1.2	0.5	1.2	1
2	45,000 m	1.8	1.2	1.3	0.6	1.3	2
3	meter	2.-	1.4	1.4	0.8	1.4	3
4	cuttings	2.3	1.5	1.5	0.8	1.5	4
5	(boutures)	2.5	1.5	1.5	0.8	1.5	5

1/ Farm dry = séché à la ferme

ZAIRESeeds Project

Estimated Cost of Production and Prices by Seed Farm and by Crop

	Average Cost of Production ^{a/} (Year 5) (\$/Ton)	Prices ^{b/}		
		Years 1-3 (\$/Ton)	Year 4 (\$/Ton)	Year 5 (\$/Ton)
<u>Kwilu Ngongo</u>				
Maize	620	620	682	744
Soybeans	711	711	782	853
Groundnuts	629	629	692	755
Beans	926	926	1,069	1,111
Cassava	520	520	546	624
<u>Pindi</u>				
Maize	571	571	628	685
Soybeans	649	649	714	779
Groundnuts	580	580	638	696
Beans	860	860	946	1,032
Rice	589	589	648	707
Cassava	476	476	524	571
<u>MPoy</u>				
Maize	493	493	542	592
Soybeans	577	577	635	692
Groundnuts	502	502	552	602
Beans	782	782	860	938
Rice	511	511	562	613
Cassava	398	398	438	478
<u>Shaba</u>				
Maize	658	658	724	790
Soybeans	856	856	942	1,027
Groundnuts	669	669	736	803
Beans	947	947	1,042	1,136
Cassava	505	505	555	606
<u>Haut-Zaire</u>				
Maize	451	451	496	541
Groundnuts	459	459	505	551
Rice	467	467	514	560
Cassava	356	356	392	427

a/ Based on base costs. Includes amortization of investment costs and recurrent costs for year 5.

b/ Equal to average cost of production (AC) for year 1-3, 110% of AC for year 4 and 120% for year 5. In calculating revenues above prices have been raised by 7% to cover estimated physical contingency costs.

ZAIRE

Seeds Project

**Kwilu Ngongo Seed Farm: Cash Flow Statement (in U.S. \$000)
and Rate of Return Analysis**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INFLUX	32.50	71.00	92.10	140.30	207.00	271.30	382.00	441.40	466.10	480.30	480.50	480.50	480.50	480.50	480.50	480.50	480.50	480.50	480.50	480.50
OUTFLWS	261.00	162.40	169.90	131.40	154.30	239.60	318.60	367.40	342.40	310.20	267.30	270.80	333.60	347.60	460.00	349.40	310.20	267.30	270.80	333.60
NB	-228.50	-90.60	-77.80	8.90	53.30	51.70	63.40	-126.00	123.70	170.30	213.00	209.70	146.90	132.90	20.50	131.10	170.30	213.00	209.70	146.90

PRESENT VALUES OF NET STREAMS AT A DISCOUNT RATE OF 13.5%

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	43.1	223.2	403.4	943.7	-137.0	-317.1	-857.3	-171.1	-359.9	-526.2
UP 10%	-132.7	47.4	227.6	767.9	-312.8	-472.9	-1,033.3	-346.9	-535.7	-702.0
UP 20%	-308.5	-128.4	51.7	592.1	-488.6	-448.7	-1,209.1	-522.7	-711.5	-877.8
UP 50%	-835.9	-635.8	-473.7	64.7	-1,016.0	-1,196.2	-1,736.3	-1,050.2	-1,238.9	-1,405.2
DOWN 10%	218.9	399.0	579.2	1,119.3	38.8	-141.3	-681.7	4.7	-184.1	-330.4
DOWN 20%	394.7	574.9	735.0	1,295.3	214.6	34.5	-505.9	180.5	-8.3	-174.6
DOWN 50%	922.2	1,102.3	1,282.4	1,822.8	742.0	561.9	21.6	707.9	519.2	332.9
LAG 1 YEAR	-	-	-	-	-	-	-	38.0	-150.8	-317.1
LAG 2 YEARS	-	-	-	-	-	-	-	-	33.3	-132.8
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	29.5

INTERNAL RATES OF RETURN OF NET STREAMS

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	14.872	20.160	24.954	37.848	8.728	0.792	NONE	9.574	6.937	5.403
UP 10%	9.339	14.872	19.703	32.177	2.458	-7.995	NONE	5.804	4.147	3.210
UP 20%	3.752	9.839	14.872	27.227	-4.730	-78.214	NONE	2.204	1.550	1.192
UP 50%	-78.214	-7.055	0.792	14.872	NONE	NONE	NONE	-8.184	-5.400	-4.070
DOWN 10%	-24.171	-	-	-	-	-	-	-	-	-
DOWN 20%	20.713	25.973	30.881	44.952	14.872	7.963	NONE	13.612	9.973	7.810
DOWN 50%	27.227	32.639	37.848	52.785	21.396	14.872	NONE	18.057	13.332	10.489
LAG 1 YEAR	57.722	65.713	73.914	100.787	49.829	41.891	14.872	36.446	26.882	21.249
LAG 2 YEARS	-	-	-	-	-	-	-	14.872	9.574	6.937
LAG 3 YEARS	-	-	-	-	-	-	-	-	14.872	9.574
	-	-	-	-	-	-	-	-	-	14.872

Internal Rates of Return of Net Streams

NB 14.872

Seeds Project

Pindi Seed Farm: Cash Flow Statement (in U.S. \$000)
and Rate of Return Analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INFLWS	43.20	113.70	160.00	204.10	248.70	331.30	445.40	531.20	622.40	680.50	680.50	680.50	680.50	680.50	680.50	680.50	680.50	680.50	680.50	680.50
OUTFLWS	156.10	471.70	374.00	411.60	185.00	277.80	323.80	443.00	353.70	444.00	376.10	335.80	410.80	412.80	437.00	505.70	434.00	376.10	335.80	443.80
NB	-112.90	-358.00	-213.00	-205.50	63.70	53.50	121.60	68.20	68.70	236.50	284.40	344.70	269.70	267.70	223.50	174.80	246.50	284.40	344.70	236.70

PRESENT VALUES OF NET STREAMS AT A DISCOUNT RATE OF 13.5%

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	-6.7	237.9	482.5	1,216.2	-251.3	-495.8	-1,229.6	-297.6	-353.9	-779.7
UP 10%	-251.9	-7.3	237.2	971.0	-496.5	-741.1	-1,474.8	-342.8	-799.2	-1,025.0
UP 20%	-497.2	-232.6	-8.0	725.7	-741.8	-986.3	-1,720.1	-788.1	-1,044.4	-1,270.2
UP 50%	-1,232.9	-988.3	-743.8	-10.0	-1,477.5	-1,722.1	-2,435.8	-1,523.8	-1,780.2	-2,006.0
DOWN 10%	238.6	483.2	727.7	1,461.5	-6.0	-250.6	-984.3	-52.3	-308.7	-534.3
DOWN 20%	483.8	728.4	973.0	1,704.7	239.2	-5.3	-739.1	192.9	-63.4	-289.2
DOWN 50%	1,219.6	1,464.1	1,708.7	2,442.5	975.0	730.4	-3.3	928.7	672.3	446.3
LAG 1 YEAR	-	-	-	-	-	-	-	-5.9	-262.2	-488.0
LAG 2 YEARS	-	-	-	-	-	-	-	-	-5.2	-231.0
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	-4.6

INTERNAL RATES OF RETURN OF NET STREAMS

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	13.376	17.736	21.824	33.535	8.513	2.650	NONE	9.289	7.045	5.647
UP 10%	8.985	13.376	17.354	20.242	3.833	-3.011	NONE	6.136	4.611	3.678
UP 20%	4.770	9.374	13.376	23.808	-1.033	-10.233	NONE	3.164	2.349	1.862
UP 50%	-10.233	-2.459	2.650	13.376	NONE	NONE	NONE	-5.328	-3.745	-2.908
DOWN 10%	18.201	22.709	27.065	40.141	13.376	7.925	NONE	12.720	9.705	7.809
DOWN 20%	23.808	28.682	33.535	48.890	18.778	13.376	-80.387	16.566	12.670	10.220
DOWN 50%	54.547	64.518	76.071	130.744	45.657	37.469	13.376	33.473	24.992	20.049
LAG 1 YEAR	-	-	-	-	-	-	-	13.376	9.289	7.045
LAG 2 YEARS	-	-	-	-	-	-	-	-	13.376	9.289
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	13.376

Internal Rates of Return of Net Streams

NB 13.38%

Seeds Project

Mpoy Seed Farm: Cash Flow Statement (in U.S. \$000)
and Rate of Return Analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INFLOWS	49.50	146.10	233.50	410.00	634.50	830.40	873.50	915.90	957.30	998.70	998.70	998.70	998.70	998.70	998.70	998.70	998.70	998.70	998.70	998.70
OUTFLOWS	202.70	631.90	633.10	610.10	450.60	437.10	571.10	671.40	711.40	489.40	640.00	566.60	537.10	600.10	676.40	722.40	609.90	448.00	566.60	537.10
NB	-153.20	-505.80	-377.40	-199.30	195.90	393.30	352.40	222.50	245.90	309.30	350.70	432.10	461.60	398.60	322.30	276.70	308.80	350.70	432.10	461.60

PRESENT VALUES OF NET STREAMS AT A DISCOUNT RATE OF 13.5%

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	344.3	753.7	1,163.0	2,391.2	-65.1	-474.5	-1,702.6	-142.7	-571.7	-949.6
UP 10%	-30.7	370.7	700.1	2,016.2	-440.1	-049.4	-2,077.6	-517.6	-946.6	-1,324.6
UP 20%	-405.6	3.7	413.1	1,641.3	-815.0	-1,724.4	-2,432.5	-872.6	-1,321.6	-1,699.6
UP 50%	-1,530.5	-1,121.1	-711.7	516.4	-1,939.9	-2,349.2	-3,577.4	-2,017.4	-2,446.4	-7,824.4
DOWN 10%	719.2	1,128.6	1,538.0	2,766.1	309.8	-99.5	-1,327.7	232.3	-196.7	-574.7
DOWN 20%	1,094.2	1,503.6	1,912.9	3,141.1	604.8	275.4	-952.7	607.3	178.2	-199.7
DOWN 50%	2,219.0	2,628.4	3,037.8	4,265.9	1,009.7	1,400.3	172.1	1,732.1	1,303.1	925.1
LAG 1 YEAR	-	-	-	-	-	-	-	303.3	-125.7	-503.7
LAG 2 YEARS	-	-	-	-	-	-	-	-	267.2	-110.7
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	235.5

INTERNAL RATES OF RETURN OF NET STREAMS

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	18.330	23.650	28.722	43.504	12.530	5.777	NONE	12.058	8.875	6.980
UP 10%	13.087	18.330	23.179	36.797	7.083	-0.683	NONE	8.487	6.193	4.898
UP 20%	8.164	13.546	18.330	31.207	1.542	-8.738	NONE	5.148	3.712	2.890
UP 50%	-8.738	-0.663	5.777	18.330	-33.628	NONE	NONE	-4.261	-2.910	-2.221
DOWN 10%	24.223	29.829	35.310	51.835	18.330	11.838	-69.624	15.976	11.821	9.328
DOWN 20%	31.207	37.335	43.504	62.768	24.933	18.330	-19.749	20.402	15.119	11.956
DOWN 50%	69.685	81.536	94.663	147.481	58.762	48.485	18.330	39.990	28.994	22.721
LAG 1 YEAR	-	-	-	-	-	-	-	18.330	12.058	8.875
LAG 2 YEARS	-	-	-	-	-	-	-	-	18.330	12.058
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	18.330

Internal Rates of Return of Net Streams

NB 18.33%

ZAIRE

Table 16

Seeds Project

Shaba Seed Farm: Cash Flow Statement (in U.S. \$000)
and Rate of Return Analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
INFLOWS	4.80	18.00	35.90	151.30	289.30	340.30	449.90	520.40	587.90	632.30	632.30	632.30	632.30	632.30	632.30	632.30	632.30	632.30	632.30	632.30
OUTFLOWS	31.40	244.60	503.30	376.30	317.70	228.70	332.70	540.30	560.60	382.40	394.00	348.70	339.70	413.70	342.30	506.60	382.40	394.40	348.70	339.70
NB	-26.60	-226.60	-447.40	-224.00	-28.40	111.60	117.20	-19.90	27.30	249.90	237.90	283.60	272.60	218.60	290.00	125.70	249.90	237.90	283.60	272.60

PRESENT VALUES OF NET STREAMS AT A DISCOUNT RATE OF 13.5%

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	-112.0	102.9	317.8	962.6	-327.0	-541.9	-1,186.6	-367.7	-592.9	-791.3
UP 10%	-338.2	-123.2	91.7	736.5	-353.1	-768.0	-1,412.8	-593.8	-819.0	-1,017.3
UP 20%	-564.3	-349.4	-134.4	510.3	-779.2	-994.1	-1,638.9	-819.9	-1,045.1	-1,243.6
UP 50%	-1,242.7	-1,027.7	-812.8	-168.0	-1,457.6	-1,672.5	-2,317.3	-1,498.3	-1,723.5	-1,922.0
DOWN 10%	114.1	329.0	543.9	1,188.7	-100.8	-315.7	-960.5	-141.5	-366.8	-565.2
DOWN 20%	340.2	535.1	770.1	1,414.8	125.3	-87.6	-734.4	84.6	-140.6	-339.1
DOWN 50%	1,018.6	1,233.5	1,448.5	2,093.2	803.7	588.8	-56.0	763.0	537.7	339.3
LAG 1 YEAR	-	-	-	-	-	-	-	-98.7	-323.9	-522.4
LAG 2 YEARS	-	-	-	-	-	-	-	-	-87.0	-283.4
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	-76.6

INTERNAL RATES OF RETURN OF NET STREAMS

	B.1	UP 10%	UP 20%	UP 50%	DOWN 10%	DOWN 20%	DOWN 50%	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	11.313	15.403	19.129	29.070	6.445	0.930	NONE	7.930	6.071	4.889
UP 10%	7.103	11.313	15.048	24.723	2.087	-4.594	NONE	4.894	3.702	2.968
UP 20%	3.003	7.478	11.313	20.893	-2.670	-11.437	NONE	2.007	1.302	1.197
UP 50%	-11.437	-4.058	0.930	11.313	-31.300	NONE	NONE	-6.177	-4.400	-3.443
DOWN 10%	15.832	19.920	25.723	34.129	11.313	6.075	NONE	11.256	8.656	6.999
DOWN 20%	20.893	25.094	29.070	40.192	16.363	11.313	-19.952	14.922	11.527	9.349
DOWN 50%	43.735	49.306	54.800	71.171	38.035	32.133	11.313	30.190	23.200	18.834
LAG 1 YEAR	-	-	-	-	-	-	-	11.313	7.930	6.071
LAG 2 YEARS	-	-	-	-	-	-	-	-	11.313	7.950
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	11.313

Internal Rates of Return of Net Streams

NB 11.312

ZAIRE

Table 17

Seeds Project

Haut Zaire Seed Farm: Cash Flow Statement (in U.S. \$000)
and Rate of Return Analysis

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
OUTFLOWS	58.60	200.50	331.80	318.20	348.80	246.30	294.30	317.30	427.30	471.30	372.30	371.30	336.30	378.30	371.30	423.30	471.30	372.30	371.30	331.30
INFLUWS	13.90	37.30	90.80	200.10	305.70	377.30	360.60	379.20	447.80	486.10	486.10	486.10	486.10	486.10	486.10	486.10	486.10	486.10	486.10	486.10
NB	-44.70	-163.60	-241.00	-118.10	-43.10	131.00	66.30	81.90	20.50	14.80	113.80	114.80	129.80	107.80	114.80	62.80	14.80	113.80	114.80	154.80

PRESENT VALUES OF NET STREAMS AT A DISCOUNT RATE OF 13.52

	B.1	UP 10Z	UP 20Z	UP 50Z	DOWN 10Z	DOWN 20Z	DOWN 50Z	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	-146.7	37.8	224.3	783.8	-335.2	-321.7	-1,081.2	-370.3	-366.0	-738.2
UP 10Z	-350.1	-143.6	22.9	382.4	-536.6	-723.1	-1,282.5	-571.9	-747.3	-939.5
UP 20Z	-351.4	-364.9	-178.4	381.1	-737.9	-924.4	-1,483.9	-773.3	-968.7	-1,140.9
UP 50Z	-1,153.5	-949.0	-782.5	-223.0	-1,342.0	-1,328.5	-2,088.0	-1,377.4	-1,572.8	-1,745.0
DOWN 10Z	32.7	239.2	423.7	985.1	-133.8	-320.3	-879.8	-169.2	-364.6	-536.8
DOWN 20Z	254.0	446.5	427.0	1,186.5	67.5	-119.0	-478.4	32.2	-143.2	-335.4
DOWN 50Z	858.1	1,044.6	1,231.1	1,796.6	671.6	485.1	-74.3	636.3	448.9	268.7
LAG 1 YEAR	-	-	-	-	-	-	-	-131.0	-326.5	-498.6
LAG 2 YEARS	-	-	-	-	-	-	-	-	-115.4	-287.6
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	-101.7

INTERNAL RATES OF RETURN OF NET STREAMS

	B.1	UP 10Z	UP 20Z	UP 50Z	DOWN 10Z	DOWN 20Z	DOWN 50Z	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
C.1	8.127	14.760	20.375	36.427	-0.437	-17.644	NONE	4.673	3.230	2.438
UP 10Z	0.491	8.127	14.199	29.388	-12.624	-37.897	NONE	0.257	0.174	0.131
UP 20Z	-9.487	1.234	8.127	23.351	-43.298	NONE	NONE	-4.069	-2.481	-2.007
UP 50Z	NONE	-53.850	-17.444	8.127	NONE	NONE	NONE	-16.903	-10.322	-7.574
DOWN 10Z	15.437	21.830	27.800	44.977	8.127	-1.643	NONE	9.387	6.543	5.012
DOWN 20Z	23.351	29.981	36.427	55.864	16.272	8.127	NONE	14.342	10.198	7.835
DOWN 50Z	62.669	73.883	85.943	129.777	51.993	41.351	8.127	33.306	24.985	19.318
LAG 1 YEAR	-	-	-	-	-	-	-	8.127	4.673	3.230
LAG 2 YEARS	-	-	-	-	-	-	-	-	8.127	4.673
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	8.127

Internal Rates of Return of Net Streams

NB 8.133

SEEDS PROJECT

Return to Farmers' Family Labor
(Values from Model, [Area: 1 ha])

Item	With Local Seeds	With Improved Seeds Priced at			
	Priced at 7 Z/kg	20 Z/kg/	30 Z/kg	35 Z/kg/	20 Z/kg/
Labor days	143	160	160	180	160
Seeding rate (kg/ha)	35	25	25	25	25
Yield (kg/ha)	900	1,300	1,300	2,000	1,040
Producer price (Z/kg)	7	7	7	7	7
Production cost (Z) ^{4/}	525	900	1,130	3,170	900
Gross Income (Z/ha)	6,300	9,100	9,100	14,000	7,280
Net Income (Z/ha)	5,775	8,200	7,970	10,830	6,400
Income to Family Labor (Z/man day)	40	51	50	60	40
Improvement ratio of Income to Family Labor	1.00	1.28	1.25	1.50	1.00
		Using F1 of controlled composite maize maize seeds ^{5/}			

1/ Average seed price in year 1 estimated at about 25 Z/kg.

2/ Model with use of fertilizers: 50 kg at 20 Z/kg, pesticides 25 Z, hire spray equipment 20 Z and construction costs 1, 250 Z.

3/ At a yield of 1,040 kg/ha the return to Family Labor with controlled and local seeds is the same.

4/ Other costs for models without fertilizer are: bags (20 Z/bag) and tools (80 Z/ha).

5/ Farmers could buy from neighbors the F1 or F2 of controlled composite maize, which would give yields of about 1,100 kg/ha. He would pay for such seeds a price of about 10 Z/kg. In that case the profit from controlled seeds should be sought in better husbandry and the use of fertilizer.

Note 1: The switchpoint for seed price is about 90 Z/kg for the respective returns to Family Labor to be equal. However, the farmer using controlled seeds expects in general the yield and the income return to family labor to increase by at least 25%. In that case the maximum seed price would be about 30 Z/kg.

Note 2: If increased production lowers producer prices the price can drop to 4 Z/kg, at which level the maximum price will be 25 Z/kg, which is the projected sales price.

Note 3: The income return to Family Labor is considerably above the average cost of hired labor, about 14 Z/kg.

ZAIRE

SEEDS PROJECT

Return to Farmers' Family Labor
(Rice Farm Model, [Area: 1 ha])

<u>Item</u>	<u>With Local Seeds Priced at 5.5 Z/kg</u>	<u>With Controlled Seeds Priced at^{1/}</u>			
		<u>20 Z/kg^{2/}</u>	<u>25 Z/kg</u>	<u>20 Z/kg^{3/}</u>	<u>20 Z/kg^{4/}</u>
Labor days	137	160	160	175	160
Seeding rate (kg/ha)	60	60	60	80	60
Yield (kg/ha)	700	1,200	1,200	1,600	975
Producer price (Z/kg)	5.5	5.5	5.5	5.5	5.5
Production Cost (Z) ^{5/}	575	1,520	1,820	2,000	1,520
Gross income (Z)	3,850	6,600	6,600	8,800	5,360
Net income (Z)	3,275	5,080	4,780	6,800	3,840
Income to family labor (Z/man day)	24	32	30	39	24
Improvement ratio of income to family labor	1.00	1.33	1.25	1.663 25	1.00

1/ Models in bush fallow without use of fertilizers.

2/ Average seed price in year 1 established at about 15 Z/kg.

3/ If yields are increased by better husbandry techniques, in particular an increased plant population, return to farmers income improves substantially. If producer prices drop to 3 Z/kg in glut periods, the sales price of 20 Z/kg for controlled seeds would give equal cost returns to family labor but would not constitute an incentive to buy seeds unless the yields would be about 1,000 kg/ha. At that level, the increase in return to family labor would be about 25%.

4/ At a yield of 975 kg/ha the return to family labour with controlled and local seeds is the same.

5/ Materials include bags and tools at a cost of 20Z/kg and 80Z/ha respectively.

Note 1: In some areas rice is planted after forest clearing, with rice yielding up to 1,000 kg/ha. The income return to family labor would not change much, in spite of a lower seeding rate, due to extra labor (30 lbd) needed for forest clearing, planting, etc.

See also note 3 of maize model.

ZAIRE

Table 20

Seeds/Research Project

Return to Farmers' Family Labor
(Maize Farm Model. [Area 1 ha])

Item	With Local Seeds Priced at 7 Z/kg	With Improved Seeds Priced at:			
		25 Z/kg ^{1/}	35 Z/kg	35 Z/kg ^{2/}	25 Z/kg ^{3/}
Labor days	143	160	160	180	160
Seeding rate (kg/ha)	35	25	25	25	25
Yield (kg/ha)	900	1,300	1,300	2,000	1,060
Producer price (Z/kg)	7	7	7	7	7
Production cost (Z) ^{4/}	525	1,005	1,255	3,170	1,005
Gross income (Z/ha)	6,300	9,100	9,100	14,000	7,405
Net income (Z/ha)	5,775	8,095	7,845	10,830	6,400
Income to family labor (Z/man day)	40	51	49	60	40
Improvement ratio of income to family labor	1.00	1.28	1.20	1.50	1.00
	Using F1 of controlled composite maize seed ^{5/}				
Income to family labor (Z/man days)	46	51	49	60	n.a.
Improvement ratio	1.00	1.11	1.07	1.30	n.a.

1/ Average seed price in year 1 estimated at about 25 Z/kg.

2/ Model with use of fertilizers: 50 kg at 20 Z/kg, pesticides 25 Z, hire spray equipment 20 Z and construction cribs 1, 250 Z.

3/ At a yield of 1,060 kg/ha the return to family labor with controlled and local seeds is the same.

4/ Other costs for models without fertilizer are: bags (20 Z/bag) and tools (80 Z/ha).

5/ Farmers could buy from neighbors the F1 or F2 of controlled composite maize, which would give yields of about 1,100 kg/ha. He would pay for such seeds a price of about 10 Z/kg. In that case the profit from controlled seeds should be sought in better husbandry and the use of fertilizer.

Note 1: The switchpoint for seed price is about 90 Z/kg for the respective returns to family labor to be equal. However, the farmer using controlled seeds expects in general the yield and

the income return to family labor to increase by at least 25%. In that case the maximum seed price would be about 30 Z/kg.

Note 2: If increased production lowers producer prices the price can drop to 4 Z/kg, at which level the maximum price will be 25 Z/kg, which is the projected sales price.

Note 3: The income return to family labor is considerably above the average cost of hired labor, about 14 Z/kg.

ZATIR
Seeds Project

Return to Farmers' Family Labor
(Bama Farm Model, [Area: 1 ha])

Item	With Local Seeds		With Controlled Seeds Priced at			
	Priced at 16 Z/kg		30 Z/kg ^{2/7}	40 Z/kg ^{5/7}	30 Z/kg ^{4/7}	30 Z/kg ^{2/7}
Labor days	162	180	180	190	190	190
Seeding rate (kg/ha)	60	50	50	50	50	50
Yield (kg/ha)	500	800	800	800	800	640
Producer price (Z/kg)	16	16	16	16	16	16
Production cost (Z)	1,260	1,900	2,400	2,210	2,210	2,210
Gross Income (Z)	8,000	12,800	12,800	12,800	10,190	10,190
Net Income (Z)	6,760	10,900	10,400	10,590	7,980	
Income to family Labor (Z/min day)	42	60	58	56	42	
Improvement ratio of Income to family Labor	1.00	1.43	1.39	1.33	1.00	

1/ Models without use of fertilizers (see also note 5) under groundnut model. Beans are often planted in mix cropping with maize, which would be the crop mainly receiving fertilizer.

2/ Average seed price in year 1 estimated at about 30 Z/kg. Materials are bags (20 Z/bag) and tools (80 Z/ha). For the model with better disease control the extra materials are chemicals 50 Z/ha, extra tools 40 Z/ha, materials for drying in field 150 Z/ha and hire of equipment 20 Z.

3/ The midpoint in seed price would be 60 Z/kg, at which price the improvement ratio would be about 1.25 (25% increase of income to family labor being the minimum needed to interest farmers).

4/ Model with the use of better disease control measures. Such control should protect the farmer against crop failure. Control measures are justified since it leaves a substantial margin for improvement of return on family labor.

5/ At a yield of 650 kg/ha, the return to family labor with controlled and local seeds is the same.

See also note 3 of maize model.

ZAIRESSeeds Project

Return to Farmers' Family Labor
(Soybeans Farm Model, [Area: 1 ha])

<u>Item</u>	<u>With Local Seeds</u> <u>Priced at 8 Z/kg</u>	<u>With Controlled Seeds Priced at</u>			
		<u>25 Z/kg^{1/}</u>	<u>35 Z/kg^{2/}</u>	<u>25 Z/kg^{3/}</u>	<u>25 Z/kg^{4/}</u>
Labor days	168	185	185	209	185
Seeding ratio (kg/ha)	40	35	35	35	35
Yield (kg/ha)	500	800	800	1,000	630
Producer price (Z/kg)	8	8	8	8	8
Production costs (Z) ^{5/}	520	1,155	1,505	2,400	1,155
Gross income	4,000	6,400	6,400	8,000	5,040
Net income	3,480	5,245	4,895	5,600	3,480
Income to family labor (Z/man day)	21	28	26	27	21
Improvement ratio of income to family labor	1.00	1.33	1.24	1.29	1.00

1/ Average seed price in year 1 estimated at about 25 Z/kg.

2/ The price of 35 Z/kg is assumed to be the maximum market price because in the farmer's perception the increase of income to family labor should be about 25%.

3/ Model with better husbandry and fertilizer use (2,000 Z), disease control (50 Z for chemicals), equipment hire (20 Z). Such measures appear to be justified if yield increases can be obtained to about 1,000 kg/ha.

4/ At a yield of 630 kg/ha, the returns to family labor with controlled or common seed is the same.

5/ For models without fertilizer materials include bags (20 Z/bag) and tools 80 Z/ha.

See also note 3 of maize model.

ZAIRESeeds ProjectProject Cash Flow^{a/}
(US\$ '000)

<u>Outflows</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
A. Seed Farms:					
Kwilu Ngongo	266.5	175.6	198.0	161.4	205.4
M'Poy	202.1	701.2	738.6	769.4	689.7
Shaba	31.3	265.5	591.3	475.4	431.2
Pindi	156.1	514.3	442.3	522.4	250.3
Haut Zaire	<u>59.2</u>	<u>215.1</u>	<u>384.0</u>	<u>391.8</u>	<u>488.1</u>
Sub-total Seed Farms	715.2	1,871.7	2,354.2	2,320.4	2,064.7
B. Bureau National de Semences	246.9	341.5	422.8	430.3	448.1
C. Quality Control	9.4	56.3	134.1	152.9	1,236.8
D. Assistance to Research	251.9	1,045.2	678.6	437.4	229.3
E. Assistance to Other Farms	3.9	34.2	44.4	108.9	112.3
F. Studies Pilot/Projects	133.7	167.7	16.9	197.5	160.4
G. Technical Assistance	333.6	767.3	1040.7	666.0	286.4
H. Professional Training	<u>110.1</u>	<u>361.1</u>	<u>326.5</u>	<u>380.9</u>	<u>552.6</u>
TOTAL	<u>1,804.7</u>	<u>4,645.0</u>	<u>5,018.2</u>	<u>4,694.3</u>	<u>5,090.6</u>
<u>Inflows</u>					
A. External Financing ^{b/} (IDA, UNDP)	1,647.0	3,921.0	4,027.0	3,502.0	3,675.0
B. Seed Farm Sales	-	301.2	523.6	699.1	945.8
C. Government	<u>163.1</u>	<u>400.5</u>	<u>434.2</u>	<u>449.4</u>	<u>503.3</u>
TOTAL	<u>1,810.1</u>	<u>4,622.7</u>	<u>4,984.8</u>	<u>4,650.5</u>	<u>5,124.1</u>

a/ Based on Project Cost Tables.

b/ Includes unallocated amounts to finance physical contingencies.

ZAIPE
SEEDS PROJECT
Government Projected Cash Flow
(US\$000)

	Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A. Outflow																					
1. Project Activities ^{a/}	163.1	400.5	434.2	449.4	563.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Support to BUNASEH ^{a/}	—	—	—	—	—	852.2	837.6	895.1	883.0	829.8	826.4	805.6	805.6	805.6	873.1	866.0	821.8	836.4	805.6	805.6	805.6
3. Payments to IDA	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
a) Commitment charge ^{b/}	142.6	125.5	99.8	74.2	39.0	10.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
b) Service charge ^{c/}	14.3	40.0	78.6	117.0	169.8	213.2	114.1	114.1	114.1	114.1	112.9	111.8	110.6	109.5	108.3	107.2	106.1	104.9	103.8	102.7	102.7
c) Principal repayment ^{d/}	—	—	—	—	—	—	—	—	—	—	—	152.1	152.1	152.1	152.1	152.1	152.1	152.1	152.1	152.1	152.1
TOTAL Outflow	320.0	566.0	612.6	640.6	772.1	1,075.4	951.7	1,009.2	997.1	943.9	1,101.4	1,069.5	1,068.3	1,067.2	1,133.5	1,127.3	1,080.0	1,093.4	1,061.5	1,060.4	1,060.4
B. Inflow																					
1. Seed sales ^{a/}	—	301.2	523.6	699.1	945.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Tax on seed farm profits	—	—	—	—	—	370.5	348.5	113.5	243.0	490.5	600.0	693.0	641.0	463.5	385.5	150.5	495.5	600.0	693.0	619.0	619.0
TOTAL Inflow	—	301.2	523.6	699.1	945.8	370.5	348.5	113.5	243.0	490.5	600.0	693.0	641.0	463.5	385.5	150.5	495.5	600.0	693.0	619.0	619.0
C. Net Cash Flow	(320.0)	(254.8)	(89.0)	58.5	173.7	(704.9)	(603.2)	(895.7)	(754.1)	(453.4)	(501.4)	(376.5)	(376.5)	(503.7)	(748.0)	(976.8)	(577.8)	(493.4)	(366.5)	(441.4)	(441.4)

a/ It is assumed that the seed farms will be transferred to the private sector in year 5. Until then seed farm revenues, although technically Government revenue would normally remain with the seed farms and would not revert to the Treasury. Proceeds from the sale of the seed farms would be additional Government revenue. Government support to BUNASEH and components other than the seed farms will continue.

b/ Amounts to 1/2 of 1.0% per year of undisturbed credit amount.

c/ Amounts to 3/4 of 1.0% per year of disturbed credit amount.

d/ Amount to 1.0% per year of principal, (US\$152.1 thousand) from years 10-20 and 3% per year of principal (US\$456.3 thousand) from years 21-30.

Table 25
Page 1 of 2

ZAIRE

Seeds Project

Economic Analysis
Rate of Return/Net Present Value
Sensitivity/Switching Values
(U.S. \$000)

BENEFITS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B.1 Maize	-	-	-	648.00	2510.10	3498.30	4331.00	4845.00	5255.30	5585.90	5585.90	5585.90	5585.90	5585.90	5585.90	5585.90	5585.90	5585.90	5585.90	5585.90
B.2 Soybeans	-	1.70	15.40	33.10	96.30	153.30	176.00	196.20	241.80	262.10	262.10	262.10	262.10	262.10	262.10	262.10	262.10	262.10	262.10	262.10
B.3 Groundnuts	-	16.60	48.90	140.60	248.70	398.80	518.60	610.50	789.20	789.40	789.40	789.40	789.40	789.40	789.40	789.40	789.40	789.40	789.40	789.40
B.4 Beans	-	0.70	6.00	26.80	99.30	148.80	202.70	268.60	351.20	419.60	419.60	419.60	419.60	419.60	419.60	419.60	419.60	419.60	419.60	419.60
B.5 Rice	-	-	10.20	48.60	100.90	106.50	135.40	167.20	213.00	259.10	259.10	259.10	259.10	259.10	259.10	259.10	259.10	259.10	259.10	259.10
B.6 Cassava, Cosettes	-	-	29.30	200.90	1130.00	4185.00	9207.00	14647.50	20927.00	28458.00	28458.00	28458.00	28458.00	28458.00	28458.00	28458.00	28458.00	28458.00	28458.00	28458.00
B.7 Cassava, Leaves	-	-	10.20	70.70	397.50	1472.00	3238.40	5152.00	7360.00	10009.60	10009.60	10009.60	10009.60	10009.60	10009.60	10009.60	10009.60	10009.60	10009.60	10009.60
B.8 Cassava, Cuttings	-	-	1.60	11.00	62.10	230.00	506.00	895.00	1150.00	1564.00	1564.00	1564.00	1564.00	1564.00	1564.00	1564.00	1564.00	1564.00	1564.00	1564.00
COSTS																				
C.1 Investment	1439.20	3575.70	3258.20	2506.40	2150.40	397.20	563.60	1162.50	1137.50	703.30	478.90	315.90	368.00	333.80	982.30	972.20	692.60	478.90	315.90	22.00
C.2 Recurrent	300.20	578.90	897.90	1093.40	1464.20	1837.70	2059.70	2374.10	2403.70	2474.70	2474.70	2474.70	2474.70	2474.70	2474.70	2474.70	2474.70	2474.70	2474.70	2474.70
C.3 On Farm	-	23.30	80.00	634.90	2151.30	3583.40	6252.30	8253.30	11441.50	14243.80	14253.80	14243.80	14243.80	14243.80	14243.80	14243.80	14243.80	14243.80	14243.80	14243.80
Total Benefits	-	19.00	121.60	1199.70	4644.90	10394.90	18315.10	26692.00	36207.50	47347.70	47347.70	47347.70	47347.70	47347.70	47347.70	47347.70	47347.70	47347.70	47347.70	47347.70
Total Costs	1739.40	4177.90	4236.10	4234.70	5765.90	5818.30	8875.60	11789.10	14982.70	17421.80	17207.40	17034.40	17086.50	17252.30	17700.80	17690.70	17411.10	17197.60	17034.40	16740.50
Net Benefits	-1739.40	-4158.90	-4114.50	-3035.00	-1121.00	4576.60	9439.50	14902.10	21224.80	29925.90	30140.30	30313.30	30261.20	30095.40	29646.90	29657.00	29936.60	30150.30	30313.30	30607.20

Economic Rate of Return: 43.62%

- a) Due to perishability and difficulty of transport it has been assumed that only 50% of the incremental leaf production would be consumed. In the event that increased supply would cause the price of leaves to drop by 50%, the project's ERR would be about 40%.

PRESENT VALUES OF NET STREAMS AT A DISCOUNT RATE OF 13.52

	BTOT	UP 10Z	UP 20Z	UP 50Z	DOWN 10Z	DOWN 20Z	DOWN 50Z	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
CTOT	61,806.4	73,937.4	86,068.5	122,461.8	49,675.3	37,544.2	1,150.9	47,377.3	34,664.5	23,463.8
UP 10Z	55,855.9	67,987.0	80,118.1	116,511.3	43,724.8	31,593.7	-4,799.5	41,426.9	28,714.0	17,513.3
UP 20Z	49,993.3	62,034.5	74,167.6	110,540.9	37,774.4	25,643.3	-10,750.0	35,476.4	22,763.6	11,562.9
UP 50Z	32,054.1	44,185.2	56,316.3	92,709.5	19,923.0	7,791.9	-20,601.4	17,625.0	4,912.2	-6,280.5
DOWN 10Z	67,756.8	79,887.9	92,019.0	128,412.3	55,625.7	43,494.6	7,101.4	53,327.8	40,614.9	29,414.2
DOWN 20Z	73,707.3	85,838.4	97,969.4	134,362.7	61,576.2	49,445.1	13,051.8	59,278.2	46,565.4	35,344.7
DOWN 50Z	91,550.6	103,681.7	115,820.8	152,214.1	79,427.5	67,296.4	30,903.2	77,129.6	64,416.8	53,216.0
LAG 1 YEAR	-	-	-	-	-	-	-	54,454.9	41,742.1	30,541.4
LAG 2 YEARS	-	-	-	-	-	-	-	-	47,977.9	36,777.2
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	42,271.3

INTERNAL RATES OF RETURN OF NET STREAMS

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	BTOT	UP 10Z	UP 20Z	UP 50Z	DOWN 10Z	DOWN 20Z	DOWN 50Z	LAG 1 YEAR	LAG 2 YEARS	LAG 3 YEARS
CTOT	43.617	47.222	50.519	59.076	39.616	35.086	14.546	32.735	25.657	20.798
UP 10Z	39.999	43.617	46.908	55.396	35.957	31.336	8.932	29.817	23.224	18.738
UP 20Z	36.646	40.315	43.617	52.071	32.558	27.806	2.357	27.111	20.971	16.837
UP 50Z	27.806	31.667	35.086	43.617	23.319	17.859	NONE	19.872	14.991	11.846
DOWN 10Z	47.602	51.216	54.535	63.292	43.617	39.142	19.822	35.923	28.311	23.051
DOWN 20Z	52.071	55.715	59.076	67.902	48.073	43.617	25.092	39.459	31.247	25.546
DOWN 50Z	70.523	74.459	78.128	87.907	66.261	61.595	43.617	53.622	42.853	35.379
LAG 1 YEAR	-	-	-	-	-	-	-	43.617	32.735	25.657
LAG 2 YEARS	-	-	-	-	-	-	-	-	43.617	32.735
LAG 3 YEARS	-	-	-	-	-	-	-	-	-	43.617

SWITCHING VALUES AT 13.52

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STREAM	APPRAISAL VALUE	SWITCHING VALUE	PERCENTAGE CHANGE
B.1	10,640.40	-43,165.96	-331.57Z
B.2	843.66	-60,962.70	-7,325.99Z
B.3	2,518.04	-59,288.31	-2,454.54Z
B.4	1,183.95	-60,622.40	-5,220.33Z
B.5	785.82	-61,020.53	-7,845.16Z
B.6	69,197.40	7,391.04	-89.32Z
B.7	24,338.71	-37,467.64	-253.94Z
B.8	3,802.89	-58,003.46	-1,625.24Z
C.1	11,110.92	72,917.27	556.27Z
C.2	10,511.75	72,318.11	587.97Z
C.3	37,881.86	99,688.22	163.16Z

TOTAL BENEFITS	121,310.89	59,504.53	-50.95Z
TOTAL COSTS	59,504.53	121,310.89	103.87Z

Net Present Value at OCC 13.52 = 61,806.4
 Internal Rate of Return = 43.6Z
 Coupon Equivalent Rate of Return = 33.4Z

ZAIRE

Seeds Project

Production of Major Foodcrops

1. Although statistical data are unreliable and often contradictory, the following information indicates the general trends in foodcrop cultivation and production.

2. Cassava is grown in all regions, but the greatest potential for development is in the belt from Bas-Zaire to Shaba, and in particular Bandundu. Although in competition with maize and rice, cassava remains a staple for a large part of the population. Estimated annual output (about 13 million tons in 1983) meets most of the requirement. Yields are low (7 tons/ha) due to poor cultivation techniques. Farmers generally plant local varieties, often susceptible to various diseases and pests. The National Cassava Program (PRONAM) has, with assistance from the International Institute for Tropical Agriculture (IITA), developed more resistant and productive new varieties, but performance under mixed cropping conditions and other secondary characteristics are still being tested. The improved varieties have been diffused on a limited scale only.

3. Maize, the second most important food crop is grown especially in Shaba, Kasai and Bandundu, which together account for 60% of domestic output. Traditionally, maize farmers use their own seed, which has often deteriorated to such an extent that average yield rarely exceeds 1 ton/ha. For some years, the National Maize Program (PNM) has been producing composite varieties (Kasai, Salongo, etc.) with higher yields at farm level (2 to 3 tons/ha). The National Fertilizer Program (PNE) has also helped raise yields by introducing fertilizers. Wherever farmers received adequate agricultural services and price incentives, they have responded positively to new techniques, with impressive results. Maize cultivation occupied 600,000 ha in 1970 and 720,000 ha in 1981, a 20% increase. The area is estimated at 800,000 in 1983. During the same period, output rose from 430,000 tons to 640,000 tons a 40% increase mainly due to increased commercial farming. Production in 1983 was 630,000 tons, but still annual maize imports total 200,000 tons or more. The major constraints to higher output are the lack of improved seeds and fertilizers, defects of the marketing system and weak extension services.

4. Rice is grown as upland rice in all the forest region of Bandundu, Equateur, Haut-Zaire and Kivu which together contribute 80% of total production. The Equateur region (especially the district around Bumba) accounts for 20% of domestic output and supplies 60% of the rice consumed in Kinshasa. The most common variety is R66 and to a lesser extent R46, R60. In addition, the National Rice Program (PNR) has, with Chinese Assistance, introduced and developed irrigated rice cultivation in some regions, but the system is being adopted slowly in spite of its higher yields (up to 4 tons/ha). The total area under rice was increased from about 240,000 ha in 1970 (5,000 ha irrigated) to 290,000 ha in 1980; output

was 179,000 tons and 240,000 tons respectively, with low average yields (700 kg of paddy per ha). Currently, rice imports are about 60,000 tons per year and increasing, because rice (and bread also) is gradually replacing other food crops as a popular food ingredient. Constraints to accelerated production increase are: (i) the lack of improved seeds and the delay in diffusing of new available varieties; and (ii) lack of adequate marketing and extension services.

5. Groundnuts and other edible legumes (beans, peas, etc.) are staple crops in certain regions (Bas-Zaïre and Kivu) and supplementary crops in others. They are usually a component in crop rotation, and are very often found in association with maize, and cassava. The area cropped under groundnuts increased from 384,000 ha in 1970 to 465,000 in 1980, and those for other legumes from 200,000 to 250,000ha. Yields are very low (0.7 ton/ha for groundnuts and 300 to 600 kg per ha for other legumes), mainly because of seed-borne diseases. Average yields for peanuts are dropping while those for other legumes are more stable. The production of healthy and improved seed would be the most important step toward increasing output. Currently, soybean cultivation is expanding rapidly but seed supply is inadequate to meet the demand.

ZAIRESeeds ProjectCultivar ImprovementMaize

1. PNM made important progress in improving maize composite with CIMMYT assistance. PNM's first effort was the selection of improved lines from crossings of SR52 (Zambia) with H632 (from Kenya), resulting in its first maize composite Shaba Safi. Thereafter mexican varieties were introduced (mainly Tuxpeno and Eto), and selections were made from the crosses of their F1 with Shaba Safi, resulting in the currently best known cultivars Shaba (for highlands above 1,000 m) and Kasai I and Salongo I (for 500-1,000 m altitude) and Salongo II for middle and low lands. Selection focused mainly on production improvement and altitude adaptation. Less has been done on disease resistance and lodging characteristics. The selected cultivars are disease sensitive in the second cropping season, when mostly GPS5 is planted, which is more resistant. PNM will shortly focus more on disease resistance under USAID supported project, and with technical assistance from IITA, especially for the introduction of virus resistant varieties.

The most important available and widely cultivated cultivars are:

Variety	Origin	Lineage	Suitable for altitudes (in m.)	Potential in tons/ha	Remarks
GPS 5	Gandajika 1960	15 locally selected lines	500-1000	6-7	Sensitive to lodging, some resistance to mildew. Mainly for season B
Kasai I	PNM 1972-80	Tuxpeno x Eto	500-1000	6-8	Mainly for season A
Salongo I	" "	10 best families Tuxpeno x Eto, IId cycle	- 500-1000	6-8	Mainly for season A
Salongo II	" "		0-1000	6-8	
Shaba	" "	(Tuxpeno x Eto) x Shaba Safi	above 1000	6-8	

PNM also participates in the international varietal testing program of CIMMYT and, as a result, it is now testing Pool 24 (including Salongo) at the Gandajika and Kaniama research stations.

2. During the period of assistance by CIMMYT the PNM focussed on the production of maize composites, instead of hybrids, because: (i) composites, with a broader genetical base, would be better adapted to the variable growing conditions at the local level; (ii) small farmers, the majority of maize growers, would have difficulty buying annually the more expensive hybrids; and (iii) yields obtained from composites were equal to those obtained from hybrids under low-input conditions. These assumptions are valid under difficult economic conditions. However, it is not certain that they remain so if cultivation incentives improve and farmers are better trained. In addition, the system of multiplication of base seeds used so far is one of continuous selection in successive generations, as opposed to a system of conservation of pure lines, whose progeny is blended to produce the composite. The continuous selection changes over time the character of the reproduced varieties and has a risk of consanguinity. In order to maintain high quality of composite base seeds PNM has to import original parent lines from CIMMYT. Recently interest in maize hybrid selection is growing, and the new PNM program would look with IITA assistance into the possibilities to develop hybrids in Zaire. At Gandajika, hybrid selection started already before 1970, and the program could be resumed.

Cassava

3. Cultivar improvement for cassava was revitalized since 1974 under the PRONAM program. The Belgian research and later INERA had already indentified some promising cultivars, notably the 02864 (para 2.04), which has proved its bacteriosis resistance during the epidemic disease outbreak in the 1970's. However, it is not resistant to other diseases. PRONAM focussed originally on disease resistance and tuber production and started a biological pest control study, since the mealy bug developed into a major threat. It also included in its research program other criteria (such as leaf production and taste, size and color of tubers, taste and toxicity of tubers and behavior in mixed cropping systems). So far two bacteriosis resistant cultivars have been selected, which are now being tested at the farmers level. The best known cultivars are:

<u>Variety</u>	<u>Origin</u>	<u>Particularly suitable for</u>	<u>Potential in tons/ha</u>	<u>Remarks</u>
02864	Mvuazi 1960	Bas-Zaire	15-20	Resistance to bacteriosis, not to other diseases
F100	Bandundu	Bandundu	n.a.	Sensitive to mozaique and bacteriosis
30074/2	Mvuazi 1981	Bas-Zaire	25-30	Resistant to bacteriosis
30085/28	Mvuazi	"	"	"
Eala Amer Mumbala Mundele	Yangambi	Equateur Bandundu	15-20	

Rice

4. Rice research started at Yangambi before 1960, and the best known cultivars selected are R66 and 2031. Research was interrupted in 1960 and later on resumed in 1970 by introducing IRAT and IRRI-lines. Work on irrigated rice started with support of Chinese bilateral assistance. Moreover, the main crop remains upland rainfed rice. Most farmers have now used their own seeds over 20 years and yields have dropped substantially, and the purity of base-seeds is not rigorously controlled. The main task of PNR will be to produce and distribute controlled rice seeds. The major tested cultivars are:

<u>Variety</u>	<u>Type</u>	<u>Origin</u>	<u>Suitable Regions</u>	<u>Potential Yield ton/ha (paddy)</u>
R66, R46	Upland	Yangambi	All Zaire	1-3
2031 ^x)	""	""	""	1-3
Peking 72/5	Irrigated	China	Bumba Bas-Zaire	3-5

x/ Crossing of R66xIR8

From a total of about 30 cultivars of irrigated rice, six were selected as suitable for Zaire (K 017, Taiwan 1 and 5, Peking 72-5, IR8 and Zoungué). From a total of about 35 upland rice varieties, (from IET, IRAT, IITA a.o.) none has so far been released or distributed, although experimental results indicate a potential yield level of two to four tons/ha.

Grain Legumes

5. Less work has been done on grain legumes after 1960. Some bean varieties have been selected at Mulungu (Wulma, C8, C10, C15) but they still have to be tested at various ecological zones. A great number of imported seeds and some local varieties are also under observation at Mvuazi, Gandajika and Mulungu. For Soja the PNL has tested varieties for the various ecological zones. They consist mainly of the SJ groups selected at Yangambi and imported cultivars. The major problem for yield improvement is the bad phytosanitary situation of legume cultivation. The selection of disease free base seeds with assistance of IITA under the National Commodity Programs (PNL) has the highest priority. The first multiplication of seeds should also be carried out under supervision of research staff with respect to, disease control, cultivation techniques, harvesting and storage.

ZAIRE

SEEDS PROJECT

SELECTED DOCUMENTS AND DATA AVAILABLE IN PROJECT FILE

<u>A. Sector/Sub-sector Reports and Studies</u>	<u>Document No.</u>
A1. DADR, "Plan de Relance Agricole 1982-1984" June 11, 1982	108.515 A
A2. DADR, "Evaluation du Plan de Relance Agricole, 1982-1984" October 1983	108.515 B
A3. EAPCA, "Zaire: Updating Report on the Implementation of the Agricultural Recovery Plan, June 1982 - October 1983" December 16, 1983	109.296 A
A4. Dep. du Plan, Bilan du Secteur Agricole Draft September 1984	
A5. USAID, Applied Agricultural Research and Outreach, Project Preparation Document, September 1983	
A6. (Rapport Provisoire) Groupe d'Etude de Réorganisation du Système National de Recherche Agronomique du Zaïre, December 1984. (avec collaboration de l'ISNAR)	
 <u>B. Project Related Reports and Studies</u>	
B1. DADR, Schema Directeur du Plan Semencier, June 1982	
B2. ICD, (Industry Council for Development, New York) "Le développement de l'industrie Semencière Nationale au Zaïre", Rapport de la mission de l'ICD, Décembre 1983	108.770
B3. DADR, IBRD, Rapport de la mission de préparation pour le projet d'Assistance au Plan Semencier national, May 1984	
B4. BUNASEM, le développement d'une industrie Semencière au Zaïre, September 1984	
B5. DAI (Development Alternatives, Inc., Washington DC) Production of Maize Seed for North Shaba, June 1983	108.267

- B6. UNDP/FAO "Support à la mise en place d'un Bureau National de Semences" Document du Projet, October 1984
- B7. Ministry of Foreign Affairs, Italy "Identificazione di un programma di sostegno nel settore della ricerca agronomica per la Repubblica delle Zaïre" July 1984. Prepared by the "Istituto Agronomico per l'Oltremare" Florence.
- B8. Arrête Departmental 100003 du mai 12, 1984, portant création et organisation du Bureau National Semencier 109.393

C. Implementation

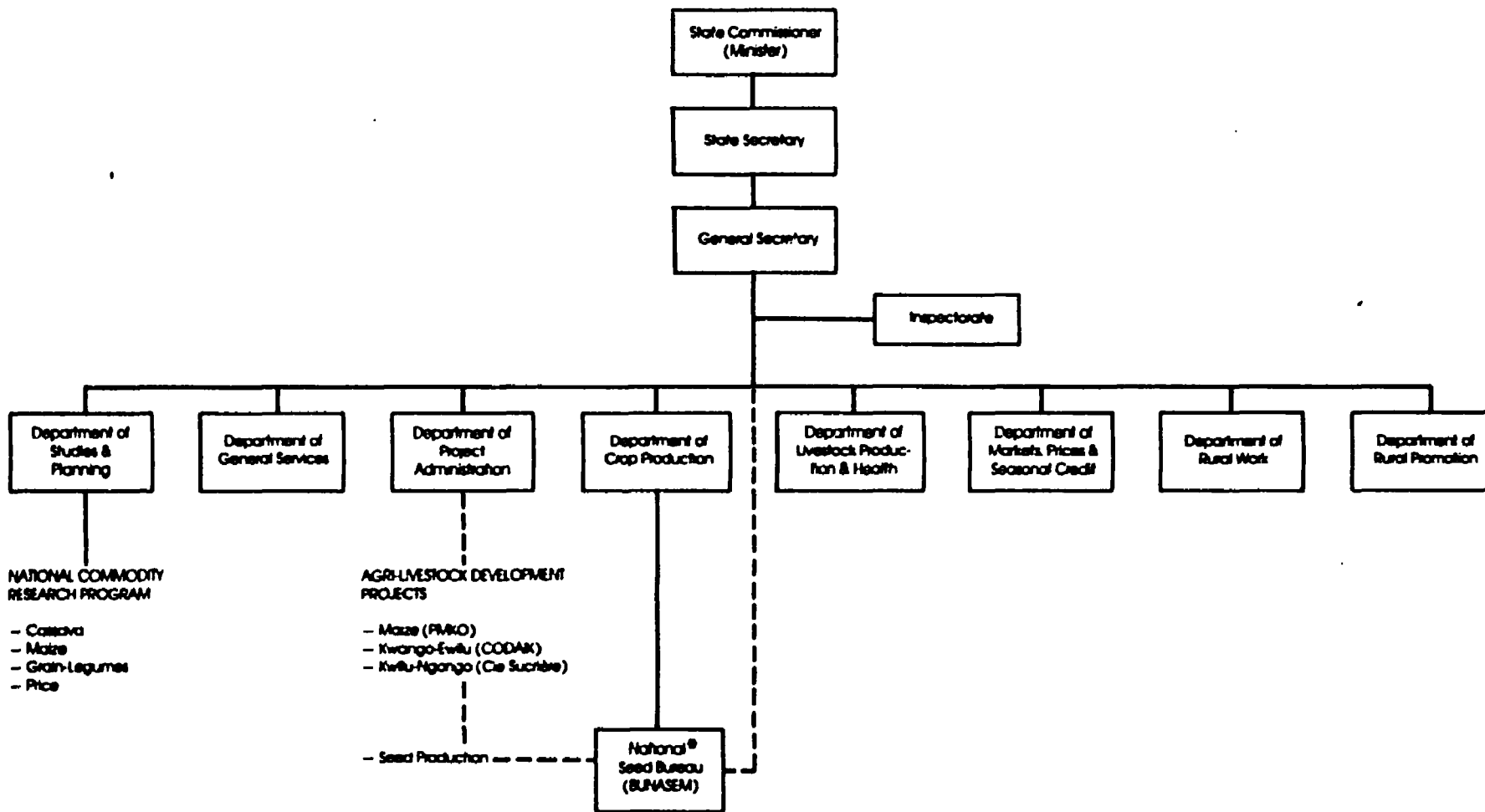
C1. Implementation volume (Table of Contents)

- Annex 1 - Agricultural Research
- Annex 2 - Technical Aspects of Seed Production
- Annex 3 - Seed Marketing
- Annex 4 - Participating Agencies and Parallel Activities
- Annex 5 - Organization and Project Implementation
- Annex 6 - Procurement and Disbursement
- Annex 7 - Standard Cost
- Annex 8 - Cost Tables
- Annex 9 - Farm Models
- Annex 10 - Financial Results
- Annex 11 - Economic Analysis

C2. Working papers on:

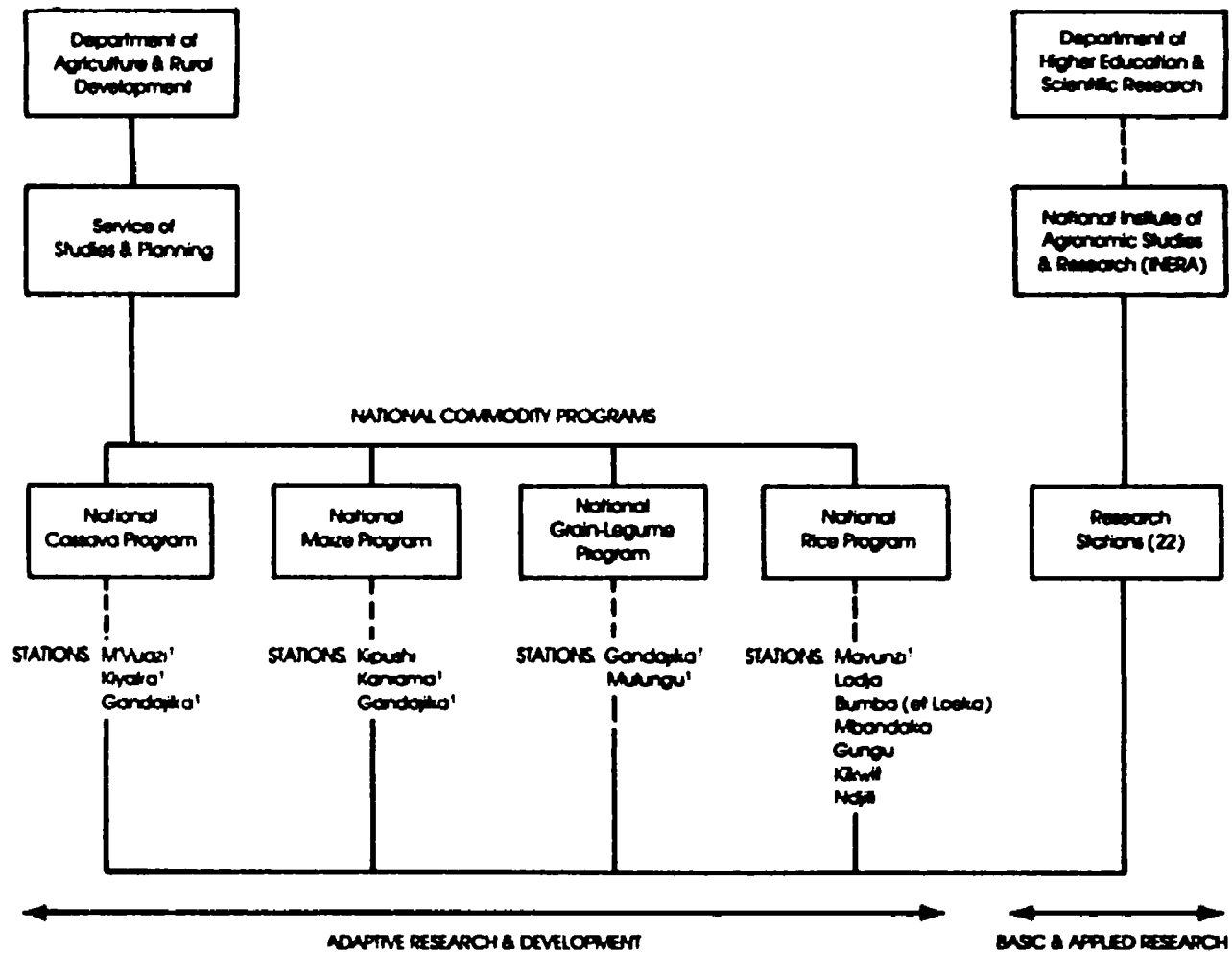
1. Kaniama Kasese
2. Upland rice
3. Situation Sanitaire de Légumineuses (Report of Mr. H.M. Maraité)
4. Background documents F.C.D. and B.C.A.
5. Information on markets/prices
6. Climate data (Report 1975, Service Climatologique)

**ZAIRE
SEEDS PROJECT
Department of Agriculture and Rural Development
Organizational Chart**



¹ BUNASEM will organizationally have the "statut" of the Department of Crop Production, until it will be organized as an independent parastatal entity ("office"). In the interim it will retain a technically autonomous position.

**ZAIRE
SEEDS PROJECT
Organizational Chart of Agricultural Research**

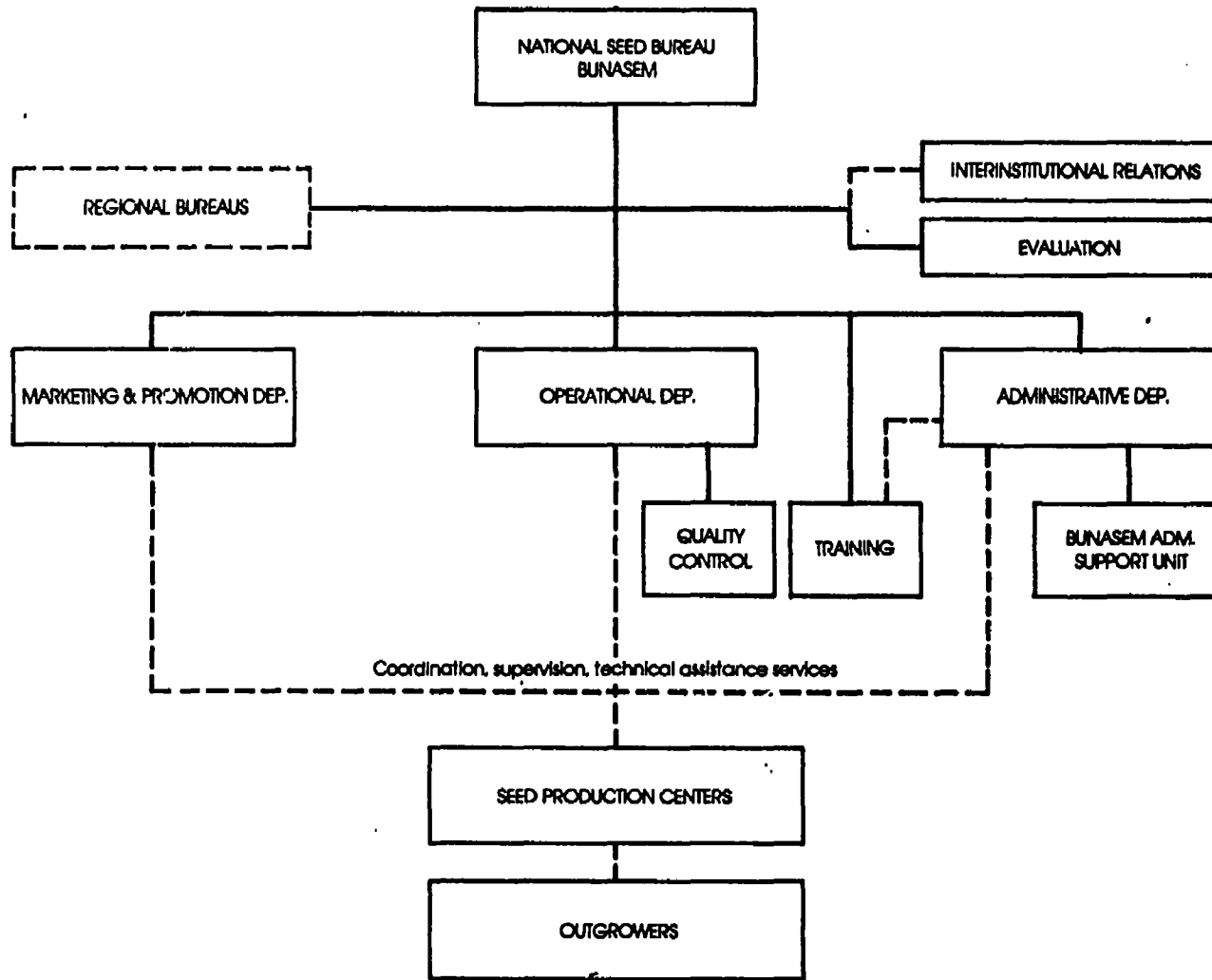


¹ These centers are INERA principal research stations.

August 2, 1984

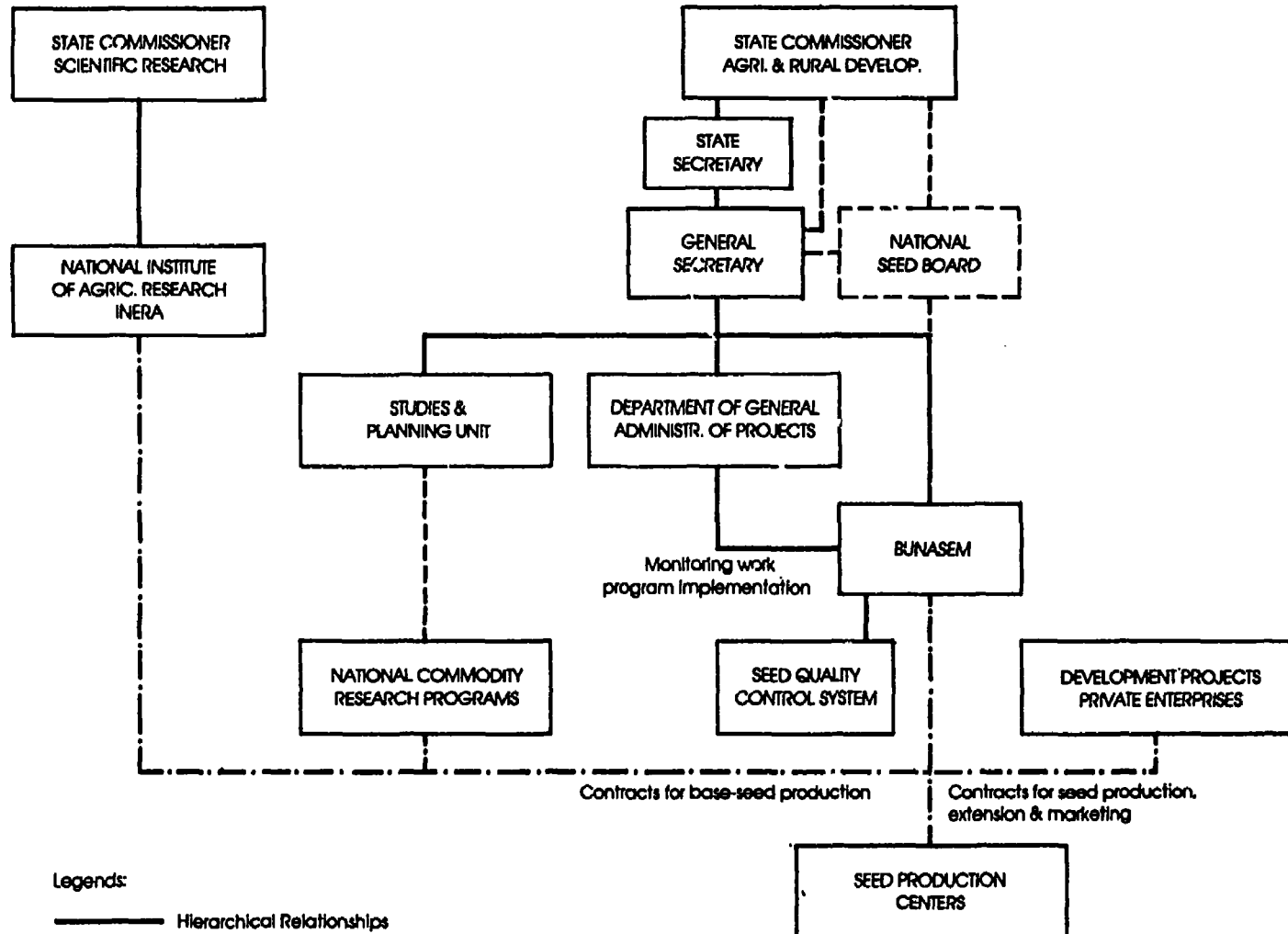
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**ZAIRE
SEEDS PROJECT
Organizational Chart BUNASEM**



Legends:
 ————— Hierarchical Relations
 - - - - - Functional Relations

ZAIRE SEEDS PROJECT Project Implementation Structure



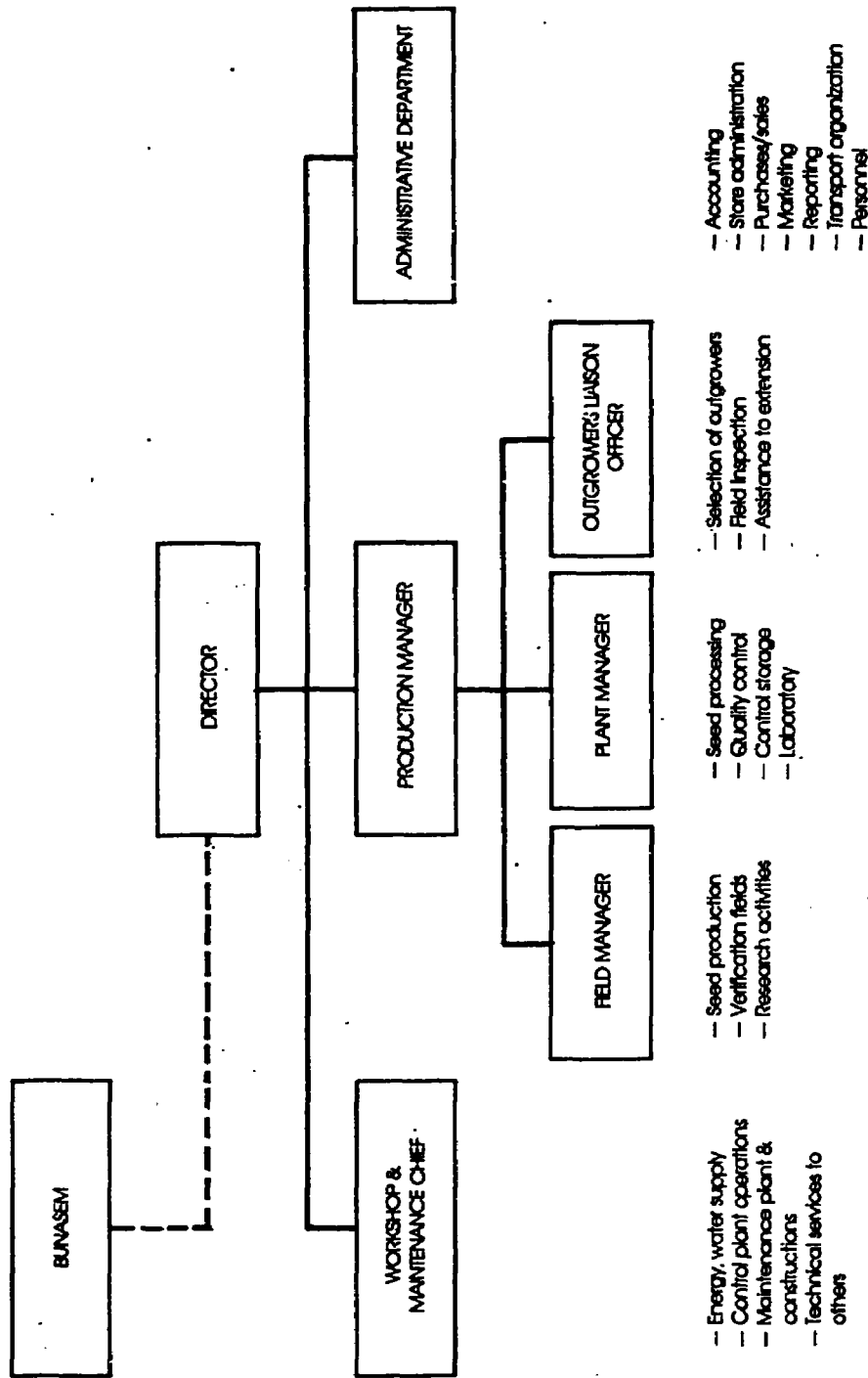
Legends:

- Hierarchical Relationships
- - - - Functional or Technical Relationships
- . - . Contractual Relationships

December 1984

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**ZAIRE
SEEDS PROJECT
Organizational Chart of Seed Production Center In Full Development**



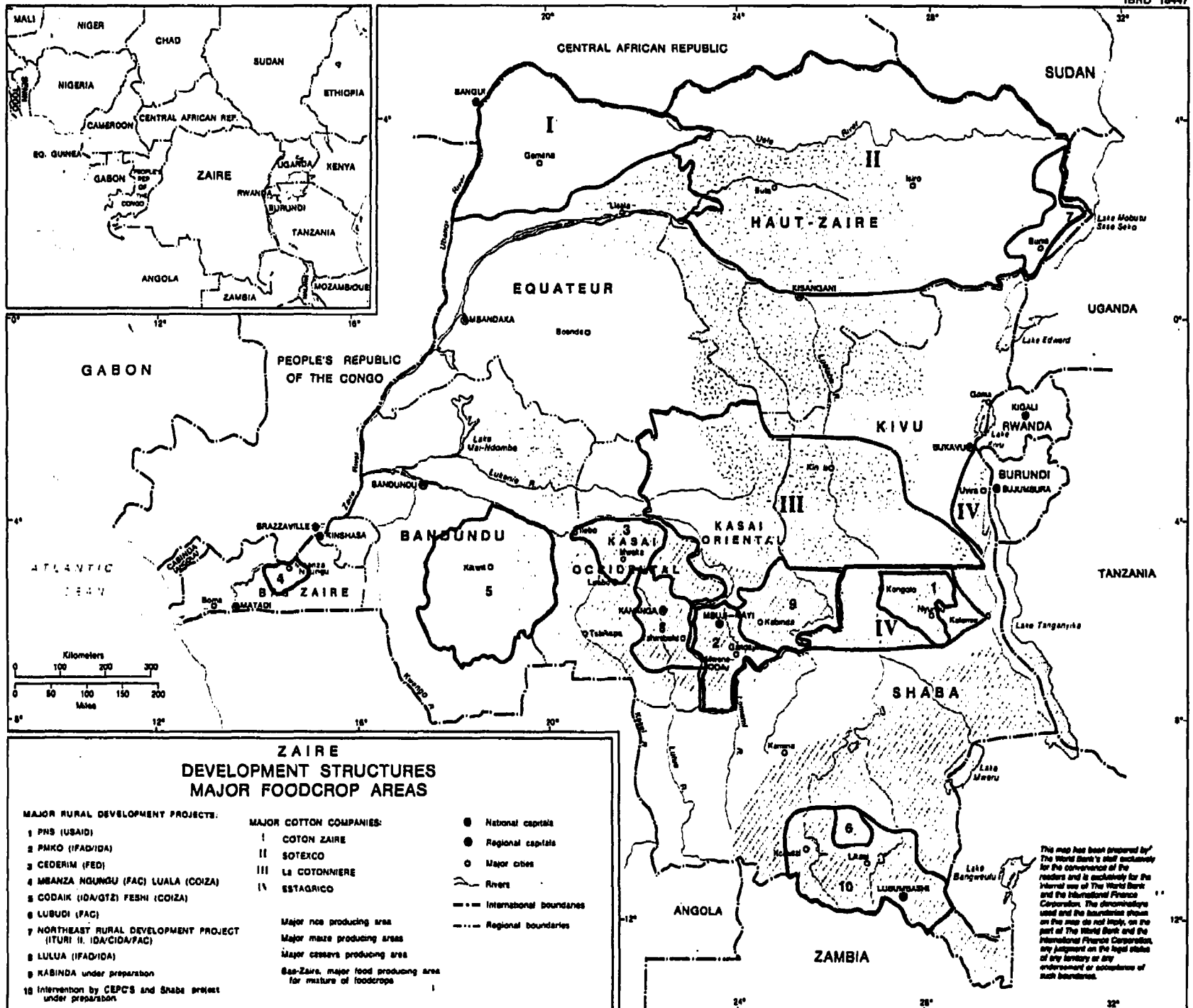
ZAIRE
SEEDS PROJECT
Implementation Schedule

Activities	Before Project	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
1. DEVELOPMENT OF BUNASEM Establishment National Seed Board Office Construction Recruitment of Advisors BUNASEM Advisors Seed Farms Ad Hoc Consultants Preparation & Signing Master Contracts with Participating Agencies Preparation & Signing Annual Contracts Preparation Annual Workprograms/Budget Preparation & Updating of Financing Plan Auditing Preparation M & E System Midterm Evaluation Completion Report & Ex Post Evaluation Preparation Follow-up Phase Development Cost Accounting System for Seed Farms, & Introduction		-----	-----	-----	-----	-----	-----
2. ASSISTANCE TO RESEARCH CENTERS Support for Gandaokwa Muuzi Kaniama Mavuzi 3. SEED FARMS Operations Bas Zaire Bandundu Kasai Oriental Shaba Haut Zaire Marketing Studies Preparation of Standard Agreements for Production with Outgrowers	-----	-----	-----	-----	-----	-----	-----
4. SEED QUALITY CONTROL Construction Laboratories Central Laboratory Laboratories on Seed Farms Preparation Control Guidelines Preliminary Register of Varieties Drafting of Seed Legislation 5. ASSISTANCE TO OTHER SEED FARMS Survey of Needs Support to Selected Farms Preparation of Standards/Agreements for Support	-----	-----	-----	-----	-----	-----	-----
6. STUDIES/PILOT PROJECTS Marketing Study Study Integration Private Enterprises Study Possibilities Production of Maize Hybrid Seeds Study for Establishing BUNASEM as Independent Office Pilot Project Kasese "Minilab" Pilot Project Study Monitoring System 7. PROFESSIONAL TRAINING Preparation of Training Courses Overseas Training Training in Zaire Refresher Courses Evaluation of Training Activities 8. TECHNICAL ASSISTANCE Various Activities Already Specified Above Under Components 1, 3, 4, 6 & 7	-----	-----	-----	-----	-----	-----	-----

Legend:

----- = Preparation

----- = Implementation



**ZAIRE
DEVELOPMENT STRUCTURES
MAJOR FOODCROP AREAS**

- MAJOR RURAL DEVELOPMENT PROJECTS:**
- 1 PMS (USAID)
 - 2 PNKO (IFAD/IDA)
 - 3 CEDERIM (FED)
 - 4 MBANZA NGUNGU (FAC) LUALA (COIZA)
 - 5 CODAIX (IDA/GTZ) FESHU (COIZA)
 - 6 LUBUDI (FAC)
 - 7 NORTHEAST RURAL DEVELOPMENT PROJECT (ITURI II IDA/CIDA/FAC)
 - 8 LULUA (IFAD/IDA)
 - 9 KABINDA under preparation
 - 10 Intervention by CEPCS and Shaba project under preparation

- MAJOR COTTON COMPANIES:**
- I COTON ZAIRE
 - II SOTEXCO
 - III LA COTONNIERE
 - IV ESTAGRICO

● National capitals
 ● Regional capitals
 ○ Major cities
 — Rivers
 - - - International boundaries
 - · - · - Regional boundaries

Major rice producing areas
 Major maize producing areas
 Major cassava producing areas
 Bas-Zaire, major food producing area for mature of foodcrops

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