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**INTERNAL EVALUATION OF
PROJECT NORTH SHABA**

DEVELOPMENT ALTERNATIVES, INC. (DAI)

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PREFACE

This report presents the results of an internal evaluation of the North Shaba Rural Development Project by the technical assistance contractor, Development Alternatives, Inc. (DAI). The evaluation is one in a series of such assessments carried out by members of the firm's home office staff. Similar evaluations have been conducted for the Arusha Planning and Village Development Project in Tanzania (March 1980) and the Provincial Area Development Program I in Indonesia (September/October 1980), where DAI also holds long-term implementation contracts. An internal evaluation of the Southern Manpower Development Project in Sudan is scheduled for the spring of 1981.

These evaluations have two principal objectives. The first is to enhance institutional learning on aspects of the development process encountered in DAI's long-term field projects. The commitment of senior staff time to these evaluations, in some instances at the firm's expense, represents an effort to capture implementation lessons and experience in greater depth than is possible by reading periodic reports sent in from the field. Since DAI remains deeply involved in both policy research and project design and evaluation work, a special effort is being made to tap the rich data base in the firm's own major overseas projects.

The second objective is to provide a formative influence on the evolution of each specific project, by identifying basic issues that should be addressed, and when necessary, by suggesting modifications or redesign of project components. In fulfilling this function, close interaction is essential between the home office evaluators and the field team leader. DAI's policy of placing a member of its home office staff in each team leader (chief of party) position is intended to facilitate dialogue and problem resolution within a common philosophical framework.

The North Shaba Project was near its mid-point at the time of the evaluation reported in this document. Since the project must operate within an unfavorable political and economic environment in Zaire, basic questions were posed regarding the potential for achieving project goals and the rationale for continuing DAI's involvement. The evaluation coincided with the revision of the Project Paper by

USAID/Kinshasa, in support of a request for \$3.5 million in additional funding, to which AID was committed in principle. Large amounts of material from this evaluation report were incorporated in the PP revision, which was approved by AID/Washington in August 1980.

Conditions Precedent, corresponding closely to the recommendations of this evaluation, were included in the new Project Agreement which was signed by USAID and the Government of Zaire in late September. As of this writing, actions by these two parties are underway to fulfill those Conditions, with the prospect of additional implementation delays unless the process is completed promptly. The evaluation team feels strongly that the CPs are essential prerequisites for continuation of the project and improvement in the prospects for positive development impact in North Shaba.

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November 1980

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CHAPTER ONE

INTRODUCTION

The objective of the North Shaba Rural Development Project is to start a self-sustaining rural development process in a remote but high-potential area of eastern Zaire, primarily by increasing small farmer maize production. The project is integrated in the sense that it addresses all of the major constraints to increased maize production at the same time: agricultural research and extension, farmer organization, rural roads, marketing institutions, intermediate technology for crop production and processing and finally an information system to monitor the impact of project interventions. Overall, the project reflects a process approach to instituting change in rural areas. It is assumed that rural development can be self-sustaining only if it is consistent with existing socio-economic systems and reflects the needs and desires of the intended beneficiaries. Consequently, a strong emphasis is placed on farmer participation and on the development of an information system that monitors receptivity to project interventions and their impact on the local population.

As originally designed, the project was extremely ambitious. It was scheduled to start in late 1976 (the Project

Agreement was signed in September of that year), with AID funding due to terminate in September 1982 and Government of Zaire (GOZ) financing due to end in 1986. New production technologies were to be introduced and marketing constraints overcome so that:

- Maize production in the project area would increase by more than 300 percent between 1976 and 1986;
- Farm households participating in the project for at least three years would experience an increase of 100 percent in their net incomes by 1982; and
- The amount of maize marketed and shipped to South Shaba would increase from 16,000 metric tons (MT) in 1976 to 48,000 MT in 1982.

From the outset, the project has experienced serious implementation delays, and the economic environment in which it operates has deteriorated steadily over the past four years. During this period, Shaba region underwent two major armed conflicts; the Lualaba river reached record flood levels, closing down project activities in intermediate technology and road and bridge rehabilitation for four months in mid-1979; and an enforced, mismanaged demonetization program severely disrupted the rural commercial and small farm sectors at the end of 1979.

While each of these events has adversely affected the project, four problems of a more systematic nature have been

diagnosed as constraints to the achievement of project objectives. These problems provided the focus for this evaluation:

- Zaire's worsening macroeconomic situation;
- The lack of dependable financial support to the project from the Government of Zaire (GOZ);
- Inadequacies in the development and dissemination of new maize production technologies; and
- Shortcomings in the technical assistance provided to the project.

There is now general agreement that the project's original production and income targets were unrealistic, particularly for a time-bounded project in a remote, inaccessible area of a country undergoing a prolonged economic crisis. Rather than match project achievements against targets whose feasibility seems increasingly dubious with hindsight, the approach in this evaluation is to analyze each of the four problem areas, in order to determine the implications for achieving significant development impact in the North Shaba project area.

The basic question addressed in the following chapters is whether this project, either as presently designed or with appropriate changes, can increase maize production and initiate

a self-sustaining and broad-based rural development process in North Shaba. The findings and recommendations (summarized in Chapter Six) contain 1) an assessment of what can likely be achieved given the constraints to increased maize production in North Shaba and 2) a set of recommendations, some of which are essential for project success, and others which would significantly increase its overall development impact over the long-term.

CHAPTER TWO

MACROECONOMIC CONSTRAINTS AND POLICY ISSUES

From a macroeconomic standpoint, there are three critical issues that affect the capacity of Project North Shaba to achieve its objectives. The first concerns the maize pricing policies of the Government of Zaire (GOZ). The second constraint is Zaire's steadily deteriorating foreign exchange and domestic resource situation. The third is the large gap between GOZ budgetary revenues and expenditures. The effects of these constraints extend beyond PNS itself, and must be addressed in the context of broader national priorities. However, it is important to recognize that unless certain measures are taken with respect to each constraint, there is a distinct possibility that PNS will not be able to achieve the objectives set forth in the Project Paper.

MAIZE PRICING AND MARKETING POLICIES

The justification and design of this project is based to a very large extent on the serious maize deficit that exists in South Shaba. The major sources of demand are the city of Lubumbashi and the copper and cobalt mining areas. Although not specifically addressed in this project, there is also a

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large maize deficit in the region of Kasai Oriental (bordering Shaba on the west), primarily in the diamond mining areas. At present, most of the deficit in South Shaba is met through imports. Maize grown in North Shaba covers some of the remaining needs in South Shaba, as well as much of the demand in Kasai.

Consumer Pricing Policy

The GOZ policy towards maize prices in Shaba and Kasai can be summarized as follows: Employees of GECAMINES, the Zairian copper and cobalt producing corporation, are supplied with maize flour at a heavily subsidized price. In 1979 the GECAMINES price was Z 0.52/kg, compared to the "official" consumer price of Z 1.14/kg. GECAMINES also provides flour at the subsidized price to other large corporations and GOZ agencies in South Shaba. In recent years MINOKA (its flour mill) has been importing between 150,000 and 180,000 metric tons (MT), mostly from Rhodesia (now Zimbabwe), and obtaining another 10,000 MT from GECAMINES' mechanized farm in South Shaba. For the South Shaba population not supplied by MINOKA, the GOZ policy is to set an official price below what the price would be in a free market. This policy is justified by the need to keep basic foodstuffs within the reach of those whose incomes are low and are not keeping pace with inflation. Prices are increased annually by the minimum amount considered necessary to assure the continued local production, commercialization and processing of maize. These are ex-mill prices

paid by retailers in South Shaba who in turn may sell to the final consumer at free market prices. Since 1977, the retail markup has ranged from 30 to 43 percent. Precise data are not available, but it appears that the quantities sold at the official price in South Shaba amount to less than 10 percent of the quantities sold through the GECAMINES system. The importance of the official price is that (1) any miller other than MINOKA who wishes to sell flour on the South Shaba market is obliged to sell at that price, and (2) it is used as the basis for establishing the producer price for maize in Shaba Region. Associated with the policy of controlled low consumer prices in South Shaba is the prohibition of maize movements between Shaba and Kasai Oriental. Some exceptions are made, the most important being the authorization to the only large private flour mill in Shaba (Tarica Frères) to sell maize to the Zairian diamond mining company in Kasai.

From the consumer's standpoint, the end result of the GOZ's pricing policy is a shortage of maize flour at "official" prices in South Shaba, because of disincentives for flour millers to process maize for the official market, and an active parallel market in both South Shaba and Kasai, where consumers are paying more for maize than they would in the absence of price controls. For the large majority of consumers in South Shaba, however, the official and open market prices have no real relevance since they are supplied with maize flour through the GECAMINES/MINOKA system.

Price Policy Impact on PNS

The relationship of the official consumer price in South Shaba to producer prices in the North Shaba project area is shown in the following table:

Table 1

RELATIONSHIP OF CONSUMER PRICES TO
PRODUCER PRICES IN SHABA
(ZAIRES PER MT)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Producer Price	75	100	220	350	450
Trader Margin	<u>30</u>	<u>60</u>	<u>80</u>	<u>250</u>	<u>250</u>
Railhead Price (North Shaba)	105	160	300	600	700
Rail Transportation to Lubumbashi	<u>10</u>	<u>15</u>	<u>23</u>	<u>54</u>	<u>155</u>
Price c.i.f. Lubumbashi	115	175	323	654	855
Milling Margin	<u>20</u>	<u>38</u>		<u>488</u>	<u>478</u>
Official Flour Price	135	213		1143	1333

To the extent that the official producer price understates the market value of flour in South Shaba, producer prices, trader margins and milling margins are lower than they would otherwise be. In 1976, neither the trade nor the milling margin was sufficient to cover costs. As a result, all the large mills in South Shaba except Tarica Frères closed, and the number of traders in North Shaba diminished sharply. The situation improved dramatically in 1978 when the quantity of maize marketed in North Shaba increased to 11.6 thousand MT compared to 4.9 thousand MT in 1977. Production has increased in 1978 because of better weather, but there is evidence that farmers also responded strongly to a doubling of the producer price. In fact, it appears that many farmers in Kongolo did not keep

enough maize for their own consumption and were obliged to repurchase some later in the season at higher prices. In 1979, production increased further and the quantity marketed totalled 12.3 thousand MT, despite serious flooding which shortened the marketing season.

In 1980, there has been another shift in policy away from production incentives. The official price of flour in Shaba allows only a slight increase in the producer price and no increases in milling and trader margins despite an inflation rate of well over 50 percent. This reflects the continued consumer orientation of maize pricing policy in Shaba. On average the official price in South Shaba can be expected to increase only as much as is necessary to assure that the production, marketing and milling of maize does not decline.

The brunt of this policy falls on the farmer. With few exceptions, the official producer price is considered a maximum as well as a minimum. Traders and millers, on the other hand, have alternatives that increase their profits. Tarica Frères, the miller that purchases most of the North Shaba maize, sells to MIBA, the diamond mining corporation in Kasai. Traders sell maize in Kalemie (the capital of Tanganyika sub-region), and in the Kasais for prices that are 50 percent and more above official Shaba prices. Of course, the farmers benefit somewhat from these alternative markets, because in some years millers and traders would not be able to operate profitably without them.

From the standpoint of PNS, the key pricing questions are (1) how much can producer prices be increased? and (2) what would be the impact on maize production in North Shaba? If maize prices were decontrolled, consumer prices in Shaba would approach those in Kasai Oriental, i.e., they could increase by 50 to 100 percent. Producer prices in North Shaba would increase correspondingly. This would help to bring maize supply and demand into balance by increasing production and causing some shift in consumption out of maize into other foodstuffs. For political reasons it is very unlikely that the GOZ would take such a step. A more realistic, although still unlikely possibility would be for the GOZ to adopt a production-oriented policy of gradually reducing the differences in consumer prices between Shaba and Kasai Oriental. This would be a less disruptive way of bringing official maize prices more in line with actual supply/demand conditions.

One economic measure of how much prices should be allowed to increase is the cost of imported maize computed at an exchange rate that reflects the true value of the zaire (officially valued at Z3 = \$1). At an exchange rate of Z6 = \$1, the cost of Zimbabwe maize in Lubumbashi would be about Z1,500/MT. At the 1980 official producer price, North Shaba maize costs Z855/MT in Lubumbashi. If impurities are taken into account, the price increases to about Z1,000/MT. At Z6 = \$1 the producer price could increase by 78 percent, from Z450 to Z800/MT and still be competitive with imports.

Production Potential and Incentives

Although in general there is little doubt that increased consumer prices would lead to increased maize production--both directly through increased producer prices and indirectly through improved marketing activity as trading and milling become more profitable--the size of the increase depends on (1) how much labor farmers would be willing to shift out of other activities or out of leisure time into maize production, and (2) whether the price increases make certain production-increasing inputs economic. On the first point, existing producer prices are presently high enough to induce some production of maize as a cash crop. Since the project started, improved seeds are proving to be economic and, combined with improvements in marketing, are leading to gradual increases in quantities of maize marketed. Further, at present prices and yields it is slightly more remunerative for the farmer to grow maize than cotton, although it does not appear that there is much competition for labor time between the two crops. It is not known at this time how maize production compares with production of palm oil, rice, peanuts and other economic activities nor how much competition there is between them for labor. What needs to be determined through microeconomic data gathering and analysis is farm labor availability in the project area and the opportunity cost of that labor, i.e., how much of a return to maize production would be required to induce an increased allocation to maize production? PNS should assign

high priority to answering this question beginning with the next growing season.

With respect to the economics of production-increasing agricultural inputs, the key question concerns fertilizers. Improved seeds have already proven economic, and since neither animal traction nor mechanization is considered feasible in the foreseeable future, the most promising next step appears to be the introduction of fertilizer. The improved seed, Kasai I, has been shown to be responsive to fertilizer use on research stations and on farmers' fields in Kasai. In North Shaba there has been some testing of fertilizer on demonstration plots with widely varying results. There has not yet been any introduction of fertilizer on farmers' fields. A very tentative analysis of fertilizer results to date is attached as Annex A to this evaluation. Calculations assumed three possible producer prices:

- The official Shaba price Z 450/MT
- An economic price based on the Z 800/MT
 real cost of maize imports
- The open market price in Kasai Z 1000/MT

At a delivered cost of fertilizer of Z1,500/MT, data from PNS show fertilizer to be uneconomic at the official Shaba price. Using the Kasai price of Z1000/MT, however, fertilizer becomes economic. If an exchange rate of Z6 = \$1 is used to calculate prices, the producer price of maize becomes Z800/MT and

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fertilizer costs Z450/ha. At these prices, fertilizer use is marginal at best under the assumed yield responses. There are enough unanswered questions concerning fertilizer use on maize in North Shaba to justify an expanded adaptive research program under this project.

In conclusion, it appears quite clear that for political reasons, the GOZ has adopted a price policy in Shaba which is not conducive to maximum increases in maize production. Such increases would be difficult to achieve, in any event, for reasons explained in the remainder of this evaluation. But a production-oriented price policy would at least introduce a set of incentives that would increase the responsiveness of farmers to production increasing possibilities, and would improve marketing services which are now an important constraint to increased production. How much production would increase cannot be determined without further microeconomic analysis in the project area, which should be initiated as soon as possible.

RESOURCE CONSTRAINTS

Since 1974, the macroeconomic situation in Zaire has deteriorated steadily. This has been due to a number of factors, including declining terms of trade, reduced productive capacity (caused partly by a precipitous Zairianization program), and an overambitious public sector development program. As production and export earnings declined, the GOZ adopted

practices that led to increased budgetary and balance of payments deficits and very rapid inflation. Since 1975, inflation has averaged close to 75 percent per year. In 1978, the volume of exports was 10 percent lower than in 1974, but because of declining terms of trade the volume of imports was 50 percent lower than in 1974. This has led not only to shortages of imported finished products, but also to sharp reductions in domestic industrial production because of the lack of raw materials and intermediate goods. Rapid inflation has also greatly reduced the resources available for investment, which has also contributed to the decline in productive capacity.

Effects on PNS

The overall situation has had a serious impact on the implementation of the North Shaba Project and on the achievement of project objectives. The project components (subsystems) most directly affected have been Infrastructure and Marketing and Credit. In Infrastructure, the most critical shortages have been those affecting cement and fuel. These have led to large shortfalls in the number of bridges built and kilometers of secondary roads reconstructed. There have also been long delays in the construction of facilities that are critical to the work of the Research and Extension subsystem. Extension activities in that subsystem have also been hampered by a lack of fuel for vehicles and motorcycles.



Perhaps the most serious impact of commodity shortages is on marketing activities in the PNS project area. It is becoming increasingly difficult for traders to obtain trucks, spare parts, fuel, and sacks, and when these items are available it is usually from illegal sources at very high prices. Only those few large traders with access to scarce items can operate, and as a result the marketing system is less efficient and competitive than it would otherwise be.

At the present time, important efforts are being made at the national level to improve Zaire's economic performance. The International Monetary Fund (IMF) is providing badly needed balance of payments support, but has insisted that the GOZ undertake several major economic stabilization measures. These include devaluation of the zaire, reduced budget deficits, no increases in real wages and strict import controls. The overall effect of these measures is intended to be deflationary, and in the short run, can be expected to have a depressing effect on economic activity. In addition, the GOZ has temporarily reversed its Zairianization policy and is seeking expatriate expertise in the industrial sector.

Based on past experience, it is doubtful that the GOZ can live up to its commitments to the IMF, but even if it does, it will be a long time before a beneficial impact will be felt in North Shaba. The continuation of commodity shortages not only means that the implementation problems described above will

continue, but also that the long-term development impact of PNS will be reduced. Specific problems directly attributable to the inability of the Zaire economy to produce and deliver necessary equipment and commodities to the project include:

- Maize production increases will be limited by the shortage of agricultural inputs, as well as by the reduced efficiency of PNS efforts to develop and disseminate new technologies;
- The lack of trucks, spare parts, fuel and sacks will greatly increase the costs of marketing maize in North Shaba, which will reduce the price that could be offered to the farmer as well as reduce competition among traders who enter the market;
- The shortage of equipment, spare parts and fuel for road maintenance makes it unlikely that primary and secondary routes will be maintained adequately. This assures that the cost of transporting maize over poor roads will remain high, and that elements of the rural population will have only limited access to markets. A related problem concerns the railroad (SNCZ), which provides the only means of transporting maize to South Shaba and Kasai Oriental. Foreign exchange shortages and low profits have resulted in a steady deterioration of rail services, which almost certainly will get worse. This could potentially cut off North Shaba from the main maize deficit areas, thus assuring continued dependence of those areas on imported maize; and
- The Intermediate Technology subsystem, which is highly visible and is considered to be one of the more successful components of the project to date, would probably not be sustainable financially, in its present form, over the long-term. The critical constraints would be the lack of fuel to provide power on a regular basis and the lack of raw materials which would then have to be imported.

The overall effect of the above problems will be to reduce the long-term development impact of PNS. In the absence of macroeconomic constraints, the production impact of project

interventions would be determined by the soundness of project design and the effectiveness of project implementation. The existence of these constraints means that, for reasons beyond the control of the project, production increases will be smaller than they could be and progress will be considerably slower. More importantly, benefit growth and spread effects will be constrained after the project itself has terminated.

Budgetary Constraints

An aspect of macroeconomic conditions in Zaire that requires special comment is the GOZ's budgetary situation. Since 1974, the GOZ has faced increasing difficulties in funding both its recurrent and investment budgets. Some expenditures have had to be cut back, but in general, the GOZ policy has been to minimize expenditure cuts by resorting to inflationary borrowing from the Central Bank of Zaire. Under the current IMF standby agreement, expenditures are limited to levels approved by the IMF. Within these overall financial constraints, the agriculture sector has relatively low priority. In recent years, agriculture has accounted for two percent of the recurrent budget and seven percent of the investment budget. Of the amounts allocated, only a small proportion has been directed to small farmer production activities. During periods of retrenchment, cuts tend to occur in the investment budget, which means that development programs that are not yet fully integrated into the DOA budget are the first to be affected.

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Overall, the relatively low priority given to small farmer agriculture means that projects such as PNS tend to be underfunded and understaffed by the GOZ. The possible shortage of funds for recurrent costs has the following implications for this project:

- The Research and Extension subsystem must be adequately funded if improved technologies are to be developed and disseminated. This not only means that a sufficient number of qualified technicians should be assigned to the project, but they must be supplied with proper facilities and means of transport, including vehicles, fuel and travel expenses;
- Unless Office des Routes (OR) has an adequate budget, road maintenance will continue to be unsatisfactory with the result that marketing services will not be available in some parts of the project area, and in general will be high in cost and inefficient;
- The nature of this project's Intermediate Technology component is such that GOZ subsidies will be required on a continuing basis. The production of IT equipment is intended to be self-financing, but any significant research and development effort to identify and adapt new tools would be too costly to be supported by profits from production.

Under even the most optimistic assumptions regarding improvements in the GOZ budgetary situation, financial support will continue to be a long-term problem for projects such as PNS. As in the case of the resource constraints discussed above, the major implication for the project is that its long-term effectiveness and development impact will not be as great as they would otherwise be. Increased priority to small farmer production would help, but it should be recognized that the

GOZ budgetary constraints stem directly from the overall economic situation in Zaire, which will not improve greatly in the foreseeable future. The more specific and shorter-term problem of GOZ support during the life of PNS is a more manageable one, and is discussed in greater detail in Chapter Three.

POLICY IMPLICATIONS

Recommended Policy Changes

It should be recognized that the constraints and policy issues discussed above are outside the scope of the project per se, and constitute parameters within which the project must operate. Further, very few of the constraints can be completely eliminated, so that any changes in policy would lead to a relaxing of parameters rather than their complete removal. Nevertheless, there are policy measures that can be taken in the agricultural sector, and with respect to national economic priorities, that could significantly increase the long-term development impact of this project.

In agriculture, the recommended policy measures include the following. An analysis of demand for agricultural products in eastern Zaire indicates that maize has the highest demand and provides the best prospects for increasing rural incomes in North Shaba. It is therefore recommended that even if the project purpose is broadened to encompass all agricultural production

and marketing, maize should remain the main focus of research, extension and marketing efforts. This should be clearly reflected in the project design and in the establishment of priorities for project activities.

For the project to have its maximum impact, it should be part of a long-term comprehensive effort to reduce the maize deficit in Shaba and Kasai Oriental. This effort should address all constraints to increasing supplies of maize flour at the consumer level, including technology development and dissemination, institutional and infrastructural development for the provision of agricultural inputs and the marketing of maize, and policy changes needed to provide proper economic incentives for maize production, marketing and milling. Such a program would be the most effective way of addressing the constraints identified in the previous section.

In the absence of a comprehensive maize production program, the pricing policy in Shaba should be reoriented towards encouraging increased production instead of minimizing official consumer prices. This would involve:

- A commitment to keep official prices high enough to assure adequate incentives for the farmer and adequate margins for traders and millers. This will result in increased supplies in South Shaba at an official price that is higher than under the existing policy, but considerably lower than the open market price being paid by most of the consumers who are not supplied by MINOKA:
- Setting the producer price before the start of the growing season instead of at harvest time. This would greatly increase the impact of price policy on production decisions by farmers;

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- Setting a minimum producer price rather than a fixed ceiling price. This would provide a further incentive to production by keeping open the possibility of price increases should market conditions change; and
- Although it appears that demand in South Shaba and Kasai Oriental can easily absorb increased production from North Shaba for the foreseeable future, it should be recognized that most of the demand in South Shaba will continue to be met by imports. The GOZ should be prepared to instruct MINOKA to purchase local grain if and when such a step becomes necessary to absorb production increases.

At the overall economic level, the obvious long-term need is for the GOZ to adopt responsible macroeconomic policies, including a realistic exchange rate and sound, noninflationary fiscal and monetary policies. In the absence of determined steps to stabilize the Zairian economy, the commodity and resource constraints that have plagued PNS and most other development projects in Zaire will continue unabated. It should be recognized, however, that Zaire's economic problems are so serious and deep-seated that even with the most determined efforts, few desirable improvements at the level of individual projects can be expected in the short run. Under these circumstances, the key policy requirement from the standpoint of PNS is for the GOZ to increase the priority of small farmer food production, and more specifically, of small farmer maize production in North Shaba. Specific steps that could be taken as part of a policy shift include:

- Increased priority to small farmer production activities in the allocation of foreign exchange and domestically produced goods that are

in short supply. This would help assure increased supplies of agricultural inputs; vehicles, spare parts and fuel for marketing; and equipment and goods needed for technology development and dissemination;

- Increased priority for small farmer production in budget allocations (The specific issue of funds allocated to PNS is discussed in Chapter Three);
- Higher priority for road transportation in rural areas. This includes budgetary allocations, improved access to equipment, materials and fuels, and priority given to establishing sustained sources of financing to meet the recurrent costs of road maintenance (earmarked taxes, generation of local resources, contribution of local labor);
- Exploration of possibilities of producing goods needed for agricultural production and marketing in areas close to where they are needed. This would help reduce dependence on supplies from abroad or from distant urban areas;
- With respect specifically to maize production in Shaba, increased priority to North Shaba in the allocation of cement, trucks, spare parts, fuel and sacks. The justification for taking this policy measure is that a successful program to increase maize production would directly address Zaire's serious balance of payments problem by reducing food import requirements; and
- Investment and allocation of foreign exchange for North Shaba maize production by GECAMINES, which is already investing in mechanized farming in South Shaba. Investments in North Shaba would have the same possibilities for saving foreign exchange and would have a much greater rural development impact.

Prospects for Change

The policy measures recommended above must be considered by the GOZ in the context of many other economic, social and political priorities. Steps of this kind are never easy for any government, and are rarely taken without strong political

reasons for doing so. It does not appear that those reasons exist yet in Zaire. Under these circumstances, probably the most that could be hoped for -- and even this seems unlikely at present -- would be that the GOZ and Shaba regional authorities could be induced to increase the producer orientation of the pricing policy, as recommended on pg. 6 of this chapter. This possibility should be explored by USAID and the GOZ at an early date. Further into the future, the start of the World Bank-financed Kasai Oriental project could provide the occasion for USAID and the World Bank to discuss an overall program of maize import substitution for Shaba and the Kasais.

Whether or not the recommended measures are taken has important implications for the long-term impact of PNS on maize production. The project can achieve production increases in the absence of policy reform (some increases have already occurred). But progress will continue to be slow and difficult. Farmer and trader profits will be kept marginal in an attempt to favor consumers in South Shaba. At the same time, the marketing system will continue to be high in cost and inefficient. In the long term, as new agricultural inputs begin to be introduced into local farming systems, production will be constrained by shortages and untimely deliveries. The combined effect will then be to reduce the production response to project interventions.

If policy changes were made and macroeconomic problems were addressed, the result would be a more rapid and greater

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increase in maize production and farmer incomes than is possible under present conditions. This means that with the same amount of resources and effort -- in the form of inputs to the project -- much greater and more sustainable development benefits could be achieved. All parties concerned (specifically the GOZ, AID, and DAI/MM), will have to accept that in the absence of policy changes progress will be frustratingly slow and will never measure up to the original expectations stated in the Project or the expectations of outside observers.

It should be noted that the macroeconomic situation could be worse, and there is the possibility that it might become so. If present IMF and GOZ efforts to stabilize the economy are unsuccessful, and there is no improvement in overall economic policies, balance of payments problems could worsen, budgetary deficits would increase and runaway inflation would continue. Under such conditions price policies could become even less favorable to the producer and the marketing system, including transport, would face increasing constraints and would become increasingly unable to perform its functions. In such a situation, macroeconomic constraints would in fact make it impossible for the project to achieve its basic objectives, and the desirability of its continuation would have to be reassessed.

CHAPTER THREE

GOZ SUPPORT TO PROJECT NORTH SHABA

This section examines the status of GOZ support to Project North Shaba, in terms of finance and personnel, and its effects on the implementation of the project to date. Recommendations are presented for improving support mechanisms within the parameters described in Chapter Two, where it was shown that Zaire's macroeconomic situation is likely to remain very poor over the remaining life of the project.

FINANCIAL SUPPORT

The inability of the GOZ to fulfill its financial commitments to PNS has had serious consequences for implementation of project activities and the achievement of project objectives. When the project was initiated, it was agreed that all local costs would be assumed by the GOZ, either from the Investment Budget (B.I.) or from Counterpart Funds (C.F.) Estimated requirements of GOZ funds for local costs were included in the original Project Paper, but because of rapid inflation these estimates are no longer relevant. The most useful approach to analyzing GOZ funding shortfalls and their impact on the project is to compare estimated requirements prepared by PNS each year against actual receipts. This comparison is shown below:

	<u>Required</u>	<u>Received</u>
1977	B.I. £ 1,500,000	£ 1,300,000
	C.F. 352,000	352,000
1978	B.I. 930,000	-0-
1979	B.I. 1,200,000	930,000 (4/79)
	C.F. 1,500,000	500,000 (4/79)
Total through 12/31/79:		
	B.I. 3,430,000	2,230,000
	C.F. 1,852,000	852,000

As can be seen, the initial funds provided in 1977 had to carry the project until April of 1979. At that time the 1978 B.I. contribution was received one year late, as well as the first £ 500,000 transfer of 1979 C.F. These funds were used to pay unpaid bills from 1978 and cover part of the expenses for 1979.

The most critical funding period for the project came in late 1979. By September, PNS had built up the work force to 944 in expectation of receipts from the GOZ of £ 1,000,000 from B.I. and the remaining £ 1,000,000 from 1979 C.F. When these funds were not received, PNS began laying off personnel, mostly in the infrastructure subsystem. At the same time, payments such as medical expenses, travel expenses and salary supplements for field work were eliminated. In late December the situation was complicated by the demonetization decree which left all banks short of cash. The result was that project salaries were not

paid in December and January. By the end of January, the PNS workforce was down to 300 and infrastructure activity had come to a virtual halt.

The situation did not improve until the end of March 1980, when £ 1,000,000 from the 1979 C.F. commitment was received. On May 1, an additional £ 1,500,000 was received from 1980 C.F., and in late May another £ 1,000,000 was received from the 1978 B.I. commitment. These funds have been used to pay bills from 1979 and are meeting current 1980 expenses.

This series of events had a very serious impact on project activities, especially infrastructure. Road and bridge construction fell far behind schedule and road construction is just now beginning to recover. In the case of the bridges, construction had been hampered by lack of cement since the start of the project and just when cement became available funds ran out. Now that funds are available again, cement is not. This has affected not only bridges, but also facilities needed by the Research Extension subsystem. Thus, a whole series of project activities has been set back which is critical to the overall effectiveness and impact of the project. Further, the uncertainty of funding is preventing the project from gearing up to full capacity, because PNS is unwilling to risk the disruptions of lay-offs and unpaid salaries that occurred last year.

Less visible but equally important was the impact on staff efficiency and morale. First, the lack of funds meant that

project staff had greatly reduced means of transport, and even if they had the means, they would not have been reimbursed for travel expenses. This meant that for all practical purposes the staffs of the R and E and Farmer Group Development subsystems were restricted to their offices and were unable to maintain direct contact with farmers. Second, with salaries being paid late, and discontinued payments of medical expenses and of salary supplements for certain types of field work, morale declined noticeably. These benefits were reinstated on June 1, but the threat of this sort of thing happening again is not conducive to increased efforts by project staff.

Although the existing funding situation is satisfactory, the causes of the problems that have occurred over the past two years remain. As discussed in Chapter Two, the GOZ financial situation is not likely to improve significantly in the near term. Also, even when funds are available the process for approval and disbursement is extremely disorganized and inefficient. Funds are rarely disbursed without special efforts, including trips to Kinshasa by project staff and interventions by the USAID Director or the U.S. Ambassador.

At the present time, 1980 GOZ allocations of zaires for PNS are \$ 1,200,000 from the Recurrent Budget (B.O.) and \$ 2,200,000 from C.F. So far \$ 1,000,000 has been received from C.F. and nothing from B.O., and there is no indication of when additional funds will be forthcoming. The B.O., for instance,

is especially short of funds this year because of IMF restrictions on expenditures. Priorities are being set by the GOZ and it is not clear how PNS will fare in the exercise. The situation is complicated by the impact of rapid inflation on project costs, and by the need to allocate zaires for the purchase of fuel that should have been funded with dollars. The latter problem is due to an administrative technicality that is presumably being straightened out by AID and the GOZ in Kinshasa.

Obviously, unless steps are taken to improve GOZ financial support for this project, serious implementation problems will continue and important project targets will not be achieved. It is essential, therefore, that as part of the current exercise to revise the Project Paper, certain procedures be established to assure that adequate funds are received on a timely basis:

- AID and the GOZ should set up a joint working level committee which would meet quarterly to review the funding situation and initiate corrective action when necessary. The suggested membership for this committee is a representative from PNS/PMU, the USAID project manager and representatives from the GOZ Departments of Agriculture, Planning and Finance.
- In view of the likelihood of funding shortages in the B.O. and B.I., it is advisable to minimize the dependence of PNS on these sources of funds, at least during the next two years when implementation delays will remain critical to the eventual success of the project. One

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way to achieve this would be to finance salaries and fringe benefits out of B.O. and finance all other local costs out of C.F.

- In view of the likely shortage of funds in B.O., there should be a procedure for reverting to C.F. when shortfalls occur. Specifically, whenever contributions from B.O. are 30 days late arrangements should be made to automatically fill the gap from C.F. within the next 30 days. Ideally, C.F. would be reimbursed from B.O. as and when the GOZ found it possible to do so.
- Although AID is supposed to have considerable influence over how C.F. money is utilized, this has not resulted in timely disbursements to PNS. An improved system of allocating and disbursing counterpart funds is needed.

GOZ PROJECT PERSONNEL

The Project Paper did not specifically address the issue of whether the GOZ would be able to staff the project with sufficient numbers of qualified, experienced personnel. No direct comparisons were drawn between the organizational and administrative features of PNS, as designed, and those of other Department of Agriculture projects. A case was presented for creating a new structure for DOA operations within the project area, in the form of a Project Management Unit, since existing DOA staff were ineffectual and often incompetent or corrupt. But the technical and administrative skills needed by new personnel who would be brought in to staff the project were not identified as a feasibility issue.

The duration of staff assignments with PNS is now being recognized as a potential constraint to project implementation. The challenges and frustrations encountered in the initial years have provided a valuable learning experience, but several key Zairois staff have expressed the desire to move on to another assignment (in most cases, this would mean returning to Kinshasa). Just as expatriate staff have tended to regard three years as a maximum period for assignment in the project area, those Zairois staff with long-term career interests in the DOA and access to other positions share a similar perspective, for some of the same reasons (isolation, absence of urban amenities and cultural events, lack of contact with professional colleagues outside the project itself). Turnover has occurred at the top of three subsystems (Research & Extension, Farmer Group Development, Communications), though for different reasons in each case. Further changes can be anticipated over the next 6 to 12 months.

This pattern underscores the need for quality in the technical assistance being furnished by DAI/MM. As analyzed in Chapter Five, the effort to date has not been fully satisfactory in terms of advisory and training impact. With new Zairois personnel either coming in or moving up to assume responsibility for key project components, the responsibility for the expatriate team will be increased accordingly. The need is greatest in the Research & Extension subsystem, as Chapter Four demonstrates, but it applies to every member of the DAI/MM team.

Experience since 1977 has shown clearly that the rate and direction of project implementation have been heavily influenced by GOZ personnel inputs, with variable results among subsystems. Taken as a whole, the complement of staff furnished by the DOA has been young and inexperienced: even the subsystem chiefs, for the most part, had little or no prior field experience as technicians, let alone as mid-level managers in the roles required of them in PNS. Equally important, for almost every individual the concepts and development strategy expressed in the Project Paper were unfamiliar, and contrasted sharply with what they knew of DOA activities in other projects.

These factors, which became evident in 1977 when the DAI/MM team arrived, meant that considerable time had to be devoted to group discussion, at the subsystem chief level, of the philosophy and approach underlying the project design. Before each subsystem's activities could be initiated, this groundwork had to be completed and a joint reconnaissance of the project area had to be undertaken. The latter exercise served the purpose of exposing unseasoned Zairois staff to the rural environment (in some cases, virtually for the first time in the role of technicians with a job to carry out), and of aiding the selection of Agricultural Centers where village-level activities would be begun.

To some degree, the beneficial effects of this joint training process may have worn off with the passage of time. The

capacity for dialogue and mutual comprehension between personnel of different subsystems, which is a prerequisite for effective coordination in PNS, needs to be revitalized.

(Chapter Five deals with the role of the American advisory team in this effort). Nonetheless, the time spent in orientation did establish ground rules and a framework for cooperation that partially account for what PNS has accomplished to date.

In terms of technical skills, the staffing situation for PNS is unlikely to change: key personnel, at the subsystem chief level and below, will have to be trained on the job. The DOA has fewer skilled and experienced personnel at its disposal than the Project Paper anticipated, and is having difficulty retaining those it has due to salary freezes and the cancellation of benefits. Furthermore, assignments in Kinshasa remain the surest way to protect and advance one's career in the Department. By comparison, being posted to a remote project -- and PNS is located in Shaba, where a history of political unrest further reduces the desirability of an assignment -- can be seen as a setback. Specific evidence of this has been observed in PNS's inability to obtain vitally needed personnel for the Communications (Project Monitoring and Evaluation) subsystem from the Statistics Division of the DOA.

CHAPTER FOUR

AGRICULTURAL RESEARCH AND PRODUCTION

INTRODUCTION

The purpose of this section is to evaluate the agricultural research activities of Project North Shaba (PNS) and their actual or potential contributions to improved agricultural production. The mandate of the project and the Research and Extension subsystem (R and E) will be reviewed. The extent, quality and appropriateness of research activities to date will be assessed. The section will present recommendations for necessary reorientation of the research program and reorganization of research and extension activities.

PROJECT MANDATE

The project goal is to achieve food self-sufficiency in the project area, Shaba region and Zaire. A political-economic goal of the project is to supply South Shaba with surplus maize produced in North Shaba.

The purpose of this project is to identify an effective rural development process for improving small farmer production and income which is replicable in other parts of Zaire. The process by which this will

be accomplished builds on the current practices of farmers, with innovations being introduced only after they have been tested and proven on farmers' own land.¹

The Research and Extension subsystem of PNS is charged with the task of identifying improved agricultural practices, testing them and extending them to producers in the project area. The subsystem's objectives are to:

- Develop, test and introduce maize and other crop technologies tailored to the farming systems in the various localities;
- Recruit and train extension workers (Department of Agriculture and para-professionals) to provide timely and appropriate technical advice as appropriate technologies are developed; and
- Create a system that allows ongoing communication among extension workers and their trainers, the farmers of the project area, and researchers.²

STATUS OF PNS AGRICULTURAL RESEARCH

The Knowledge Base

As admitted in the Project Paper, virtually no systematic information was available to the project on existing farmer production practices at the time implementation began. The

¹ Project Paper, p. 64.

² Project Paper, p. 72.

original baseline survey proposed in the Project Paper was judged to be too politically sensitive and too closely identified with past history in Shaba Region to be a wise undertaking for PNS if it wished to establish an open and constructive dialogue with farmers. The Zaire Department of Agriculture is not involved in any systematic data collection within the Region, and its area and production estimates are of highly questionable value.

The soil survey programmed in the Project Paper was undertaken in April/May 1980, and the interpretation will only become available in July. The only attempt at classifying production environments has been a subjective assessment by farmers in the 37 Farm Centers (sites of current PNS extension activity) who have described their fields as being located in "savannah" or "forest." There is no documentation available in the project area on current production practices and resource (land, labor, capital) requirements. Some broad descriptions have been recorded, but with no indication of relative importance (size, distribution, inputs, outputs). There are no assessments of costs and returns to the various farmer production practices or of the relative competition between production activities. This lack of substantive, quantified knowledge concerning local production practices is paralleled within the R and E subsystem by a generally accepted assumption that such practices are inefficient and low-yielding.

Ongoing Research Activities

The current PNS research program has a dominant emphasis on improved maize production practices, with the primary innovation being the use of fertilizer. The motivations for this are the politically desirable objective of improving food supply to the southern areas of Shaba Region and the adopted strategy of the National Maize Program (PNM). The topics of agricultural research in Project North Shaba have been variety trials (maize, groundnuts), planting date (maize), mixed crops (maize, beans, rice), rotations (cotton, maize, manioc, groundnuts, sesame), land preparation (maize), fertilizer levels (maize) and diseases (maize). Although some effort has been directed to other crops, the testing has been unsystematic and only partially applied.

The PNS research program is organized on three levels. The first level of research is being executed currently on four trial stations: Ngaba (Mbulula), Kongolo, Nyunzu and Kilubi. These stations are also used as maize seed multiplication centers. The majority of the activity has occurred on the station at Ngaba. Serious delays in the arrival of equipment and in construction have impeded the full installation of the research program.

At the second level, diamond maize trials have been installed on demonstration fields in 16 Farm Centers (in 1978-79) and then in 18 Farm Centers (in 1979-80). Of hypothetically

eight treatments (2 varieties x 2 fertilizer levels x 2 cultural practices), only four are currently being applied to these demonstration fields. It should be noted that this particular maize diamond trial has not been pre-tested on the trial stations.

At the third level, a particular package of recommended practices is being promoted to farmers who, on the basis of demonstration fields, decide to apply certain improved techniques on their own fields (*champs d'encadrement*). This package includes the use of the improved seed variety (Kasai I), and the improved practices of row planting, increased density and more thorough weedings. On the one hand, there is no concrete evidence that the improved practices have been systematically applied, and on the other hand, such a package has not been tested on the trial stations for demonstration on the demonstration fields. Given that the application of the improved cultural practices cannot be substantiated, the only firm conclusion from past *champs d'encadrement* is that the use of the improved seed results in a 20% - 25% increase in yield over the local varieties (see Annex B).

Technical Package and Viability

To date, the research program consists primarily of attempts to prove the PNM/CIMMYT maize production package at the expense of testing any other production techniques or doing any concerted work on other crops. As demonstrated

in Annex B, much of the work has been piecemeal and unsystematic. What is applied on the farm is not part of the diamond trials, nor is it tested on the trial stations.

The currently recommended package includes an improved maize variety (Kasai I), early planting (September 15), row planting and increased density (75 cm x 50 cm x 2 plants), and no fertilizer applications. Although the nature of potential risks to farmers in adopting this package is known, no effort has been made to assess the tradeoffs between increased benefits and increased risks.

It is known that the variety Kasai I is vulnerable to yellow streak virus, but that early planting minimizes this risk. In promoting pure stand cropping, the project may be upsetting the traditional system for maintaining soil fertility. To recommend a shallow-rooted crop (maize) in savannah areas can potentially accelerate erosion. The entomologist consultant, Dr. Whitcomb, has also urged caution in disrupting the complex of current practices, noting that we still have little understanding of the current farming systems and their ability to control insects and diseases.

A FARMING SYSTEMS PERSPECTIVE

Variety of Existing Agricultural Production Systems

As acknowledged in the Project Paper and by DAI Agronomist Don Humpal, there is a wide range of existing production systems within the project area. At present, only a very general subjective typology of these systems exists. In order for PNS researchers to better understand the universe in which the results of research will be applied, the current subjective typology must be matched and verified with the forthcoming soil survey by Dr. Gamble, with the ERTS interpretations (soon to be available to the project), and with demographic data, to generate a usable set of classified production environments.

The research program should organize its on-station trials, field trials (i.e., "demonstration" fields), and on-farm trials (*champs d'encadrement*) to be representative of these specified production environments. A more accurate description of current cropping systems will permit more relevant adaptation of the research. It will be necessary to complement the technical typology of production environments with a substantive understanding of on-farm resource allocation (land, labor and capital).

With a well-defined matrix of production environments, it will be possible to identify a manageable number of farms for intensive data-gathering. The information which should be monitored will include family composition, areas planted with each

crop, input use (labor and purchased inputs) by activity and by crop, and yields by crop for each typology, on a farm-level basis.

With the typology of production environments and the monitoring of on-farm resource allocation, the research program will be in a position to identify production bottlenecks and suggest appropriate agricultural innovations to be tested and extended. This approach forms the foundation of an adaptive research program. Adaptive research presumes a need to understand the existing farming systems, out of which a research agenda can be identified, tested and analyzed.

An Adaptive Research Program

In order to reorient the current agricultural research program and adapt it to farm systems in the project area, the current three-level organization should be maintained. The geographical placement of these three levels should reflect the specified typology of production environments. On-farm resource allocation should be monitored and production bottlenecks identified. Research topics should include a complex of crops, including but not limited to maize, and a complex of technical practices including but not limited to fertilizer.

Such a research program can potentially mushroom to unmanageable proportions. With careful stratification, precise and constrained sampling techniques, and religious respect for

data-gathering methods, it is more than feasible to keep a program of this kind within the capacity of PNS personnel and resources.

Possible Output

The challenge to the PNS research program is to generate recommendations which are responsive to farmers' needs. The selective adoption of the PNM maize package to date demonstrates clearly that farmers are evaluating each element of the package and are using those techniques which respond to the conditions in which they work.

Data currently generated within the project are published with no discussion of the methodology used, the problems encountered in data collection, manipulation of the raw data or analysis and interpretation of its implications. Information should be generated for the purpose of improving, planning and implementing project activities. In a practical sense, regular and conscientious record-keeping is a precondition, and interpretative analysis is indispensable.

For the next agricultural season (for which land-clearing begins in July), research site selection should reflect the production typology. The design of on-station work should be broadened. The diamond trials should be expanded to at least six treatments, and the monitoring of on-farm applications should be much more systematic.

Combined with the farm survey of resource allocation, the research results from past years and 1980-81 in particular will be used to better direct on-station design of research activities for subsequent years. The demonstration fields in some Farm Centers should be maintained beyond one year, in order to maintain a matrix of fields corresponding to the production typology. As other possible technical innovations are identified (not limited to maize), they can be field-tested and demonstrated on these fields. The monitoring of on-farm adoption should pay special attention to farmer modification of "recommended" practices.

MICROECONOMIC ANALYSIS

As an integral component of agricultural research, all technical recommendations should be subjected to a microeconomic analysis. Both in the design of research activities and as a final test before practices are recommended to farmers, economic parameters should be applied to the recommendation and to the predictable adjustments in the farming system made by adoption of the recommendation.

The information gathering activities spelled out in this redesign of the research program will provide the needed data base for such economic analysis. This data base also includes the very economic parameters farmers use to make their own

farm management decisions. The direction of economic analysis should go beyond straightforward cost and return assessments. The analysis should compare on-farm resource allocations of land, labor and capital to assess the relative competitive position of different crops and cropping techniques. Beyond its usefulness in designing and executing appropriate research, economic analysis and viability is an important indicator of the sustainability of agricultural innovations.

Implications for New Technologies

Agricultural technologies can be categorized as mechanical, biological and chemical technologies. A particular technology should be perceived as a tool and its use. An improved hand hoe or seed variety is not a technological innovation by itself, unless accompanied by a use for it. As an example, if the performance of a new maize seed variety is dependent on improved weeding, which competes with land preparation of cotton fields, the effect of a new mechanical technology on labor requirements for weeding will be critical to the successful adoption of the new seed.

One chemical technology important to PNS is the application of fertilizer. As discussed above, the research program should continue with a component of fertilizer trials. These trials should include the rates currently being recommended. Added to the technical assessments of fertilizer use should be an economic evaluation of the impact of fertilizer on farm

economics. (The report prepared in early 1980 by Cit. Otikeke of the National Fertilizer Program, PNE, is seriously deficient on this subject). A more serious problem is the reliability of supply and the determination of the price at which fertilizer should be sold when/if it is available. The relative competition between different crops and between fertilizer application on different crops will be strongly influenced by the pricing of fertilizer and farm-gate producer prices for different crops. Furthermore, with unreliable supply, the opportunity cost of not having access to fertilizer should figure in the design of both research and extension. As an example, if the performance of an improved variety is predicated on the availability of fertilizer, it may not be rational to promote such a fertilizer-dependent variety.

Using information generated by the project, together with macroeconomic data on fertilizer costs and supply potential, the project should initiate a systematic evaluation of the economic viability of using fertilizer in the project area. Its use does not appear to be an inarguable economic proposition, particularly given current input/output pricing policies of the GOZ and the unreliability of supply.

Production Credit

Agricultural credit, whether it be for production, processing or marketing, has not been a major issue in PNS so far. Recent events -- specifically, the development of USAID's 025

Marketing Loan -- indicate that in some areas this situation will change. In the area of production credit, PNS has been making in-kind crop loans for seed. It is foreseen that similar loans would be made for fertilizer, if technical and economic analysis led to it being recommended. This possibility raises certain logistical difficulties, both with input delivery on time, and with recuperation of loan repayments.

With the currently recommended technologies, it would appear that there is no substantial need for production credit, beyond seasonal crop loans. But the lack of an explicit understanding of production systems and on-farm economics makes such a conclusion tenuous at best.

The project needs to evaluate on-farm cash flow profiles, drawing on the information in conjunction with its research program. If the argument can be made for an expanded production credit program and/or with the beginning of the marketing loan (025), the question of an institutional capacity to administer such a program will have to be examined, and a suitable system designed and installed. (Chapter Five, discussing technical assistance, recommends that a Marketing Specialist be recruited to deal specifically with implementation of 025 within the project area and adjoining zones of the Tanganyika subregion).

If PNS is selected as the credit authority, major emphasis will have to be placed on a self-financing credit program and

on creating a viable institution to sustain such a program after the project itself terminates, e.g., an interlocking network of cooperatives.

CONCLUSION

This section has outlined the basic parameters of a more comprehensive, systematic and realistic adaptive research program for PNS. The details and organization will be worked out by PNS staff -- among whom the to-be-recruited American agronomist will be a key factor -- over the months of June-August, 1980. Annual planning exercises for each subsystem, which are underway as of this writing, offer the best opportunity for introducing the needed change of emphasis and elaboration of structure for the program.

The objective of agricultural research and extension in PNS should be to learn what productive activities exist currently, to identify production bottlenecks, to develop agricultural innovations which relieve those bottlenecks and to demonstrate their comparative advantages to farmers. The project has barely begun to address this broad set of objectives; while it is imperative that gaps in the program be filled promptly (i.e, in time to ensure more useful research during the 1980-81 year), it is equally important to establish thorough, careful analytical procedures that can be carried

out over a longer period. The outlines of the agricultural research program described in this section reflect both the urgency of the task and the reality of agricultural research -- namely, that it seldom produces dramatic results in one or two years, and should not be viewed as a source of rapid, simple solutions to production bottlenecks in established small farmer agricultural systems.

CHAPTER FIVE

TECHNICAL ASSISTANCE

TEAM LEADERSHIP

Much of what follows in this section of the evaluation hinges directly on the choice of a new chief of party (COP) to assume Ken Koehn's position on October 1, 1980. As this evaluation is written, a decision has not been made, although Koehn's prospective successor (Sargent) has participated in the evaluation. Without prejudging the decision either way, two points should be made regarding the COP's role in the project, to set the stage for a discussion of technical assistance requirements.

The first point concerns project management and the division of responsibilities within the Project Management Unit (PMU). While the contract holds DAI's chief of party accountable for the substantive content, direction and coordination of project activities, this is an impossible mandate unless that individual is largely free from day-to-day administrative and financial details. Leadership and guidance for the DAI/MM team, and through them, for their Zairian counterparts, pose enormous demands on the COP. Freedom from the day-to-day administrative tasks requires a willingness and competence

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on the part of the Project Director, a Zairian, and the Assistant Director for Administration and Finance, presently an American, in handling their respective tasks, based on an explicit division of labor within the PMU. Only in the past eight or nine months has an acceptable and formal working arrangement been clearly defined. The results have been positive, and are reflected both in the performance of the outgoing COP and in the existence of a functioning management system that can be handed over to his successor.

The second point concerns the management and use of information in a project which has not yet generated analytical results (or even descriptive reports) on a par with expectations. The new COP will have to focus his attention on this problem, and a strong background in agricultural economics will be indispensable. Formal, structured uses and presentations of data are needed to integrate a project that presently suffers from conflicting interpretations of data that are either intuitive and impressionistic, or statistically inadequate. The project has become far too big, and is presently burdened with too many problems of internal coordination, to be managed through informal systems alone. While some progress has been made -- e.g., with production estimates for 1979-80 as compared with those for 1978-79 -- the process must be greatly accelerated by the new COP.

TEAM COMPOSITION

The Project Paper called for a four-person team from the prime contractor, with four other positions in the Infrastructure subsystem to be filled through a subcontract or directly by AID through personal contracts. The prime contractor's team was to consist of:

- A Deputy Project Director with a strong background in project management, agricultural economics and data collection and analysis, who would serve as COP;
- An Assistant Director for Administration and Finance, with a background in accounting and an M.B.A.;
- An Agronomist with a small farmer orientation and experience in directing extension programs; and
- A Rural Development Specialist with economic training and experience in marketing and co-operative development.

All four individuals were expected to be fluent in French, with additional competence in Swahili considered highly desirable. The Rural Development Specialist was to be based in Nyunzu, 188 km by road from Kongolo, the project headquarters, and the Agronomist at Mbulula, 66 km away. It was assumed that all four would be at their posts and fully equipped to begin work by the spring of 1977.

Experience during implementation has contradicted almost all of the assumptions made in the Project Paper regarding technical assistance. Most key personnel were not fully

established in the project area until January 1978, and the Agronomist slot was not filled until June 1978. By that time, USAID and DAI had added three positions to the contract team:

- A Project Support Officer in Kinshasa to handle logistical demands far beyond the capacity of USAID (filled in June 1977);
- A Pilot/Mechanic to fly and maintain a single-engine plane purchased with counterpart funds for project use (staffed in May 1978); and
- A position for a Women's Rural Development Specialist (filled for six months in 1977-78, and vacant since then except for several TDY personnel).

While the original plan called for each DAI advisor to divide time between several subsystems, team roles have evolved towards more specific one-to-one counterpart assistance. Two subsystems which lacked intensive technical guidance were Marketing and Credit and Communications (the information system). A joint advisory position for the two was created and filled in late 1979. A Peace Corps volunteer assigned to Intermediate Technology from 1977-79 returned for a second tour (through November 1981) as advisor to that subsystem's chief. These two additions brought the DAI team to nine (with the Women's RDS position vacant), and the full American team to 13, counting four MM personnel assigned to Infrastructure.

The technical assistance team serving since the start of PNS has been resilient and adept at coping with potentially devastating setbacks. A functioning project exists where many

people had predicted that nothing could ever be accomplished. However, in certain types of technical skills, and in the capacity for knowledge transfer, the team has had obvious limitations. The main problem areas can be summarized as follows:

- The team has been deficient in the agricultural expertise needed for a sound research program;
- Skills in economic analysis have been lacking, until the recent recruitment of a Marketing/Information advisor with limited experience; and
- The Infrastructure subsystem has operated without a senior, qualified American engineer on site in the first three years.

The effect of these shortfalls has been compounded by the inexperience of PNS' Zairian staff, and by inadequate attention to the training function for which each American is responsible in the project. The views of Zairian staff on this subject are consistent from one subsystem to another, i.e., they feel that they have received little specific, structured, on-the-job training. Disappointment runs deep with some who believe they lost the chance for overseas training while being retained in a project where they have had to fend for themselves, rather than receiving intensive, high-quality technical assistance.

The project is badly in need of specialized skills from the American personnel who will work in it over the next three years. Agronomy, economics and engineering have been cited as critical skill areas -- with the first posing both the greatest needs and the greatest difficulties in recruitment. But the

conseiller role (and each individual's willingness to act in this role) is equally essential. It is the only real justification for sustaining a large American team in the project.

TEAM DEVELOPMENT

Because of the diverse personalities and backgrounds that individual technicians bring to a project, the building of a team, in the true sense of the word, can be a formidable task. With the first generation of DAI/MM personnel working in PNS, conflicting personal styles and agendas interfered with communication. Few had any interest in discussing the broad developmental issues which the project was designed to address, and many were skeptical of each other's competence, motivation and usefulness to the project. There is no doubt that the isolation of the project area and the conditions of stress and uncertainty resulting from external events (the Second Shaba war, the 1979 flood of the Lualaba River, shortages of fuel and/or materials) had further negative effects on team interaction.

These problems are not unique to Project North Shaba, of course, nor does this mean that team members never cooperated in carrying out their work. But the costs of pronounced individualism on a technical assistance team are especially high in an integrated project such as PNS. There were two serious consequences:

- The efforts of DAI/MM staff were not well coordinated, with the result that subsystem interdependencies remained weak; and
- Zairian staff received conflicting signals and did not always know what instructions they should follow.

The latter problem was aggravated when individuals on the DAI/MM team publicly criticized one another. Given that the Zairian staff had their own territorial concerns (subsystem vs subsystem) and problems of mutual distrust and lack of confidence, and that many of them were struggling with new and unfamiliar responsibilities, the perceived lack of solidarity among the Americans made work considerably more difficult.

The changeover in DAI/MM personnel that will occur during 1980 does not automatically ensure that a more cohesive team will emerge. Even with new individuals who are "team players" by nature, a collaborative approach will require time and conscious effort, especially from the new COP. A continuing dialogue will be needed about project objectives, the methods used to reach them, and the tradeoffs involved in each decision that is made along the way. But the potential leverage for drawing the DAI/MM team together is greater now than at any time since the project was started.

RECRUITMENT STRATEGY

Hindsight indicates how unrealistic the Project Paper was in specifying personnel requirements for PNS and in assuming that an ample supply of multi-lingual, multi-talented technicians was available and willing to work in eastern Zaire. The drawbacks of the project's location loom even larger now than they did four years ago. The expansion of team size calls for greater specialization in certain positions than was originally foreseen: in theory, it should allow for seasoned individuals with proven skills, overseas experience, and a facility for languages, without spreading any one advisor too thinly across several different jobs.

But we also know that ideal candidates for the demanding jobs in PNS seldom appear exactly when they are needed. Often the choice appears to rest between the "well-travelled resume" and a young candidate who is an unknown quantity, when the preference is for someone with a small number of field assignments under his belt, in the 35-45 age range, who simply cannot be found. Why not? Family responsibilities, particularly children's education, may rule out a posting in Kongolo; or such a person may have determined that the time has come to get out of overseas development work altogether.

To make up for time lost in implementation delays and inadequate work in agricultural research and extension, PNS has a much greater need for specialists at this point than for

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generalists. The changing technical assistance requirements as the project evolved were not anticipated in the Project Paper. For that matter, the phasing of different combinations of skills over a project's life cycle has been virtually ignored in the development literature. (Perhaps PNS, because of its unusually long duration, offers the best example of how important such phasing can be, and will serve to illuminate this subject).

Can the specialists be found? The signs are fairly hopeful on most fronts, with the gravest doubts hanging over the Agronomist position. French (or a capacity to learn it rapidly) is essential for knowledge transfer; solid agronomic credentials are essential for influence and credibility with the Zairian staff; and a concern for small farmer production behavior is essential for a sensible adaptive research program -- now so obviously lacking. The need for a sustained, high-quality effort over three years (through September 1983) argues for care and thoroughness in selection, rather than a rapid decision on the first plausible person who volunteers for the job.¹

Recruitment for the RDS positions appears less difficult, although the likelihood of placing a husband/wife team is lower than that of identifying two separate individuals. The Men's RDS slot can probably be filled first, and delay should be

¹ An agronomist carried out a six-week TDY assignment with PNS in September-November 1980, and returned to the U.S. for language training prior to permanent assignment in North Shaba.

minimized due to the departure of the original RDS (Grosz) and the Zairian chief of the Farmer Group Development subsystem (Bonani).¹ The Women's RDS position will require a person with practical (as opposed to solely academic) experience; to date, research priorities have been emphasized by TDY personnel without giving Zairian women in the Farmer Group Development subsystem anything concrete with which to work.

Longer lead time is available in recruiting a full-time advisor for the Marketing and Credit subsystem: a two-year position as advisor to the subsystem can only be justified when USAID's 025 marketing loan becomes operational. The 48 grain trucks provided under the loan may not arrive in North Shaba until late in the 1981 marketing campaign. Thus a tour from mid-1981 to mid-1983 seems appropriate. In the meantime, the advisor now concentrating on Information (Gold) can continue assistance to the subsystem in the area of data collection and analysis.

MM's recruitment efforts for the two Infrastructure positions being vacated in August 1980 are proceeding, with a qualified civil engineer from the home office now slated to fill the senior position. Both new individuals must be prepared to apply themselves to learning French, and PNS must recruit a full-time language instructor (French and Swahili) to be on site in Kongolo by August.

¹ This position was filled in October 1980.

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Taken as a whole, DAI/MM will have a young team working in PNS over the next three years. There will be obvious limitations because individuals will be short on experience, and their decisions and advice will reflect this. But motivation, language skills and a commitment to training counterparts can outweigh these limitations, provided that project activities are integrated, giving structure to each technician's assignment. To be truly effective, the team must be anchored by three key personnel whose inputs are crucial to the project: the chief of party, the agronomist and the senior engineer who will coordinate Infrastructure activities.

SHORT-TERM ASSISTANCE

To date, the project has received a large amount of TDY assistance, which has been highly variable in its quality and impact. Three types of TDY inputs can be distinguished:

- Potential candidates for long-term positions on the team, who spent four to six weeks with the project;
- Specific problem-oriented assistance on technical issues affecting one or more subsystems; and
- Visits by DAI and MM home office representatives to assist with project management, in general, and with the Information (DAI) and Infrastructure (MM) subsystems in particular.

A candid assessment of the experience to date leads to several conclusions. The first category of TDY has served as

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a useful testing mechanism for personnel, though it did not generate a "product" (i.e., a document subsequently used by PNS staff) from the individuals concerned. Where major uncertainties about a long-term assignment exist on the part of the individual, the PMU, or both, this TDY mechanism is worth the time and expense. But experience indicates that it should not be used unless the chances of a successful long-term placement are substantially greater than 50 percent.

The second category of TDY has not been utilized to its full potential, nor as early in the implementation process as it should have been, although the "products" do exist and can serve as the basis for future work. (See the reports by Humpal, Whitcomb, Lockhart, Gamble and Lindblad -- although the last of these is technically the least sound.) The chief problem lay with DAI's (recently departed) agronomist who resisted outside assistance, and with certain Zairian staff in the Research and Extension subsystem. Professional insecurity and a distrust of outside "experts" diluted the impact of this assistance -- indeed, it had to be imposed on the subsystem by the PMU, with firm pressure from DAI.

Specialist TDY inputs are very expensive: an individual consultant's salary, expenses, materials for work, etc. can easily exceed \$10,000 per month. Are they worth continuing? The answer is yes, provided that the long-term DAI/MM technicians are both capable of sensitizing their Zairian counterparts to the value of such assistance, and of translating the

results into a program that the staff can implement. The need remains greatest in the Research and Extension subsystem. At a minimum, the recent work in soils, entomology and plant pathology should be financed to completion. Undoubtedly, though, further TDY inputs will be identified over the next two or three years, and these should be budgeted in the Project Paper revision.

The third category, involving DAI and MM home office personnel on a periodic basis, has proven useful in crisis management (especially in PNS' first 12 months), in strengthening field/home office dialogue (though this remains suboptimal), in sustaining team morale, and in providing an overview to those deeply immersed in implementation problems. There are lessons, too, in what this type of TDY has not been able to accomplish, specifically for two subsystems:

- TDY assistance to the Information subsystem (by Barclay) was a poor substitute for ongoing, intensive work by an advisor who should have been recruited at the start; and
- Periodic management assistance to Infrastructure (by Morrison) could not bring about sustained improvements in the day-to-day operations of the subsystem.

The technical assistance strategy for the remaining years of PNS reflects these conclusions, insofar as a large long-term team is programmed, with emphasis given to areas that have been weak. Continuing home office involvement through TDYs is an important component of the strategy. Given the heavy

turnover in personnel occurring this year, the future availability of Koehn, as a permanent DAI staff member, will be a major resource for the team that carries on the project.

LOGISTICAL SUPPORT

It is not possible to deal with this subject in great detail, but several recommendations are presented based on observations and discussions with team members.

First, the Kinshasa Project Support Office has proven to be crucial over the past three years by providing a capacity that neither USAID nor the GOZ Department of Agriculture has. Since mid-1979, the addition of a second project (INERA) to the work load, at USAID's request, has cut into the support PNS would otherwise have received. But beyond this extra responsibility, problems exist in the quality of support, the establishment and handling of priorities and the frequency of reporting to the field team, USAID and DAI/MM. These require (and will receive) the immediate attention of the COP on his forthcoming trip to Kinshasa, and followup when the ADAF returns from vacation in July. While supervision by remote control from Kongolo is difficult, the Project Support Officer (PSO) is not directly accountable to USAID -- he works for the PMU, and is ultimately responsible to the DAI chief of party.

Projected commodity requirements for PNS are substantial through at least mid-1982, indicating that the PSO position should be staffed for the next two years. Greater accountability, and hopefully better performance, can be obtained with the following measures:

- Immediately reinstating the end-of-month Kinshasa "Situation Reports" which were discontinued some time in 1979;
- Maintenance of a complete, detailed inventory of all equipment and supplies currently held in Matadi and/or Kinshasa, with hard copies sent to Kongolo every month and radio updates to provide the PMU with a basis for scheduling shipments by container or cargo flight;
- Immediately reinstating regular Procurement Status Reports from the DAI home office (currently irregular) to reach the PSO by telex before the end of each month; and
- On a quarterly basis, following the schedule for Project Technical Committee meetings (see Chapter Three), the COP or another member of the PMU should visit Kinshasa and review the performance of the PSO, giving assistance where needed.

Shortages of zaire funds have forced postponement of several cargo flights (as well as railroad shipments) during the past twelve months. It is strongly recommended that the 1980-83 PNS budget include dollar funding for at least eight DC-4 flights to Kindu (if not Kongolo), with flexibility in scheduling to fit the arrival of project commodities and the urgency of need as defined by the PMU. It is assumed that most, if not all, of these flights would be used by September 1982.

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The project's single engine plane has proven indispensable -- well beyond the expectations that led to its purchase in 1978. The existence of regular passenger service on Air Zaire between Kinshasa and Kindu, and presently at least, between Kongolo and Lubumbashi, limits the need for long-haul passenger runs in the Cessna 206. Within eastern Zaire, as originally foreseen, utilized at a level of 30-40 hours per month, the plane will be instrumental for project support through mid-1982. The present Pilot/Mechanic will return for one or two years following home leave; if he remains only one year, he will be replaced by a new person on a 12-month contract starting in mid-1981.

TIMETABLE FOR 1980-83

The accompanying chart shows the proposed timetable for long-term technical assistance over the next three years. By the final year (October 1982 through September 1983) the DAI/MM team will have been phased down to the following positions:

- Chief of party and Advisor to Project Director;
- Agronomist;
- Marketing Advisor (completion of 2-year assignment coordinated with the 025 USAID loan); and
- Equipment Maintenance Specialist providing assistance to OR and possibly developing maintenance programs for merchants involved in the 025 program.

Project Component	Title	9/80	9/81	9/82	9/83
PMU	COP/Advisor to P.D.	Three-year assignment thru 9/83.....			
	ADAF	Assignment ends 6/81*			
	Info System Advisor	Assignment ends 12/82.....			
	PSO/Kinshasa	Assignment ends 9/82.....			
	Pilot/Mechanic	Present P/M to 6/82.....			
Research & Extension	Agronomist	Three-year assignment thru 9/83.....			
Farmer Group Development	Men's RDS	Two-year assignment thru 9/82.....			
	Women's RDS	Two-year assignment thru 9/82.....			
Intermediate Technology	Advisor	Assignment ends 11/81.....			
Marketing & Credit	Advisor	Two-year assignment starting mid-1981...**			
Infra-structure	Coordinator	Two-year assignment thru 9/82.....			
	Equip. Mntc. Spec'st	Three-year assignment thru 9/83.....			
	Road Const. Spec'st	Assignment ends 9/82.....			
	Bridges/Bldg Spec'st	Assignment ends 9/82.....			

* Proposed extension through 6/82 under consideration by USAID and GOZ.

** Contingent on implementation of USAID Marketing Loan 025.

Using USAID's current rule of thumb for total costs per person-year, the addition of the 1982-83, with four technicians remaining with PNS for most or all of that year, will add about \$500,000 to the dollar budget for the project. In practice, however, costs per person-year with PNS have been considerably below USAID's norm, and the total cost of the additional year to the U.S. Government is likely to be well below \$1,000,000.

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CHAPTER SIX

SUMMARY OF FUNDINGS AND RECOMMENDATIONS

The findings and recommendations of this evaluation are presented in two sections: first, those pertaining to prospects for starting a self-sustaining rural development process in North Shaba; and second, those pertaining to implementation performance, emphasizing those elements of the project where changes are required.

PROSPECTS FOR DEVELOPMENT IN NORTH SHABA

Two central concerns in this evaluation were whether self-sustaining development is indeed possible in North Shaba, and whether the likely benefits from a major production project are worth the costs. The following findings relate to these two key issues.

The most positive aspect of this project is that it is located in an area of high agricultural potential. The soil conditions and climate, especially reliable rainfall, favor the introduction of improved, high-yielding technologies. Furthermore, the market for maize in South Shaba and Kasai Oriental is large enough to absorb any production increases

that are likely to be achieved in the next 10 years. At the present official exchange rate, North Shaba maize is slightly more expensive than imported maize; but if the open market exchange rate were used, North Shaba maize could easily compete with imports. Since maize is currently more remunerative than other crops and enjoys a larger market, it should continue to be the basis for any program to achieve self-sustaining development in the North Shaba area.

On the negative side, there are three constraints that will seriously limit the development impact this project can have in the short to medium term. These are:

- Macro-economic conditions in Zaire. Zaire's economic problems affect all development activity, especially small farmer production projects. All commodities are in short supply and the transport system to remote areas is deteriorating steadily. For North Shaba this means that certain inputs needed to increase small farmer productivity, such as fertilizer, cannot be obtained on a regular basis. Also, commodity shortages make maize marketing more expensive and limit the quantities that can be shipped to South Shaba. Trucks, spare parts, fuel and burlap bags are in chronic short supply, and the railway link between North and South Shaba urgently needs maintenance and repair. In short, even if a high-yielding new technology could be introduced to small farmers in North Shaba, widespread adoption would be limited by the lack of agricultural inputs and constraints on marketing.

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- GOZ Price policy. The achievement of increased maize production is hampered by GOZ pricing policy, which seeks to keep consumer prices as low as possible without completely discouraging domestic maize production. If prices were decontrolled and the zaire were devalued by 50 percent (which would be justified in terms of Zaire's balance of payments), producer prices in the North Shaba area would rise far above the present level. This would increase the profitability of maize production and provide incentives for on-farm investments and adoption of new farming practices needed to achieve large increases in production. Until producer prices are increased, farmers are likely to adopt only those new practices that involve a minimum of risk and a minimum of change in their farming systems.
- The low priority of small farmer agriculture. Introducing a new agricultural technology to large numbers of small farmers is difficult under any circumstances. It is made more difficult in Zaire by the low priority accorded to small farmers by the GOZ. Because scarce funds, commodities and skilled personnel are allocated primarily to heavy industry, heavy infrastructure and large-scale mechanized farming, it is especially difficult for small-farmer development efforts in remote areas to overcome the implementation problems common to all rural development programs and the macro-economic problems particular to Zaire.

Looking to the future, significant improvements in these conditions are unlikely. Zaire's economic problems are deep-rooted, and even if the GOZ were willing to take the steps necessary to solve them -- which it is not -- it would be years before there would be any discernible impact in the project area. The same applies to the GOZ's agricultural policies. Major policy changes such as a shift in priority

from large mechanized farms to smallholdings, or a reorientation of agricultural pricing policies from consumers to producers, are politically difficult and are usually taken only when there are no alternatives. This is not yet the case in Zaire.

The major implication of these findings is that regardless of how well the project meets its own immediate objectives, it cannot achieve a large increase in agricultural production and farmer incomes in the foreseeable future. In fact, in purely economic terms the benefits likely to be derived from this project during the next ten years are much below what would be needed to obtain a positive rate of return. Although this argues against a large-scale production-oriented project, the agricultural potential of the area and the needs of the rural population justify some type of development activity.

What is needed is a project that increases the ability of small farmers to maximize their production within existing constraints, and lays the groundwork for major increases in production should macro-economic conditions and government policies improve. Such a project is very similar to the one proposed in the original Project Paper, but without the ambitious production targets. Whatever development program is initiated should be designed to be as self-sufficient as possible, since very little sustained financial or manpower

support is likely to be forthcoming from the national government. This means that the interventions funded under this project should be limited to adaptive agricultural research with a farming systems perspective, including on-term trials, an extension program involving local farmers as much as possible, and a farmer organization activity to show the local population how to work together to market their goods, maintain their roads, obtain credit and perform other economic functions with a minimum of dependence on outside institutions. At the same time that a project of this kind is being implemented, USAID and other interested donors should put as much pressure as possible on the GOZ to make its agricultural policies more conducive to increased small farmer production. Such changes in policy would do more than anything else to get a self-sustaining development process started in North Shaba and other parts in Zaire.

IMPROVING PROJECT IMPLEMENTATION

Apart from the overall prospects for development in North Shaba, the evaluation identified shortcomings in project performance that must be addressed. First and foremost, serious deficiencies were noted in the agricultural research and extension subsystem, requiring a major shift in approach. Secondly, implementation problems were diagnosed, and solutions

proposed, in the area of technical assistance recruitment, the GOZ financial support systems, and methods for dealing with commodity shortages. These findings and recommendations are summarized below.

Agricultural Research and Extension

As of mid-1980, this subsystem was based almost exclusively on promotion of a technical package for maize production that was developed by the National Maize Program (PNM) and tested in other regions of the country. The research program was oriented toward demonstrating that the PNM package is superior to existing practices and should be accepted by small farmers in North Shaba, and the extension program disseminated the package at the farm level. This approach has two important shortcomings. First, very little attempt has been made to understand existing farming systems, and second, there is no systematic effort to adapt the PNM package to conditions in North Shaba. The result of the agricultural research and extension activities thus far is that farmers are accepting the improved maize variety but not the recommended practices. Plans are to continue promoting the full PNM package on the assumption that the only reason why the recommended practices not been accepted is that the farmers need more convincing.

This subsystem should have been implemented in stages, which was the approach advocated in the Project Paper. First,

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there should have been a baseline survey of existing farming systems to determine what farmers are doing and why. Second, there should have been a research program oriented towards the needs and possibilities in North Shaba. This means, for example, that instead of testing and demonstrating the PNM package in toto, the research staff should have conducted tests with and without fertilizer (which is not available), and with and without the second and third weedings, which farmers seem reluctant to accept. Also, there should have been a systematic program of field trials in both savannah and forest areas. The third stage should have been the extension of one or more packages of practices tested in the area and based on an understanding of existing systems.

In retrospect, it seems clear that the agriculture subsystem promised to do too much too soon. Given the lack of knowledge about farming systems in the project area and an agricultural staff that was not trained to do adaptive research, it was not feasible to achieve the planned production targets during the life of this project. The first three years should have been limited to farming systems research, institution-building and carefully monitored field trials. Had this been done, the project today would be much closer to having a significant and lasting impact on small farmer productivity and incomes throughout North Shaba. What needs to be done now is to recruit a production agronomist and an

agricultural economist and begin reorienting the Zairois agricultural staff. Much has been learned about what needs to be done in the project area, and most organizational arrangements have been put in place. This should greatly reduce the lead time before concrete results can be achieved. It must be emphasized, however, that unless this subsystem is reoriented and revitalized, the project will not succeed in achieving its objectives of increasing farmer incomes or in starting a self-sustaining development process.

Technical Assistance

A high quality of technical assistance is essential for the success of this project. This is because 1) there is presently almost no indigenous capacity in Zaire to carry out integrated small farmer production projects; and 2) the participatory approach to rural development on which this project is based requires careful planning, organization and continuous redesign during the early stages of implementation. DAI did remarkably well in finding personnel who were well motivated and able to adapt to difficult conditions. However, the team has been seriously deficient in certain technical skills and has suffered from a general inability to transfer knowledge to local personnel. The most critical staffing needs are:

- A production agronomist. It is no exaggeration to say that virtually no progress has been made in setting up an ongoing adaptive research and extension program for North Shaba. The existing program consists almost entirely of extension agents promoting the use of an improved maize variety, along with certain farming practices recommended by Zaire's National Maize Program. This activity represents a traditional top-down approach to extension and could have been (in fact was) carried out without any technical assistance from this project.
- An agricultural economist. What this project needed from the beginning was a farming systems-oriented agricultural economist, to gather baseline data and set up an information system to monitor the socio-economic and production impact of project interventions. These activities were not carried out systematically; as a result, the project has made almost no progress in identifying farm-level constraints to increased production. A junior agricultural economist was hired in late 1979. Because of his limited experience he will require strong supervision, preferably by the new Chief of Party.
- A senior engineer for the infrastructure subsystem. A qualified engineer with experience in developing countries would have provided the direction necessary to cope with many implementation problems faced by this subsystem, and would have upgraded the quality of knowledge transfer. The feeling of the Zairois staff in the subsystem is that they have learned very little from their U.S. advisors.

Overall, the quality of technical assistance provided has not been adequate to accomplish project objectives. An essential precondition to the continuation of PNS is that all of the team members should speak French; much greater attention

must also be given to Swahili, presently spoken only by two of the advisors to the infrastructure subsystem. It will be difficult to find new staff who meet all the criteria enumerated above, since North Shaba is an exceptionally difficult post to recruit for. But every attempt must be made to identify candidates capable of improving DAI/MM's technical assistance inputs, since the project has been adversely affected by weaknesses in the effort thus far.

GOZ Budgeting Efforts

Except for the initial disbursement of funds in 1977, GOZ funding of local costs has experienced continuous delays and shortfalls. The most critical period was in late 1979, when the project was fully staffed and ready for a major effort in road construction, and construction of facilities for the agricultural research and extension subsystem. The lack of funding from the GOZ caused large layoffs, halted the work of the infrastructure subsystem and effectively immobilized the agricultural extension and farmer group development staffs. Aside from tremendous disruptions at the time of the funding shortages, the lack of GOZ support results in long-lasting drops in morale and makes it impossible for the project to gear up to full capacity.

Unless this problem is resolved, the project will function at well below its full potential and its development impact will be reduced correspondingly. Since it is certain that the GOZ will continue to face stringent budgetary constraints, adequate financial support for the project will require continuous special efforts by the PNS management, the Ministry of Agriculture, USAID and at times the U.S. Embassy. Before a new Project Agreement is signed, the USAID Mission with assistance from the U.S. Embassy should negotiate new procedures for disbursing GOZ funds. Steps should also be taken to decrease the dependence of the project on the GOZ capital budget (Budget d'Investissement) and to increase the proportion of funding from Counterpart Funds, over which the U.S. has some control.

Commodity Shortages

The infrastructure subsystem has been seriously hampered by the lack of cement, fuel and spare parts. Commodity shortages have also had a significant adverse impact on marketing of agricultural crops. It is becoming increasingly difficult for traders to obtain trucks, spare parts, fuel and sacks. Only those few large traders with access to scarce commodities can operate, making the marketing system less efficient and competitive. As noted above, these shortages are attributable to deepseated macro-economic problems that

will not be solved in the foreseeable future. Consequently, it can be expected that project performance will continue to be adversely affected by the lack of key commodities. PNS management is coping in the best way it can, by utilizing all possible sources of supply and maintaining contacts with Government agencies in Lumumbashi and Kinshasa that are responsible for the allocation of critical commodities. Significant improvements are needed in the reporting function, however, especially at the Kinshasa Project Support Office, but also at DAI's home office, to keep PNS management better informed on the routine flow of commodities to North Shaba, and on arrangements for special orders and shipments.

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ANNEX A

NOTE ON THE ECONOMICS OF FERTILIZER USE
IN NORTH SHABA

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NOTE ON THE ECONOMICS OF FERTILIZER USE
IN NORTH SHABA

Attempts to assess the economics of fertilizer use in North Shaba are hampered by the side variations in the research results to date and the lack of experience with its use on farmers' fields. If the extremes are eliminated from 1979 demonstration trials, it appears that yields increase by 50 percent as a result of improved seeds and a further 100 percent increase is achieved when improved seeds are combined with modern practices and fertilizer. On farmers' fields it has been found that improved seeds increase yields by an average of 25 percent and there is no statistically significant impact from modern practices. This suggests that even when farmers accept modern practices they do not follow them rigorously. This has been confirmed over a period of several years in the FAO maize project in Kasai.

For purposes of calculating the economic returns to fertilizer on farmers' fields, the following assumptions are used:

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|----|---|-----------|
| 1. | Yields using traditional practices and local seeds: | 1.0MT/ha |
| 2. | Yields using traditional practices and improved seeds: | 1.25MT/ha |
| 3. | Yields using some modern practices and improved seeds: | 1.4MT/ha |
| 4. | Yields using some modern practices, improved seeds and fertilizers: | |
| | a) assuming 60 percent yield increase over (3) | 2.25MT/ha |
| | b) assuming 70 percent yield increase over (3) | 2.4MT/ha |

The 60 and 70 percent increases in yields attributable to fertilizers (rather than 100 percent as found on PNS demonstration fields) reflects (a) the fact that not all of the improved practices used in the demonstration fields will be accepted by farmers; and (b) farmers will not be as efficient in using

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fertilizers as DOA staff are on demonstration plots. The 70 percent increase in yields implies a production increase of 1 MT/ha. This increase has been obtained on farmers' fields under the FAO fertilizer program with close supervision from extension agents. For the purpose of projecting benefits from PNS, it would be reasonable to assume that yield increases of one metric ton/hectare or more would be obtained by farmers after five years of experience. The above yield assumptions are converted into farmer incomes using three alternative prices:

1. Official producer price in Shaba Z450/MT
2. The economic market price based on the cost of imports using an exchange rate of Z6 = \$1.00¹ Z800/MT
3. Kasai open market price assumed by the World Bank for its maize project Z1,000/MT

The results are shown below:

RETURNS TO FERTILIZER USE
(Zaires/ha)

	<u>Producer price/MT</u>		
	<u>Z450</u>	<u>Z800</u>	<u>Z1,000</u>
Production increase from the use of fertilizer:			
(850kg./ha)	383	680	850
(1000kg./ha)	450	800	1,000
Cost of fertilizer: 200kg./ha at Z1.5/kg. in col. 1 and shadow price of Z2.25/kg. in col. 2 and 3. ^a	300	450	450
Cost of additional labor: 40 days at Z0.80/day	32	32	32
Net return to fertilizer			
- Production response: 850/kg.	51	198	368
- Production response: 1000/kg.	118	318	518

^a The basis for the fertilizer produce price is: cost of fertilizer c.i.f. Natadi (\$250 x 6 = Z1,500) plus transport cost to Shaba (Z750) = Z2,250/MT or Z2.25/kg.

¹ The unofficial exchange rate in Zaire has recently increased to Z7 = \$1 but part of this is seasonal. It is assumed that later this summer the exchange rate will settle at Z6 = \$1.

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Past experiences with fertilizer programs indicate that small farmers are not likely to accept fertilizers unless the value of the increased production is double the cost of the fertilizer. Using this criteria, fertilizer is clearly economic only when the producer price is \$1,000/MT and the yield response is one metric ton/ha. Using prices for maize and fertilizer that correspond to the true costs of imports, it appears that farmers would have to achieve yield increases of more than one metric ton/ha for fertilizer to be attractive.

It must be emphasized that the above calculations are based on very sketchy data. PNS must continue its testing of fertilizer, improve its research design as discussed in Chapter Four of this evaluation, and extend its research from demonstration fields to farmers' fields.

ANNEX B

PNS AGRICULTURAL RESEARCH RESULTS, 1979-80

ANNEX B

PNS AGRICULTURAL RESEARCH RESULTS, 1979-80

ON-STATION TRIALS

Groundnut Varieties - Mbulula/Kongolo (4 repetitions)

<u>Variety</u>	<u>Ngaba (Mbululula)</u>	<u>Kongolo</u>
Local	1.7 t/ha	3.5 t/ha
G 17	2.4 t/ha	2.3 t/ha
A 1052	1.9 t/ha	2.7 t/ha
A 1055	2.3 t/ha	3.2 t/ha
A 65	2.2 t/ha	3.3 t/ha
Average Yield	2.1 t/ha	3.1 t/ha

Fertilizer Applications - Kasai I (maize) - Ngaba (1 repetition)
Yields in t/ha

	<u>N (Kg/ha)</u>					<u>Average/P205</u>	
	<u>0</u>	<u>60</u>	<u>120</u>	<u>180</u>	<u>240</u>		
<u>P205 (kg/ha)</u>	<u>0</u>	<u>2.3</u>	<u>2.0</u>	<u>2.0</u>	<u>1.7</u>	<u>-</u>	<u>2.0</u>
	<u>60</u>	<u>-</u>	<u>3.3</u>	<u>2.3</u>	<u>2.9</u>	<u>-</u>	<u>2.8</u>
	<u>90</u>	<u>-</u>	<u>2.5</u>	<u>3.7</u>	<u>3.4</u>	<u>-</u>	<u>3.2</u>
	<u>120</u>	<u>-</u>	<u>3.0</u>	<u>2.0</u>	<u>3.8</u>	<u>2.5</u>	<u>3.8</u>
<u>Average N</u>	<u>2.3</u>	<u>2.7</u>	<u>2.7</u>	<u>2.9</u>	<u>2.5</u>		

Maize Varieties - Ngaba (4 repetitions)

<u>Variety</u>	<u>t/ha</u>	<u>Variety</u>	<u>t/ha</u>
Salongo	2.9	Shaba I C 1	2.5
Salongo II	3.4	Tuxp. Keto	
Kasai I	2.7	CIMMYT	2.3
PNM I	2.2	Mazcla TB	3.3
PNM I C 1	2.6	CIMMYT across	3.8
Shaba I	2.2		

Date of Planting (Maize) - Ngaba (1 repetition)

<u>Date</u>	<u>t/ha with fertilizer</u>	<u>t/ha w/o fertilizer</u>
15/09/79	3.3	0.8
22/09/79	4.5	2.7
29/09/79	4.2	2.7
06/10/79	4.6	2.5
13/10/79	3.4	1.9
20/10/79	3.3	2.7
27/10/79	2.8	2.2
Mean:	3.7	2.2

Crop Rotations - Ngaba (Average 6 repetitions)

<u>Rotation</u>		<u>Tons per hectare</u>			
		<u>1978/79</u>	<u>1979/80</u>	<u>1980/81</u>	<u>1981/82</u>
1.	without fertilizer	maize 1.7	maize 2.7	maize	maize
2.	with fertilizer	maize 3.7	maize 5.2	maize	maize
3.	without fertilizer	g'nuts 0.7	maize 4.3	g'nuts	maize
4.	with fertilizer	g'nuts 0.7	maize 5.3	g'nuts	maize
5.	without fertilizer	cotton 0.3	maize 3.4	cotton	maize
6.	with fertilizer	cotton 0.2	maize 5.4	cotton	maize
7.	without fertilizer	cotton 0.3	g'nuts 0.7	maize	maize
8.	with fertilizer	cotton 0.3	g'nuts 0.9	maize	maize
9.	without fertilizer	sesame 0.9	maize 3.0	sesame	maize
10.	with fertilizer	sesame 1.1	maize 5.0	sesame	maize

Soil Preparation - Ngaba (1 repetition)

Maximum tillage: 4.2 t maize/ha Minimum tillage: 3.9 t/ha

DIAMOND TRIALS AT FARM CENTER
DEMONSTRATION FIELDS

<u>Treatment</u>	<u>1978</u>	<u>Yield in t/ha</u>		
		<u>1979</u>	<u>S</u> <u>1979</u>	<u>F</u> <u>1979</u>
PT + VL - F	0.9	1.4	1.3	1.7
PT + VA - F	1.3	2.1	1.9	2.6
PM + VL - F	2.1	2.7	2.6	3.1
PM + VA + F	2.1	4.2	3.7	5.0
Mean yield	1.8	2.6	2.3	3.1
Number of observations	16	15	7	6

PT - Traditional Practices
 PM - Modern Practices
 VL - Local variety
 VA - Improved variety
 F - Fertilizer (66-46-0)

S - More than 60% of fields are described as savannah by farmers
 F - More than 60% of fields are described as forest by farmers

ON-FARM APPLICATIONS ON TEN FARM CENTERS

Kongolo Sector (1979)

	VA + PM		VA + PT		VL + PT	
	F	S	F	S	F	S
Tons/hectare	1.7	1.2	1.7	1.3	1.4	1.1
Number of observations	26	24	37	13	44	18