RICE POLICY DEVELOPMENT IN MADAGASCAR

Richard H. Goldman
Thomas P. Tomich

November 4, 1992

CAER Project (940-0405)
Contract PDC-0095-Z-00-9053-00
Harvard Institute for International Development
for USAID/Madagascar

Harvard Institute for International Development
USAID
Consultancy Assistance on Economic Reform Project

RICE POLICY DEVELOPMENT IN MADAGASCAR

Richard H. Goldman
Thomas P. Tomich
November 4, 1992

Introduction

This report offers some ideas about the prospects for successful rice policy reform in Madagascar. It begins with a brief review of available production and consumption statistics placed in a simple food balance context and compared with a selection of other countries, most of which are rice dependent. It calls attention to the uniqueness of Madagascar's food economy at its level of economic development. This section also attempts a simple reconciliation of changes in rice consumption over the past decade with underlying economic forces. The second part of the report covers issues relating to pricing policy and marketing structure. It addresses issues about integrating Madagascar's rice economy into the world market, the sources of and appropriate policies for dealing with domestic rice price instability, and possible policies and investments for improving domestic market integration and lowering costs. This is followed by a section about prospects for a rice-based accelerated growth strategy. It discusses domestic production possibilities and raises questions about the expected impact of marketing and international trade reforms on rice production. The report concludes with a series of recommendations regarding the need for additional information and for components of a data monitoring system which will help clarify some of the issues raised here and provide evidence regarding the economic response to reforms in the rice economy.

An Outline of the Food Economy

FAO food balance sheets based on Madagascar's reported food production and net imports place the country's food consumption level in 1980 at 2475 calories per person, well above nutritional requirements. This consumption performance followed a ten year period where real per capita income declined steadily at an annual rate of 1.25 percent. Rice, of which 13 percent was imported, contributed about 55 percent of these calories in 1980. Cassava, the next largest source, contributed about 12 percent. By 1988, per capita calorie consumption had declined by 13 percent, just meeting the WHO nutritional standard. Over the eight year period real per capita income fell at a 2.7 percent annual rate. In 1988 there were no rice imports. The rice share of calories had fallen marginally, while the contribution of cassava increased to 14 percent. Although we have no FAO food balance sheets for the past few years, the production and trade

statistics suggest that calorie availability may have increased about 5 percent during 1989 and 90, declining in 1991 to the 1988 level.

These implicit consumption statistics are remarkable, both in their rate of decline and their high absolute level. The record suggests that Madagascar, long one of the poorest countries in the world and with a virtually unrelieved pattern of economic decline, has a food economy that looks like that of the wealthier and more successful countries of Asia. Figures 1 and 2 place Madagascar in this larger context. Both figures relate calories produced per capita with calories consumed per capita. Countries that are positioned on the 45 degree line are calorie self-sufficient. Countries above the line are net exporters of calories; those below are net importers. The expansion path lines show how countries have changed positions over time in terms of their per capita production and consumption and international trade. Figure 1 traces out these relationships for total calories. Figure 2 depicts the situation for the principal staple food, either rice or wheat depending on the country. Madagascar's 1980 position is similar to countries with two to four times its per capita income. Its 1988 position is much more consistent with other countries with current per capita incomes in the $300 range (not shown on the graph).

It is possible that official statistics result in an overstatement of food availability. If so it is likely that paddy yields, already low, are inflated. There is evidence, however, to suggest that, in fact, the statistics are reasonably accurate. A recent World Bank study of food security in Madagascar estimates that at current levels of income and expenditure patterns, 35 percent of households cannot afford a diet with the WHO minimum standard of 2100 calories. Well over half of these households are rural (a third of rural households), most of which drop out of the food insecurity category if the calorie standard is lowered by 10 percent. Even with this adjustment, however, 32 percent of urban households remain in food poverty. The two page summary of the report that was available to us (see recent World Bank country economic report) contains enough information for us to test for consistency between Madagascar's aggregate food availability statistics and the Bank's estimate of food expenditures and consumption levels for the rural and urban poor. The procedure involves using those estimates and then calculating the implied daily food intake for the balance of the population. The distribution statistics and the implied calorie intake for "others", the non-poor, are shown in Table 1. The estimated food intake for the non-poor ranges from 2320 to 2640 depending upon aggregate food balance assumption of 2200 or 2400 calories per capita. This range is quite plausable. In other words, the estimated distribution of income and expenditure is consistent with both the degree of poverty and the relatively high level of average food availability in Madagascar.

Although this report is not about cassava, it is important to note here that it is the principal staple food alternative to rice for poor consumers. The Bank's study suggests that food poverty is increasingly and urban problem in Madagascar, as population pressure in rural areas stimulates urban migration. Over the past decade the urban population share has increased from 18 to 25 percent. Research into cassava marketing and ways to lower marketing costs should result in lower cassava prices in retail markets.

Another perspective on the food economy comes from our attempt to explain the fall in average rice consumption reported since 1980. Surprisingly, most of the reported change between 1980-88 and 1985-88, is accounted for by a simple food economy model with conservative estimates of income and own (rice) price elasticities and a small cross-price elasticity between rice and manioc prices. These parameters are combined in this exercise with the record of changes in deflated rice prices and per capita incomes and the rice/manioc price ratio. The model overshoots by 40 percent the decline in consumption between 1980-88 but by only 10 percent for the 1985-88 period. An outline of the approach and results is shown in Table 2. The price record for 1980-83 is very suspect, showing a 90 percent growth in real rice prices. Reducing this price increase by 30 percent, adjusting the 1980 price upward, dramatically improves the model's tracking of the reported data, leaving only an 18 percent error for the 1980-88 period. The basic point is that although the data which portray Madagascar's food economy are crude and full of inaccuracies, various independently collected statistics relate to each other in an orderly way and probably paint a broadly accurate picture.

Rice Prices in Madagascar: a Policy Framework

Rice prices affect production incentives, rural incomes, nutritional well being, the role of rice imports in the economy, and issues of economic stability. Much of economic policy is aimed at influencing the general level of rice prices as well as the relationship between producer and consumer prices. The conceptual framework outlined here aims to clarify the policy and other factors which determine rice price levels and relationships. Actual price performance is complicated by many uncertainties, such as the actual level of domestic production from year to year, the level of world prices for imports, the exchange rate, and institutional rigidities which influence the availability of domestic credit and foreign exchange. Although all agricultural prices are subject to degrees of unpredictability, the issue is particularly sensitive when it involves the price of the principal staple food.

Measured at either the producer or consumer level, the average annual price of rice varies from year to year. This may be thought of as the price level. In addition, Madagascar is

accustomed to a situation where prices immediately following the main rice harvest in May and June are lower than they are in January and February. Below actual seasonal price rises for recent years are examined. Conceptually, for the purposes of policy design and monitoring, it is important to distinguish the price level as it varies from one year to the next from the intraseason price movements. Although in practice the two are fundamentally related, they are also influenced by separate factors. The distinctions are important as they relate to the appropriateness of policy interventions and the potential impact and efficacy of particular policy instruments.

Simply put, in a closed economy with no imports the price level is determined by annual supply and demand relationships. When production is unusually large, prices in that year will generally be lower than in a normal year, and vice versa. In an open economy where rice is imported when it is profitable to do so, the price level is determined by import prices and the exchange rate which converts the world price to domestic currency. In both the open and closed economy cases, the domestic price in the harvest season is lower than that at the end of the market year. This seasonal price rise is required to cover the cost of storing rice from the harvest season until the next harvest (closed economy) or from the harvest season until prices rise to the point where imports are profitable (open economy). In other words, a collector buying paddy during the harvest season must speculate about how high the price is going to be later in the year in order to decide how much to buy and what price to pay the farmer. In a competitive market individual traders bid the farm gate price up and down each year according to their guesses about how high the price will be later in the year. In other words harvest prices are influenced by a number of uncertainties about future market condtions, particularly the the economic conditions which determine the end of season price.

In an open economy domestic prices cannot rise higher than the cost of imports, since if they do, imports become more profitable, and the additional imported supply will keep the domestic price down. So the seasonal price rise in an open economy is anchored at the high end by the price of imports. Given an expectation about this price, the farm gate price in the harvest season must be low enough to cover the costs of storage. We will return later to issues and policy instruments related to world or border price instability.

In addition to the seasonal price rise required to cover the cost of storage over time, there is an additional marketing margin required to cover the cost of milling and processing and transporting rice from surplus to deficit areas. These costs, although they may be subject to fewer uncertainties than the seasonal issues, may be subject to substantial inefficiencies relating to infrastructure and domestic market integration.

Summarizing, one can consider the difference between the farm gate price at the harvest season and the consumer price of rice at the end of the market year as comprising two price bands or market margins. One band covers the cost of processing and transportation and the other covers the cost of storage over the season. The underlying costs associated with each band are subject to varying degrees of inefficiency, some of which may be remedied by investment and policy. These bands move up and down from year to year, reflecting the price level, which is influenced by domestic supply and demand forces (closed economy) or import prices (open economy). The price level and some of the underlying costs associated with the market margins are subject to varying degrees of uncertainty.

In this context there are three sets of issues which need to be addressed by policy. First, are price level issues, particularly the relationship between world prices and the domestic price level. These issues relate mainly to questions of resource allocation efficiency. Second, are uncertainty and instability issues. Finally, there are structural issues concerning the underlying costs associated with the storage or time margin and with the transport/processing margin.

Border Price Issues and Stabilization Policy

The recent economic deterioration and adjustment has resulted in reduced rice imports. Nevertheless imports, even in small quantities, play an important role in stabilizing rice prices at the end of the season. In addition, with population growth and the prospect for improvement in economic conditions, demand for rice is likely to grow faster than production, thus imports are likely to grow. Under these conditions, policies should promote, rather than inhibit, efficient open economy operations. In principle, the domestic rice price level should reflect that in the world market. In the long run this will facilitate an efficient allocation of resources, based on comparative advantage, in Madagascar. In a more short run and, perhaps practical vein, policy interventions which aim at maintaining the domestic price level above or below the import parity, or border price, either place a heavy burden on poor consumers or involve substantial fiscal cost and direct management by government officials.

Although world rice prices have been on a modest falling trend in recent years, moving to an import parity pricing policy should not result in deteriorating price incentives for Madagascar's farmers. Even if world rice prices do not recover (many believe that they will since demand trends in Asia are increasing faster than domestic production), import parity prices in Malagasy Francs will probably increase. The import parity price involves the interaction of two prices, the world rice

price for the particular grade imported and the exchange rate. Even with a level world rice price, the prospect of future devaluations of the Franc will result in rising import parity prices for Madagascar.

Currently, there is another factor influencing the import parity price level in Madagascar. That is the 30 percent import duty. This is the ultimate of regressive taxes. In a recent World Bank study 35 percent of Madagascar's households are estimated to be "food insecure", unable to afford the cost of a nutritionally adequate diet. A 30 percent import tariff, which raises all rice prices and increasingly so as markets become more integrated and efficient, is a remarkable tax burden on the poorest in one of the world's poorest countries. We have been told that the World Bank and IMF continue to support this tax in the interest of harmonizing tariffs. But the efficiency gains in this instance are minimal and the equity and welfare costs very high.

Although we believe the tariff should be removed, the timing of its removal raises certain issues. For reasons discussed more fully below, changes in this policy should generally not take place in the later part of the market year. Tariff removal could accompany exchange rate devaluation, which would partially offset the latter's effect on the rice price level.

Staple food price instability is a major issue in all developing countries. Structural price changes, such as those associated with economics of rice storage or trend changes in supply/demand balances domestically or in the world market are often confused with instability. There are, however, uncertainties and transitory features about domestic production and about import prices and quantities which cause important disruptions in markets. If these occur when domestic inventories are short, as they are in the latter part of the market year when imports are expected, food prices rise or fall at a rapid rate. A short-run price elasticity of .1 translates into a 10 percent price increase for every one percent of unexpected supply shortfall (on top of the normal seasonal price rise required to induce storage). It is an important function of economic policy to minimize these shocks and their consequences.

In Madagascar, rice production shocks are not unusually large (particularly by African standards). Much of the adjustment is probably made in on-farm consumption levels except in years when the marketed surplus areas are unstable. Since 1980, the average deviation of a rice crop from the previous one is 4 percent. In only three years was the deviation larger than 4 percent; two unusually large crops and one unusually small. The deviation from trend, or "expected" production levels is even smaller. These are not big production shocks by developing country standards, and they occur when inventories from the new crop are large and information about crop size can be factored

into market decisions and prices in an orderly fashion over a period of months.

The more difficult shocks to deal with are related to importing. Because the economic incentive for imports comes near the end of the market year, unexpected events can produce dramatically unstable end of season rice prices. When seasonal rice price rises are unexpectedly large in Madagascar, the ususal causes are end of season problems relating to rice importing. The main sources of these shocks are easy to identify, and different policy instruments are effective in ameliorating their effects.

The world rice price instability is an important factor. The rice market is one of the more unstable commodity markets and concern about domestic impact is justified. The principal policy instruments for compensating for these price shocks are domestically held buffer stocks or variable import levies. In both cases the policy instrument should be designed to offset the transitory component of world rice prices rather than to lean against the trend. An important difficulty is that in any particular year it is impossible to distinguish transitory from trend changes. The usual policy approach is to set a target import parity domestic price based on a three to five year moving average of the world price. Deviations from this target price are offset by purchases or sales from the buffer stock or from adjustments in the variable tariff. One common pitfall occurs in inflationary economies with fixed or inflexible foreign exchange rates. As nominal rates become overvalued the target import parity price of the stabilization program loses linkage with the world price. When exchange rate adjustment finally occurs, the destabilization of staple food prices or the fiscal cost of offsetting the devaluation are very large.

Since the world price of rice must be translated into the domestic price level through exchange rate conversion, in Madagascar an important source of price level instability is caused by exchange rate adjustments. Only institutional reforms and macroeconomic policies consistent with a sustainable balance of payments profile offer longer run solutions to this problem. It is likely to remain an issue for some time. The uncertainty relates to timing and magnitude, not the direction, of exchange rate adjustments. Devaluations during the harvest season when inventories are large, rather than later in the market year, should relieve much of the price instability associated with these changes. It should be noted, however, that these adjustments are not random shocks to rice prices, but rather structural changes in price levels. The objective should be for domestic rice prices to reflect this adjustment in an orderly fashion.

The institutional and political shortcomings in Madagascar's state enterprises, as is the case in many other countries, have discredited public monopoly as an option for managing rice imports. The most desirable alternative is to promote private competition in rice importing. Unfortunately, there is cause for concern that rice imports could be monopolized privately or, what seems more likely, could be restricted by a cartel. Importers, traders holding large stocks, banks that finance both groups, and government officials share incentives to collude. Moreover, their small numbers in Madagascar increase the likelihood collusion would be feasible to raise margins on rice imports. This is, in part, a legacy of past mismanagment of the economy in general, and excessive control of rice in particular. But the process of transition to a more competitive rice market that began with trade liberalization to eliminate some barriers to entry is all the more fragile because of three issues that create other barriers to entry: (1) the small scale of imports, (2) rationing of credit, and (3) rationing of foreign exchange.

World rice trade takes place in lots of 10,000 tons or more Hence, the maximum number of rice importers in Madagascar is roughly annual imports (in tons) divided by 10,000. If the world price is high and the domestic crop is good, that might be one lot of 10,000 tons. If the world price is low and Madagascar's crop is short, perhaps there would be as many as ten. Imports of about 50-60,000 tons were called for by government in 1991 and 1992, suggesting 5-6 lots. It is not far fetched to imagine that the small group of firms likely to import this rice could collude in this political economy.

More than the number of firms that could handle imports, however, the decisive question is whether other firms also have the means to import. Even a single private importer could not enforce a monopoly if other firms could easily import rice. To contest a rice import monopoly or cartel, firms need at least two things: credit and foreign exchange. And, as with storage, subsidized credit for rice imports gives the few recipients a non-competitive edge and makes it even harder for other firms to contest the market. We have the impression from our interviews, however, that firms believe they will be able to get credit at market rates once the political situation calms.

Rationing of foreign exchange creates the most difficult barrier to competition in rice imports. As a consequence, there will be a risk that a firm or cartel can corner the rice market during the soudure as long as foreign exchange is allocated administratively. One way to fix this is to devalue to a market clearing exchange rate. Given the depth of Madagascar's macroeconomic and balance of payments difficulties, this is an unlikely prospect. If free convertibility is not an option, a study of second best institutional mechanisms for foreign exchange allocation deserves high priority. Auctioning foreign

exchange, for example, is one option that would open greater opportunities for competition than the current administrative mechanism.

In summary, uncertainty about bank credit and foreign exchange availability and the associated collusive behavior that results are currently the biggest sources of import instability in Madagascar. These restrictions cause uncertainty about whether open or closed economy price formation will prevail in the rice market at the end of the season. Madagascar should make the institutional reforms required to ensure competitive access to credit and foreign exchange the highest priority of its rice price stabilization program. This should be combined with more appropriate timing of devaluations. These interventions should substantially improve staple food price stability. A buffer stock with its complicated management requirements, heavy fiscal costs, and opportunities for corruption should be avoided. A variable levy is a possible option for the future because it is easier and less costly to manage but it deserves consideration only after the priority reforms are implemented and an assessment is made of problems caused by the remaining instability due to world price changes.

Rice Marketing Margins and Domestic Price Formation

An efficient rice market allocates rice to meet demand across seasons and regions with minimum costs of storage, transport, handling, and other expenses. But 'minimum' does not mean free. Costs of marketing services will be a significant share of retail rice prices. The following sections review determinants of domestic marketing margins with two objectives in mind. The first is to provide a basis for judging whether market forces are at work that will reduce--rather than raise--marketing margins over time. The second is to outline the scope for government marketing policy, highlighting pitfalls that could arrest progress toward more efficient marketing.

Seasonal price variation. As already noted, traders will not store rice from the harvest season to sell later (say during the soudure) if they do not expect to receive a price that covers their storage costs. Some costs of storage vary little from year to year, e.g., handling. However, the cost of finance, which is the largest element of storage costs, is determined by the interest rate and the time that stocks must be held. For example, at the prevailing nominal rate of interest of about 2.5% per month on commercial credit, the seasonal price increase would have to be at least 25% just to cover the finance costs of holding rice for 10 months. The longer stocks are held at prevailing interest rates, the higher the cost of storage. Thus significant seasonal price increases are necessary to cover storage costs even if one only considers financing. Furthermore,

the seasonal price increase will vary from year to year in efficient markets even if import prices are constant as a result of fluctuations in output. From 1986 through 1991, the average seasonal price rise from the lowest quarter to highest quarter of the year was 42% in nominal terms and 27% in real terms. In light of current commercial interest rates of 30% per year, these do not seem high. The highest seasonal increase was in 1991, when the nominal price increase was 78% between the harvest in 1991 and late 1991/early 1992.

Government efforts to squeeze the seasonal price rise below the cost of storage will also reduce the role of private traders in marketing across seasons. Yet economies of scale in storage are not decisive at this stage of development--indeed if markets are fragmented, there are distinct advantages to decentrallized storage--and it is unlikely government has capacity to undertake this market function efficiently. In short, private traders are the best hope for efficient rice storage in Madagascar and policy should avoid measures that restrict their role in storage. Aside from providing technical assistance on methods to control losses from pests, there is not much scope for constructive government intervention to reduce private storage costs. Administrative fees and levies, if there are any that have a direct effect on construction or operation of grain storage facilities, should be abolished. The insight that finance costs are the main element of storage costs might suggest interest rate subsidies for grain storage. However, like everywhere else, it is apparent that subsidized credit is rationed in Madagascar. Rationed credit gives the few recipients a non-competitive edge over others who might store rice. (Indeed, preferential access to subsidized credit by some was the main complaint voiced by a spokesman for the private trade.) Interest rate subsidies for private storage then inhibit healthy competition that will drive down storage costs in the short run as well as undermining the longer term process of developing an efficient banking system that eventually will bring down market-clearing interest rates.

Rice imports and seasonal price formation. Rice import policy is the most powerful instrument available to government--for good or ill--regarding the incentives to store embodied in seasonal price variation. Discussion so far has proceeded as if traders had a firm idea of the price and timing of rice imports. In fact, in 1991, there was tremendous uncertainty about these determinants of the seasonal price ceiling. From our interviews, it appears that traders expected government to import rice in the fourth quarter of 1991. They managed their stocks accordingly, selling in anticipation of a price ceiling at the cost of imports. When imports failed to materialize, stocks were lower than they should have been and the price spike was the result. In effect, Madagascar reverted to a closed rice economy. Prices rose high enough to allocate rice stocks that had been expected to serve for a few weeks consumption but which instead met demand

over several months. Anyone who had stocks made a lot of money--and it is possible, if not likely, there was collusion to exploit this situation further. Economic turmoil, particularly in transport and goverment administration, fueled the price increase too. But the main point here is that the 1991 price spike clearly resulted from rice import policy failure.

Consistent implementation of rice import policy deserves high priority because it affects seasonal price variation in two ways. The most dramatic is acute policy failure to import, as in 1991. But the chronic problem of inconsistent policy and erratic rice imports from year to year also works its way into seasonal price margins by greatly increasing the uncertainty traders face in making decisions about acquiring and holding stocks. As it turned out, traders who bet the government could not arrange timely imports in 1991 profited from the situation. Suppose, instead, that government had arranged imports in time and that it waived the 30% tax--then they could have lost. The exaggeration of risks stemming from erratic government import policy is a barrier to entry to firms that might be good at storage but who cannot risk capital or who lack the insider influence to play this game where profits are linked only tenuously to minimizing storage costs. Firmer expectations about the seasonal price anchor--say knowing it will bear some regular relationship to the world price of rice--can, over time, lead to smaller seasonal margins in proportion to reduced risks. It probably is neither feasible nor desirable for government to eliminate these risks from world price fluctuations (see above discussion on stablization), at the very least, however, government should avoid accentuating these fluctuations.

Spatial price variation. In an efficient rice market, prices will not differ across locations by more than the cost of moving rice (including not only transport costs, handling, and financing costs, but also taxes and administrative costs and a premium for risk of loss from theft or other hazards). When these costs are very high because of scattered population, difficult terrain, and deteriorating infrastructure, prices can vary over a considerable range before they diverge enough to make it profitable to move rice from one place to another. Thus, it is likely to be some time before rice markets in Madagascar are fully integrated. And these features currently are compounded by petrol rationing and mounting security problems. Political and economic stabilization combined with a long-term program of investment to improve transport and communication should help to reduce these marketing costs. But converting such developments into smaller margins between rice prices at different locations also depends on competition between traders.

Despite formal liberalization of marketing, there appear to be strong impulses to establish local barriers to entry by traders. This can involve local cartels, licensing and

administration fees, witholding trading licenses, and other restrictions on access to markets and ports. We have heard anecdotes concerning all of these barriers to regional rice trade in Madagascar and it is very difficult for government to eliminate them by fiat. Now that private trade is legal, however, it also is much harder for local authorities to enforce extralegal restrictions on movement of rice. While these vestiges of long-standing controls remained after liberalization and may even have regained some ground during the current political turmoil, they should dissipate with time. It is, in fact, encouraging to hear traders complain about rising competition in regional trade. Moreover, their assertion (if not their preference for measures to restrict competition) seems to be supported by preliminary results of a recent rice marketing study sponsored by the World Bank that indicates improved spatial integration compared to an earlier World Bank study and indicates a trend toward greater competition along lines anticipated in Berg's recently published study of Madagascar's rice market liberalization.

Monitoring prices in various markets can play an important role in supporting the development of competitive regional trade. Most importantly, evidence of narrowing marketing margins can be used as ammunition to counter the restrictive impluses of officials and the efforts of some traders who will seek new regulations to limit access by competitors. But suppose price monitoring reveals that margins have not narrowed even though costs are constant or falling? The best course of action would be to take steps to publicize market information in a timely fashion. The rice traders we were able to interview in the capital have a sense of prices in other centers, but there appears to be no formal market news. Increasing access to information about rice prices in different markets in Madagascar (and the world) through regular reports on the radio could be an important public service to traders and farmers alike.

Nevertheless, there is cause for concern about localized shortages in the many isolated areas that are virtually cut off from the outside world every year because of poor infrastructure and bad weather. Market failure resulting from lack of credit for holding stocks at the local level and the possibility of collusion between local officials and traders to extract monopoly rents are real issues. However, government capacity to perform efficient arbitrage across regions clearly is limited and, almost inevitably, such public activities undermine incentives for private traders to undertake this marketing function. If these seasonal problems are routine, local people and the private trade may be able to store in anticipation. The most serious situations are those that involve unanticipated disruption of rice marketing (unusually severe weather; collapse of a key bridge). If any government intervention is feasible, it is these surprises that deserve priority for attention.

Milling. In addition to marketing of rice across seasons and space, milling provides another link in the marketing chain between world prices and farmgate incentives. As with storage, scale economies in milling probably are exhausted at a relatively modest size in a country like Madagascar. Thus, it is unlikely rice milling constitutes a natural monopoly and the major barriers to entry are, like storage and trading, most likely to be financial and administrative rather than economic. There is no evidence that milling capacity is a bottleneck now. Procurement of the rice crop by the President's party for political purposes this season means, however, that the current situation may not reflect normal commercial conditions. In any event, it seems unlikely milling will emerge as a serious bottleneck unless there is a surge in output (as in Pakistan in the early phases of its Green Revolution).

The Prospects for a Rice-Based Economic Growth Strategy

Given the brevity of this visit, our lack of familiarity with Madagascar, and constraints on travelling outside of Antananarivo while we were here, we offer the following notions with a deep sense of humility but at the same time an intuitive feel that we are correct.

Our reading, discussions with members of the IRRI team here, with World Bank staff working on Madagascar, and with others lead us to believe that Madagascar may be lacking the critical ingredient for a rice "take-off". Rice-led economic growth, wherever it has occurred, has been based on the powerful genetic capacity embodied in seeds of new varieties. With good varieties and irrigation, adoption and substantial yield improvements have been wide-spread. Many agronomists and economists insist that the "right" prices and a balanced package of inputs are necessary preconditions for rapid rice production growth. But there is almost no Green Revolution success story where those conditions were in place prior to rapid adoption of the new seeds, not in Pakistan, not in the Philippines, not in Indonesia. In most cases important improvements were made in the policy and institutional environment after the Green Revolution was well underway, and these changes were strategic to keeping it going. The common initial ingredients were seed varieties that worked and a substantial area base of adequate water control.

Nothing we have read and no one we have talked to speaks with any conviction about the existence in Madagascar of rice varieties with this potential. On the other hand, there exists a large area of irrigated land, although it is afflicted by deteriorated infrastructure and poor water management. Before large investments are made, promises offered, and expectations raised, the actual on-the-ground situation needs to be clarified with respect to the seed variety situation. Without appropriate

seed varieties, high-powered rice growth cannot occur here. With them, dramatic growth is possible and returns to institutional change and investment in the rice sector are high.

Even without a change in rice varieties, some growth should be attainable from input intensification. In fact the foregoing sections about border prices, market integration, and reducing marketing costs, all aim at raising the effective farm gate price of rice so that input use becomes more profitable. The strategic input here is fertilizer in the short and medium run. The critical question is whether existing (or even new) rice varieties are fertilizer responsive under the current conditions of water control and management. The experience throughout Asia shows that the water control standard necessary to promote adoption of high-yielding seed varieties is considerably <u>less</u> demanding than that required to generate large fertilizer response. On the other hand, we are informed that almost no fertilizer is being applied currently. Is this because the credit and input supply system has broken down or because the actual physical fertilizer response on most of Madagascar's rice is low? A recent Cornell survey by Bernier and Dorosh "Constraints on Rice Production in Madagascar: The Farmer's Perspective", finds very little use of fertilizer and concludes that technical response is the most likely reason. Even on the better paddy land managed by farmers who produce for the market, the marginal physical response to fertilizer is low, only a third or less of that commonly found in Asia. Why this is so and whether the critical constraints can be overcome are first-order questions that must be answered before other policy instruments, such as fertilizer price subsidies, are considered.

The price level of fertilizer has little policy significance in the absense of a fertilizer-responsive rice variety. Even if there were such varieties, we see little scope for a fertilizer subsidy to work in Madagascar. Since government lacks the financial resources to make subsidized fertilizer widely available, such subsidies would merely create rationing and ultimately would be counterproductive. As with rice marketing, the most pressing fertilizer marketing issues are macroeconomic (exchange rates, foreign exchange allocation, import credit, and trade restrictions) rather than sectoral price policies.

Finally, there is the question of appropriate allocation of public investment to agriculture. Until the above questions are answered, there is no way make investment judgements. We offer however, an observation about the recent Cornell study on Agricultural Growth Linkages in Madagascar, which we believe contains important and useful insights. The study, driven by strong assumptions, is based (according to the authors, page 35) on very thin evidence about the technical basis for rice growth. This reinforces our concerns expressed above. The basic conclusion of the study is that investments in improving rice

production have similar or perhaps more dynamic growth linkages to improvements in export crop production. The critical assumption of the study is that crop production improvements generate income and that new income is expended according to the existing pattern of household expenditures. Most of the growth linkages are based on this expenditure pattern. The study makes no distinction, however, between adoption of technology which generates income through sale of a marketed surplus and inputed income growth accruing to farmers who produce rice only for home consumption. It seems to us that the former scenario generates a different expenditure pattern and greater linkage potential than the latter. If this is so, then it has implications for the pattern of investment returns in different resource zones of the rice sector. This raises questions about the possibility of a tradeoff between equity and investment returns. These questions are based on a quick reading of the Cornell study, but they have important implications and should be clarified.

Recommendations

We feel the following activities deserve priority for attention from USAID if the Mission wishes to commit resources to analysis and discussion of rice policy in Madagascar.

1. Assessment of seed situation and water control environment. There are two central strategic questions regarding rice development prospects in the near term that we were unable to resolve with certainty. First, is there a high-payoff variety poised for adoption? Second, if there is, why has it not been adopted? Definitive answers to these questions would require a consultancy by a senior rice economist who can survey the development potential in major rice farming systems and assess prospects for technological change in light of existing varieties available from IRRI and elsewhere.

2. Price monitoring. Whether or not there is rapid growth in rice output, we feel efforts to extend the collection and analysis of price and market information are both feasible and highly beneficial in informing rice policy discussions. We suggest priority be given to collecting the following price infomation:

Monthly retail prices of rice and manioc (fresh or dried) for major urban centers

Seasonal producer prices for rice (paddy) and nitrogen fertilizer in rice producing areas.

The BDE already collects data on retail prices for Antananarivo in a timely fashion (September averages were available in October) and the chief of their price monitoring unit mentioned

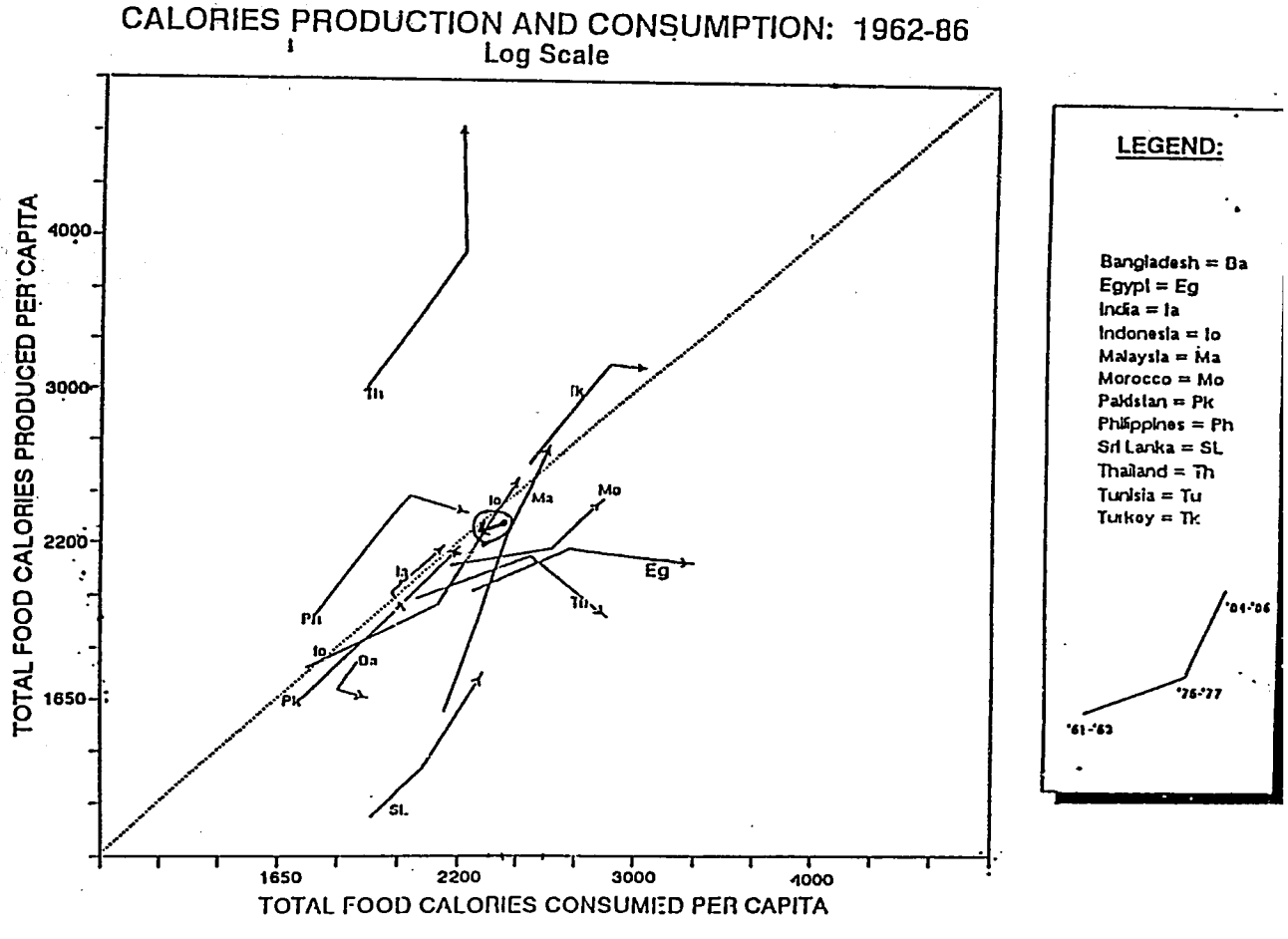
that they are trying to extend coverage to other cities. We understand that regional price monitoring was initiatied by the Ministry of Agriculture's defunct food security unit and that these data still may be recorded even if they are not being complied by the Ministry. Either or both of these may be opportunities for USAID to contribute to local capacity building.

3. Policy monitoring. The preceding discussion highlighted policies governing (1) foreign exchange allocation, (2) credit subsidies and availablity of commerical credit, and (3) tariff and non-tariff barriers to imports of rice and fertilizer as areas of strategic importance for rice policy. The most efficient way to keep abreast of changes in these policies and their implications for the rice situation is to establish a network of contacts among traders in major marketing centers, either individually or through business groups or associations. This is probably already a regular aspect of Mission activities.

4. Monitoring national food balances. The FAO produces annual updates of its food balance sheet for Madagascar that are useful in tracking trends in national food balances. If the Mission continues to take an active interest in rice policy, it would be worthwhile to obtain the current balance sheet from FAO in Rome on a regular basis. It is worth noting that some of the assumptions--particularly regarding waste of rice and cassava--used in compiling the balance sheets deserve further scrutiny.

5. Cassava Marketing Study. Cassava is the principal staple food alternative to rice for poor people in Madagascar, but little is known about how it is marketed. A study of the cassava marketing system is recommended, with a particular concern about the efficiency of marketed supplies available to the increasing number of urban poor.

FIGURE 1



(K) MADAGASCAR 1980/81 - 1988/89

FIGURE 2

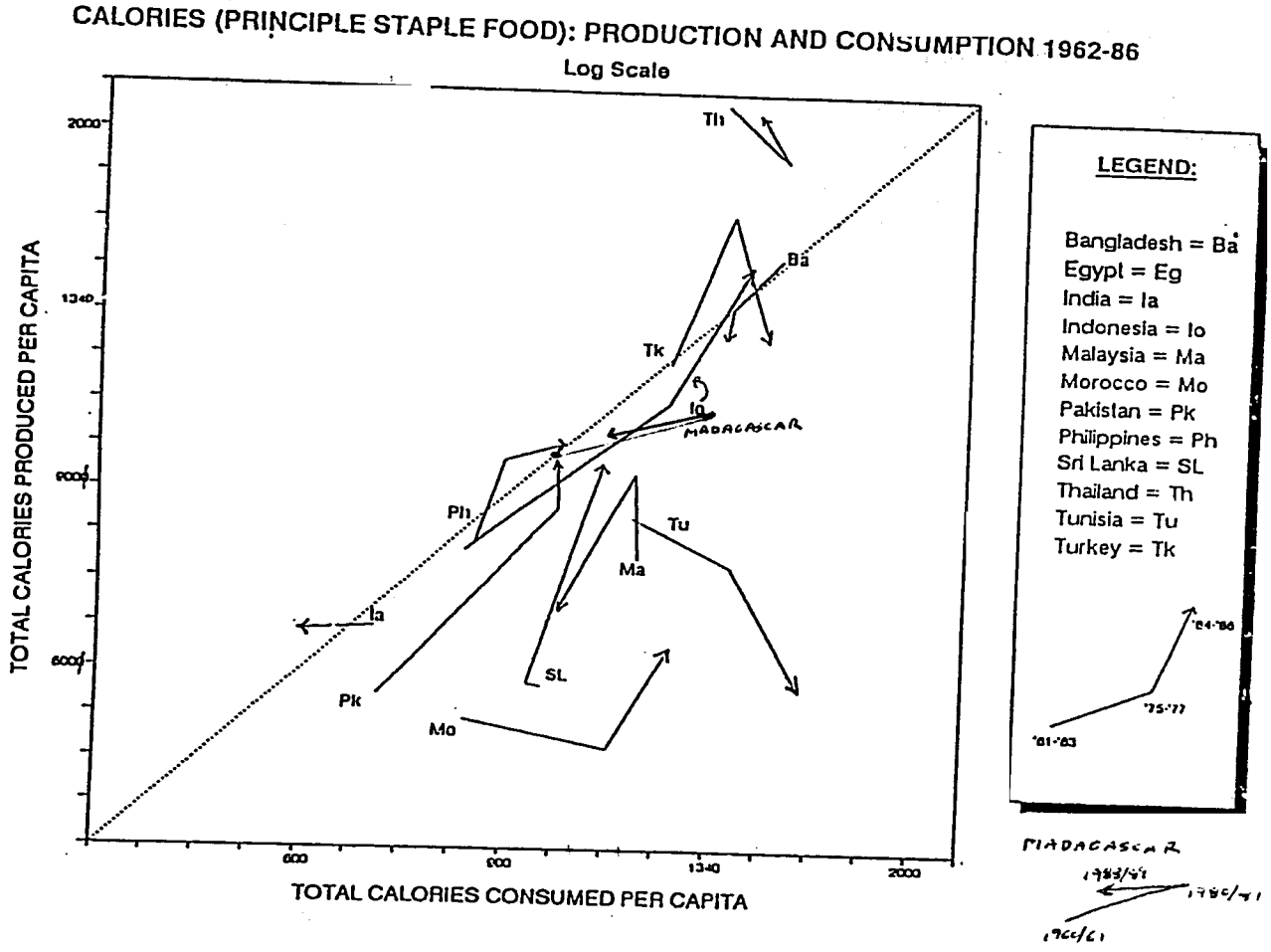

CALORIES (PRINCIPLE STAPLE FOOD): PRODUCTION AND CONSUMPTION 1962-86
Log Scale
TOTAL CALORIES PRODUCED PER CAPITA
TOTAL CALORIES CONSUMED PER CAPITA
2000
1340
600
600
1340
2000
Th
Ba
Tk
Ig
MADAGASCAR
Ph
Tu
Ma
Ia
SL
Pk
Mo
LEGEND:
Bangladesh = Ba
Egypt = Eg
India = Ia
Indonesia = Io
Malaysia = Ma
Morocco = Mo
Pakistan = Pk
Philippines = Ph
Sri Lanka = SL
Thailand = Th
Tunisia = Tu
Turkey = Tk
'61-'63
'75-'77
'84-'86
MADAGASCAR
1983/84
1966/67

Table 1
ESTIMATED LEVELS AND DISTRIBUTION OF CALORIES

	% OF TOTAL[1]	REGION	CALORIES/ DAY	
RURAL[2]	75			
VERY POOR		6	1800*	
POOR		28	2000*	
OTHERS		66	2320	2640
URBAN	25			
VERY POOR		32	1800*	
POOR		10	2000*	
OTHERS		58	2320	2640
MADAGASCAR				
VERY POOR		12.5	1800*	
POOR		24	2000*	
OTHERS		64	2320[3]	2640
MADAGASCAR				
WEIGHTED AVERAGE CONSUMPTION			2200	2400

1. Shares from World Bank Study

2. From World Bank Food Security Study:
   Very poor = cannot afford 1900 calories*
   Poor = cannot afford 2100 calories*
   (Terminology "Very poor" and "Poor" is ours.)

3. Consumption by "Others" estimated by us to conform with aggregate food balance of 2200 and 2400 calories

* Point estimate of 1800 and 2000 are from us.

NOTE: This table can be revised upon acquisition of full World Bank Report.

Table 2
SIMPLE MODEL EXPLAINING
REPORTED CHANGE IN RICE CONSUMPTION

	ELASTICITIES			% CHANGE IN VARIABLES			% CHANGES RICE CONSUMPTION	
	ε_Y	ε_R^P	ε_{RM}^P	Y	P_R	P_R/P_M	Estimated	Reported
1980-88	.2	-.1	-.02	-34	122	113	-21	-15
1985-88	.4	-.15	-.05	-11	31	25	-10	-9

ε_Y = Income elasticity

ε_R^P = Own price elasticity

ε_{RM}^P = Cross price elasticity between rice and manioc

Y = Real Per Capita Income (using the "Private Consumption" national accounts item as a proxy for income)

P_R = Market Rice Price deflated by rice adjusted (removed) CPI traditional

P_R/P_M = Rice/manioc market price ratio

Reported rice consumption from Government of Madagascar and changes in FAO Food balance sheets

NOTE: A low income elasticity was chosen for the 1980-88 period since it begins with a high calorie consumption level. A higher elasticity was assigned the 1985-88 period reflecting the prior period fall in food consumtion and sharply lower real incomes in '85. This logic accounts for the price elasticity adjustments also.

Table 2 (Cont.)
REAL CONSUMER RICE PRICES

	Consumer Price* (market)	Rice Index (R)	CPI^T	CPI^T_{NR}	Real Rice Index	
1980	57	14	40	45	31	100
1981	71	17	55	62	27	
1982	118	29	47	50	58	
1983	204	50	82	88	57	
1984	295	72	90	93	77	
1985	410 (464)	100	100	100	100	
1986	454	110	114	115	96	
1987	395	96	131	137	70	2
1988	486	119	165	173	69	225
1989	565	137	181	189	72	
1990	582	142	202	213	67	
1991	665	162	219	229	70	
1992 (U-S)	786	192				

* 1980-84 from Dorosh et al. (see caveat in text)
1985-91 from BDE and IMF Recent Developments 6/30/92
IMF series agrees with Dorosh at splice. BDE seems too high for 1985.

Rice = 15% of CPI^T

Food = 60% of CPI^T

Rice = 25% of CPI^F

$$CPI^T = .45F_{NR} + .15R + .4NF$$

$$CPI^T_{NR} = \frac{CPI^T - .15\ R}{.85}$$