NRI
Natural Resources Institute

BRAZILIAN EXPERIENCE WITH GRAIN WAREHOUSING SERVICES AND ASSOCIATED MARKETING TOOLS

Report commissioned by the DFID
Crop Post-Harvest Research Programme

Authors:
Jonathan Coulter
Eduardo Leão de Sousa
Prof. João Martines

May 1998

LIST OF CONTENTS

ACKNOWLEDGMENTS

The authors express their thanks to all those who collaborated in this study, including Helio Sirimarco (who gave invaluable orientation in the initial stages), Banco do Brasil, ESALQ, the Getulio Vargas Foundation, the Ministry of Agriculture and Supply, CONAB, the Bolsa de Mercadorias e Futuros, the Organization of Brazilian Co-operatives, OCEPAR, Co-op. Bom Jesus de Lapa, ABIOVE, the Association of Commodity Exchanges and São Paulo State Agricultural Federation.

GLOSSARY OF TERMS AND ABBREVIATIONS

ABIOVE	Brazilian Association of Vegetable Oils Industries
Armazens Gerais	General warehouses
BB	Banco do Brasil
BM&F	Bolsa de Mercadorias e Futuros
CBOT	Chicago Board of Trade
CMG	Commodity Certificate with Guaranteed Delivery
CONAB	National Supply Company
CPR	Rural Product Note (Cédula de Produtos Rurais)
GDP	Gross domestic product
ESALQ	Escola Superior de Agricultura "Luiz de Queiroz", University of São Paulo
IBGE	Brazilian Geographical and Statistical Institute
LE	Electronic auction system of Banco do Brasil
PEP	Premio de Escoamento da Produção = Transportation premium
PL	Liquidation premium
SAFEX	South African Futures Exchange
SECEX	Secretaría de Comércio Exterior = Ministry of Foreign Trade

SUMMARY

The main purpose of this report is to draw lessons from Brazilian experience in the development of agricultural warehousing services, and related improvements to grain marketing systems, which may be of use to African countries. As a by-product, the authors wish to provide Brazilian stakeholders in the same field with a discussion document which can be helpful in their own deliberations on this topic.

Brazil is one of the World's major agricultural producers and exporters, but still has massive untapped potential, both in terms of area and yield increases. Government policies in the support of Brazilian grain production have changed from one of heavy market intervention in support of "mercantilist" objectives, until the end of the 1980s, to more liberal policies in the 1990s. Currently Government seeks to unlock the country's agricultural potential while answering concerns of geographically disadvantaged producers, in ways which do not place a unacceptable burden on the public purse.

General warehousing services have existed for over 100 years, but with all agricultural commodities except coffee, the quality of services has been poor. Many warehousing companies were formed hurriedly with the main purpose of managing large Government intervention stocks, storage facilities were often poorly designed, and public oversight arrangements were totally ineffective in the face of unprofessional and sometimes fraudulent practices. With the reduction in pubic procurement, the warehousing sector must look for private sector custom, but in reality it is ill-placed to service it, and warehouse receipts lack credibility with the banks. The legal requirement that warehouses have a non-trading status and the existing fiscal regime also make it difficult for them to operate successfully without public-sector contracts.

In official circles there is a growing consensus about reform measures required. Practical oversight has been improved, but it has so far proved impossible to change warehousing law.

The Bolsa de Mercadorías e Futuros (BM&F) of São Paulo is one of the largest financial futures exchanges in the World, and its hedging facilities could potentially be used to underwrite the value of stored collateral. However as soft commodities only represent a minimal part of its turnover, this potential has not been realized. In large part, this can be attributed to the lack of a strong primary marketing sector, including efficient third-party warehousing services.

Other related risk management interventions are discussed, including both the activities of multinational grain companies and rural product notes (CPRs), a bank-guaranteed security. Both of these are instrumental in financing farmers production and post-production expenses, and providing market outlets at guaranteed prices.

The authors conclude that the reforms of this decade are increasing market efficiency and reducing the budgetary cost of agricultural support programmes, but further reforms in the grain storage and trading sectors are needed to fully unlock the country's productive

potential. It would be appropriate for the monetary and fiscal authorities to take a leading role in this process.

Concerning Africa, the main lesson drawn from Brazilian experience for Africa is to avoid a situation whereby the provision warehousing services can become dependent upon political processes. This may be accomplished in two ways including: (a) a *laissez-faire* approach, attracting into the storage business international companies and other players which have confidence of the domestic and international banking community, and; (b) instituting a licensing and inspection system, which is effectively insulated from day-to-day political processes. The latter approach is more difficult to implement but would increase the number of eligible warehouse operators.

Brazilian experience also suggests that warehouses should be allowed to trade in their own right, as well as storing for third parties. At the same time, it provides evidence that the establishment of warehousing systems should generally precede the development of commodity exchanges, and not vice versa. The possibility of financing storage through the issue of securities, and not simply through bank loans, should also be considered in the African context.

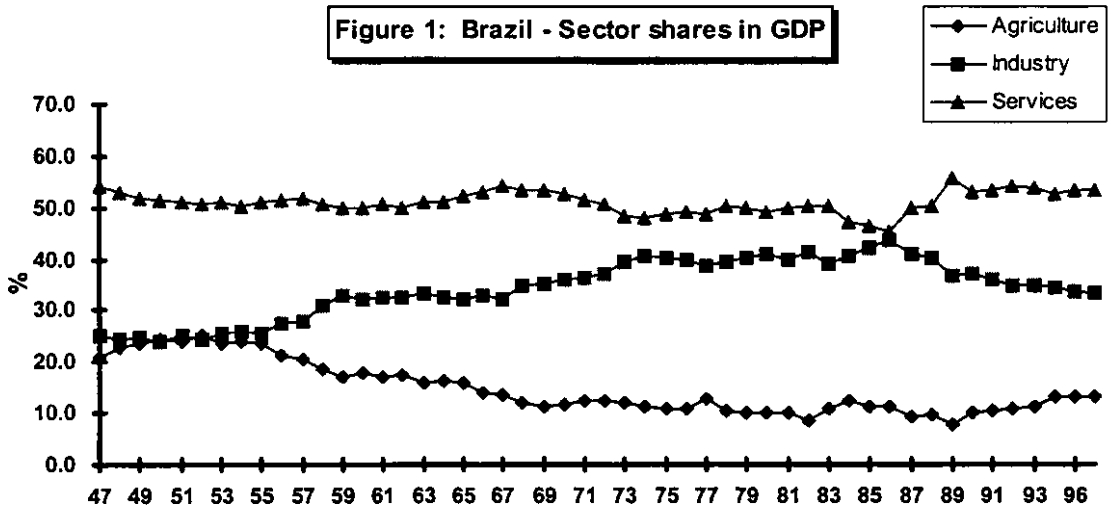
INTRODUCTION

The main purpose of this report is to draw lessons from Brazilian experience in the development of agricultural warehousing services, and related improvements to grain marketing systems, which may be of use to African countries. As a by-product of this exercise, the authors wish to provide Brazilian stakeholders in the same field with a discussion document which can be helpful in their own deliberations on this topic.

In some places we use the term *public warehousing*. This does not connote public ownership of warehouses, but warehousing services which are made available to the public in general. In Latin American countries such services are normally provided by *general warehousing* companies (*Armazens Gerais* or *Almacenes Generales)*, set up under a special laws specifying how they may operate, and for their licensing and supervision by a State entity. These companies have existed in the Continent for more than a century.

SOME CHARACTERISTICS OF THE BRAZILIAN ECONOMY

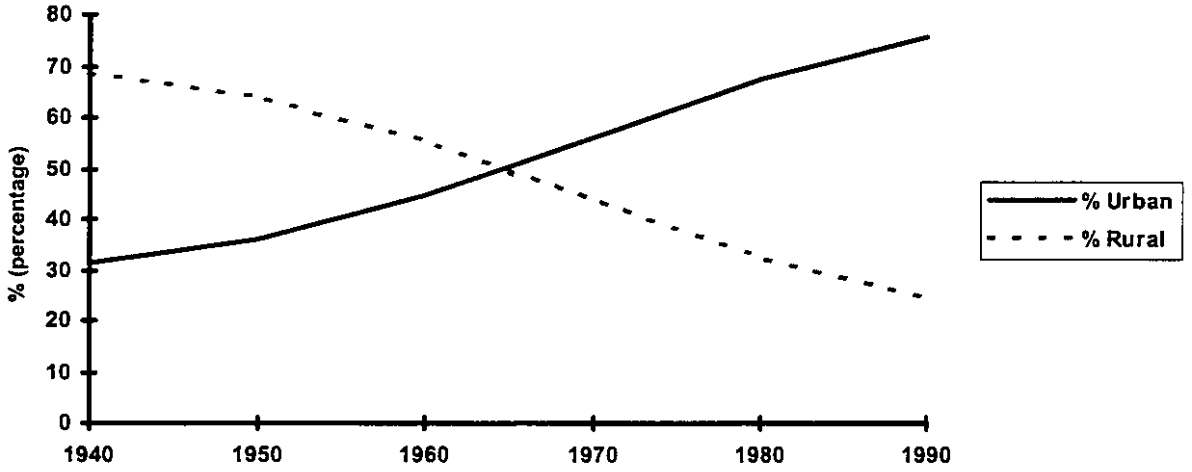
Brazilian Gross Domestic Product (GDP) is around US$ 700 billion, the highest in South America, and in recent years it has been growing at around 2-3%. In 1996, agriculture accounted for about 14% of GDP - see Figure 1.



Source: Instituto Brasileiro de Geografia e Estatística - IBGE

According to the last population census, Brazil now has around 160 million inhabitants. The urban population has increased continuously since 1940 and is now in excess of 70% - see Figure 2.

Figure 2: Brazil - Urban/Rural Population Distribution



Source: IBGE

Table 1 shows how Brazilian agriculture and livestock production has grown since 1988. Clearly production increases have outstripped population growth.

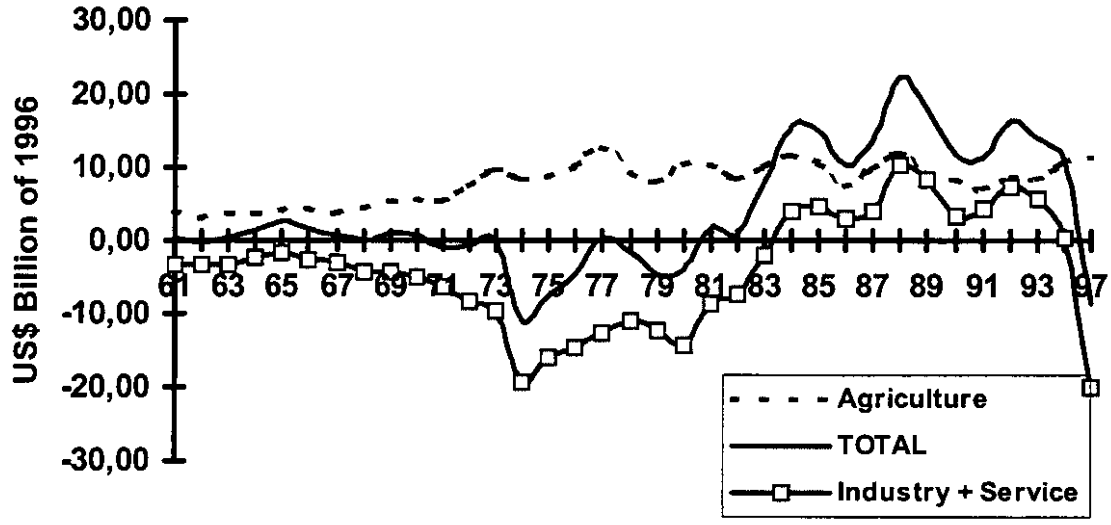
Table 1- Brazil - Total Arable (28 crops) and Meat (beef, pork and chicken) Production

Year	Arable Production (million tonnes)	Meat Production (million tonnes)	Population (million inhabitants)	Per-capita agricultural production (kg/inhabitant)	Per-capita meat production (kg/inhabitant)
1988	368.47	4.59	139.82	2,635	33
1989	372.50	4.82	142.31	2,618	34
1990	367.74	5.07	144.72	2,541	35
1991	367.58	5.54	147.07	2,499	38
1992	387.32	5.87	149.36	2,593	39
1993	360.72	6.08	151.57	2,380	40
1995	434.34	7.63	155.82	2,787	49
1997	450.35	8.20	157.87	2,853	52

Source: IBGE

Brazil is a major agricultural exporter, with total exports reaching US $16.2 billion. The leading commodities were soybeans and soybean meal ($5.1 billion), coffee ($2.7 billion), tobacco ($1.1 billion), sugar ($1.0 billion) and frozen concentrated orange juice ($1.0 billion). The country regularly runs a net trading surplus in agricultural products, and this compensates for frequent deficits in other trading sectors - see Figure (Graph) 3.

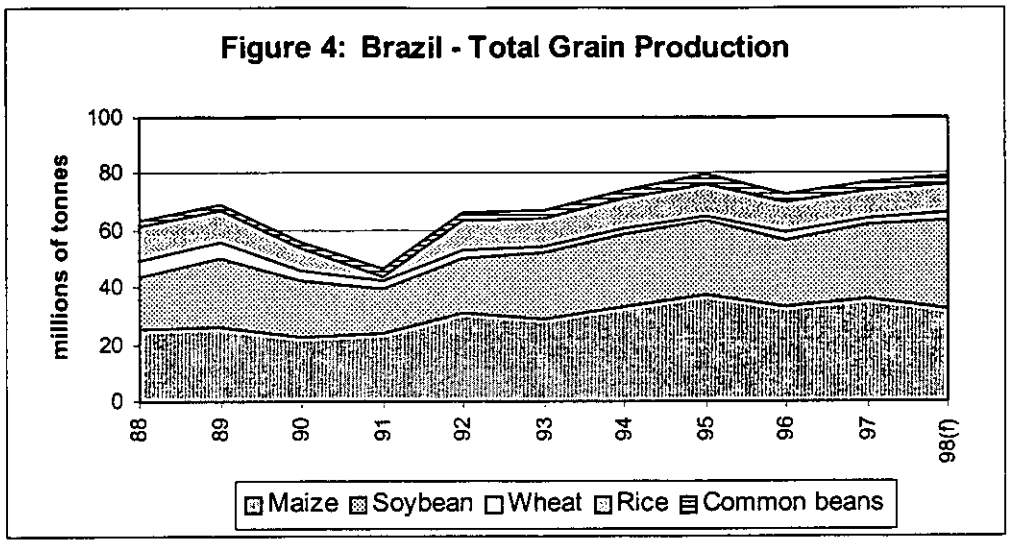
Graph 3- Brazil - Net Trading Balance



Source: Central Bank of Brazil

BRAZILIAN GRAIN PRODUCTION AND GOVERNMENT SUPPORT POLICIES

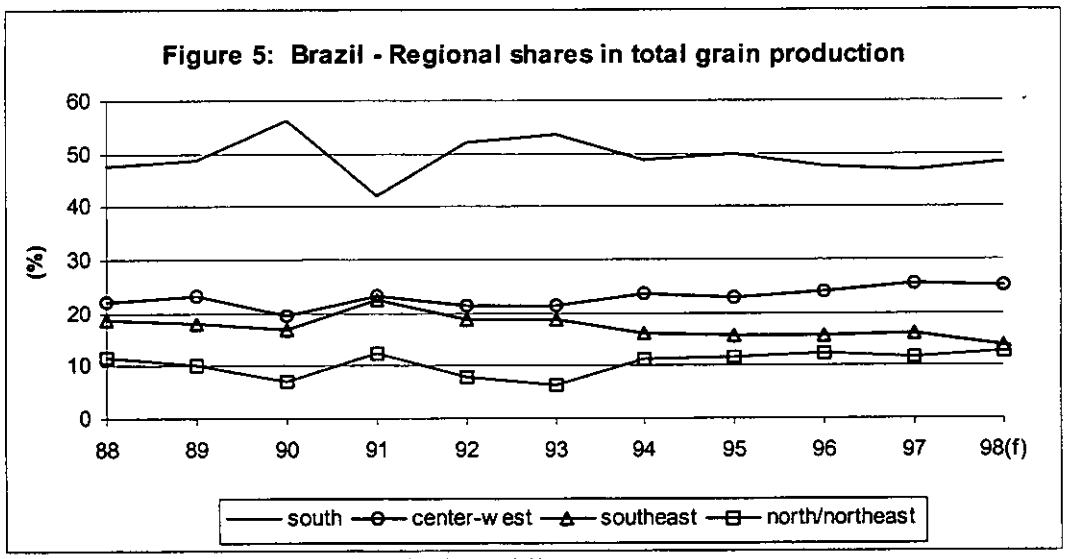
The main grains and grain legumes produced are maize, soybeans, rice, common beans and wheat, and combined production of these has varied between 72.5 and 80 million tonnes over the last five years (see Figure 4). In most commodities the country is close to self-sufficiency, except in the case of: (a) soybeans and soybean products, for which it is the second largest exporter in the world, and; (b) wheat, for which it is a major importer.



f = forecast Source: CONAB (Feb, 1998)

For much of the 20th Century, and up until the 1980s, Brazilian agriculture was dominated by a doctrine of economic nationalism, with "mercantilist" trade policies emphasizing national self-sufficiency, import substitution and export promotion. Between the 1960s and 1980s, subsidized credit was provided for investment in storage and primary processing, with a view to increasing production and opening up new lands in the interior of the country, particularly the Central-Western States (Goiás, Mato Grosso and Mato Grosso do Sul) where farming is characterized by very large and highly mechanized farms. Much as happened at the time in Southern and Eastern Africa, pan-territorial minimum prices were guaranteed to farmers regardless of the cost of moving produce to market. The level of public grain stocks was sometimes in the range of 15 to 20 million tonnes.

Regional production and trends in the same are shown in Figure 5 and 6.



f = forecast Source: CONAB (Feb, 1998)

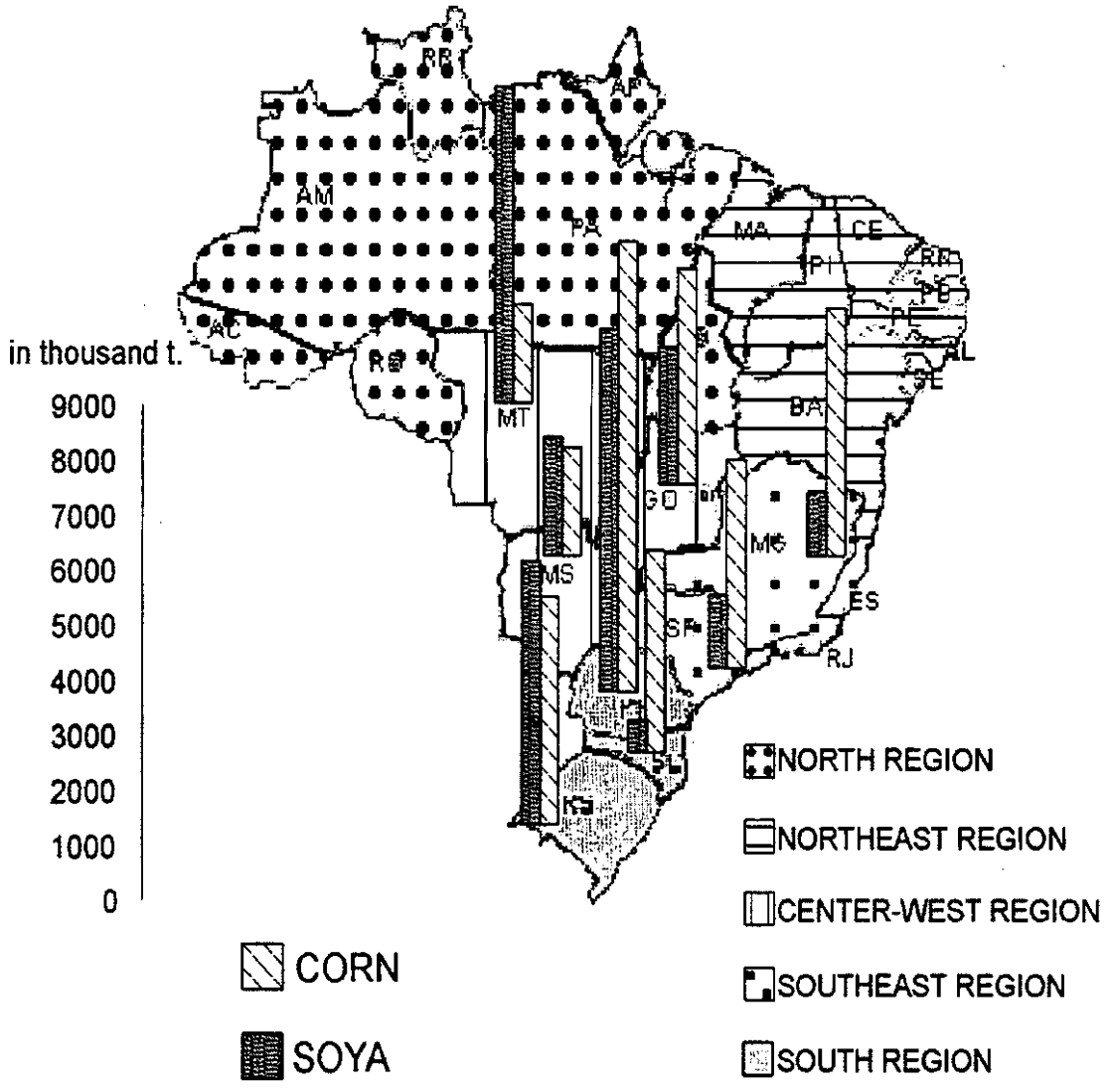


Figure 6: Map of Brazil, highlighting main producing States for soya and corn (maize)

Such policies helped bring about major increases in production, and in many ways paralleled Government subsidization of agriculture in the EC, Japan and USA during the same period. However, they also involved major misallocation of resources, and contributed to the budgetary deficits and hyperinflation which Brazil experienced until the implementation of the *Plano Real* in mid-1994.

In the 1990s, there has been a major change, with the simplification of the import regime, ending of discrimination against foreign investment, privatization of State-owned companies, greater targeting of public assistance at small farmers and the rural poor, and other reforms. Government is running down its public procurement services

for agricultural crops, and replacing them with much more selective forms of support, e.g. Government put option contracts, Marketing Premiums (PEPs), and Liquidation Premiums (PLs), with the intention of acting in a more localized and cost-effective manner (see Box 1 for further explanation). Government stock and these contracts are sold through brokers in 29 cash commodity exchanges around the country, and since 1994 , they have been linked by an electronic auction facility (LE) instituted by the Banco do Brasil (BB)[1], bringing an added dimension of transparency to the operation. Official minimum prices still exist, but they are now regionally differentiated, partly compensating for differences in marketing costs.

At the same time, Government now seeks to privatize the railways and ports, and develop a cheaper multi-modal transportation system, combining road, river and rail, to overcome the country's cost disadvantages, to overcome its heavy dependency on road transport - as a consequence of which the cost of shipping maize 1,100 km from the State of Goiás to Port of Santos can be as high as US$ 40 per ton, about five times the cost of shipping grain from Illinois to New Orleans by barge (Leão de Sousa and Marques, 1997).

[1] Banco do Brasil has a network of 4,000 branches and is the biggest public-sector bank in Brazil

BOX 1: INNOVATIVE FORMS OF PRICE SUPPORT

The traditional form of intervention in Brasil, as in most developing countries, has been through direct acquisition of produce and storage in public warehouses (known as the AGF scheme). Recent innovations have sought to maintain a safety net, but at a greatly reduced cost.

Liquidation Premiums (PL's) have been instituted as a means of liquidating stocks financed by Government loans (EGF), and are sold through the BB electronic auction system. The value of the premium is the difference between the Government's minimum price and the market price bid through the auction. Brokers on each exchange bid as a group against other exchanges.

With *Transport Premiums* (Premios de Escoamento da Produção or PEPs), Government assists private players in transactions between surplus to deficit regions, by subsidizing the cost of freight. The value of the premium is the lowest bid offered on BB's electronic auction system.

With the 1997 harvest, Government started selling *put options* to maize producers, with a view to: i) guaranteeing minimum prices and reducing price volatility in general, and; ii) decreasing supply during this period. They are often provided to producers and co-operatives in receipt of Government storage loans (EGFs). In 1997, options for about 2.5 million tonnes were offered to producers. Of this they purchased options for about 1.2 million tonnes, and then exercised their options for 250,000 tonnes. The quantity which was actually sold at the guaranteed minimum price was only one tenth of the quantity Government offered to buy.

The main advantages of these instruments are that:

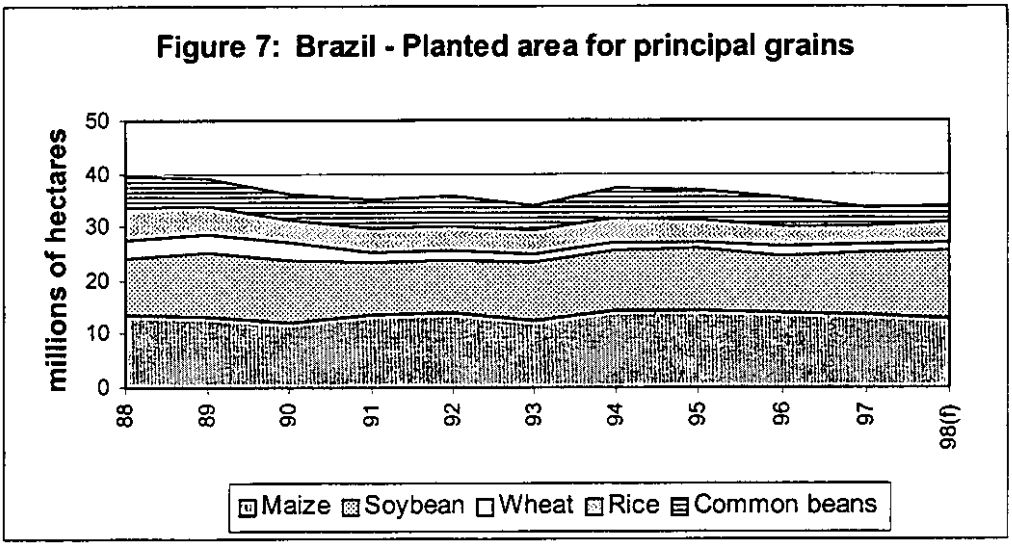
(a) Government intervenes in the market only in specific regions and at specific times. In addition, by transferring responsibilities to the private sector, Government reduces its own grain carrying and management costs.
(b) due to the use of the electronic auction, the system is transparent, so that all players in the market know in which regions grain is to be delivered, the number of contracts negotiated, the target prices and the premiums paid.

In a situation where, for many years, farmers have been offered subsidized credit and guaranteed minimum prices (determined on a pan-territorial basis), the attempt to reform Government intervention involves major political hurdles. This is particularly the case with the production of maize in the Centre-Western areas of the country. The scale of the task is indicated by the volume of Government maize stocks at the end of 1997 (8.1 million tonnes, of which over 3 million tonnes were two or more harvest years old).

Figure 4 shows that growth of grain production since 1994 has been moderate, and it is likely that this is partly due to the reduction and rationalization of unsustainable forms of public support. Figures 7 and 8 show that production increases during the last decade are due to yield increases, and that areas planted have actually fallen. Reduced profitability is forcing producers to use increasingly sophisticated technology, with a view to improving yields and reducing unit costs.

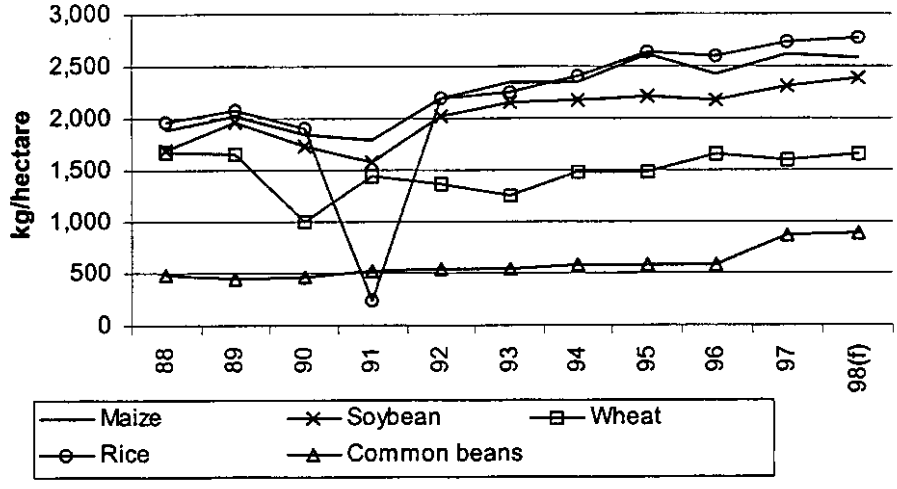
Notwithstanding impressive yield increases, they remain very low by the standards of other major exporting countries. Maize productivity has grown by upwards of 5 percent over the last decade, but yields are still only 30% of the American average and 50% of Argentinian levels.

Figure 7: Brazil - Planted area for principal grains



f = forecast Source: CONAB (Feb, 1998)

Figure 8: Brazil - Yield of main grains



f = forecast Source: CONAB (Feb, 1998)

There is major potential for growth in both area and yields. With regard to area, the Brazilian Ministry of Agriculture estimates that, even allowing for all environmental protection restrictions, an additional 40 million hectares could be brought under the plough. As stated by Ministry officials: "As opposed to the agricultural blocks of the Northern hemisphere like the United States, European Union and China, where there is no idle land, and there is no room for great expansion, Brazil still has plenty of land to be incorporated into the productive process" (Coelho and Henz, 1997). The focus of policy is now on ways to unlock this potential without putting an undue burden on the public purse, for example by enhancing logistics and reducing transport costs, and by improving agricultural financing mechanisms.

EXPERIENCE WITH PUBLIC WAREHOUSING AND ASSOCIATED MARKETING SERVICES

With the current warehousing law dating from 1903, Brazil has well over 100 years experience in this field. The law, which has never been amended, provides for the licensing of *Armazens Gerais* by the Ministry of Industry, Trade and Tourism, and their supervision by the Municipal Boards of Trade (*Juntas Comerciais Provinciais*). Armazens Gerais are prohibited from trading in their own right, and following the normal practice of code-law countries, they issue a two-part warehouse receipt, consisting of a *conhecimento de depósito,* denoting title to the goods, and a *warrant*, to be used in pledging goods to a borrower.

Notwithstanding this long experience, public warehousing has performed poorly with all agricultural commodities except coffee. Problems such as forged receipts first occurred before World War II, but these difficulties were greatly compounded between the 1960s and 1980s, due to the high level of Government involvement in agricultural marketing. Many warehousing companies were formed hurriedly specifically for the purpose of storing Government intervention stocks. Government oversight proved ineffective; they were inadequately supervised and often the object of fraudulent and unprofessional practices, compounded by a climate of impunity where there were few prosecutions. This has lead the sector into disrepute with prospective private sector depositors and banks, and prevented the development of a secondary market for the *conhecimento de depósito* and of borrowing against *warrants*. More recently, these problems have hindered the process of establishing effective systems of price discovery through Brazilian commodity exchanges (see below for further discussion).

There has been some improvement in the situation since 1996, when the National Supply Company (CONAB) started to take corrective action, such as striking non-performing companies from lists of warehouses accredited to handle Government stocks, and in other cases, taking legal action.

Government intervention also had a major impact on market performance as regards grain quality, particularly in the case of maize. Here there were two contributory factors:

- a change in grading practices. Since 1976 Brazil has had an official maize grading system, with three different grades. In Government purchases, prices were differentiated by grade. However, at the beginning of the 80s, it started to pay the same price for all maize bought, classifying it simply as "above" or "below" a single acceptance grade (*padrão)*. Given that Government was the biggest buyer, traders immediately adopted this unofficial system of classification.

- subsidization of warehouse construction. As grain production started to migrate to the Central-Western region, there was an abundance of subsidized "official" investment loans for warehouse construction[2]. This led to the building of many large flat bulk stores without any provision for internal segregation[3].

The combined effect of these two factors was literally the destruction of Brazil's maize grading system. Government no longer required produce to be graded, and the new storage facilities did not allow for segregation.

According to CONAB, the total capacity of agricultural warehouses in Brazil in 1997 was 91 million tonnes, of which 10% belonged to Federal and State Governments, 28% to cooperatives, and 62% to private owners. 65% of total capacity was in bulk form and 35% for bags. A very large, but unquantified part belonged to the Armazens Gerais.

According to a report by CONAB officials, this warehousing network has serious physical shortcomings, with problems of the following kind in many areas: poor location; overcapacity; unsuitable handling design (bag versus bulk); poor quality of installations; inadequate facilities for segregation of cereals by type, grade and age; inadequate quality control equipment and discharge facilities, and; lack of suitable access roads and transport facilities (Coelho da Costa and Tosta, 1995). Relatively little storage capacity is located on farms. Much of this can be attributed to the accelerated and subsidized development of storage facilities under the former regime of Government incentives and pan-territorial pricing.

In practice the legal provision against trading by warehousing companies has been widely flouted. Often they are simply trading companies which have found a profitable niche in Government storage business.

---

[2] "Official" credit refers to loans which are either funded by the Treasury or funded by other sources under special interest rate conditions set by Government.

[3] The scale of the construction boom in Central-West Region can be inferred from the following data. The average capacity per storage unit in Goias, the Region's main producing State, is 12,200 tonnes, more than double the Brazilian average, which is 5,800 tonnes. At the same time the ratio between storage capacity and combined soybean and maize production for Goias and Mato Grosso in 1997 was 1.20, while for the rest of Brazil it was only 0.76.

As government support is reduced, the country increasingly needs strong private services in the areas of financing, storage and market mediation, but finds itself ill-served by a warehousing sector which has developed under public tutelage. In many areas, strong services are provided by co-operatives, but their geographical coverage is patchy, and performance variable. In the case of soybeans, the gap has been largely filled by four international grain companies: Bunge and Born, Cargill, ADM and Louis Dreyfus, which between them now account for almost 50% of soybeans crushed in the country. These companies have greatly expanded their presence under the liberalized policy environment of the 1990s, and are now well represented in producing areas. They have a major role in financing soybean farmers, directly and through co-operatives, against cash forward contracts which are hedged on the Chicago Board of Trade - CBOT.

Except in the case of soya, private buyers' are generally unwilling to finance production of grains, due to their fear of performance failure by farmers. Apart from the State-owned BB, only the co-operative sector regularly finances maize producers on a large scale. Given lack of hedging facilities, sales are normally on a spot basis, which brings a high level of price risk to producers. In the case of common beans, even the co-operatives are largely inoperative, due to a 12% turnover tax which tends to be evaded by their private competitors.

Among senior agricultural officials, there is now a high level of awareness of the failings of the warehousing sector, and of the need to review the Law and institute new licensing and supervisory procedures. There is a widespread belief that the trading role of warehousing companies should be legitimized, along the lines of US practice, with a view to creating a network of local elevator companies providing a range of services to farmers, including spot, forward, delayed pricing, minimum price and other contractual arrangements. Such companies would finance farmers, and given their physical proximity they would be well placed to vet loan applicants with minimal risks of default. The need to reduce and rationalize taxation laws has also been highlighted, particularly with regard to turnover taxes. The main arguments are analyzed in Appendix 2, which contains a copy of an article by Leão de Sousa and Marques (1997) analyzing the competitivity of maize and soya production in the US and Brazil.

As indicated above, CONAB has made some progress in reforming this system, having instituted a full register of warehouses and a system of accreditation for those which may handle Government stocks. It also makes physical checks on stocks. The accreditation criteria so far applied only covers technical performance and debts to Government, and there is so far no system for the oversight of private stocks as exists for example, in the United States. However, this is envisaged under a planned Canadian technical co-operation project.

Warehousing law and relevant tax codes remain unreformed. Among people interviewed by the author, there was a consensus that this is due to vested interests within the warehousing sector itself, there being resistance to any system which will bring companies under closer scrutiny with regard to stocks, taxes and other matters.

Notwithstanding slow progress at an official level, BB is planning its own system of warehouse oversight. Its objective is to select the best warehouses and provide them with the support they need to ensure year-round utilization, thereby minimizing unit operating costs. They will be linked up directly to the Bank's auction system, giving farmers direct access to markets from within the warehouse, and have lines of credit with which to finance production. They will supply inputs on credit or as barter for CPRs[4]. To participate in this scheme, selected warehouses will have to satisfy a strict set of criteria regarding their financial status, technical competence and creditworthiness. Inspection visits will be very frequent - every two months was mentioned, vis a vis a typical interval of 9-12 months in the US.

THE FINANCIAL SECTOR IN THE PROCESS OF AGRICULTURAL REFORM

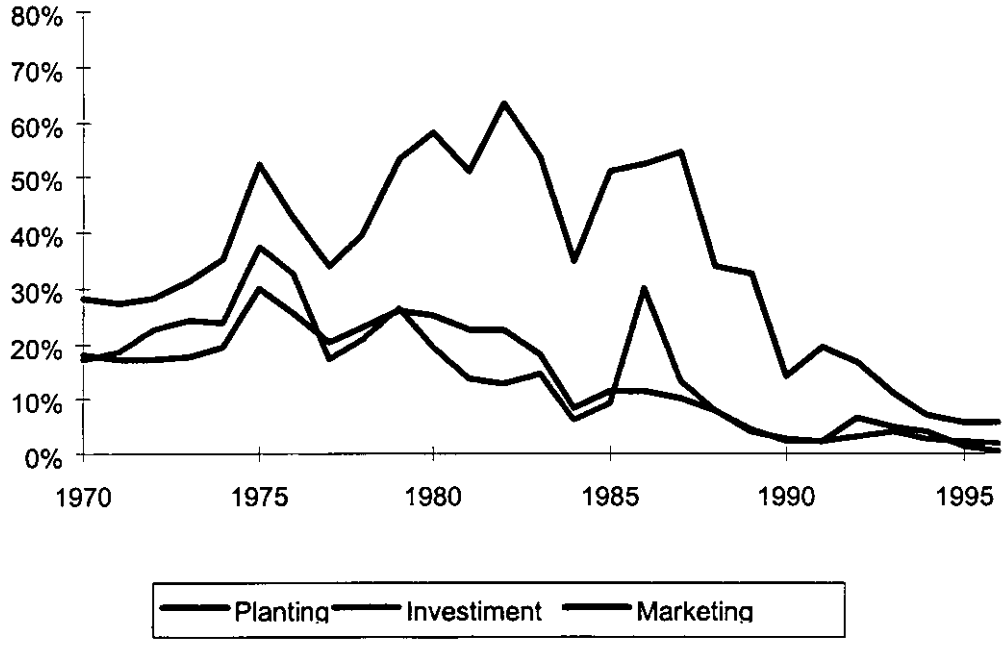
Rural financial services represent one of the most intractable areas for policy reform. While there has been a major fall in the overall level of agricultural credit (see Figures 10 and 11), Government has been unable to extricate itself from heavy involvement in lending

The period of State control has left Brazil with a major State-owned bank, the Banco do Brasil (BB), which has 4,000 branches, and a very large share of the country's agricultural lending portfolio (70-75% according to trade opinion, though the accuracy of this estimate cannot be confirmed). BB has a reputation for sound private-sector oriented management, and has been a proactive player in seeking to improve the performance of agricultural marketing system, through the institution of the electronic auction (LE) and the Rural Product Notes (CPRs - see below).

Source: Banco do Brasil and Central Bank of Brasil

[4] CPR is a kind of a bond that is issued by grain producers in order to do a cash foward contract with grain traders and processors, against the payment in advance.

Figure 10: Brazil - Ratio of "Official" Agricultural Credit to the Gross Agricultural Product



Source: Banco do Brasil and Central Bank of Brazil

The new policies call for competition in financial services to the agricultural sector, but this is made difficult by Brazil's post *Plan Real* interest rate structure, which discourages other banks from lending for agriculture. Commercial interest rates are being sustained at around 27%, or approximately 20% in dollar terms, a rate which at the same time is politically unacceptable among agricultural constituencies.

In practice, there is heavy Government involvement in agricultural lending, with the effect that rates do not exceed 20% in local currency terms. One of the main sources of official credit are the *exigibilidades*, i.e. 25% of cash deposits which banks are required to set aside for agricultural lending at preferential interest rates ranging from 6 to 9.5% per year, depending on the crop and type of producer. Moreover 100% of funds from BB's *green savings accounts* must be used for the same purpose. However, as one would expect with any system of credit rationing, these resources do not meet the demand of the agricultural sector. Many commercial farmers are obliged to borrow informally, at real interest rates of more than 70% per year (pers. comm., ESALQ).

THE DEVELOPMENT OF COMMODITY EXCHANGES AND OTHER APPROACHES TO RISK MANAGEMENT

Commodity exchanges have an important role to play in price discovery and in protecting farmers and other participants in the marketing chain against price risks, as well as banks lending against commodity inventories. This is particularly important in the increasingly volatile post-liberalization scenario which is now unfolding.

The Bolsa de Mercadorias e Futuros (BM&F), the only Brazilian Commodity Futures Exchange, has established futures contracts for soybeans and maize, among other products, but the use of these contracts has so far been very limited, particularly in the case of maize (see Appendix 3). While soybean traders can and do hedge on Chicago[5], a domestic contract would assist in hedging for lean season months, when local prices are poorly correlated with those in the US (*pers. comm.*, ABIOVE).

One of the major constraints to the development of futures contracts is the prohibition on the involvement of foreign investors (speculators), who could provide much-needed liquidity and arbitrage with other exchanges. BM&F has proposed to the monetary authorities that foreign investors be allowed to operate on the futures exchange, but so far there has been no resolution to this effect.

At the same time, BM&F's decision to go for cash settlement contracts in preference to physical delivery[6] discourages some players wishing to use the exchange for the purpose of physical delivery - a key factor in the successful establishment of maize contracts on the South African Futures Exchange (SAFEX). However, BM&F claims that cash settlement brings investors and pension funds onto the futures market, since it avoids the need of taking delivery of physical products.

BM&F's decision also reflects concerns about the prospective enormity of the task of organizing adequate warehousing services, particularly in the case of soybeans. Soybean production is very dispersed, and it would be necessary to accredit many warehouses; overseeing such a network would be difficult. With annual production of around 27 million tonnes, and marketing largely concentrated into a three month period, required storage capacity (100,000 tonnes in several locations) could not be found in the necessary locations.

Related to this are problems of performance failure faced by soybean crushers and exporters financing Brazilian growers. BM&F argues that the creation of physical delivery arrangements could create massive demands for beans from crushers and exporters seeking to avoid procurement costs and performance risks on cash forward contracts.

---

[5] According to Margarido and Leão de Sousa (1998), about 70% of CBOT's soybean price changes are instantaneously transmitted to Brazilian soybean producers prices.

[6] Only in the case of coffee, has BM&F licenced warehouses for delivery of produce. Physical delivery is possible for sellers (not buyers) of maize, through an auction system, but in the case of soya, it requires exceptional agreement between the contracting parties.

By contrast, Leão de Sousa and Marques (see Appendix 2) emphasize as a major constraint on BM&F the lack of a strong primary marketing sector along the lines of US elevator companies. US farmers themselves make limited direct use of futures and options markets, but indirectly benefit through local elevator companies who offer a range of contractual alternatives to farmers, hedged by their own positions on these markets.

A further factor inhibiting the development of futures contracts is their very transparency. According to some sources, many Brazilian companies are afraid that such involvement will increase the level of taxation that they will have to pay. This underlines the need to rationalize and simplify Brazilian tax codes. In Colombia, an exemption from taxation at source has been successfully used to bring trading within the ambit of the Bolsa Nacional Agropecuaria, a measure which has moreover facilitated income tax collection at end of year.

As noted above, Brazil also has 28 cash commodity exchanges operating in different State capitals and other trading centers, formed for the main purpose of auctioning Government stocks. While certain exchanges are reported to be considering the establishment of cash contracts for cereals, and three have brokerage arrangements with BM&F, they have not so far developed a significant role in the development of private marketing systems. Many of them are unlikely to survive the reduction in public-sector procurement.

Among Latin American commodity exchanges, there is much interest in developing linkages between countries and exchanges. The Argentinian exchange Bolsa de Cereales de Buenos Aires has been seeking to create a delivery location for wheat in Brazil. This has so far not materialised, due to local taxation issues and inability to strike an agreement with a suitable local partner.

Probably the most significant development in risk management with grains in recent years has involved the international companies which as noted above now have a major role in financing soybean farmers, against cash forward contracts. They have greatly expanded their presence under the liberalized policy environment of the 1990s, and are now well represented in producing areas.

In recent years there have been various attempts to institute commodity-backed securities, including CMGs[7] and CPRs. They are issued by farmers usually at some time before planting or before harvest, when they require financing for land preparation or inputs. They specify a given quantity and grade of the commodity in question, to be delivered at a given location at a particular date in the future. They are then guaranteed by BB, which sells them, either through its electronic auction system or over-the-counter, paying the farmer the proceeds of the sale less the cost of financing up to the date of delivery and a fee – from 6 to 8% of the value of the transaction. The Bank itself requires the farmer to put up collateral in order to participate in this scheme - normally a mortgage on his property.

[7] Commodity Certificate with Guaranteeed Delivery - a private instrument similar to the CPR but no longer used.

CPRs have enjoyed some success in the case of soybeans and coffee, due to the BB's central role in guaranteeing performance, thereby virtually eliminating those performance risks usually associated with forward purchases from farmers. Moreover, the existence of futures markets for these commodities allows BB to indicate to farmers the likely price realization. In the case of soybeans, quantities traded peaked at 393,000 tonnes in 1995/96 (1.5% of total production) but fell in the following two years (see Appendix 4). Demand appears to be constrained by the competing services of international grain companies offering similar facilities. Here, it is worth highlighting these companies' direct access to dollar finance, which often places them at an advantage to domestic competitors. Certain commentators also claim that uptake of CPRs is limited by the level of fees charged, the absence of competition from other banks and the high level of the interest rates practiced nowadays. Another difficulty is the risk arising from the absence of crop insurance.

Finally, BB has been studying the possibility of bank loans linked to futures contracts and put option contracts. The former would minimise price risks, while the latter would guarantee a minimum price to the producer without him losing the opportunity of earning when prices go up. Because liquidity on BM&F, coffee must be the first commodity to experience this kind of financial operation.

MAIN CONCLUSIONS RE BRAZIL

Brazil has major production potential, both in terms of area expansion and productivity. The reforms of this decade are increasing market efficiency and reducing the budgetary cost of agricultural support programmes, but further reforms in the grain storage and trading sectors are needed to fully unlock the country's productive potential.

Among Ministry of Agriculture officials and other associated with the sector, there is considerable awareness of the problems and possible solutions. There is now need for initiative at a political level to convert this awareness into practical policies. It would be appropriate for the monetary and fiscal authorities to take a leading role in this process.

Reform of the warehousing law and the institution of effective oversight systems, which will ensure the creation of an efficient warehousing sector, are two major priorities. Two public sector institutions (BB and CONAB) have plans for oversight. These ought to be discussed among key stakeholders (farming and trading interests, traders, agro-industry, banks, researchers etc.) with a view to optimizing design and minimizing duplication of effort. If possible, warehouses should be opened up to stocks financed by different banks.

In designing oversight systems, relations to the State should be given careful consideration. Given the experience of the past, a key question for the 21st Century would be: How can a professional system of regulation be instituted, effectively insulated from short-term political pressures?

Systems of oversight can be inexpensive in countries with well established commercial mores, backed by an effective legal establishment - the Ohio State system costs about 6 US cents per tonne of grain handled. It will be much more expensive in countries without such an institutional background; at least in the early stages systems will need to be relatively draconian, and costly. This understanding is clearly enshrined in BB's oversight plans referred to above.

IMPLICATIONS FOR AFRICA

Brazilian experience may be useful to African countries in helping to plan their future agricultural development, and in avoiding pitfalls. Many countries experience similar socio-political realities to those which have characterized Brazil over the last century, notably weak regulatory and legal systems, widespread areas of business impunity, and Governments prone to bouts of heavy interventionism.

With the exception of South Africa, and port areas of other countries, the concept of agricultural warehousing is little developed in Africa. A notable exception to this has been the initiative of international inspection companies, which have set up warehouses to serve their multinational clients. These have increased their involvement in recently liberalized markets such as Zimbabwe and Zambia. Some parastatals, e.g. in Zimbabwe and Ghana, have likewise entered the storage business, acting for private clients. These initiatives still leave much to be done to fully develop private storage activities, and decisions to be taken about the leasing and/or sale of Government stores in ways which facilitate efficient marketing and minimise inter-seasonal price variability - some countries experience average coarse grain price variability of 75% or more between harvest and lean season.

The main lesson from Brazilian experience is to avoid a situation whereby warehousing services can become dependent upon political processes. Such mistakes can easily be repeated by Governments eager to establish their credentials in rural areas; indeed this was demonstrated in one African country where the Government tried to implement a warehouse receipt financing scheme shortly before general elections in 1996. Shortly before the harvest, private companies were asked to tender for warehousing contracts. In reality the scheme never went ahead, since there was insufficient time to organise it; various local observers were very relieved. Given major defaults which had occurred with a previous marketing credit scheme, and the shortage of time available to plan and implement the new initiative, there was a real danger that poorly qualified operators would be selected, with altogether adverse results.

Governments will inevitably try to intervene from time to time in agricultural markets, but one should at least try to avoid creating a weak warehousing industry which becomes dependent on such measures. There appear to be two ways in which this can be done:

- a laissez-faire option - deliberately avoiding complex legal and regulatory arrangements, with the result that such services are provided mainly by international inspection companies, and other international companies which have the confidence of the international banking community;

- a licencing and inspection system sanctioned by Government, but deliberately insulated from the political process, and with its own sources of financing (e.g. a levy on all produce moving through the marketing chain) and delegated authority to ensure compliance with the law (e.g. by closing warehouses).

The advantage of the latter system is that it could greatly increase the number of companies, particularly local companies, qualified to operate warehouses to the standards required by all interested parties (including the international banking community), and the number of prospective depositors and borrowers making use of warehouse receipts. The main disadvantage of this arrangement is the difficulty of enlisting and maintaining the support of Government and other key stakeholders. Governments would need to be convinced that by relinquishing direct political control over the licencing process, they will ultimately increase domestic value added and participation in the marketing process.

If African countries opt for the licencing of warehousing companies under a specific legal framework, Brazil's experience suggests that such companies should be allowed to trade in their own right, as this will enhance financial viability and ensure stock turnover. At the same time, there needs to be a *quid pro quo* - licensees should guarantee farmers and others access to storage space, without placing them under undue duress to sell to the warehousing company. The law and regulatory authorities will need to find the right balance in terms of incentives and obligations so that all parties feel motivated to work in this way.

In establishing warehouse receipt financing, the existence of viable commodity exchanges is a particularly favourable development, since they provide for price discovery and a means by which banks can easily liquidate the debt of defaulting borrowers. However, Brazil's difficult experience in this area tends to confirm African and Eastern European experience, i.e. that in developing countries and emerging markets successful exchanges are few and far between. A probable explanation to the differing experience of BM&F and SAFEX is the latter's access to reliable storage services, provided by long-established co-operatives who enjoy the full confidence of the banking system (Norvell, 1998). Given that comparable networks do not exist in other African countries, this suggests that the best strategy will often be to establish a strong network of licensed warehouses before considering establishing a commodity exchange. This can subsequently form the basis for local commodity exchanges, or for building links with commodity exchanges in other countries. Donor funds could legitimately be used to cover much of the cost of setting up licencing authorities, given that these would constitute a public good facilitating the development of really efficient marketing systems.

The development of Rural Product Notes (CPRs) is an interesting innovation which may be of interest in the African context, as a means of pre-financing production and marketing processes, while locking in favourable prices. However the system requires a strong and widely represented financial institution to guarantee the document. In many African

countries, the weakness of branch banking systems creates a significant barrier to instituting such arrangements. In Brazil, CPRs have so far only found favour with larger farmers who can provide tangible collateral to the Banco do Brasil; it would be difficult to set up such a scheme with African smallholders, as these typically lack physical collateral. Moreover for

reasons indicated above it is unlikely that many countries will have facilities whereby buyers can hedge their risks.

In some countries, a more viable alternative will be to create a security backed by warehouse receipts, as currently planned by the Bolsa Nacional Agropecuaria in Colombia. In this case, Colombia starts with one major advantage, i.e. a reputable if somewhat over-regulated warehousing sector.

One further area where there are possible lessons for African countries is with official price support (see Box 1). Imaginative use of market-based mechanisms has allowed the country to drastically reduce the costs of such support.

REFERENCES

Bremen, A. A comercialização dos estoques governamentais de milho (Safra 1996/97, in: *Revista de Política Agrícola,* 4/97, p3-4.

Coelho, C.N. and Henz, R.A. (1997) *Agricultural Policy in Brasil: Development and Prospects.* Agricultural Policy Secretariat, Ministry of Agriculture. Mimeo.

Coelho da Costa, R and Tosta, E.J. (1995) Armazenagem: diagnóstico e perspectivas, in: *Revista de Política Agrícola,* 3/95, p18-27.

Leão de Sousa, E.L. and Marques, P.V. (1997) Competitividade do milho e soja nos Estados Unidos e Brazil, in: *Preços Agrícolas*, November 1997.

Margarido, A.M. and Leão de Sousa, E.L. (1998) *Formação de preços da soja no Brasil.* Paper submitted to Revista de Economia e Sociologia Rural, Brasília.

Nayro, C.N. (1997) O plano real e o desempenho da agricultura, in: *Revista de Política Agrícola,* 4/97, p17-27.

Norvell, N. (1998) *The Role of Warehousing in Africa - Lessons for Warehousing Receipt Financing from South Africa, Tanzania and Uganda.* Report completed under the DFID Crop Post - Harvest Research Programme Project AO 726, June 1998.

Schouchana, F. (1997) Mercados Futuros e Opcoes Agropecuarios no Mundo e no Brazil, in: *Preços Agricolas*, October 1997.

APPENDIX 1: LIST OF PERSONS MET

Sr Helio Sirimarco, Río de Janeiro	Former Executive Director of the Bolsa Brasileira de Futuros
Fundação Getulio Vargas, Río de Janeiro	Antonio Salazar P. Brandão, Diretor
Ministério da Agricultura e do Abastecimento	Célio B. Porto, Coordenador Geral de Programaçao e Avaliaçao Carlos Nayro Coelho, Coordenador Geral
CONAB, Brasilia	Pedro Sérgio Beskow, Gerente, Departamento Técnico Operacional
Banco do Brasil, Brasilia	José Carlos Vaz María Auxiliadora D. de Souza Irineo dos Santos Newton Augusto Marcelo Chaves Marcio Mesquita
Organização das Cooperativas Brasileiras	Celso Luiz Claro de Oliveira, Assessor Internacional Diógenes Pereira C.A. Aguiar, Gerente de Projetos, International Cooperative Alliance Luiz Carlos Colturato and Evandro Scheid Ninaut, Departaménto Técnico e Económico
ESALQ, Piracicaba	Geraldo Sant'ana de Camargo Barros, Professor Danilo Macarini Umbelino dos Santos José Vicente Caixeta Filho Eduardo Luis Leão de Sousa Prof. João Martines Filho
Federação da Agricultura do Estado de São Paulo	José Cassiano Gomes dos Reis Jr, Assessoria da Presidencia
Bolsa de Mercadorias & Futuros, São Paulo	Antonio Bueno, Senior Economist Félix Schochana, Gerente de Merc. Agrícolas Renato Teixera da Costa, Gerente de Clasificação
ABIOVE	Fábio G.B. Trigueirinho, Secretário Geral
Bolsa de Mercadorias do Río Grande do Sul	Noel Moraes Vieira, Superintendente Geral
Organização das Cooperativas de Parana (OCEPAR), Curitiba	Guntolf van Kaick
Bolsa de Mercadorías de Paraná	Frederick Frank Bueno, Superintendent
Bolsa de Cereais e Mercadorias de Londrina	Antonio Abrão, Diretor Presidente
Cooperativa Mista Bom Jesus Ltda., Lapa	Milton Locatelli, Diretor Secretário Luiz Roberto Baggio, Diretor Presidente

APPENDIX 2

Corn and soybean competitiveness in the U.S. and in Brazil

Eduardo Luis Leão de Sousa[1]
Pedro Valentim Marques[2]

1. Grain production and transportation

Several factors contribute to the great competitiveness of U.S. grains, which are grown in the Midwest, in the region known as *the corn belt*. The first factor is a combination of excellent physical and chemical properties of alluvial soils and topography, the extraordinary flatness of the central plains making possible fully mechanized farming. These conditions, coupled with the use of high technology, ensure high average productivity rates—7,500 kg of corn and 2,700 kg of soybean per hectare , as compared with 2,700kg and 2,100 kg , respectively, in Brazil. Granted that the production systems in Brazil are extremely heterogeneous, particularly as regards corn, resulting in great differences in average productivity, the fact remains that soil and climate conditions in the grain -producing region of the U.S. allow a significant reduction of costs, thereby increasing the comparative advantage of the U.S. over competitor grain-producing countries.

Another important factor is associated with the logistics of grain distribution: the predominance of railway transportation and wide use of river transportation, particularly for export products (see fig. 1 and Table 1 for major flows and output volume).

The waterways system serving the corn belt, consisting of the Mississippi River and its main tributaries--the Missouri and Illinois--, is navigable throughout and flows into the Gulf of Mexico where the U.S. has its principal grain exporting port. To have an idea, freight between Illinois and the Gulf, a

---

[1] Eduardo Luis Leão de Sousa, Agronomist, M.S. and Doctoral candidate in Applied Economics, Luiz de Queiroz College of Agriculture, , University of São Paulo, Piracicaba, State of São Paulo. Winner of the 1996 BM&F - The Commodities & Futures Exchange/USP/ESALQ Agricultural and Livestock Derivatives Markets Prize. E-mail: ellsousa@carpa.ciagri.usp.br. This paper was originally published in Portuguese in the "Preços Agrícolas", ano XI, no. 133, nov 1997. This magazine can be found at the following Internet address: http://pa.esalq.usp.br

[2] Pedro Valentim Marques. Ph.D. Associate Professor, Department of Agricultural Economics, Luiz de Queiroz College of Agriculture, University of São Paulo. Has worked actively in the area of Agricultural and Livestock Futures Markets. E-mail: pvmarque@carpa.ciagri.usp.br

distance of approximately 1,200 km, costs about US$7.50/ton by river and US$11.00 by railway. In Brazil land transportation between Montividiu (GO) and the port of Santos—a distance of approximately 1,100 km – costs about US$40.00/ton in May 1997.

Figure 1. **Map of the United States showing the main corn and soybean producing states in the corn belt and the major export route**

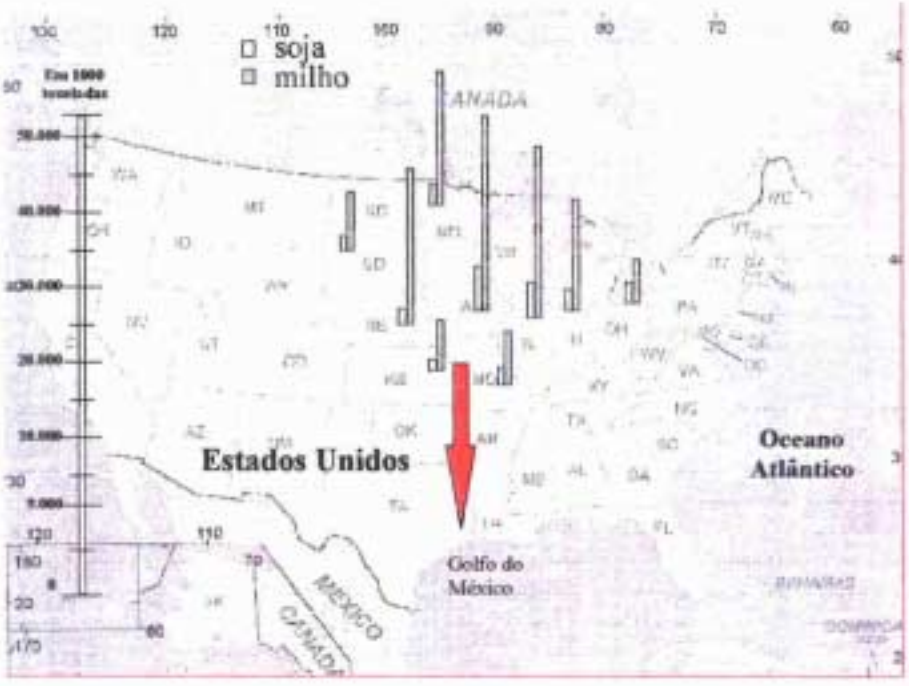


Table 2 compares the shares of the different modes of transportation in the total volume of grain transported in the two countries, showing the heavy use of land transportation in Brazil, which greatly increases the final cost of the commodity. According to GEIPOT (1997), the average transportation cost of bulk farm products in Brazil may be as high as US$22.41/ton. This represents, for instance, 20 percent of the average price of corn.. However, this cost may drop to US15.10/ton by the year 2000, according to a simulation which consider some proposed improvements and some projects under way or already scheduled, which will change the share profile of the different modes of transportation, favoring railroad and river transportation over land transportation.

Table 1. Soybean and corn production in the main producing states of the U.S.1996 (In metric tons)

State	Soybean	Corn
Iowa	11,315,664	46,756,717
Illinois	10,856,424	39,972,216
Minnesota	6,101,423	23,642,336
Indiana	5,542,988	18,243,038
Ohio	4,276,711	8,307,134
Missouri	4,078,047	9,663,762
Nebraska	3,686,163	32,300,533
South Dakota	2,470,505	10,069,254
Kansas	2,013,850	9,720,912
Other	14,601,355	54,237,496
Total	**64,943,130**	**252,913,398**

Source: USDA

Table 2. Modal shares in the total volume of grain transported in Brazil and in the United States (In percent)

Mode of transportation	Brazil	United States
Land	81.49	28.3
Railroad	16.14	48.8
Waterways	2.37	22.9
Total	100.0	100.0

Source: GEIPOT/Department of Transportation (1997) and Norton, Bertels, and Buxton (1990)

It is clear that the features pointed out make U.S. grain production and transportation highly competitive. But a very efficient marketing structure also plays an important role in making U.S. products cheaper and thus competitive on the international market.

2. Marketing structure

The marketing of grain in the U.S. is done almost entirely through *elevators* (Fig. 2)--a combination of general and grain warehouses--, as they

derive their income from both buying and selling grain and from grain drying and storage services provided to producers and processors. Elevators play a fundamental marketing role and possess features that make possible gains in efficiency and makes the final product more competitive.

Figure 2. **The Andersons warehouse in Champaign, Illinois with a static capacity of more than 300,000 tons**

The first of these features is the high degree of competition among elevators: there are almost 12,000 elevators in the U.S., with a fixed storage capacity of 230 million metric tons, i.e., and average of approximately 20,000 mt per elevator (Table 3). Owing to this stiff competition, elevators operate with very narrow commercialization margins—about 1.5 percent—and significantly more competitive storage rates than in Brazil. These storage rates may even be waived in years of poor crops.

Table 3. Number of elevators in the U.S in the main producing states
Static storage capacity (In metric tons)

State	No. of elevators	Storage capacity
Iowa	694	28,845,114
Illinois	1,150	30,399,012
Minnesota	705	13,173,994
Indiana	486	9,395,069
Ohio	549	9,o61,474
Missouri	103	1,714,230
Nebraska	587	17,736,294
South Dakota	297	3,322,613
Kansas	889	22,693,412
Other states	6,406	93,707,703
Total	**11,866**	**228,046,915**

Source: Agricultural Statistics Board, USDA (1995)

Another interesting function elevators perform is that of buyers or intermediaries and consolidators, acquiring grain from the producers and reselling it in large lots to larger enterprises such as Cargill or ADM, in a market highly concentrated in four companies who together account for more than 75 percent of all U.S. soybean and corn processing and exporting.

One last prominent feature is the high level of professionalism of traders, who are 100 percent protected by hedge operations on the Chicago Exchange, which does effectively encompass all futures transactions on the U.S grain physical market. In 1996, the volume of soybean traded on the CBOT was almost 2 billion tons, approximately 15 times the world 's production of this commodity. Also in 1996, over 2.5 billion tons of corn were traded, i.e., more than five times the world's production in that year.

Let us now look at the types of contract between producers and elevators and the importance of the futures market in reducing transaction costs owing to lower risks and the transparency and liquidity of the sector.

Operations and contracts

As a rule, elevators set the buying price of products in storage or for future delivery. Quotations may change several times in the course of a day, depending on the oscillations on the CBOT. Elevators offer a wide range of contracts, according to the commodity, crop stage, region , and the policies of individual elevators. Basically, the most common types of contracts are as follows:

1. Storage. Covers services rendered, such as grain drying and storage: costs depend on the length of storage time. In Brazil this activity is carried out basically by General Warehouses and is regulated by a law--in force since the beginning of the century (!)--, which prohibits them to engage in any buying, selling, or intermediary transactions. Article 8. 4) of Decree 1102 of November 21, 1903 disposes of this matter quite incisively:

> *General warehouses shall not engage in trading in merchandise of the same kind as the merchandise they propose to store nor acquire for their own account or for third parties any merchandise offered for sale in their establishments, not even for private consumption.*

Apparently, the purpose of such restriction is to prevent or make difficult any improper withdrawal of grain from the warehouses. But experience shows that despite the prohibition to market such commodities, irregularities do occur, as has been found in the past in connection with government stocks. The law, then, must be harsh in punishing proven unreliable depositaries.

It goes without saying that this restriction accentuates even further the imperfections of the physical market, thereby increasing transaction costs. It encourages informal negotiations, a common practice between warehouses, which preempts trading with large businesses, for instance, in addition to hindering a higher degree of professionalism and reliability in the sector. Also, businesses who restrict themselves to providing storage services cannot increase their earnings by engaging in marketing and have fewer chances of a more rapid turnover, which would allow them to spread their fixed costs.

As Table 4 shows, the average price of storage in the state of Illinois is half the current price in Brazil. Storage of grain with 15 percent moisture over a

six-month period costs the U.S. producer $7.25 per ton or less than $0.20 per bushel. In Brazil, the average cost of the same service to the producer would be upwards of $16 per ton or more than $ 0.40 per bushel.

Table 4. Average rates of grain storage in the State of Illinois

	US$/ton
storage the first three months	4.40
monthly rate after three months	0.70
drying above 14 percent moisture	0.75/percentage point

Source: The Andersons (Champaign, Ill.), Clarksons Grain Company (Cerro Gordo, Ill.) and data provided by Rural Extension Professor Darrel Good, University of Illinois.

2. Spot sale. Spot sales, together with the cash forward contract market, is the most common form of grain acquisition. They usually take place at harvest time and the product is bought upon arrival at the elevator.

This is another crucial difference between Brazil and the U.S. regarding this type of operation. In Brazil this operation would be subject to a series of cascade taxes and differentiated treatment according to destination. Thus, a merchant must pay several taxes on his receipts: COFINS [Contribution for the Financing of Social Security] (2 percent), PIS [Social Integration Program] (0.65 percent), CPMF [Temporary Contribution on Financial Movements, i.e., a check tax] (0.20 percent), ISS [Tax on Services] (3-5 percent), in the case of brokerage and/or storage services, in addition to being subject to various forms of ICMS [Tax on the Consumption of Goods and Services], which may or may not be deferred, depending on the State of origin, the State of destination and on whether the buyer is a feed company or a food industry. There is also the income tax and the social security contribution. In addition to these direct costs, the merchant must monitor closely the collection of these taxes and keep abreast of the frequent changes of tariffs and rates, concerns an American merchant does not have, as total taxes on the sale and acquisition of grains in the U.S. is 0.0 percent. The only tax the American merchant must pay is the income tax on business profits at the end of the fiscal year.

Because of favorable tax policies and intense competition, an elevator can operate with very narrow marketing margins. In fact, elevators in the corn belt operate with a margin of 4-6 cents/bushel in the case of corn and 6-8 percent in the case of soybean, which is equivalent to approximately 1-1.5 percent of the total commodity value.

3. Cash forward contract. According to a survey by Texas's A&M University[3], 46 percent of U.S. soybean and corn producers resort to this type of contract, whereby the merchant contracts to buy the commodity at a future date at a preset price to be paid against delivery. It is worth noting that the benchmark price is always the CBOT price minus the basis (the difference between the commodity's quotation on the futures market and the quotation on the physical market in a given location). This basis is calculated daily on the basis of a historic average. This price is posted daily by each elevator and cannot differ very much from that of the nearest competitor, as, competition being tough, a producer would not hesitate to drive a few more miles to sell his product to a neighboring buyer. Thus, each elevator daily sets the basis, which together with the margin will be subtracted from the CBOT quotation for the month when the product will be delivered, the result being the final price contracted with the producer (Table 5). It should be noted that, after the basis is set (the risk will be assumed by the elevator), the futures contract price can change several times in the course of a day according to the oscillations on the Exchange. But once the contract is signed, the price agreed upon at the moment of the transaction shall prevail and must be paid to the producer on the agreed date against delivery of the product.

Table 5. Illustration of how price is set for a cash forward contract

Activity	**US$/bushel**
CBOT quotation of corn for September '97	2.59
(-) Basis of merchant X in Indiana on 7/15/97	0.12
(-) Marketing margin	0.05
Price to be paid upon delivery at harvest time	2.42

Thus the producer lowers his risks by guaranteeing a price for his product in a transparent manner without resorting directly to the Futures Exchange, as this

[3] This survey was done in 1989 in 13 states of USA. Answers were obtained from 3,494 agricultural producers, of whom 840 were soybean and/or corn producers.

would entail costs associated with a commercial letter, mark-to-market deposits, price risks, and the monitoring and management costs of the transaction. Brokerage costs are also expected to be lower for elevators than for producers, as they trade in large volumes with brokerage firms.

4. **Delayed price.** This type of contract allows the producer to deliver grain in the present and to sell it at anytime in the future. The advantage of this type of contract is that, differently from simply storing the commodity, the elevator is allowed by U.S. law to sell it and to assign it, offering the producer more attractive prices than storage prices.

5. **Minimum price contracts.** These are futures contracts between elevator operators and producers setting a minimum price and a date for future delivery. Prices are based on the strike price of a put option bought by an elevator, minus the premium paid and the basis. Thus the producer still has the opportunity to sell on the market if the market price is higher than the contract price, after paying the premium paid by the company plus financial costs.

These are the more common types of contracts but there are others, such as hedge-to-arrive, which allows the producer to set the final price, leaving the basis open. Combinations of buying and selling option contracts are also utilized, guaranteeing a minimum price; however, the option for a lower premium will restrict gains to a given limit. There is, then, a wide range of mechanisms that can be chosen by a producer, according to whether he is more or less inclined to take risks. These mechanisms are gaining increasing importance, owing to the U.S. government's policy to steer away from subsidies.

Brazilian agriculture and the role of futures markets in Brazil

Our intent was to point out some aspects that make U.S. farm products more competitive as a result of efficient production, transportation logistics and marketing structure. Now we would like to point out some characteristics and trends of soybean and corn marketing in Brazil and to make a comparison with the U.S. model, as well as suggesting ways likely to make this agricultural sector more efficient.

Brazilian producers are great risk takers, as effective protection mechanisms against sharp fluctuations of farm prices are little utilized. On the other hand, the grain crushing and exporting industry shows a clear, inevitable tendency towards concentration, similar to what already occurs in developed countries.

In recent years Brazil has been the scene of great business deals involving acquisitions and mergers and witnessed the arrival of international trading companies operating with significant volumes in search of economies of scale. With a higher level of concentration of the buying sector, less transparency may occur, thereby increasing the risks to producers. Thus, the existence of a dynamic futures market which clearly reflects market expectations may attenuate the shortcomings of the physical market, minimizing risks and lowering transaction costs.

A big question is why grain futures markets have been so slow in taking off in Brazil, as they possess the main desirable features needed for implementation. If we look at corn, for example, we see that the corn agribusiness chain satisfactorily meets the main requirements to ensure the success of a futures market: very significant financial and physical volumes, amounting to almost R$5 billion a year in agricultural production alone; high growth potential (upwards of 5 percent yearly over the last decade): highly diversified use; significant price volatility and product liquidity; no direct competition with international Exchanges, as the correlation between domestic and international prices is quite low; the recent economic stability; and, lastly, less government intervention in recent years, resulting in wider risk exposure.

A paradoxical situation is thus evident: the market lacks effective protection against the high price risks inherent in the activity and yet no advantage is taken of this protection mechanism. Granted, the design of futures contracts in Brazil is adequate; but these conditions for the success of a futures market, although necessary, would not by themselves be sufficient to make it a reality.

One possible explanation for this apparent paradox could be the inadequate marketing structure of the physical markets, consisting as it does of a small number of large businesses which by themselves cannot ensure the liquidity of the Exchanges and of a large number of producers who are not cognizant of this mechanism. Although the Commodity and Futures Exchange-BM&F is actively implementing a familiarization program through courses and lectures aimed at rural producers, dissemination of this knowledge is slow

and the majority of producers have difficulty in obtaining access to the mechanism and in making it operational for themselves. Even in the U.S., where the CBOT has operated with high liquidity for over a century, only 12 percent of soybean and corn producers responding to a Texas A&M survey had operated directly on the futures exchange. In addition, the brokers themselves prefer to work with businesses who negotiate various contracts several times during the year, instead of working with producers who engage in hedging only one transaction a year, which covers only part of their production and brings brokerage firms only a modest revenue. It becomes clear, then, that although it is crucially important for producers to familiarize themselves with this instrument, in most cases its utilization entails high transaction costs for both parties.

One possible way to attenuate the difficulties in generating liquidity on Brazilian exchanges might be to modify the marketing structure of physical markets by ensuring the viability of firms to provide storage and marketing services to producers and industries on the model of U.S. elevators. The first advantage of such a model is that these agents could buy grain from farmers at lower administrative and operational costs than from large businesses, as these must set up costly field and management personnel structures, have a fleet of cars to visit farms throughout the region, maintain offices in the various producing regions to negotiate directly with farmers, and invest in credit risk analysis, as they often advance funds to farmers for planting their crops. These merchants could amass larger volumes of grain to resell to the large industries at lower cost and in a surer and more efficient manner, as their units would be located directly inside the producing regions' micro-environments. Industries would also benefit from acquiring large lots, which would allow better logistic and industrial planning.

In addition to reducing transaction costs, such a structure would encourage contracts, which would mean price security for the farmers and assurance of supply for the merchants. Finally, giving support to this model, the Futures Exchange would come into play, indirectly making its utilization viable for farmers as well as ensuring greater efficiency and a lower level of conflicts in the chain by reducing uncertainties and enhancing transparency, as the value of contracts would follow the exchanges, who would assume an important role as price indicators.

It might be argued that cooperatives could perform this function. Sure, many have a quite dynamic profile and have shown interest in seeing the exchanges strengthened . However, besides the fact that their number is relatively small in Brazil, conflicting interests and the diversity of their activities may often lead to higher operational costs.

The incorporation of the General Warehouses into this system could inject a much desired higher degree of competition in the market, as, according to a survey done by CONAB in August 1997, there are approximately 6,400 registered grain warehouses in Brazil, with a static capacity of almost 60 million metric tons.

But the introduction of this model faces a series of barriers and difficulties already mentioned, such as the current legislation governing the General Warehouses, which prevents them from selling the grain they store; a distorted and burdensome tax system, which reduces the agents' competitiveness and encourages informal trading; and the lack of a free market tradition, as the Government is the principal buyer.

However, some initiatives that have permitted a greater progress in the restructuring of Brazil's farm policy model should be mentioned, namely, the introduction of government put option contracts, which allow the government to act on the market in a transparent, more localized, and less costly manner; the effort on the part of the exchanges and universities to disseminate the knowledge about farm futures markets among farmers; and the creation of discussion forums and sector chambers which bring together the various agents on the agribusiness chain to discuss problems and seek solutions to existing conflicts.

In conclusion, a definitive solution to the marketing of grains in Brazil requires, as a top priority, a drastic modification and reorganization of the physical markets, currently in the straight jacket of an obsolete tax system and of a legislation whose efficacy must be reexamined; and the designing of a sustainable farm policy with clear and firm rules, so that the sector may finally restructure itself to compete in an increasingly globalized economy.

Bibliography

Colling, P. *Factors impacting the potential success of futures markets.* Paper prepared for the 4th Annual Meeting of the Pan American Commodity Exchange Association, 1996.

Fruin, J.E., W. Halbach & L.D.Hill. *Corn movements in the United States.* Agricultural Experiment Station, College of Agriculture, University of Illinois at Urbana-Champaign, 1985.

GEIPOT—Brazilian Transportation Planning Company, Ministry of Transportation: proposed measures to overhaul the transportation infrastructure and to rationalize transportation of bulk farm products. April 1997.

Good, Darrel. *Using futures markets to manage price risk.* Cooperative Extension Service, Department of Agricultural Economics, University of Illinois at Urbana-Champaign, December 1986.

Leuthold, R.M., J.C. Junkus & J.E. Cordier. *The Theory and practice of futures markets.* Lexington, MA, Lexington Books, 1989.

Norton, J.D., P..J. Bertels & F.K. Buxton. *Transportation of U.S. Grains: a modal share analysis,* USDA, Washington-DC, 1980.

SIFRECA—Agricultural Cargo Transportation Information System, June 1997.

Smith, R.D. *National Assessment of Producer Marketing Alternatives: Practice and Attitudes.* College Station, Texas Agricultural Extension Service/Texas A&M University/USDA, 1989.

The Andersons, Contract description. Urbana-Champaign, Illinois, 1997.

USDA. Agricultural Statistics Board. NASS, 1995.

APPENDIX 3: AGRICULTURAL CONTRACTS OF THE BOLSA DE MERCADORIAS E FUTUROS (BM&F)

The following table shows annual values of BM&F futures contracts in millions of US$.

TABLE 3.1: BM&F FUTURES CONTRACTS FOR AGRICULTURAL COMMODITIES - ANNUAL VALUES IN MILLIONS OF US$

Year	Sugar	Live Cattle	Coffee	Soy-beans	Cotton	Maize	Total
1991		13	109				121
1992		48	354				402
1993		55	681				736
1994		54	1,232				1,286
1995	18	327	1,260	20			1,625
1996	23	915	1,488	127	30	11	2,595
1997	32	884	2,301	101	108	65	3,490

The value of has grown by about 60% per annum since 1992, but as indicated by Shouchana (1997), agricultural commodities still represent a tiny proportion of the total value of derivatives traded by BM&F, the fourth largest futures exchange in the world. In the United States, agricultural contracts averaged 15% of the total number of contracts traded on futures exchanges between 1992 and 1996, but in Brazil, the relevant figure for 1997 was about 0.05%.

Contracts for coffee and live cattle represented 91% of the total value traded in 1997. As noted in the main text, coffee is the one commodity for which BM&F has accredited warehouses operating as delivery locations. In the case of live cattle, by contrast, the system of cash settlement is preferred by the trade, as it obviates problems associated with fraudulent fattening.

The value of soybeans traded in 1997 represented approximately 1.5% of the national trade in this commodity. Major buyers continue to hedge on Chicago. For maize the value traded at BM&F was approximately 2.7%.

Given this situation, and the considerable potential of the Brazilian market, BM&F is devoting significant resources to the expansion of its agricultural turnover. According to the latest annual report and conversation with BM&F staff, the following approaches are being pursued:

- Launching cash contracts based on Rural Product Notes (CPR) based on sugar, cotton, livestock, Arabica coffee, corn and soybeans, with provision for cash settlement. This will provide support to the securitisation of agricultural receivables, attract more funds into the sector, and more closely align sector profitability with interest rates.
- Promoting futures contracts as hedges to purchasers of CPRs.
- Instituting an Agro Fund of which at least 51% has to be invested in domestic agribusiness securities including futures contracts.
- Opening of regional offices in six different locations where agricultural businesses are most active, to decimate information, attract new customers and provide logistical support to brokers.
- Educational work including the promotion of arbitrage operations between different markets.

Development of a call options market, together with the Federal Government, based on Government stocks of agricultural commodities, including coffee, corn and others. This mirrors the Government initiative in providing put options for farmers.

APPENDIX 4: STATISTICS ON RURAL PRODUCT NOTES (CPRs) GUARANTEED BY THE BANCO DO BRASIL

POSITION AS OF 16.03.98

PRODUCT/ HARVEST		VALUE IN R$'000	QUANTITY IN TONNES OR '000 LITRES	NUMBERS OF CPRs
ALCOHOL	**94/95**	**1,000**	**2,959**	**2**
COTTON	94/95	349	326	1
	96/97	70	50	1
	97/98	58	40	1
COTTON TOTAL		**477**	**416**	**3**
RICE	**94/95**	**12,000**	**73**	**30**
LIVE CATTLE	94/95	2,400	1,443	3
	96/97	390	323	6
	97/97	391	267	5
	97/98	1,004	888	7
LIVE CATTLE - TOTAL		**4,185**	**2,921**	**21**
COCOA	**94/95**	**15**	**15**	**1**
COFFEE	95/96 (*)	879	426	16
	96/97 (*)	7,208	4,172	142
	97/98 (*)	34,016	11,357	513
	98/99 (*)	20,340	7,974	447
COFFEE TOTAL		**62,443**	**23,929**	**1,118**
SUGAR CANE	**94/95**	**5,000**	**3,764**	**2**
ORANGE JUICE	**94/95**	**1,000**	**1,334**	**1**
MILK	**94/95**	**2,650**	**12,400**	**36**
MAIZE	94/95	729	8,934	12
	95/96	50	495	1
	96/97	0	0	0
MAIZE - TOTAL		**779**	**9,429**	**13**
SOYA	94/95	5,877	42,012	17
	95/96	57,491	392,528	648
	96/97	31,367	168,879	397
	97/98	11,156	52,207	156
	98/99	303	1,820	2
SOYA - TOTAL		**106,194**	**657,446**	**1,220**

TOTALS	**184,943**	**714,686**	**2,447**

(*) Marketing year.
Rate of exchange, March 1998 R$1.15 = US$1.