



Enhancement of Agricultural Commodity Marketing in Egypt: Some Issues and Options

PREPARED BY
Dr. Stephen Marks

SUBMITTED TO
USAID

SUBMITTED BY
Nathan Associates Inc

UNDER CONTRACT NO.
PCE-I-00-98-00016-00
Task Order 827

August 2006

Limitations and asymmetries in the flow of information along the agricultural supply chain of Egypt are impediments to the further development of the agricultural sector. Such development is crucial to efforts to enhance growth and alleviate poverty, particularly in Upper Egypt.¹ Some examples of such problems:

- Egyptian farmers are limited in their ability to obtain information about market conditions, notably market prices of outputs, but also prices of inputs like fertilizer, pesticides, and seeds.
 - Small farmers often have less information about output prices than local traders or exporters, and thus have a weak bargaining position at the time of sale or at the time a contract is set for future delivery.
 - Farmers may lack critical information about the optimal timing of planting and marketing of various crops.
 - Farmers involved in contractual relations with traders may find that it is difficult to enforce a contract that has been set in advance.² An exporter may claim, for example, that market conditions have weakened to the point that he would be driven out of business if he purchased the crop at the originally agreed price. Farmers need independent sources of price information, to help them evaluate the credibility of such claims.

With inferior contract terms and problems in the enforcement of the contract, farmers tend to protect themselves by participating less in commercial farm production and more in production for their own use. This can be costly in terms of foregone opportunities, since some of the products that are exported in particular have the potential to generate much higher incomes for the farmers than can traditional crops.

- Other weakness in information management along the supply chain can also be significant. For example, if certain kinds of agricultural produce are not traceable to their source, then their access to high-payoff markets such as the European Union may be limited. Product traceability is important primarily for health reasons, but also may be important for national security reasons. In any case, it is now a reality of the global economic environment with which Egypt must comply.

Limited information is clearly not the only problem for agricultural development in Egypt. The limited availability of infrastructure such as cold storage and transport, particularly in Upper Egypt, constitutes a severe impediment to the expansion of production of high value fruits and vegetables. Water management in Egypt could be far more rational as

¹ Upper Egypt has some inherent advantages in agricultural production. It has more and better water and soil, and also may offer a different growing season for production of crops consumed within Egypt as well as exported. Nevertheless, the region remains relatively isolated and poor. A recent report from the World Bank notes that Upper Egypt has about one-fourth of the population of Egypt, but half of the population that is in poverty, and emphasizes the dependency of the poorest families in Upper Egypt on incomes from agriculture. World Bank, *Upper Egypt—Challenges and Priorities for Rural Development*, Report No. 36432-EG, Policy Note, Water, Environment, Social and Rural Development Department, Middle East and North Africa Region, June 15, 2006.

² Exporters may similarly find that farmers break contracts outright, or fail to comply fully with their conditions.

well, allowing for a tremendous expansion of agricultural output. Nevertheless, this report will focus on the information problems and related issues.

A wide variety of models for provision of greater price transparency exist. Each has its own costs and benefits. This study will consider the following:

- The Egyptian poultry bourse, which has been in operation since late 2002, as a possible model for the organization of other agricultural commodity markets.
- The more ambitious establishment of commodity futures exchanges. This portion of the study will be based largely on experiences in other countries.
- Other steps that could be taken by Egypt that could lay groundwork for the later development of futures exchanges, and that would provide their own benefits in the meantime.

I will next consider other issues for the supply chain in agricultural commodities in Egypt. I will then look at the commodities that the Ministry of Trade and Industry wished to have examined. In particular, I have examined a variety of indicators that characterize conditions in these sectors, to answer the following sorts of questions: Is it a traditional or a non-traditional crop? Is Egypt an importer, an exporter, or both? In which parts of the country is the commodity primarily produced? Does it tend to be produced by smaller farmers or larger farmers?

The report concludes with a discussion of possibilities for further analysis of these commodities using internal and external market price data. I have obtained, or learned how to obtain, much external price data, from a variety of sources that I will document. I have also suggested that the Ministry of Trade and Ministry obtain internal price data, from the Ministry of Agriculture and CAPMAS. Perhaps in the future these data will be available for analysis.

1. The Poultry Bourse

The Poultry Bourse was established in December 2002 and functions to this day, though market conditions were seriously disturbed in and after November 2005 by the spread of bird flu and by efforts to contain it.

The Ministry of Trade and Industry has been interested in whether the Poultry Bourse could serve as a model for similar exchanges in other agricultural commodity markets. My preliminary assessment is that are advantages to the Bourse, but also some potential problem areas. This section will discuss the Bourse in theory, and then performs some simple empirical analysis.

1.1. Operation of the Bourse

Participation in the Poultry Bourse is mandatory for all parties who transport live chickens for sale. To enforce participation, the Bourse is operated in cooperation with the Ministry of Agriculture. There is an office of the Bourse in each province of Egypt.

Each truck that delivers chickens is equipped with a transponder, which indicates the identity of the seller, the quantity of chickens being delivered, the location of the truck, and its destination. A fee of EP15 is charged by the Bourse per large truck (three tons) and EP7 per small truck (less than three tons, usually about 1.5 tons). For a large truck, given the current price of live chickens at the farm (EP 6.75 per kilogram), the fee works out to only 0.074 percent of the value of the shipment. An inspector checks each shipment that comes along the highway, at police checkpoints, to make sure there is an active transponder on board. Thus, the presence of the transponder on the truck allows an readily-verifiable assurance that the shipment is being tracked by the Bourse and the fee is being paid.

At the Bourse, a daily price is obtained from the matching of supply to demand. This is done by a committee of big buyers and sellers; there is no auction or other automatic mechanism. The price presumably is never allowed to drop below production cost, and is legally binding throughout the country. Deviations of ± 10 piasters per kg (about $\pm 1.5\%$ of the price) are allowed, based on the weight of the chicken or the distance traveled by the supplier. (Smaller chickens have less meat content per kg of body weight.) The information is spread by satellite or local television, or by word of mouth.

1.2. Rationale for the Bourse

The Poultry Bourse was intended to boost and stabilize the price of live chickens. The basic problems for poultry growers were conveyed to us by three commercial chicken growers from Fayoum governorate. The optimal growing time for chickens is 45 days, and their entire stock of 10,000 chickens ideally is sold within the span of a few days around that date. The chicken houses are then cleaned, and a new set of chickens raised to maturity. The seller is under a time constraint, especially in a hot climate such as that of Egypt, once the chickens have grown to optimal size. One has to continue feeding and caring for the chickens, and there is a risk that they could die. If a seller does not have a prior contractual relationship with a buyer, but has to search for a buyer at the time the chickens are being marketed, the seller may have to deal even if the price offered is very low. Knowing this, buyers usually do not enter into contracts.

According to Abd El Ghaffar Youssef, the president of the Bourse, market information previously was difficult for sellers (and buyers) to obtain. Specialized intermediaries were able to push down the price received by sellers, and push up the price paid by buyers. Sometimes chickens had to be sold at 30% below production cost. He argues that with the Bourse prices have been more stable, and have been higher for sellers and possibly lower for buyers.

It is the smaller sellers who tend to have less information and less bargaining power versus market intermediaries. The operation of the Bourse reduces “search costs” for sellers (and buyers): it is less costly to obtain price information with the Bourse than without it, particularly for smaller sellers and buyers.

There is also an economic rationale for the mandatory participation of sellers in the Bourse: the Bourse provides a “public good” (information) that benefits all sellers in the poultry market. It is costly to provide this information, but because nobody can be prevented from obtaining this information if they have a satellite TV, say, then there must be some mechanism to assure that these costs are covered so that the information can continue to be

provided. The fee serves this purpose. That the fee is imposed on sellers, as opposed to buyers, is irrelevant from an economic standpoint: presumably sellers have some ability to pass along their costs, including this cost, to buyers.

1.3. Potential Issues

One concern about the Poultry Bourse is that it could facilitate cartel behavior among sellers. In particular, large sellers have incentives to limit supply of chickens to the market. The information provided by the Bourse includes not only price information but also quantity information. There could be an implicit or explicit agreement among large sellers to limit quantity in order to push up prices. This quantity information could be used to assure that other large suppliers are not “cheating” on the cartel arrangement by selling more than they agreed to sell.

In addition, setting a binding price at a national level could further facilitate coordination among large suppliers, by eliminating their freedom to offer discounts to certain buyers in order to attract more business, thus facilitating tacit coordination.

It is not clear how much of a concern this should be. According to Mr. Youssef, there is a union of poultry producers has that 27 members, who together have a market share of about 50%. The other 50% comes from smaller producers, including about 5% from households. Thus, the market does not seem to be heavily concentrated, and indeed also has large firms on the buying side, though these issues deserve further investigation.

A final consideration is that there exists an alternative way to restrain supply in order to push up the price. In particular, the government imposes quotas on importation of grandparent stock for broiler chickens, which then limits the number of chicks that can be hatched within Egypt. Ramzi Nasrallah, Vice President of the Wadi Group, the second-largest poultry and feed company in Egypt, notes that these import quotas can have complex effects. The quotas are allocated on a per-company basis, for specific types of grandparent stock. As breeding stocks are improved, certain types of grandparent stock may become more advantageous than others, and thus the firms that have the rights to import these types of grandparents may derive a competitive advantage from the quota system. Other companies may not wish to fill their own quotas for obsolete grandparent stock.

A more general concern with the Poultry Bourse is that it tends to be more efficient to seek decentralized alternatives. Setting a rigid price by committee will not allow for correction of regional imbalances in supply and demand, for example, which is particularly a concern because transporting live chickens over long distances can be risky in a hot climate.

A final issue is that the Poultry Bourse seems to force transactions into a spot market. Mr. Nasrallah points out that 70-80 percent of the poultry market is in live chickens, which generally are not sold under contract. At most 20% goes to large processing plants that process thousands of birds per hour. These plants cannot rely on the spot market, but have to have contracts or even integrate upstream into production of live birds to assure continuity of supply.

1.4. Empirical Findings

The three poultry farmers from Fayoum believe that the Poultry Bourse has been helpful to them. They do not belong to the Bourse, but believe that the traders who buy their chickens carry transponders in their trucks. The farmers call the Bourse to get price information, and state that they can treat the Bourse price as a minimum price rather than a mandatory price. Sometimes local market conditions work to their advantage, and they can charge a higher price.

Ramzi Nasrallah of the Wadi Group argues that the Poultry Bourse has tended to reduce the intraday volatility of poultry prices. Such a claim is not empirically verifiable with publicly-available data, though it certainly would be a positive development. Mr. Nasrallah provided us with weekly average data on the farmgate prices of live white chickens gathered around Egypt by representatives of his firm since 1990, and these data allow some analysis of the effects of the Bourse.

I converted these weekly figures to monthly averages, for the period from January 1998 through October 2005. The bird flu hit the poultry market in November 2005. I then scaled these data by monthly data on the consumer price index in Egypt, to get a real price of live chickens, shown in Figure 1 for 1998-2006.

The graph seems to indicate that the real price of white chickens rose substantially at the same time that the Poultry Bourse was being established, in December 2002. It remained higher until it decreased sharply in November 2005, with the outbreak of bird flu followed by measures to contain it, and since then has rebounded.

As shown in Table 1, the increase in the mean real price between the pre-Bourse and post-Bourse periods was 17.9 percent, from 4.17 year 2000 Egyptian Pounds (EP) to 4.92 year 2000 EP. The standard deviation of these monthly average prices was slightly lower following establishment of the Bourse, at 0.48 year 2000 EP compared to 0.51 prior to the Bourse, and the coefficient of variation (equal to the mean divided by the standard deviation) was lower as well. A formal t-test for the existence of a difference between the mean real price in the two periods yielded a t-statistic of 7.24, indicating that the increase in the mean price was highly statistically significant.³

The timing of the increase in the real price of live chickens shown in Figure 1 seems to point to the establishment of the Poultry Bourse as the causal factor. However, there are several possible alternative explanations for the price increase:

- There could have been a sudden increase in real GDP per capita, which could have caused an increase in demand for protein sources like chickens. Annual data on GDP per capita do not indicate a sudden increase, but rather relatively steady and slow growth.
- There could have been a coincident increase in feed prices. Corn prices at U.S. Gulf ports were steady or lower at the time of the establishment of the Bourse. U.S. soybean meal prices rose substantially from 2002-03, but by 2004 had returned to the

³ The t-statistic has 92 degrees of freedom. Regression analysis, in which the real price was regressed on a constant and a dummy variable indicating the post-Bourse period, yielded very similar results.

2002 level. (It would be better to have a time series of feed prices within Egypt; such may be available from the Ministry of Agriculture.)

- There could have been a decrease in usable quotas on imports of grandparent stock for breeding chickens. Market participants presumably could shed further light on this possibility.

Additional price information would give a clearer picture of the effects of the Poultry Bourse. In particular, it would be useful to compare the monthly retail price with the farmgate price data. If the retail price diminished, or at least if the margin between the retail and farmgate prices narrowed, we could have more confidence that the Bourse had a positive effect for society overall. The retail price is important, of course, because holding down the costs to the Egyptian people of protein sources such as chicken is desirable.

1.5. Applicability to Other Commodities?

Does the Poultry Bourse offer an institutional arrangement that can or should be applied in other agricultural markets? One would have to weigh the advantages and disadvantages, in the context of these other markets.

We would expect search costs to be especially high for sellers in markets in which the commodity is highly perishable. This certainly is the case for chickens, as noted earlier. The model would be particularly applicable to markets in which the commodity is relatively perishable, such as certain fruits and vegetables like tomatoes, rather than to markets for storable commodities such as rice and beans. Of course, even for markets of storable commodities, sellers may be under pressure to sell due to financial constraints.

The question is also whether there might be superior alternatives to the centralized and rather cumbersome mechanism that the Poultry Bourse presents. We now turn to a variety of such alternatives.

2. Futures Exchanges

Commodity futures exchanges may provide an alternative way to improve the performance of some agricultural markets. Some prominent agricultural traders, such as Hussein El-Aguizy, Vice Chairman of the Horticultural Export Improvement Association (HEIA), are enthusiastic about the idea of commodity futures markets in Egypt.

The Chicago Board of Trade defines a futures contract as

A legally binding agreement, made on the trading floor of a futures exchange, to buy or sell a commodity or financial instrument sometime in the future. Futures contracts are standardized according to the quality, quantity, and delivery time and location for each commodity. The only variable is price, which is discovered on an exchange trading floor.⁴

⁴ The Web site of the Chicago Board of Trade provides a glossary of terms used, accessible via <http://www.cbot.com/>.

Commodity futures exchanges offer opportunities to achieve a more efficient risk allocation: some parties want to speculate (intentionally take on risk), others want to hedge (avoid risk). In addition to such risk shifting, futures exchanges may allow parties to diversify their holdings more efficiently. A trader may know that price cycles in two commodities tend to be inversely related, for example, or a trader may be able to sell short some contracts while holding long positions in others.⁵

Futures exchanges also provide information to the market about anticipated future demand and supply conditions; to the extent that demanders and suppliers can respond rationally to these price signals, price fluctuations may be smoothed to some extent. Reduction of price volatility can be beneficial to both farmers and consumers. Moreover, the price in a futures market is particularly transparent: the high, low, and closing prices typically will be reported each day by the exchange, along with volume for each of the futures contracts traded.

These benefits will spread to others who are not able to participate directly in the exchange. For example, a trader who can hedge against price risk for a particular commodity, can offer to buy it under contract from farmers at a fixed price with less risk, and thus will not have to discount his price to the farmers by such a large risk premium as otherwise would be necessary. Farmers can also benefit from the greater price transparency, and from any reductions in commodity price fluctuations that the exchange enables.

2.1. Experiences in Various Countries

Relatively few countries have organized futures exchanges, particularly in agricultural commodities. Such exchanges are particularly rare for horticultural products like fresh fruits and vegetables. In the United States, the Chicago Board of Trade and the New York Board of Trade are the most prominent of the futures exchanges that include coverage of agricultural commodities.⁶ No horticultural products are traded on these exchanges.

In Egypt, the Alexandria Cotton Exchange emerged in 1865 or earlier. It was not a futures market in the strict sense, because the contracts were not standardized and traded at arm's length, but rather it was a venue in which traders met to arrange individual forward contracts.⁷ It survived until it was nationalized by President Gamal Abdel Nasser in the 1950s.⁸ The current Minister of Agriculture, as a businessman, has tried to resurrect the cotton exchange, but the industry has shrunk in Egypt, in part because the global demand for Egyptian cotton has been reduced by the introduction of synthetic fabrics, and in part because government pricing of other commodities like sugar beets within Egypt has put cotton at a competitive disadvantage.

The United Nations Conference on Trade and Development (UNCTAD) reported in 2000:

⁵ A short sale refers to selling some item that one does not yet own. One must in effect buy the item in the future to cover the short sale. A long position means simply that one owns the item.

⁶ Their Web sites are <http://www.cbot.com/> and <http://www.nybot.com/>, respectively.

⁷ A forward contract specifies a quantity of particular quality to be delivered at some point in the future. It may or may not set the price in advance; if it does not, it indicates how the price is to be determined in the future.

⁸ Samir Raafat, "The Rise and Fall of Alexandria's Cotton Exchange," *Egyptian Mail*, November 1, 1997.

Another country where exchanges have existed for a long time is Turkey. Around 20 of them have been engaged in active commodity trade (others are called exchanges, but in fact, only act as centres for the registration of commodity trade transactions); the oldest, in Izmir, traces its origin back to 1891. These exchanges act as physical trading centers, to which a range of commodities are brought for inspection and immediate sale. Some of these exchanges have been looking at the possibility of introducing more sophisticated forms of trade, based on warehouse receipts and even futures contracts (the Izmir Cotton Exchange has now an active futures contract on cotton).⁹

Indonesia started a commodity exchange (the Bursa Berjangka Jakarta) for a number of commodities in 2000, but now it appears that only futures contracts in gold and palm olein are actively traded (<http://www.bbj-jfx.com/>).

A joint partnership between the New York Mercantile Exchange and Dubai Holding is to lead to formation of the Dubai Mercantile Exchange (<http://www.dubaimerc.com/>) this year, for trade in petroleum products and precious metals.

The Multicommodity Exchange (MCX) of India came into operation in 2002 and now has active trade in futures contracts for a great variety of commodities and financial instruments, including grains, legumes, sugar, spices, and even horticultural products such as potatoes and red chili peppers. This probably offers an excellent model for Egypt to follow, if it is interested in trying to develop a commodity futures exchange of its own.¹⁰ MCX India has a very informative Web site (<http://www.mcxindia.com/>), which includes reports on market conditions for each of the commodities traded, which would provide a model for the sort of analyses that Egypt might want to do in preparation for the development of such an exchange.

As one example of the infrastructure of rules that the MCX India provides, it is instructive to examine its contract specifications for potatoes, one of the commodities that the Ministry of Trade and Industry asked me to look at. This contract specification is attached. The contract specifies first how the trading is conducted and the timing of the delivery. Of interest is the daily price limit, which is set in recognition that prices on commodity futures exchanges can be highly volatile. For potatoes in MCX India the daily limit is plus or minus 4% of the closing price on the previous day:

Once a futures price has increased by its daily limit, there can be no trading at any higher price until the next day of trading. Conversely, once a futures price has declined by its daily limit, there can be no trading at any lower price until the next day of trading.¹¹

⁹ UNCTAD Secretariat, "Commodity Exchanges Around the World." This and other UNCTAD reports on commodity exchanges are at http://r0.unctad.org/infocomm/comm_docs/themesfr.asp. For a brief discussions of warehouse receipts, see Sections 2.2 and 3.3 below.

¹⁰ On the difficulty of development of a commodity exchange in India, see Lamon Ruten, "Moving India's Commodity Exchange Industry Forward: Learning From Best International Practices," Presentation at the Concluding Workshop of the World Bank/IDF on Commodity Exchange Development, Mumbai, 31 October 2000.

¹¹ "What To Look For In A Futures Contract," Llectric Law Library, <http://www.lectlaw.com/files/inv12.htm>.

Thus, the daily limits are designed to give market participants time to digest news and resist panic. A potential drawback is that such measures can slow price adjustment, leaving the market out of equilibrium longer and preventing efficient transactions from taking place.

Also of interest in the contract specification are the detailed quality specifications, and terms under which rebates are to be paid to purchasers in the event that a delivery is rejected because it did not meet the quality specifications. Finally, the delivery and settlement procedures are specified in detail, as is the sampling procedure by which the quality of the product is to be inspected.

2.2. Applicability to Egypt?

It is clear that organized futures exchanges offer benefits, but are such exchanges feasible and optimal for agricultural commodities in Egypt?

For a commodity futures exchange to function well, there must be free play for speculation. In some societies, speculation is perceived to be gambling and may be viewed as being profitable only at the expense of others. An economic defense of speculation rests on two pillars. First, as noted above, if some parties take on risks, it can be because it is efficient for them to do so, because this provides insurance to others for whom it is more costly to bear risk. Second, one can remember the old adage that profitable speculation tends to stabilize the price, which is socially beneficial; the reason is that to profit one must buy at a low price and sell at a high price, thus adding to demand when the price is low and adding to supply when it is high.

If futures exchanges are culturally compatible with Egypt, then one must consider other prerequisites. To function well, in particular, futures exchanges require:

- (1) A set of commodities that are storable and transportable at reasonably low cost and are uniform in quality. If a commodity is not storable or transportable, it may literally be impossible to fulfill a futures contract in that commodity, and so detailed rules about default will have to be in place. Businessman Sherif Al Maghraby points out that futures markets are problematic for fruits and vegetables for these sorts of reasons.
- (2) A legal system that efficiently enforces property rights and contracts.
- (3) A financial system that offers potential commodity traders reasonably low-cost access to credit.
- (4) A system to provide low-cost assurance that the commodities being traded exist and will be delivered on time. The legal system is important in this respect, but the reputability of institutions that support and participate in the exchange are critical as well, because use of the legal system is usually very costly. The kinds of institutional mechanisms that can provide security to the exchange include bonded warehouses, which exist in many countries and which are run by companies called collateral

managers.¹² Commodities are deposited in these warehouses; the depositor then obtains a warehouse receipt that can be traded or can provide collateral for a loan that the depositor may take.¹³

- (5) Sufficient interest in these commodities that there will a reasonably large number of participants in the market on a regular basis, who trade a volume of these commodities that is sufficient to cover the overhead costs of the exchange. This last condition assures that market conditions will be reasonably competitive, so that the market will not be subject to manipulation by a few powerful parties. A greater volume of trade on a regular basis also tends to assure that the price will not be excessively volatile.

In addition to the fundamental conditions described above, a regulatory framework for the commodity futures exchange also needs to be in place. In the United States, for example, regulation is done by the Commodity Futures Trading Commission in conjunction with self-regulation through the National Futures Association, the association of brokers who participate in futures trading.

Many countries have exchanges for shares in publicly-traded corporations, but do not have commodity futures exchanges, which can be much harder to do. Apart from some of the factors noted above, one reason is that stock exchanges literally involve trading in *stocks* of indestructible assets—ownership shares that are to be held by someone for an indefinite period of time, even if the value of those assets goes to zero. An agricultural commodity futures exchange instead is critically dependent on *flows* of commodities produced and consumed each year. These flows are often subject to greater uncertainty than are the total stocks of commodities, particularly in the case of agricultural products, which are vulnerable to the vagaries of the weather, among other factors. Without the possibility of adding to or drawing from physical stocks of these commodities, their prices could be so volatile that they would not attract as investments.

In summary, futures exchanges offer the most advanced form of commodity trading, but also impose very high demands. How does Egypt rate as an environment in which a commodities futures exchange could survive or even flourish? Some observations:

- On a comparative judicial/legal effectiveness index developed in a 2004 World Bank study (0 lowest, 100 highest), Egypt ranked number 48 out of 104 countries, at 46.9. Denmark rated highest, at 95.3, while Pakistan rated lowest, at 4.8. Among other countries that have commodity futures markets, the United States was number 13, at 83.7. India ranked number 35, at 59.9. Indonesia ranked number 57, at 39.9. Legal disputes in India can take decades to resolve, while the legal system in Indonesia remains rife with corruption.¹⁴ Presumably Egypt is somewhere in between.

¹² A Swiss-based company, Cotecna (<http://www.cotecna.com>), claims to offer such services in Egypt, among other countries. The Principal Bank for Development and Agricultural Credit (PBDAC) in Egypt also may offer services along these lines, though it is not clear how efficiently it functions. The World Bank study cited in note 1 observes that the PBDAC requires land as collateral, which will be of no benefit to tenant farmers, who are usually among the poorest of the poor.

¹³ An excellent introduction to the uses of warehouse receipts is provided by Richard Lacroix and Panos Varangis, "Using Warehouse Receipts in Developing and Transition Economies," *Finance and Development*, September 1996, 36-9 (available at www.imf.org/external/pubs/ft/fandd/1996/09/pdf/lacroix.pdf).

¹⁴ The study also included indexes for corporate and public sector ethics, corporate governance, legal and illegal corporate corruption (<http://www.worldbank.org/wbi/governance/pdf/ETHICS.xls>).

- The population of India is 15 times that of Egypt, so that the internal market within India is huge compared to that of Egypt. The likelihood that the volume of transactions and number of participants will be sufficient is much greater in India than in Egypt. However, Hussein El-Aguizy argues that Egypt is part of a larger bloc of Arab countries, including others like Syria and Lebanon, which could allow expanded scope for such a market.
- Cold storage and refrigerated transport facilities are seriously deficient, especially in Upper Egypt. Without such facilities, product shelf life is typically short for fruits and vegetables, and it would be problematic for such perishable products to be traded in a futures exchange: a difference of just a few days in the harvest date could imply a very big difference in quality.

Despite these cautionary notes, the development of a futures exchange could be treated as a longer-run goal, and the present focus could be put on the development of prerequisites to the later establishment of such an exchange. These precursor developments are considered in the section below, as alternatives that could provide their own benefits along a path to further commodity market development.

3. Other Arrangements and Markets

Reliance on standardized and often impersonal transactions in a futures market is not the only way to arrange commodity trades. Production and exchange can be organized by short-term or even long-term contracts between parties, for example. A processing company that needs assurance of quantity and quality of a product may even wish to vertically integrate into production of its agricultural raw material itself.¹⁵

This section will briefly consider three alternatives: spot produce markets, forward contracts, and the use of financial instruments to facilitate trade and provision of credit.

3.1. Spot Produce Markets

It is hard to imagine that any country would not have exchanges for physical trade in commodities. Such markets are particularly important for daily trading in the more perishable items such as fruits and vegetables. The largest wholesale market in the world for trade in fruit and vegetables is the Rungis market outside of Paris. It is a spot market: delivery of the products is immediate. France does not have futures markets in fruits and vegetables.

Egypt has spot wholesale markets as well—at El Abour, Sixth October City, Assuit, Alexandria, and perhaps other locations. Produce often comes into the El Abour market from Upper Egypt, and may be subsequently returned to Upper Egypt after it has been sorted, processed, and repackaged. At El Abour, organized open-outcry auctions for various commodities are held. These auctions provide price transparency, which is discussed further below in the context of policy alternatives.

¹⁵ The Farm Frites company does this in Egypt, by growing potatoes from which it produces frozen French Fries, to assure appropriate quality and quantity of its primary intermediate input.

3.2. Forward Contracting

Forward contracts have been used extensively in the agricultural sector in Egypt. In a repeated contractual relationship with a reliable buyer, a farmer may be able to specialize more heavily in higher value crops. Someone who has 100 feddan cannot put them all in tomatoes for the spot market, for example, because the risks are too great, including weather risks, pest risks, and price risks. So maybe the farmer only puts 5 feddan in tomatoes. If that farmer is in a secure contractual relationship with a tomato buyer, however, the farmer may be able to put more land into tomatoes and less in traditional crops for his own use or for local sales. The total payoff over the medium to long term will be greater than if the farmer only produced for the spot market.

Farmers from Fayoum with whom we spoke had grown onions for export under such contracts, for example. These contracts may be available even to small farmers, or associations of small farmers, who would not have the resources to participate directly in a futures exchange. The contracts may allow farmers to hedge against price fluctuations, if the price and quantity are both specified in the contract.¹⁶ A disadvantage is that, with the price fixed, one or the other of the parties may be tempted to back out of the contract: if the price goes down after it was set in the contract, the trader will be tempted to back out; if it goes up, the farmer will be tempted to do so.

At the village level, contracting of this sort is often tied to the provision of finance. A traditional approach is that a local trader with intimate knowledge of a village lends a farmer funds, in exchange for a claim on some part of the crop that the farmer harvests. Usually the implied rate of interest is high, as the trader collects rents on his knowledge of and influence over the farmer. A problem with this time-honored approach is that the dependency of the local farmer on finance from a local trader may allow the trader some capacity for monopsonistic extraction of rents from the farmer. Expanding the options for finance for the farmer, expanding the information available to the farmer, and organizing farmers into associations may all help to bring about a more equitable and efficient division of the gains from agriculture. Section 5.1 discusses how the globalization of markets has revealed an additional problem in this model for the acquisition of crops—that crops gathered in this way are not traceable back to specific producers.

Fayoum and Menia farmers expressed frustrations that some of the exporters with whom they had contracted had backed out of the arrangement, claiming that the onions were not of proper quality. They also say that they produce less of the higher-value export products than they would, if they could trust the exporters to honor their contracts. They believe that, if they had independent information on prevailing prices and market conditions for these products, they would be in a better position to develop trust with the exporter.

Independent observers note that many contracts for horticultural products to be produced for export by farmers in Egypt do not specify clearly the quality of the product to be provided. Farmers and exporters both may believe that they have advantages due to that ambiguity, but the net effect is that there have been contracting problems between exporters and farmers in Egypt. Over time, however, experienced market observers believe that the situation has improved, and will continue to do so.

¹⁶ Omar A. Abdin, Assistant Managing Director for Horticultural Project at Farm Frites, and an expert on contractual arrangements points out that his company offers a flexible range of alternatives: from fixed price, to a freely floating price based on the future spot price, to combinations of the two.

To the extent the legal system is costly or ineffective, a market-based mechanism that may help to overcome disputes in contracting is repeated dealing between associations of farmers and particular purchasers such as processing companies or exporters. An association of farmers will have a certain permanency that individual small farmers will not, and may be able to apply peer pressure on individual farmers to make sure that they fulfill their contracts.¹⁷ Furthermore, although there have been many “cowboy exporters” in the market, reputational concerns on the part of some processors and exporters will also strengthen their incentives to fulfill their contracts.¹⁸ Agricultural production for export, and use of these market mechanisms, are new to Upper Egypt in particular. There are also certain simple policy steps that would assist in building trust between farmers and buyers, as will be discussed further in Section 4 below.

3.3. Agricultural Finance

Institutional arrangements that make it easier for farmers to borrow can provide benefits to farmers directly or indirectly. Such credit may not come cheap. Vast experience in many countries has shown that such credit should not be subsidized, though it may be possible to lower the costs of the credit through innovations such as warehouse receipts (see Section 2.2), which allow the farmer to collateralize the crop that has been produced: creditors should be willing to charge less interest on loans backed by secure collateral in the form of the agricultural produce.

If farmers can obtain finance based on their newly-harvested crop, they may be able to avoid selling at the bottom of the market, which tends to occur precisely when many other farmers like themselves are also harvesting the crop. Indonesia passed legislation on 20 June 2006 to enable the use of warehouse receipts. Indonesian Trade Minister Mari Pangestu stated that one benefit would be to reduce commodity price fluctuations and the losses they cause to farmers, by allowing farmers to wait for more favorable price conditions¹⁹ The Ministry is now developing implementing regulations for the legislation, with the goal of completion within a year or less.

4. Policy Alternatives

Apart from support for improvement of the legal system and of agricultural finance, two specific policy measures may be able to enhance information flows in agricultural markets. One of these, market monitoring, would be most efficiently done in a centralized manner, to avoid duplication of effort, and thus in principle is ideally suited for government. The other is to disseminate this price data and other information to farmers. This probably is best done

¹⁷ Small farmers tend to be weak and isolated economically. Their prospects can be greatly enhanced by the development of grass roots (bottom up rather than top down) organizations that can attract and bargain for a better price with buyers of their outputs, can bargain for a better price for specialized inputs such as seeds, fertilizer, and pesticides, may be able to provide a framework for finance, can provide improved post-harvest storage and handling, and can disseminate technical expertise to their members. USAID is supporting the development of such associations in various parts of Upper Egypt through the various AERI (Agricultural Exports and Rural Incomes) projects.

¹⁸ Certain exporters reportedly have begun to be blacklisted by farmers in Upper Egypt who have problems producing for the export market.

¹⁹ “House Passes Bill on Warehouse Receipts,” *Jakarta Post*, June 21, 2006,

through mostly decentralized efforts, such as through regional agricultural information centers.²⁰ In this section, both of these possibilities will be discussed further.

4.1. Market Monitoring

Information is not equally available to all market participants: small farmers in general know less about the situation outside their local area than do larger farmers or traders, local traders know less about foreign market conditions than do exporters, and even exporters may know less about those conditions than do the importers in other countries with whom they deal. Remedying these information asymmetries can have significant payoffs, particularly for the bargaining position of farmers, but also potentially for other Egyptian parties in the supply chain.

The regular and timely (same-day) availability of reliable data on market conditions, prices in particular, in other countries as well as in markets within Egypt, could also help to build trust between parties, which could facilitate the fulfillment of contracts. For example, if farmers can verify that the foreign market price has fallen, as the exporter claims, then disputes between the exporter and the farmers may be avoidable. Availability of information on prices in the rest of Egypt, or even in Europe, will promote verifiability and trust, and keep traders honest.

Monitoring of both external and internal price data would be useful because some commodities are targeted for the export market, while others are more for domestic consumption, and foreign and domestic prices do not necessarily move together. (See Section 7 for further analysis that could be done, if both internal and external price data were available.)

External Price Data

Data on prices of agricultural commodities around the world are available from both commercial and governmental sources. Because the commercial sources require that users get their permission for reproduction or distribution of the data, the governmental sources are probably a better bet.

Nevertheless, a couple of the commercial sources should be mentioned. The British magazine *Fresh Produce Journal* published monthly data on the median price and price range for the following horticultural products from Egypt during the month of May:

- Oranges, Liverpool and Glasgow
- Bobi Beans (Green beans), Liverpool
- Red, and green, chile peppers, Manchester
- Mangetout (snow peas), New Covent Garden
- Salad onions (spring onions), Manchester

²⁰ This idea is being advocated by Tarek Hussein El Baz, Senior Assistant to First Assistant to the Minister of Trade and Industry, among others.

Many other fruit and vegetable prices are quoted. The Web site associated with the magazine (www.freshinfo.com/journal) also includes access to weekly updates of the data. A similar publication is Eurofruit Magazine, which offers monthly data on prices of fruits and vegetables in continental Europe (<http://www.eurofruitmagazine.com/>).

The best governmental source for international commodity price data is the U.S. Department of Agriculture (USDA). Reports on particular commodity groups provide regular price updates of specific commodities at particular locations. These can be found at the Web site of the Foreign Agricultural Service (FAS) within USDA, at <http://www.fas.usda.gov>, or of the Economic Research Service of USDA, at <http://www.ers.usda.gov/>. The FAS Web site includes data on Production, Supply, and Distribution of various major farm commodities—product balance sheets that estimate annual sources of supply (from initial stocks, production, and imports) as well as uses of the product (for ending stocks, human consumption, other consumption, and exports). The ERS site includes detailed coverage of certain commodities, such as sugar and grains.

Agribusiness Online (<http://www.agribusinessonline.com/prices/>) is a free Web site that offers convenient access to the most recent USDA price data from markets in various locations, but for time series of past data one must go to the USDA site. Within the USDA Agricultural Marketing News Web site there is a Fruit and Vegetable Portal (<http://www.marketnews.usda.gov/portal/fv>) and a Livestock and Grain Portal (<http://www.marketnews.usda.gov/portal/lg>).

A final alternative would be to monitor prices on the Multicommodity Exchange of India or other commodity futures markets around the world: instead of imitating these exchanges, it might be useful to free ride off the transparency that their markets provide. (Indeed, there would be nothing to prevent Egyptians from using these exchanges to hedge, say.) A danger of this sort of free riding would be that market conditions in India, say, could be quite idiosyncratic, particularly to the extent that there are significant barriers to importation or exportation of the relevant products; thus, these prices might not be particularly relevant to the concerns of Egyptian exporters.

The government of Egypt might find that it is worth doing its own monitoring of selected international markets at which prices of Egyptian farm products are reported. Cooperative arrangements with other governments might also be possible.

An important caveat is that external price data can be particularly difficult to interpret. Farmers have to understand that the price they have been getting may be a small fraction of the wholesale or especially retail price in other countries, for example, due to transportation costs, processing costs, tariffs and non-tariff trade barriers, and downstream margins due to the risks assumed by various parties along the supply chain. Farmers may also tend to take price data from a single foreign market and infer that it applies to all foreign markets: the quality that residents of the UK demand, and the prices that they are willing to pay, for fruits and vegetables, for example, are far above those on continental Europe; in Germany in particular, the prices that consumers are willing to pay for horticultural products are strictly limited.²¹

²¹ Personal conversation with Peter Wetzel, Technical Adviser to the El Shams project sponsored by USAID and run by CARE.

Internal Price Data

Some commodities are targeted for the internal market rather than the export market. Moreover, for many commodities, we should expect that the retail price in Egypt is quite different from the retail price in, say, Paris. This would probably include horticultural products (fruits, vegetables, and some herbs and spices) for which it is costly to arrange international trade, particularly without much advance notice. In addition, farmers may wish to know their full range of alternatives, including both the internal and external markets. Thus, monitoring of domestic wholesale and retail markets, and timely dissemination of that information, would be useful as well.

This is not new to Egypt. In the recent past, monitoring and dissemination of this sort of agricultural price information from within Egypt was done by ACDI-VOCA, a non-governmental organization (NGO) sponsored in this activity by USAID; it may be that the further involvement of NGOs in the future would provide this data most efficiently. However, the Ministry of Agriculture also monitors some domestic farmgate, wholesale, and retail market prices, and indeed collaborated with ACDI-VOCA on the earlier project. The Ministry of Agriculture, or the Ministry of Trade and Industry, could do the monitoring and indeed it would be worth investigating whether a cooperative arrangement might be possible.

Monitoring and reporting would ideally be done on auction prices or other regularly available prices in the El Abour and other wholesale markets in Egypt, as well as major retail markets. Information could be provided on the high, low, and average price during a given time period (daily or weekly, for example). Timeliness of the dissemination of the information would be crucial.

There may be difficulties in interpretation that are similar to those that arise for foreign prices. In particular, agriculture experts in Egypt cite a rough rule of thumb—that the farmgate price of horticultural products will be one-third of the retail price in traditional markets. Retailers take a big margin, but also assumes the biggest risks that the product will not sell before its quality has been degraded by time.²²

4.2. Regional Agricultural Information Centers

An important element of reform often is decentralization and empowerment of the private sector rather than a perpetuation of centralized governmental control. A useful application of this principle could be the creation of regional agricultural information centers. These would be especially important in Upper Egypt, in which the development of the agricultural sector lags behind that of Lower Egypt. Such centers would require donor support to be established, and because of the public good nature of the services provided, would probably need ongoing financial support. Our interviews with agricultural sector participants and observers in Suhag and Qena governorates indicated that there is not a lot of confidence in the extension services provided by the Ministry of Agriculture. The introduction of alternative providers of these services, through a framework in which competition (in bidding for contracts to operate the centers, for example) would stimulate innovation and responsiveness, could be an attractive way to go.

²² Other market participants emphasize how competitive all these markets are: from the farm in Egypt all the way to the consumer in the European Union, say, profit margins are getting squeezed. Nevertheless, there are substantial costs incurred along the supply chain.

Farmers or associations of farmers could use these centers to obtain important technical information, information on optimal timing of planting and harvests, information on the latest agricultural quality and health standards applied in various markets, risk management strategies, and price information for inputs and outputs. Farmers could access information on farm prices directly through the Internet, and in addition Internet access could be one mechanism for the dissemination of price information gathered by the government or NGOs inside or outside of Egypt.

The regional agricultural information centers ideally would be part of a more comprehensive effort to improve the efficiency of the agricultural supply chain, which is particularly important in Upper Egypt, in much of which economic isolation and backwardness remain serious problems.

5. The Supply Chain

The prominent Egyptian businessman Sherif El Maghraby, among others, points to the critical importance of the supply chain for agricultural products—to deliver high quality at low cost and on time. He observes that for agricultural produce it is normally important that there be both a local market and an export market. Farmers can learn by doing in supplying the local market until they are ready to step up their quality to export market levels. Even if development of a sector was driven by the export market, a local market can provide a remunerative outlet for produce of lower quality than that demanded in the export market, and thus act as cushion that may enable farmers or others to weather the tough times. Thus, development of the internal market and the export market go hand in hand, though certainly the imperatives of these markets can differ.

Maghraby is of the view that at this point there are no longer significant regulatory impediments to the establishment of business enterprises in Egypt: if one sees a profitable opportunity, one will be able to take advantage of it. He believes that the private sector can accomplish any task that it seeks to accomplish. Others see the regulatory, infrastructure, and even cultural problems of agricultural development as posing problems that require some degree of coordination to be solved, partly through government in a facilitating role but also through non-governmental organizations or private business associations at various levels. In this view, agricultural development, particular in remote areas such as Upper Egypt, is a chicken and egg problem, for which there needs to be some investment in public goods to create the climate in which private parties will see profitable opportunities.²³

In any case, I would emphasize that, from an economic standpoint, for any sectors of the economy, the question is not how long the supply chain is, or how many different parties participate in it, but whether it is efficient. Efficiency requires that margins be competitive and not excessive due to the exercise of market power on the buying or selling side. It also requires that transaction costs not be excessive. The supply chain for a particular commodity may involve many parties simply because it is less costly to organize the distribution of that

²³ There is clearly a role for government in improving water management through infrastructure investments along the Nile waterway and the associated canal system. There are estimates that proper management of this waterway, and use more efficient irrigation techniques, could allow the land area devoted to agriculture in Egypt to quadruple. Even in this case, however, decentralized, market-based approaches may facilitate conservation of the resource. In California, for example, farmers have been allowed to resell water not used by them, and thus have been exposed to an opportunity cost for using water for irrigation in a wasteful manner.

commodity through separate firms rather than through fewer firms that are vertically integrated across stages of the distribution process. For example, a firm that specializes in processing of potatoes into French Fries may find it quite costly to integrate upstream into the distribution and production of potatoes. If it is involved in these activities itself, it must be able to monitor upstream conditions, to make sure that employees and other parties are complying with the objectives of the firm. It could be less costly to give independent suppliers their own profit motives to make sure that production and distribution are conducted efficiently.

5.1. Information Deficiencies

Deficiencies in the availability of information can threaten the competitiveness of Egyptian producers and traders, particularly in non-traditional sectors in which by definition there is not a lot of experience. For example, an association of farmers in Qena governorate tried to grow green beans recently for the European market, but had inadequate information on the importance of timing the growing of the crop to market conditions in Europe. The crop ended up having to be destroyed.²⁴

As noted earlier, there is a problem with the traditional supply chain model, in which a local commodity collector with a special relationship to farmers sells to exporters or others: these relationships along the supply chain may be opaque in terms of information flows. Importers in other countries expect traceability back to the source, do not want uncertainties about pesticide usage, and so on. There also may be quality concerns if the product is perishable and spends an appreciable amount of time in possession of a local trader without proper refrigeration facilities.

The fundamental argument for traceability is that it enhances accountability. For example, a farmer whose lower-quality potatoes are mixed in with the potatoes of many other farmers from some area may not have the proper incentives to improve the quality of those potatoes, and the local trader who gathers them will have incentives to hide those lower-quality potatoes in a shipment of the commodity. By neglecting quality, the farmer creates a negative externality: the reputation of all farmers in the area could be damaged, and thus the price that they are offered in the future for their potatoes could be reduced. Traceability back to a specific farmer, or at least association of farmers that can apply its own social pressures for its members to maintain quality, would eliminate, though indeed at some cost, this externality problem and lead to a more efficient allocation of resources and better export opportunities for farmers in the area.

Establishing and maintaining the traceability of farm products back to their sources, and transparency about the conditions under which these products have been grown, the pesticides that were used, and so on, are in practical terms more and more important to obtain access to many markets, the European Union and the United States in particular, and will become even more important in the future. The regional centers could assist in the collection and organization of information about farm production conditions to be transmitted in the direction of ultimate consumers of the products along an information network that parallels the supply chain.

²⁴ Based on interviews in August 2006 with the head of an association of small farmers in Naga Hammadi, Qena governorate.

5.2. Infrastructure and Competition

As noted earlier, one of the great concerns for agriculture in Egypt is that agricultural development is critical to efforts to eradicate poverty, particularly in Upper Egypt. Of the many concerns about agricultural development in Upper Egypt, a central one is the development of adequate physical infrastructure, particularly in the form of cold storage and refrigerated transportation of agricultural commodities.²⁵ It is also important that the agricultural distribution system be competitive: farmers and traders who have choices about the parties to whom they sell generally do better.

A recent World Bank (WB) study (note 1 above) argues that competition in agricultural markets of Upper Egypt is limited, to the detriment of poor farmers:

Access to inputs and commercialization of output in rural Upper Egypt is often controlled by a handful of actors, either public or private. This monopoly creates inefficiencies (WB, 2006, xiii).

The study documents problems for horticultural farmers in Upper Egypt in getting access to pesticides, fertilizers, and seeds due to government regulations and the role of state enterprises.

The study does not document the asserted limitations on competition in Upper Egypt on the output side, but does say, “In Upper Egypt: “The fruit and vegetable market is controlled by a few traders, except in Fayoum and Giza, where the competition among traders is high” (WB, 2006, 34).

Other experienced market observers offer a rather different perspective: there are no inherent barriers to competition in most commercial agricultural sectors in Upper Egypt,²⁶ but it remains risky for exporters or processors, due to lack of infrastructure and the newness of these sectors in the region. Certainly there can be bottlenecks in the market: there may be economies of scale in regional cold storage, for example, in the form of large regional centers, but smaller facilities may be adequate in more remote rural areas. The implication is that if agricultural production in Upper Egypt can be made less risky, more traders will come, with implied benefits for farmers.

In any case, the World Bank study then goes on to recommend policy measures similar to those that I recommend in this report:

Interventions in this area might include providing support for systems that disseminate market information to farmers on prices, required characteristics, quantities, and timing (WB, 2006, xiii).

It also makes more comprehensive recommendations on infrastructure, finance, and governance relevant to Upper Egypt.

²⁵ The import duty on refrigerated trucks until 1998 was 45 percent, but the implementing legislation to lower the tariff was only recently issued. Larger trucks remain subject to duties of 22% (weight greater than 5 tons but less than 9 tons), 12% (weight from 9 and less than 18 tons), or 5% (other)..

²⁶ One exception that has been noted is the aromatics sector, in which reportedly five companies have the only processing factories and do dominate the market.

In my own field work, I certainly found that limitations on competition exist in the sugar sector. In Qena governorate, for example, sugar cane farmers must sell their crop to the state-owned sugar factory. Business executives there reported to us that larger sugar farmers had gotten information on the international price of sugar as a bargaining tool with the state-owned sugar company. There is a perception that large farmers of sugar cane may be able to cut a better deal for themselves than small farmers.

Because the price of the sugar contained in sugar cane (and sugar beet as well) is set by the government of Egypt, these negotiations presumably occur on different issues. One problem is that the sugar content of the crop is measured by the state-owned sugar company, and thus subject to manipulation in its favor. Negotiations could focus on the measurement of the sugar content, and also on the timing of the milling of the sugar cane owned by these farmers: larger farmers may be able to get their cane processed at a time at which the sugar content of the cane is at a maximum, while others may have to wait longer.

My very limited field work can by no means offer a comprehensive assessment of these issues; it is most important to be aware of the possibility that competition may be limited, and to try to understand its consequences, especially for the poorest members of society.

6. The Commodities Examined

The Ministry of Trade and Industry asked me to examine seven commodities: sugar, rice, beans (*ful*), potatoes, onions, citrus, and bananas. The first three are traditional commodities, while the last four are non-traditional.²⁷ This study will focus on rice, broad beans, potatoes and dry onions, the last two because of recent efforts to introduce these vegetable crops to Upper Egypt.

6.1. Overview

There is no ideal, comprehensive data source for all aspects of these sectors. A reasonably good source seemed to be the FAOSTAT online database from the Food and Agriculture Organization (FAO) of the United Nations (<http://faostat.fao.org/default.aspx>). It has detailed annual data on production and trade for each of the commodities through 2004; from these amounts, consumption plus the change in stocks can be inferred, as discussed below. It also includes data on farmgate prices, from governmental sources, but only through 2002.

In addition, the trade data include both quantities and values; from these figures, unit values can be computed. Examination of these unit values provides a useful check on the integrity of the underlying quantity and value data. For Egypt, these figures appear to behave erratically over time, indicating that there are problems with the underlying data. These problems may be mostly on the quantity side, since customs officials have stronger incentives to get values correct for purposes of duty assessment.

The FAO production data presumably are drawn, perhaps with some adjustments, from data compiled by the Ministry of Agriculture and Land Reclamation. There is an additional check on these production data: the figures include area harvested and yield. If yield per

²⁷ This follows the classification of the World Bank (2006, see note 1), and was confirmed by conversations with market participants.

feddan behaves relatively consistently over time, one can have more confidence in the production figure.

USDA data on Production, Supply, and Distribution are available for rice, sugar, and citrus products, among the commodities of interest. These data are compiled subject to an adding-up discipline: total sources (initial stocks, production, and imports) and uses (ending stocks, consumption, exports) of each commodity each year must be equal.²⁸ In addition, the units for the data are expressed on a consistent basis. For example, rice quantities are described in terms of milled rice equivalents.

Data on quantities and values of exports and imports are also available by subscription from the online COMTRADE database of the United Nations. An advantage of these data is that one can obtain the data for Egypt as reporter with its various partner countries, and can also obtain data for Egypt as partner with all the various countries that reported trade with it. This provides an additional cross-check on the validity of the data.

Table 2 shows the most recent production level for the seven commodities across Lower, Middle, and Upper Egypt and Other areas.²⁹ (Both sugar cane and sugar beet are included for sugar.) Table 3 shows the same figures, but scaled as percentages of the total production of each crop in the same year. Thus, it gives a cleaner indication of the distribution of each crop around Egypt, and across the seasons, independent of the total volume of the crop. Apart from sugar cane, these commodities, particularly rice and potatoes, are relatively under-represented in Upper Egypt, the region with the greatest potential for agricultural development. Sugar cane area in Upper Egypt cannot grow further due to restrictions on planting for the sake of water conservation. Of the other commodities, onions and bananas have made the greatest inroads in that region. Bananas are the only one of these crops that is not produced primarily in Lower Egypt.

Table 4 shows the distributions of farm sizes across which various agricultural products are grown, in percents. It shows separate figures for Lower and Upper Egypt. All commodities included in the source table are listed;³⁰ a useful division between traditional and non-traditional commodities is provided. These figures should be used in conjunction with those in Tables 1 and 2, since the presence of the various crops across regions varies greatly. Among the commodities in which the Ministry of Trade and Industry was interested, only rice tends to be grown in larger farms rather than those of less than one *feddan*.

Table 5 shows commodity balance sheets for each of the four commodities under examination. The data for rice come from USDA, while the data for the other commodities come from the United Nations, the FAO and the Comtrade database. Notice that only for rice is measured usage within Egypt relatively stable over time. It makes sense that usage would in fact be quite stable for staple food commodities. The volatility of the implied usage data

²⁸ In at least one sector, sugar, there appear to be problems with these data, however: no exports are indicated since 2003, but other sources indicate that Egypt had substantial exports to the Middle East, North Africa, and East Africa in recent years.

²⁹ Specifically, by governorate, Lower Egypt includes Alexandria, Behaira, Cairo, Dakahlia, Damietta, Gharbia, Ismailia, Kafr El Sheikh, Menoufia, Port Said, Qalyoubia, Sharkia, Suez. Middle Egypt includes Beni Suef, Fayoum, Giza, Menia. Upper Egypt includes Assuit, Aswan, Luxor, Qena, Suhag. Other includes Matruh New Valley, Noubaria, Red Sea, North Sinai, South Sinai. The Middle Egypt governorates are often lumped together with Upper Egypt.

³⁰ Horse beans is similar to broad beans.

for broad beans, potatoes, and dry onions make it a concern that these data are not particularly accurate.³¹

The remainder of this section examines the four commodities more closely, pointing to general market conditions and trends as well as some important technical details on these crops.

6.2. Rice

Egypt is a substantial net exporter of rice. UN Comtrade data reveal that the main export destinations have been the Middle East, Eastern Europe, and Western Europe. The main regular sources of imports have been India, Pakistan, and Italy. The balance sheet for rice shows slight upward trends in production and exports since 2000.

Rice is the only commodity among the four shown in Table 5 for which international price data are readily accessible: the USDA publishes data on export rice prices for India, Pakistan, Thailand, and Vietnam. However, these varieties of rice are all long grain. Virtually all rice produced in Egypt is short grain. Other than Egypt, the major medium and short grain exporters are Australia, China, and California.³² Price data are very difficult to acquire for Australia and China, although perhaps one could examine unit values for Australia.³³

In Egypt, rice is almost exclusively a product of the Delta, in which agricultural markets are relatively well developed. Rice can be stored for very long periods, if it is kept subject to relatively cool and constant temperatures and relatively dry (with moisture level below a relative humidity of 65%).

Based on year 2004 data from the Ministry of Agriculture and Land Reclamation,³⁴ the average farm price of rice, EP 1025 per ton,³⁵ was slightly more than half of the average traditional retail market price of rice, at EP 2000 per ton.

6.3. Broad Beans (Ful)

Egypt's imports of broad beans far exceed its exports. Major sources of imports have been China, France, and the United Kingdom. Of Egypt's exports of broad beans, more than half have gone to Italy in recent years.

According to data from the Ministry of Agriculture the average farmgate price of broad beans in 2003 was highest in Upper Egypt, at EP 251 per ardab, compared to an average price

³¹ However, the USDA rice data have the same sort of problem seen in the USDA sugar data: they indicate virtually zero imports in recent years (just as the USDA sugar data indicate zero exports since 2003). This is dubious, given data from both Egypt and other countries on their trade with each other. Nevertheless, the USDA data may give a more accurate picture of production and consumption overall.

³² Based on personal communication with Nathan W. Childs, Senior Economist, Economic Research Service/USDA.

³³ Nathan Childs (note 33 above) notes that a U.S. export price series for California medium grain rice is reported in the weekly Creed Rice Market Report; the Creed Rice Co. can be contacted at www.ricecreed@aol.com.

³⁴ *Study of the Indicators of Agriculture Prices*, volume 2 (Summer & Nili Crops), 2004 (June 2005)

³⁵ This probably is a price for unhusked, unmilled rice; the costs of husking and milling, and the change that they cause in the weight of the rice, should be taken into account to make these prices more comparable.

of EP 218 overall. The average price was lowest in Lower Egypt, at EP 214 per ardab. One may conjecture that the higher price in Upper Egypt primarily reflects a transportation cost differential, given the sizable volume of imports relative to production.³⁶ The average retail price throughout Egypt was 263 piasters per kg that year.³⁷

Storage of dry *ful* is ideally done in a cellar, in which the beans are protected from light (which turns the beans brown) and kept cool. The beans may be storable in this form for several months.

6.4. Potatoes

Egypt is a net exporter of potatoes, principally to the European Union, notably Germany, Italy, Greece, and the United Kingdom. Eastern Europe and the Middle East are also export destinations. Potatoes are also processed into frozen French Fries and in other ways within Egypt. Seed potatoes are imported almost exclusively from the European Union, notably the Netherlands.

Of the seven commodities examined, the value of potato exports in recent years has been ranked first or second, oranges being the other major export. Of these commodities, potatoes commanded 14.6% of the value of exports in 2005.³⁸

Potatoes require cold storage for maximum shelf life. Potatoes stored under ideal temperature and humidity can last 5-10 months.³⁹

Brown rot is a concern, though some market participants claim that the European Union sometimes manufactures brown rot concerns in order to keep imports out and prices higher within the EU.

According to data from the Ministry of Agriculture, the average farm price of the summer potatoes crop in 2004 was EP 695 per ton, compared to an average wholesale price of potatoes of EP 860 per ton and an average traditional retail market price of EP 1370 per ton.

6.5. Dry Onions

Egypt is a substantial net exporter of dry onions. The Middle East, Russia, and the United Kingdom have been the primary export destinations.⁴⁰

Mature dry onions can be stored for 1-8 months if kept at zero degrees centigrade and with a relatively low humidity level. There is a drying plant in Alexandria. In Upper Egypt, there is also one in Qena, but local business leaders say that its technology is not up to date.

³⁶ Businessman Sherif El Maghraby concurred with that assessment.

³⁷ Officials at Magrabi Agriculture told us that for legumes there are about 75 kilograms per ardab; however, this would imply that the farmgate price was higher than the retail price, when expressed in common units. The weight per ardab is probably closer to the amount for grains, which is about 155 kilograms per ardab.

³⁸ Based on COMTRADE data from reporter countries that traded with Egypt.

³⁹ Adel A. Kader, *Postharvest Technology of Horticultural Crops*, third edition, University of California, Agriculture and Natural Resources, Publication 3311, 2002.

⁴⁰ The data cannot be separated into dry onions and green onions.

There is also one in Assuit, and may be others around the country. A white mold has been a problem for onions in Egypt.

According to 2004 data from the Ministry of Agriculture, the average farm price of summer onions was EP 386 per ton, compared to an average wholesale price of EP 890 per ton and an average traditional retail market price of EP 1220 per ton.

6.8. Candidates for Futures Markets?

Are any of these commodities candidates for futures markets in Egypt? Probably rice is the best candidate. The rice sector is free of major government intervention, and thus could benefit from price stabilization. Rice is storable for extended periods, relatively standardized, and produced, consumed, and traded in relatively large volumes.

The horticultural products are less uniform in quality, not produced in such great volumes, and are perishable. Forward contracts such as already exist in the market probably offer the best opportunities for farmers interested in hedging their risks. These forward contracts could certainly be supported through greater price transparency, as discussed above, however. The MCX India does offer a potential model for commodities futures exchanges in the future, even for horticultural products like potatoes, if development of such exchanges is determined to be a realistic goal for Egypt.

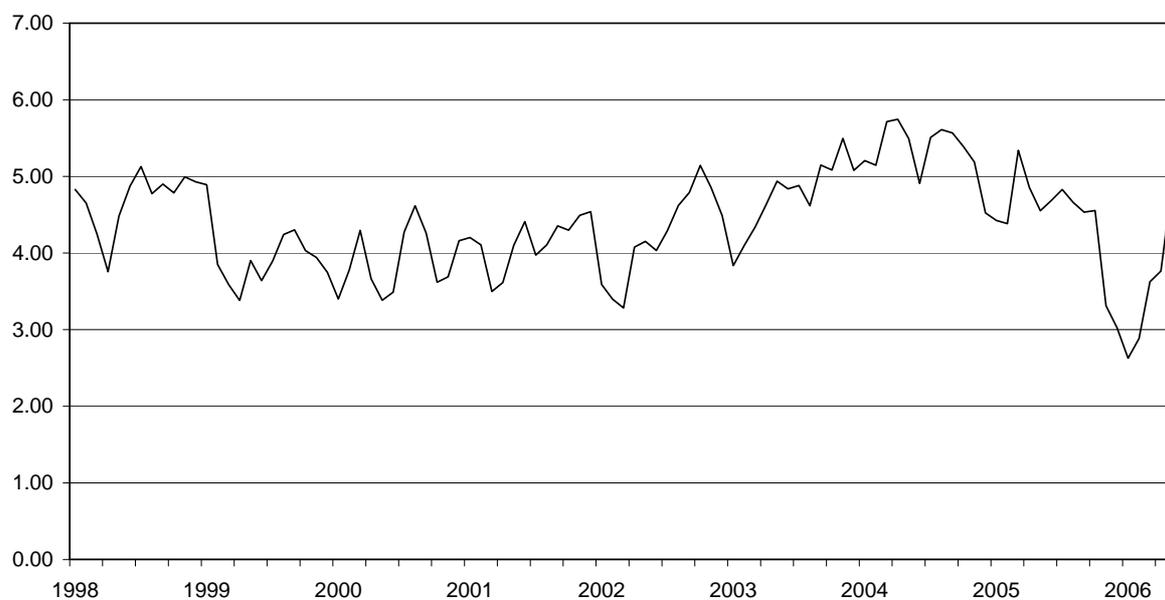
7. For Further Analysis: The Importance of Price Data

Further examination of prices of agricultural commodities would be useful in a number of ways, such as to facilitate interpretation of the day-to-day price signals obtained from markets inside or outside. Specifically, datasets of prices from the recent past would be useful in trying to answer the following questions:

- Are prices of certain commodities correlated with prices of other commodities? This is useful both in predicting commodity price trends and in developing hedging strategies.
 - Do commodity prices within Egypt track with prices of closely-related commodities outside of Egypt? Are the items close substitutes?
 - We should expect that the prices of bulk commodities like sugar, wheat, corn, and perhaps rice that are readily tradable and storable, and that are close substitutes with foreign-produced commodities, should have a relatively close relationship to foreign prices. For example, it would be interesting to study empirically the relationships between the international prices of different types of rice, in effect to understand better the extent of substitutability between these varieties. Can international long-grain rice prices be used to predict the international price that Egyptian rice can command at any point in time? Similarly, one could expect that the wholesale or retail price of sugar within Egypt would track closely with the FOB price of refined sugar at European Union ports.

- On the other hand, the price that green beans and other horticultural products can command in retail markets in Egypt may not bear much relationship to the price that green beans can command in France. It is primarily the export market for which high-value horticultural production is targeted. To trade these commodities internationally is more costly, given their perishability, particularly in the absence of an advance arrangements. These frictions, along with differences in retail margins, should allow for substantial international price differences.
- For which commodities are prices within Egypt most volatile over time? For these commodities, both the benefits and the risks of forward contracting or a futures exchange would tend to be greatest. One can envision such volatility as occurring over a variety of time horizons:
 - Analysis based on, say, month-to-month volatility in commodity prices would not necessarily be definitive: even intraday volatility can be substantial for some commodities, such as live chickens, at some points in time.
 - It would be ideal to examine such volatility across a range of horizons, using a variety of different data.
- For which commodities are prices within Egypt most different across governorates at a given point in time? This could serve to organize a research program on these markets. One could hypothesize about, and then seek confirmation for, alternative theories of these price differentials, which could be due to the frictions caused by transportation cost or due to regional differences
 - in the degree of competition among buyers
 - in the quality of the commodities produced
 - in the availability of relevant infrastructure: roads; refrigerated or other storage facilities; refrigerated or other transport; sorting, handling, and packaging facilities
 - in the profitability of alternative crops that could be grown on similar land.
- As noted in Section 1.4, it would be interesting to look at how margins between farmgate, wholesale, and retail prices of live chickens have behaved since the introduction of the Poultry Bourse, compared to previously.

Figure 1. Real Monthly Average Farmgate Prices of Live White Chickens, 1998-2006
(Year 2000 EP/kg)



Source: Based on weekly chicken price data from the Wadi Group, translated to monthly values and deflated by the Egyptian consumer price index from International Financial Statistics online database from the International Monetary Fund.

Table 1. Tests for Differences between Means of Real Monthly Prices of Live White Chickens, Pre-Bourse (January 1998 to November 2002) versus Post-Bourse (December 2002 to October 2005)

Percentage Increase in Mean	17.9			
	Mean	Standard Deviation	Coefficient of Variation	N
Pre-Bourse	4.17	0.51	0.12	57
Post-Bourse	4.92	0.48	0.10	37
Test for Difference Between Means	Difference Between Means	Its Standard Deviation	t-Statistic	
	0.75	0.10	7.24	

Table 2. Production of Selected Crops by Region, Egypt, 2004-05 (Tons)

	Lower	Middle	Upper	Other	Total
Rice (Summer)	6,195,309	115,940	67	39,399	6,350,715
Sugar Cane (Summer)	129,947	2,148,739	13,949,868	1,884	16,230,438
Sugar Beet (Winter)	2,892,790	420,283	3,009	113,453	3,429,535
Broad Beans, Dry (Winter)	198,368	14,291	22,146	48,049	282,854
Single Cropped	198,368	13,810	21,423	48,049	281,650
Intercropped	-	481	723	-	1,204
Onions, Dry	1,017,055	606,661	360,521	55,347	2,039,584
Summer					
Single Cropped	77,865	127,708	-	554	206,127
Intercropped	87,918	-	-	-	87,918
Nili	98	65,439	76,423	360	142,320
Winter					
Single Cropped	608,096	355,498	284,098	54,433	1,302,125
Intercropped	243,078	58,016	-	-	301,094
Potatoes	2,224,141	423,156	60,409	356,964	3,064,670
Summer	902,534	107,183	662	126,452	1,136,831
Nili	242,152	227,363	33,460	766	503,741
Winter	1,079,455	88,610	26,287	229,746	1,424,098
Citrus	1,796,680	216,745	124,162	750,012	2,887,599
Oranges	1,371,951	75,437	74,411	328,226	1,850,025
Mandarin	215,511	113,853	30,733	301,174	661,271
Sour Lime	204,896	27,169	18,961	84,794	335,820
Other Citrus	4,322	286	57	35,818	40,483
Bananas	268,751	102,929	175,791	327,652	875,123

Table 3. Production of Selected Crops by Region, Egypt, 2004-05 (Tons)

	Lower	Middle	Upper	Other	Total
Rice (Summer)	97.6	1.8	0.0	0.6	100.0
Sugar Cane (Summer)	0.8	13.2	85.9	0.0	100.0
Sugar Beet (Winter)	84.3	12.3	0.1	3.3	100.0
Broad Beans, Dry (Winter)	70.1	5.1	7.8	17.0	100.0
Single Cropped	70.1	4.9	7.6	17.0	99.6
Intercropped	-	0.2	0.3	-	0.4
Onions, Dry	49.9	29.7	17.7	2.7	100.0
Summer					
Single Cropped	3.8	6.3	-	0.0	10.1
Intercropped	4.3	-	-	-	4.3
Nili	0.0	3.2	3.7	0.0	7.0
Winter					
Single Cropped	29.8	17.4	13.9	2.7	63.8
Intercropped	11.9	2.8	-	-	14.8
Potatoes	72.6	13.8	2.0	11.6	100.0
Summer	29.4	3.5	0.0	4.1	37.1
Nili	7.9	7.4	1.1	0.0	16.4
Winter	35.2	2.9	0.9	7.5	46.5
Citrus	62.2	7.5	4.3	26.0	100.0
Oranges	47.5	2.6	2.6	11.4	64.1
Mandarin	7.5	3.9	1.1	10.4	22.9
Sour Lime	7.1	0.9	0.7	2.9	11.6
Other Citrus	0.1	0.0	0.0	1.2	1.4
Bananas	30.7	11.8	20.1	37.4	100.0

Summer and Nile crops are given for 2004, and Winter crops for 2005.

Source: Agricultural Statistics, Arab Republic of Egypt, Ministry of Agriculture and Land Reclamation, Economic Affairs Sector, Volume 2, Summer and Nile Crops, 2004, September 2005, and Volume 1, Winter Crops, 2005, January 2006.

Table 4. Crop Production in Lower and Upper Egypt, by Farm Size (percent)

	Lower Egypt (feddan)				Upper Egypt (feddan)			
	<1	1 to <3	3 to <5	≥5	<1	1 to <3	3 to <5	≥5
Traditional crops								
Fodder								
Long berseem	46.9	45.3	5.5	2.4	70.9	27.0	1.1	1.0
Short berseem	52.1	45.2	1.7	0.9	51.4	40.0	7.1	1.4
Summer maize	52.5	47.5	0.0	0.0	84.2	14.6	0.8	0.4
Nili maize	25.0	62.5	12.5	0.0	82.4	14.7	2.9	0.0
Other								
Barley	3.6	27.7	24.1	44.6	72.7	18.2	0.0	9.1
Chick peas	0.0	0.0	0.0	100.0	25.0	75.0	0.0	0.0
Horse beans	25.0	57.3	9.4	8.3	37.7	54.7	5.7	1.9
Wheat	37.8	43.1	10.0	9.1	53.5	39.2	4.9	2.4
Cotton	45.3	48.1	4.8	1.7	39.5	48.1	8.5	3.9
Summer maize	44.7	43.0	7.9	4.3	54.5	39.6	4.9	1.1
Rice	46.0	44.9	5.8	3.3	13.0	60.9	4.4	21.7
Sorghum	62.0	34.5	3.5	0.0	60.1	35.4	3.2	1.4
Nili maize	57.1	14.3	0.0	28.6	100.0	0.0	0.0	0.0
Nontraditional crops								
Fruits								
Grapes	66.6	23.8	9.5	0.0	50.0	16.7	33.3	0.0
Guava	72.7	9.1	0.0	18.2	100.0	0.0	0.0	0.0
Lime	35.2	58.8	0.0	5.9	62.5	37.5	0.0	0.0
Mandarin	10.5	31.6	15.8	42.1	66.7	16.7	16.7	0.0
Mango	22.0	45.8	13.6	18.6	50.0	45.5	4.6	0.0
Olives	21.6	43.8	16.8	17.7	50.0	50.0	0.0	0.0
Vegetables								
Beet	0.0	50.0	50.0	0.0	0.0	0.0	100.0	0.0
Cabbage	66.6	33.3	0.0	0.0	100.0	0.0	0.0	0.0
Garlic	100.0	0.0	0.0	0.0	66.7	25.0	8.3	0.0
Onion	50.0	37.5	8.3	4.2	87.5	12.5	0.0	0.0
Winter tomato	16.6	58.3	4.2	20.8	15.0	65.0	15.0	5.0
Dry French bean	100.0	0.0	0.0	0.0	0.0	100.0	0.0	0.0
Eggplant	44.4	55.6	0.0	0.0	100.0	0.0	0.0	0.0
Okra	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Summer tomato	6.5	52.3	21.5	19.6	0.0	100.0	0.0	0.0
Potato	0.0	100.0	0.0	0.0	33.3	66.7	0.0	0.0
Nili tomato	20.0	80.0	0.0	0.0	25.0	62.5	12.5	0.0
AMO								
Peanut	19.7	40.7	19.8	19.8	80.0	20.0	0.0	0.0
Sesame	25.0	66.7	8.3	0.0	28.6	57.1	14.3	0.0
Sunflower	50.0	50.0	0.0	0.0	37.5	53.1	9.4	0.0

AMO = aromatic, medicinal, and oil plants.

Nili indicates September to November growing season

Source: World Bank, *Upper Egypt—Challenges and Priorities for Rural Development*, Report No. 36432-EG, Policy Note, Water, Environment, Social and Rural Development Department, Middle East and North Africa Region, June 15, 2006.

Table 5. Agricultural Product Balance Sheets for Milled Rice, Potatoes, Dry Onions, and Broad Beans, 2000-06

	2000	2001	2002	2003	2004	2005	2006
Milled Rice (1000 mt)							
Initial Stocks	631	887	894	870	719	502	357
Production	3,965	3,575	3,705	3,900	4,128	4,130	4,140
Imports	11	-	50	-	-	-	-
Exports	705	468	579	826	1,095	1,000	800
Consumption	3,015	3,100	3,200	3,225	3,250	3,275	3,300
Ending Stocks	887	894	870	719	502	357	397
Broad Beans, Dry (mt)							
Imports	172,446	242,524	287,869	307,668	314,003		
Exports	8,986	6,478	4,995	5,306	6,624		
Production	353,909	439,480	400,910	400,000	400,000	400,000	
Usage*	517,369	675,526	683,784	702,362	707,379		
Potatoes (mt)							
Seed Imports	72,909	38,394	64,981	60,367	63,917	30,594	
Other Imports	4,137	75	875	168	47	125	
Seed Exports	172	74	91	48	1	-	
Other Exports	152,750	192,026	304,511	270,305	354,087	296,718	
Production	1,769,910	1,903,134	1,985,317	2,039,351	2,546,610	2,500,000	
Usage*	1,621,296	1,711,183	1,681,681	1,769,214	2,192,570	2,203,407	
Dry Onions (mt)							
Imports	19	-	177	-	-		
Exports	147,258	166,357	293,429	320,233	350,571		
Production	762,993	628,376	754,856	686,345	895,491	1,302,125	
Usage*	615,754	462,019	461,604	366,112	544,920		

*Usage includes consumption and usage by processing industries, plus the change in stocks, inferred as a residual from trade and production data.

Source: For rice, USDA, Production, Supply, and Distribution data online (http://www.fas.usda.gov/psd/complete_files/default.asp)
For all other commodities, FAOSTAT online (<http://faostat.fao.org/default.aspx>) for all data except trade data for potatoes, which come from the United Nations COMTRADE database (available by subscription at <http://unstats.un.org/unsd/comtrade>).