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Sub-Sector Map of Agricultural Seeds

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ACRONYMS LIST

<i>ACRONYM</i>	<i>DESCRIPTION</i>
AC	Agricultural Census
AERI	Agriculture Engineering Research Institute
AHD	Aswan High Dam
AIC	Agricultural and Irrigation Committee of the People's Assembly
ALCOTEXA	Alexandria Cotton Exporters Association
APRP	Agricultural Policy Reform Program
ARC	Agriculture Research Center
ATUT	Agricultural Technology Utilization and Transfer Project
AY	Agricultural Year Locator (October 1 st to September 30 th of the following year)
BOD	Board of Directors
CAGA	Central Administration for Governorates Affairs
CAPMAS	Central Agency for Public Mobilization and Statistics
CAPQ	Central Administration for Plant Quarantine, MALR
CASC	Central Administration for Seed Production
CASP	Central Administration for Seed Certification
CAWD	Central Administration for Water Distribution
CBE	Central Bank of Egypt
CIDA	Canadian International Development Agency
CIF	Cost, Freight and Insurance
CMA	Capital Market Authority
Co.	Company
COP	Chief of Party
CSPP	Egyptian-German Cotton Sector Promotion Program
CTS	Cargill Technical Services
DA	Development Associates, Inc.
DAI/B	Development Alternatives, Inc./Bethesda
ELS	Extra Long Staple Cotton
EMEPAC	Egyptian Company for Production Marketing and Exporting Ag. crops
ERSAP	Economic Reform and Structural Adjustment Program
ESAs	Employee Shareholder's Association
ESOPs	Employees Stock Ownership Program

<i>ACRONYM</i>	<i>DESCRIPTION</i>
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FDIs	Foreign Direct Investments
Fed.	Feddan = 4200 square meter
FIHC	Food Industries Holding company
FOB	Free on Board
FSR	Food Security Research Unit
GA	General Assembly
GASC	General Administration for Supply Commodities
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GOE	Government of Egypt
HC	Holding Company
IDA	International Development Association
IFC	International Financial Cooperation
IFPRI	International Food Policy Research Institute
IPPC	International Plant Protection Convention
IPO	Initial Public Offering
IIMI	International Irrigation Management Institute
IR	Intermediate Results
Kg.	Kilogram
Kt.	Kentar
Libra	Pound of 0.45359 kilogram, also abbreviated as lb.
LE	Egyptian Pound
LK	Lint Kentar of cotton, 50 kgs.
LS	Long Staple cotton
MALR	Ministry of Agriculture & Land Reclamation
MENA	Middle East North Africa
MEIC	Ministry of Economy & International Cooperation
MIMW	Ministry of Industry & Mineral Wealth
MMT	Million Metric Ton
MoTS	Ministry of Trade & Supply
MPE	Ministry of Public Enterprises

<i>ACRONYM</i>	<i>DESCRIPTION</i>
MPWWR	Ministry of Public Works & Water Resources
MLS	Medium-Long Staple cotton
MVE	Monitoring, Verification & Evaluation Unit
NARP	National Agricultural Research Project (a former USAID Project)
NBE	National Bank of Egypt
NCF	National Consulting Firm
NGO	Non-Governmental Organization
O & M	Operation & Maintenance
OSAF	Office for Studies And Finance
PA	People's Assembly
PBDAC	Principal Bank for Development and Agricultural Credit
PEO	Public Enterprise Office
P&L	Privatization & Liberalization
PIDP	Partnership In Development Project
PMU	Project Management Unit
PPC	Program Planning Committee
PRA	Participatory Rapid Appraisal
PU	Purdue University
RDI	Reform, Design & Implementation Unit
ROW	Rest of the World
SCC	Sugar Crops Council
SCRI	Sugar Crops Research Institute
SIIC	Sugar and Integrated Industries Company
SK	Seed Kentar of cotton (157.5 kgs.)
SS	Short Staple cotton
STTA	Short Term Technical Assistance
SWG	Sugarcane Working Group
TA	Technical Assistance
TAMIS	Technical & Administrative Management Information System
TAT	Technical Assistance Team
TF	Task Forces
TO	Training Officer
TOR	Terms of Reference

<i>ACRONYM</i>	<i>DESCRIPTION</i>
TNA	Training Needs Assessment
TRG	Training Resources Group
TSG	The Services Group
UMD	University of Maryland
USAID	United States Agency for International Development
US\$	United States Dollar
WB	World Bank
WTO	World Trade Organization
WUA	Water User Association

Executive Summary

This study examines the structure of the market for planting seeds in Egypt. Some seeds are dominated by the private sector and others are in the public sector. Each crop constitutes a different market for seeds though there are similarities across crops.

The structure of the seed market of a crop is strongly influenced by the source of and availability of the parent breeder seed. For example, private seed companies are active in producing hybrid maize, grain sorghum, sunflowers, and vegetable seeds and, hence, the private sector is the primary producer and distributor of these seeds. In the case of wheat, rice, lentils, barley, and faba beans, MALR has the major breeding program and still plays a large role in seed production, though distribution of these seeds is moving into private hands. Estimates were made of the shares going through private channels for each crop and the number of private firms involved.

In recent years the Horticultural Unit within MALR has gained considerable influence in the production of foundation and registered seed and of seed registration and imports. The close association of this unit with EMEPAC, a private stock company, may lead to significant improvements in seed production or significant concentration of market power and a decline in competition within the seed sector. All private seed production companies must have access to foundation or registered seeds to maintain low producer seed costs through a competitive market system.

Private maize seed producers without a breeding program must rely on ARC for hybrid inbred lines. Many of these producers contend that new varieties should be put up for tender so that the highest bidder would have exclusive rights to market that variety rather than compete, as presently done, with CASP.

The market for seed potatoes is unique. Due to viruses and brown rot, Egyptian potato producers import 60,000 tons of seed potatoes each year from Europe at a tremendous cost. Potato exporters can produce only two generations of potatoes from each seed shipment. Disease resistance is necessary to retain export markets in Europe. A potato producers' co-op and many private companies import seed for their own use. Tissue culture programs should be examined as a way to reduce seed costs.

The private sector controls importing, breeding, producing, and exporting vegetable seeds. Many growers spend LE 100-200/fd for seed. Costs of legal imports of tomato seeds are estimated at LE 17m, LE 15m for cucumber seeds and LE 5m for carrot seed. Imports of all vegetable seeds are estimated at about LE 50m/year.

The GOE should do everything possible to encourage private breeders to invest in seed breeding or tissue culture programs, especially for potatoes, tomatoes, and cucumbers. Protecting breeders' rights is a necessary part of this effort and should be directed at gaining the maximum possible benefits from current biotechnology. Tight inspection controls may help to keep out diseases and insects but they also may discourage entry of needed foreign investment, expertise, and genetic materials.

Introduction

An agricultural subsector is defined as the firms and agencies that are engaged in the processing and movement of a specific agricultural commodity from production on the farm until it reaches the consumer. In the case of agricultural seeds, consumers of seeds are the farmers who plant these seeds. The seed marketing subsector is here defined as those activities which begin after seed breeders have developed varieties or hybrids until they are in the hands of the farmers who will plant the crop for the production of food or fiber. A few remarks will be made regarding seed breeding as a background for this report but the marketing of breeding seed is not the intended scope of this report.¹

Seed Breeding

Organized seed improvement programs exist in most countries in the world. In Egypt, the responsibility for agricultural seed improvement within MALR lies mainly with the ARC. This agency is responsible for the public effort to breed new agricultural and horticultural seeds. Tables 1 and 2 list the number of registered varieties of most crops in Egypt by both the public and private sectors. This listing shows that most varieties of many field crops come from the public sector. However, the private sector has been active in breeding field crop varieties such as double and 3-way cross hybrid maize, sorghum, sudangrass, sunflowers, and many types of vegetables. Some Egyptian universities have crop varietal breeding programs. For instance, the University of Assuit developed and released a now-popular variety of faba beans called "Wally." We will see as we look at each crop that the source of the breeder seed greatly influences the pattern of distribution of these seeds.

¹ For more details on aspects of seed breeding in Egypt see the various reports by Delouche listed in the references.

Table 1. Number of varieties of field crops registered by public sector companies, 1988-1998

Crop	Public Sector	Private Companies	Total
Alfalfa	5		5
Barley			
6 row	2		2
2 row	2		2
Berseem	7		7
Chickpeas	2		2
Cotton	12		12
Fava beans	10		10
Flax	2		2
Lentils	1		1
Maize			
white lines	10		10
yellow lines	8		8
Single white hybrids	9	2	11
Single yellow hybrids	5	1	6
Double white hybrids	3	3	6
Double yellow hybrids			
3-way white hybrids	6	6	12
3-way yellow hybrids	2	1	3
Millet	1		1
Rice	8		8
Sorghum	6	6	12
Sorg. X Sudangrass	4	2	6
Soyabean	3		3
Sunflower		5	5
Wheat			
Soft	16		16
Hard	3		3
Sugar cane	7		7
Munge bean	1		1
Total	135	26	161

Source: Private communication, M. Ibrahim El Hawary, CASC.

Table 2. Number of varieties of vegetable crops registered by public and sector companies, 1988-1998

Crop	Public Sector	Private Companies	Total
Beans	1	12	13
Cucumbers	8	23	31
Garlic	1		1
Karkade	1		1
Sweet Potato	4		4
Tomato	7	31	38
Squash	1	3	4
Peas	1	1	2
Cowpeas	1		1
Watermelon	2	7	9
Melon	2	6	8
Radish	3		3
Spinach	1		1
Eggplant		9	9
Pepper		15	15
Potato		34	34
Artichoke		2	2
Asparagus		2	2
Strawberry		5	5
Okra	1		1
Lettuce		6	6
Cabbage	1	1	2
Cauliflower	1		1
Carrot		2	2
Turnip	1		1
Table beets		2	2
Total	37	161	198

Source: Private communication, M.Ibrahim El Hawary, CASC.

Seed Classes

The 4 seed classes are based on the number of generations away from breeder seed. The first class, or generation, is breeder seed; the second is foundation seed. Foundation seed is used to produce the third generation (or class) seed called registered seed. This seed is grown mostly under contract with farmers under the supervision of CASP. Registered seed is provided to growers to produce certified seed, the fourth class of seed. Certified seed is produced under contract with farmers and requires certification in the field and laboratory inspection by CASC staff. The class of seed distributed to growers for crop production, and thus the major concern of this report, is certified seed.

Under the current law on crop seed certification and distribution (Ministerial Decree No 38 of 1997 of MALR), the production of foundation, registered, or certified seed is prohibited without obtaining the appropriate license from MALR. Foundation seed originates from breeder seed, is produced under the direct supervision of the breeder, must possess the genetic characteristics of the variety, and is the source of all certified seed. When the ARC has the breeder seed, the foundation seed is grown on MALR land.

Rather than plant all certified seeds for 100% of all crops, farmers usually retain seeds from previous crops. Estimates of seed retention by Egyptian farmers will be provided for each major field crop.

Public Agencies in Seed Production and Distribution

Three agencies within MALR deal with seeds: ARC, CASC, and CASP (the latter 2 evolved from CAS. CASC is responsible for seed testing, seed certification, registration of varieties, licensing of the various seed production and distribution firms, collection of seeds data, seed extension activities in MALR, and other activities. CASP is responsible for producing what seeds are needed—mainly cotton, wheat, and rice—until all production has been taken over by the private sector. CASP deals mainly with planting seeds for cotton, wheat, and rice.

The Director of the Horticultural Commercial Unit recently was given administrative control over CASP, the seed resources of EAO, and other resources within MALR. The Horticultural Unit is closely affiliated with a private sector company EMEPAC.

CASC

In 1997 this agency had 2,245 permanent employees and 3,507 casual employees. Of the permanent employees, 356 were in seed testing, 857 were in certification, 407 in field inspection, 83 in extension, and the balance in administration or on leave. CASC has offices in 22 governorates, 11 with seed testing stations charged with field-testing for certification, seed certification, and licensing of traders. It also has 2 locations for plot testing of seeds. These tests are done to test for variety purity, for weed seed contamination, and for seed-borne diseases prior to certification. The head office in Cairo spot checks these field stations.

CASC, working with the Seed Council, Cotton Council, and Oil Seeds Council, is in charge of variety registration. It arbitrates disputes over seeds and is involved with new seed legislation and national seed policy.

CASC Licensing

One of CASC's duties is to inspect and license all seed companies. The license and permit fees are described in Annex II of Decree # 38.

Seed production companies are required to hold a general license, which is issued for 5 years at a cost of LE 500. In addition, the company is required to have a permit (LE 50) for each variety, each district, and each year in which it produces this seed. As of March 1998 there were 43 licensed seed producers in Egypt.

CASC attempts to register and license all seed distributors or traders, whether at the national or village level. A 3-year license costs LE 50 and was issued to more than 3,000 traders in 1997. As of 31 December 1997 there were 7,554 licensed seed traders in Egypt. However, many village seed traders operate without a license. Perhaps they know that they cannot meet the requirements for licensing, such as adequate storage space, etc, or they simply try to avoid paying the LE 50 fee.

Seed processing firms must also be inspected and licensed. Cotton gins, oil mills, and cotton seed delinting units must pay an annual license fee of LE 50. There also are 61 cold storage units, mostly for seed potatoes, that are licensed by CASC.

CASC also inspects and certifies seed conditioning plants. Currently there are 32 licensed seed plants and 6 unlicensed MALR plants in Egypt. (see Annex Table 2). Of the 16 private vegetable seed conditioning plants, only 4 are large, mechanized operations. Most private seed conditioning is done manually.

CASP

This agency currently has 3,198 permanent employees, 83 seconded from other agencies, and 3,748 casual employees for a total of 7,029 employees. As discussed above, ARC does the seed breeding for GOE and produces the breeder seed, some foundation seed, and some registered seed. CASP also produces some foundation and registered seeds. CASP, private companies, and some private co-operatives produce certified seeds which are distributed to farmers for crop production.

CASP sets the prices of the seed it produces and distributes it to farmers through co-operatives and private traders. The private sector has expanded rapidly since 1996 when CASP set seed prices at about 200% of the equivalent commodity market prices. This policy removed much of the indirect subsidies previously included in CASP seed prices and allowed private sector companies to compete with CASP.

Seed Production

Seed production is a multiyear process beginning with the breeder seed and ending with the certified seed that is sold to farmers. The production of certified seed involves a minimum of one year, from the planting of the registered seed by contract farmers until the planting of the certified seed. Farmers produce practically all certified seed for all crops under contract with either CASP, private sector seed production companies, or a co-operative.

All seed producing firms produce the bulk of their seed on private farms under contract. The seed producing company obtains registered or foundation seeds from CASP, or from its own breeding program, and provides it to the farmers growing seed for them. Some private seed companies prefer to purchase foundation seed from ARC and multiply it for 2 generations before sales of certified seed.² They feel that this procedure is more profitable than purchasing registered seed from ARC. Only a few of the largest companies, those with skilled agronomists on their staff, follow this procedure.

In 1997 the ARC began charging royalties on foundation and registered seed, essentially doubling the price of these seeds. Prices of all ARC seeds are not available but one company gave examples of the prices they paid to ARC for wheat seed. Compared to the market price of wheat of roughly LE 100/ardeb, the current CASP price of certified wheat seed is around LE 220-230/ardeb, depending upon the variety, and the price paid to ARC for foundation seed was LE 437- 478/ardeb.

Another major factor in determining which generation seed to purchase from ARC is the skill and experience of the seed company employees in seed production. Major seed producers hire agricultural engineers to supervise the seed production activities of the contract farmers. Seed companies purchase the seed from the farmers at a premium price, provided the seed meets the CASC standards for certification. The premiums paid by CASP average about 10-13% over the regular market price of the grain for most crops.

All seed companies, and CASP, attempt to deal with large farms to reduce supervisory and certification costs. For example, in 1994 CASP had wheat seed production contracts with 4,328 farmers covering 69,122 fd. This was an average size of almost 16 fd/farm. In the case of faba beans, the average size seed contract was for 9 fd. CASP reports that some farmers keep some of the seed for their own use the following year or to sell as high quality, but not certified seed, to their neighbors who are willing to pay a higher premium than that paid by CASP.

In March 1998 the number of licensed seed production companies was 43 (see Annex Table 1). The list included a few companies that produced seed for their own use and not for sale and several seed producing co-operatives. The number of companies producing seed of each crop varies widely and will be presented as we discuss each crop.

Seed producing companies set the farm-level prices of the seeds they produce then discount that price to seed traders or co-operatives by 8-12% depending upon credit terms and the volume of seeds sold.

Seed Distribution

Seed distribution differs by crop. The crops are divided into 5 categories for this discussion: cotton, maize, other field crops, potatoes, and other vegetable crops.

² As stated above, registered seed is the first generation after foundation seed, and the second generation is certified seed.

Estimates will be presented of the percent of seeds of each crop, or category of crops, which is produced and distributed by each type of distributor.

The bulk of the seeds, both field crops and vegetables, reach the farmer either through private seed traders or through village co-operatives. Activities of these 2 groups are briefly described here, along with a description of PBDAC.

Private Seed Traders

As reported above, there were 7,554 CASC-licensed seed traders and one and a half again as many unlicensed traders at the end of 1997 for a total of nearly 19,000 seed traders. Private traders sell the bulk of vegetable and maize seeds in Egypt and some of the other field crop seeds. A survey of firms in 20 villages in March 1998 revealed that about two-thirds of the licensed seed dealers sold vegetable seeds; 50% of them sold maize seed; 40% sold wheat seed; and 38% of those located in the rice areas also sold rice seed. The sample size of this survey was quite small and further research on this topic is needed.³

Licensed seed traders market a variety of agricultural inputs. Most seed dealers sell pesticides and some sell bagged fertilizers; seed sales represented only 34% of their total sales. Seed traders have an average of one employee who is paid a wage of LE 6/day.

Egypt's central vegetable seed market is in Cairo on Ahmed Maher Street in the Bab El-Khalk area. Some of the major importers, exporters, and producers of vegetable seeds in Egypt operate 14 shops within a 2-block area. They sell to all village traders and direct to farmers in many governorates. For example, while we were in one shop a farmer from Beni Suef purchased LE 1400 worth of seed. (This was less than 2 kg. He bought 1200 grams of imported melon seed priced at LE 1/gram.).

Village Co-operatives

There is a village co-operative in every major village, about 4,644 in all, according to the 1990 Agricultural Census. Organizationally, these MALR-administered co-ops are in three societies that were formed in the 1950s in areas where land was redistributed to farmers during land ownership reform. They are the Agrarian Reform co-ops, about 250,000 farmers in 600 villages on 900,000 feddans; the General Co-op Society for New Lands, about 83,000 farmer in 300 villages owning about 1m feddans of land reclaimed from the desert or from saline areas in the Nile Valley; and Village Co-ops, all other areas—about 3,750 general-purpose co-ops.

The village-level co-ops in all three groups furnish some crop inputs for farmers including seeds and reported the following sales of seeds in 1996-97: maize-891 tons,

³ No data were collected on unlicensed seed traders or their activities. Seed producing and distributing company officials reported in interviews that most unlicensed seed traders have no shop or store. They operate part-time and sell small quantities of vegetable seeds to farmers who do not want to buy a full standard 100-gram tin of seeds.

wheat-17,406 tons, rice-5,102 tons, potatoes-750 tons, onions-105 tons, peanuts-0.5 tons. These quantities represent formal distribution through the central co-op. Individual village co-ops may also distribute seed for private seed companies.

Village-level co-ops receive a small commission on seed sales. On wheat and rice produced by CASP their commission is LE 2/ardeb which is about 1% on wheat and 1.2% on rice. On cotton they receive LE 1.20/ardeb which is 1%. The commissions on seed provided by private companies vary with each company but are similar to that paid to private traders.

PBDAC

PBDAC, once the major distributor of a wide variety of seeds (most of which were produced by the MALR), now distributes only hybrid maize seeds under consignment arrangements with private seed production companies.

Cotton Planting Seeds

The production and distribution of cotton planting seed in Egypt is different from all other crops because growers cannot retain cottonseed. Since growers must deliver their seed cotton to a gin to separate the seed from the lint, they must obtain new seed each season. This aspect of the cotton crop facilitates, in some respects, the provision of improved cotton planting seeds to growers.

Cotton planting seed production is entirely in the hands of MALR. ARC is the sole breeder of cotton varieties in Egypt; farmers under contract with CASP produce all certified cotton planting seed, CASC certifies all the seed, and CASP conducts all conditioning, including delinting.

All cotton planted in a large area will be registered seed of one variety to eliminate mixing cotton lint. For certified seed to be released to farmers in 1998, 212,800 feddans were planted with registered seeds in 1997. Of this total area, 43,402 feddans were rejected by CASC and 169,398 feddans (69.6%) were certified by CASC as meeting the standards for the varieties and were ginned.

Ginning is done in selected gins that either gin only cotton to be used for seed or gin seed cotton first to avoid contamination with cotton not to be used for planting. Lint tests determine whether the seed is taken by CASP to its processing facilities.

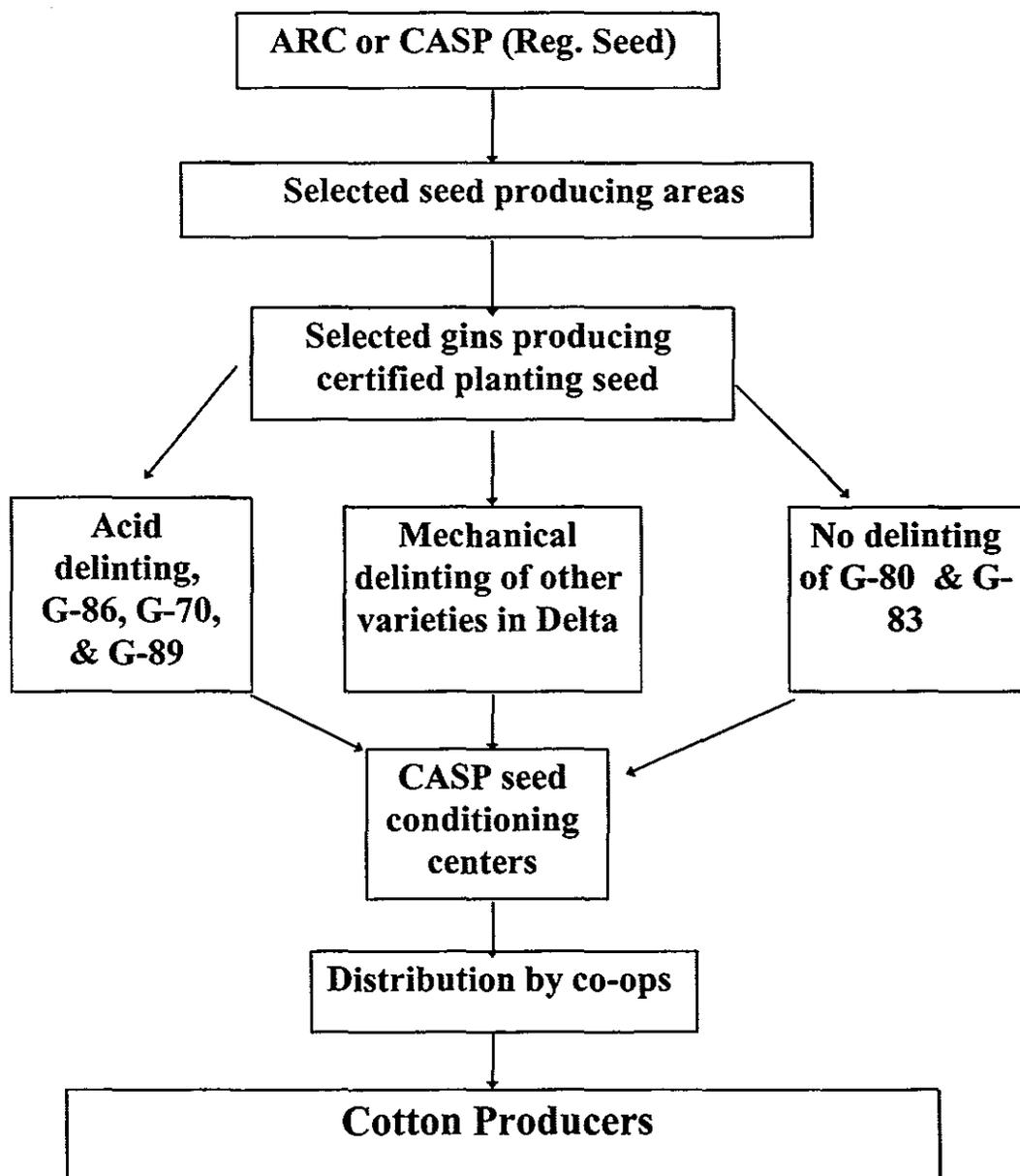
Ginning does not remove all small fibers, or lintels, which make the individual seeds hang together in clumps and prevent sorting, cleaning, and other steps in seed conditioning. Delinting (removing lintels from planting seeds), practiced widely for many years in most cotton-producing countries, was introduced in Egypt in 1994. MALR

used mechanical delinting on more than half the crop in 1995 and 1996, until a GTZ-furnished acid delinting plant was activated in 1997.⁴

With gin-run seed, cotton growers used approximately 70 kg/fd. CASP recommends the use of 30 kg/fd of delinted seed. This reduction is possible because the delinted seed has a higher rate of germination, and has been treated with pesticides to improve survival rates. (In comparison, the planting rate in the USA, with mechanical planting, is about 4 kg/fd.) However, many farmers are not as yet convinced that the lower seeding rate is adequate. They insist on using more than 30 kg/fd.

⁴ Acid delinting is preferred over mechanical delinting mainly because mechanical delinting causes some seed damage and acid delinting more completely removes the lintels.

Fig. 1. Cotton seed subsector map



With a seeding rate of 30 kg/fd and an estimated crop size of 1m feddans, at least 30,000 mt of planting seed is needed annually. The GTZ acid-delinting plant produced 10-15,000 ardeb for the 1998 planting season (120 kg/ardeb) (1200 to 1800 mt). Acid delinting was done in 1998 on some of the seed needed for varieties Giza 86 and 70 and 500 ardeb of Giza 89. Thus, acid delinting was used on only 3-4% of the total cotton planting seed in 1998 but in the future the GTZ acid delinting plant will be able to delint about 20% of the total planting seed needs.

Some seed for other varieties grown in the Delta in 1998 was mechanically delinted but not enough to fill the needs. Three public oil and soap companies do mechanical

delinting but they do not have the capacity to delint all of the seed needed. No delinting was done in 1998 on the varieties planted in Upper Egypt since these varieties are generally clean of lintels. The rate of planting of these delinted varieties is unknown but will be somewhere between 30 and 70 kg/fd.

After delinting and other seed conditioning, CASP distributes the bulk of the seed directly to co-operatives for distribution to members. In 1997 CASP distributed about 15% of the cotton planting seed directly to growers while the co-operatives distributed 85%. In 1998 the price of cotton planting seed, set by CASP, was LE 60/30 kg sack, or LE 2/kg. The co-operative distributing this seed received a commission of LE 1 to LE 1.30/sack (whether cash or credit). This is commission of only 1.6 to 2.2%. The general-purpose co-ops obtained a contract with CASP to distribute almost all of the cotton planting seed in 1998 except for that distributed by other co-operatives.⁵ Thus, the Agricultural Reform Co-op distributed seed in 1998 for about 125,000 fd, the Land Reclamation Co-op distributed seed for 60,000 fd, and the general purpose co-ops distributed the balance of the cotton seeds.

MALR control of the breeding and production of cotton planting seed will likely continue for many years. Offshore companies have indicated an interest in cotton breeding but have not made any commitment to do so.

MALR's concern that private sector firms do not have the ability to maintain seed purity compels it to maintain control of seed production. However, privatization of distribution can proceed while still maintaining control of production within CASP. Co-ops now distribute the bulk of the cotton planting seeds, which was formerly performed by PBDAC. Since these general-purpose co-ops are government managed and not farmer managed, this is only a small step toward privatization.

Cotton planting seed produced by CASP could be sold to private firms for delinting, conditioning, and distribution as soon as the seed has been certified by CASC. This transfer could be performed at the gins immediately after CASC and Cotton Research Institute certification. This implies that the delinting and conditioning plants also come under private ownership, or at least private management.

There is possibility for private profit making through the production of high-quality seed. Opportunities exist for further improvement of these seeds through better conditioning and treatment with pesticides. One obstacle to privatizing cotton planting seed is the farmer's current unwillingness to fully accept the delinted seeds (primarily the lower rate of seeding). The acceptance of these seeds and the lower planting rates are still in transition. More experience by farmers with the delinted seed will reduce the uncertainty for private seed investments.

⁵ General purpose marketing and credit co-ops under the direction of Samir Shehata, MALR.

Number of firms and employees in cotton planting seed marketing.

Since farmers grow cotton in rotation with other crops there are about 3 million Egyptian farmers that grow cotton but only about 1 million producers in any one year. About 213,000 feddans of cotton were designated at planting time for the production of planting seeds in 1997. Thus, about 200,000 farmers are producing planting seeds each season.

The number of gins used varies from year to year but is estimated at 15-20% of all gins or 10 to 15 gins.

Only one plant, that furnished by GTZ, currently has facilities for acid delinting. This plant employs 10 permanent and 25 casual employees at an annual cost, including bonuses and incentives, of LE 130,000. It also hires contract workers to load and unload seed.

Three soap and oil companies furnish facilities for mechanical delinting. Several CASP seed centers are used for seed processing. Generally each variety of cotton is processed in a different plant—10 varieties were planted in 1997.

Maize

The private sector has been active in the breeding of maize hybrid varieties in Egypt (Table 1). The sale of hybrid seeds offers potential for profit not possible with the sale of open-pollinated crops since farmers can easily retain seed from open-pollinated crops. ARC has produced most of the hybrid maize varieties now used in Egypt but private breeders are gaining ground. The major private maize breeders are MISR-Pioneer, EGAS, National Seed Co., and Hytech. Currently ARC provides about 20% of the breeder seeds for hybrid maize and private breeders provide about 80%.

Sixty-four percent of farmers (Table 3) planted seed retained from previous crops (F2) rather than improved F1 hybrids. Seed experts indicate that the F2 single cross hybrids will yield 80% of the F1; thus farmers must weigh spending an extra LE 10/kg (planted at a rate of 15 kg/fd) against a 20% yield increase. Also, farmers lack knowledge of the benefits of hybrid seeds.

Farm-level prices of certified maize seed in 1998 ranged from LE 4 to LE 15/kg. Lower prices were for the older hybrid varieties and those sold by co-operatives while higher prices were for the newer and higher-yielding varieties produced by private companies.

A small portion of maize seed is imported. Hytech reported that they take inbred lines which they have developed in Egypt, send these to an affiliate company in India to produce the hybrid seed, then import the hybrid seed for sale. Also, Dekalb has a local affiliate that imports hybrid maize seed for local sale.⁶

⁶ El-Nil Company, which is affiliated with DeKalb, does not have a breeding program for maize in Egypt but imports some maize seed from the parent DeKalb company.

PBDAC no longer distributes seeds for CASP but does distribute seeds under consignment for many private seed companies, primarily maize seed. In 1997 PBDAC distributed 330 tons of maize seed for 6 private seed companies.

Table 3. Seed needs and production for major field crops by private sector and CASP 1995-1996

Crop	Crop area 1995-96 (00) FD	Rate of seed use KG/FD	Total seed Use (00 Tons)	Percent Retained by Farmers	Total Seed Purchases (00 Tons)	Production of seed by:			
						Private sector (00 Tons)	(%)	MALR (00 Tons)	(%)
Cotton	710	47.6	33.8	0	33.8	0	0	33.8	100
Maize	2,146	15	32.2	64	11.6	10.8	94	0.7	6
Wheat	2,512	75	188.4	67	62.2	5.3	8.5	56.9	91.5
Rice	1,401	60	84.1	62	31.9	7.2	22	24.7	78
Faba beans	339	75	25.4	86	3.6	1.3	38	2.2	62
Soyabeans	82	30	2.5	70	0.7	0.09	12	0.61	88
Lentils	11	80	0.9	88	0.1	0	0	0.1	100
Barley	448	60	26.9	99	0.3	0	0	0.3	100
Sorghum	382	10	3.8	81	0.7	0.7	96	0.03	4
Sunflower	74	12	0.9	89	0.1	0.05	59	0.04	41
Onion	94	7	0.7	97	0.018	0.004	22	0.014	78

Source: CASC, 1996.

Table 4 presents a tabulation of hybrid maize seed production by private companies for 1998 which indicates more production of seed (14,500 tons) than will likely be sold. This tabulation also shows that 4 companies together have about 87% of the maize seed market. These companies each have their own breeding research programs but several also purchase some registered seed from ARC.

EGAS, MISR-Pioneer, National, and Hytech are the major producers of most field crop seeds in Egypt including maize, wheat, rice, fava beans, grain sorghum, soyabeans, and sunflowers. Together they produce 85-90% of the seed for these 7 major crops. These are the only companies that have any breeding programs for field crops and the only companies which have their own seed conditioning plants.

Table 4. Production of certified maize seed by private companies for 1998 planting

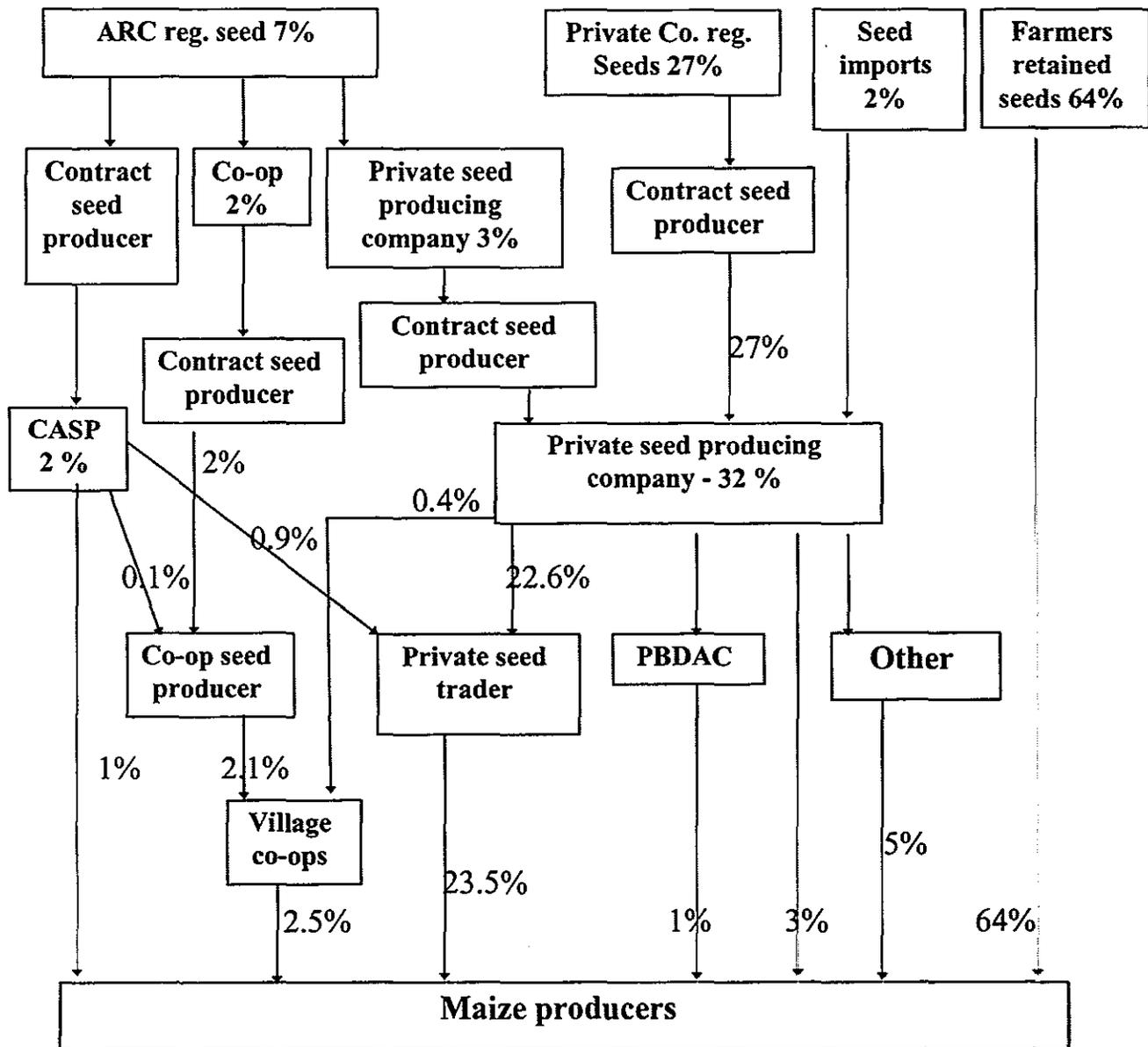
Name of company	Seed Production (Tons)	Market share (%)
EGAS	4,000	28
MISR-Pioneer	3,500	24
National	2,000	14
Hytech	3,000	21
Rice Co-op	800	5
El Safa	400	3
All others	800	5
Total	14,500	

The combined annual sales of these 4 companies are about LE 80 M. ranging from LE 10m to LE 35m; each has 40 to 120 employees (average 81) and the average reimbursement to employees is just over LE 12,000/annum. This is well above the average of other agriculture workers because this group includes many scientists. Total annual sales per employee in 1997 ranged from LE 166,000 to LE 330,000 with an average of LE 235,000. This level of sales per employee is no doubt far above that of the smaller companies.

The total number of private sector companies that produce maize seed is estimated between 21 to 29. Some of these companies are one-person operations producing as little as 50 tons of seed. The 20 or so smaller maize seed companies sell an average 85 tons each, valued at LE 0.5m/company. It is likely that they would sell other seeds as well.

As illustrated in Fig. 2, the major sellers of maize seed are the private traders. They sell about 23% of all maize seed used by farmers and about 3/5ths of the seed that is sold. The group labeled "other" sold 5% of the total or about 16% of total sales. This group included private seed improvement associations and extension workers.

**Fig. 2. Maize seed subsector map.
(Share of product flow)**



Other Major Field Crops

Farmers are able to retain seed from most other major field crops produced in Egypt. CASP provided estimates of the percentage of farmers' use of their own produced and retained seeds in 1996 and 1997 and the shares of the certified seed that was produced by CASP, producer co-ops, and private seed producing companies. CASP distributes about 40% of its production of these crop seeds directly to farmers, mostly through the governorate offices and seed conditioning plants, 40% to village co-ops and the remaining 20% through private seed dealers, extension workers, seed councils, or the

Agricultural Syndicate. It distributes a small amount of wheat and rice to the seed producing co-operatives also. The seed production co-ops sell their production directly to farmers. Estimates of the distribution by the seed companies are based on interviews of 5 of the major private companies.

Wheat

Of the wheat planted in late 1997 for 1998 harvest, 67% was planted with seed retained by farmers from the 1997 harvest. The balance was certified seed produced from ARC varieties. Of this certified seed, 82% was produced by CASP, about 12% by private seed companies, and the remaining 6% by private co-ops such as the Rice and Cereal Producers Co-op and other similar private co-ops in the Delta governorates.

Private seed companies distribute about 60% of their production of wheat seed to private seed traders, about 12.5% is sold directly to farmers, about 15% is distributed through village co-ops, and about 12.5% to others, including seed councils and extension workers.

In total, the biggest seller of certified wheat seed to farmers is CASP at almost 34%. Village co-ops sell about 28% of the certified wheat seed and private traders sell about 22%.

CASP reports that in 1997 it sold registered or foundation wheat seed to 20 private companies and co-operatives, but it seems doubtful that all 20 companies sold certified wheat seed in 1997. Total private company sales in 1997 are estimated at only 5,300 tons. Actually the bulk of the seed sold by CASP was foundation seed which the seed companies can use for 2 generations to produce certified seed for sale. Perhaps there will be a large increase in market share by the private sector in wheat seed sales in 1998.

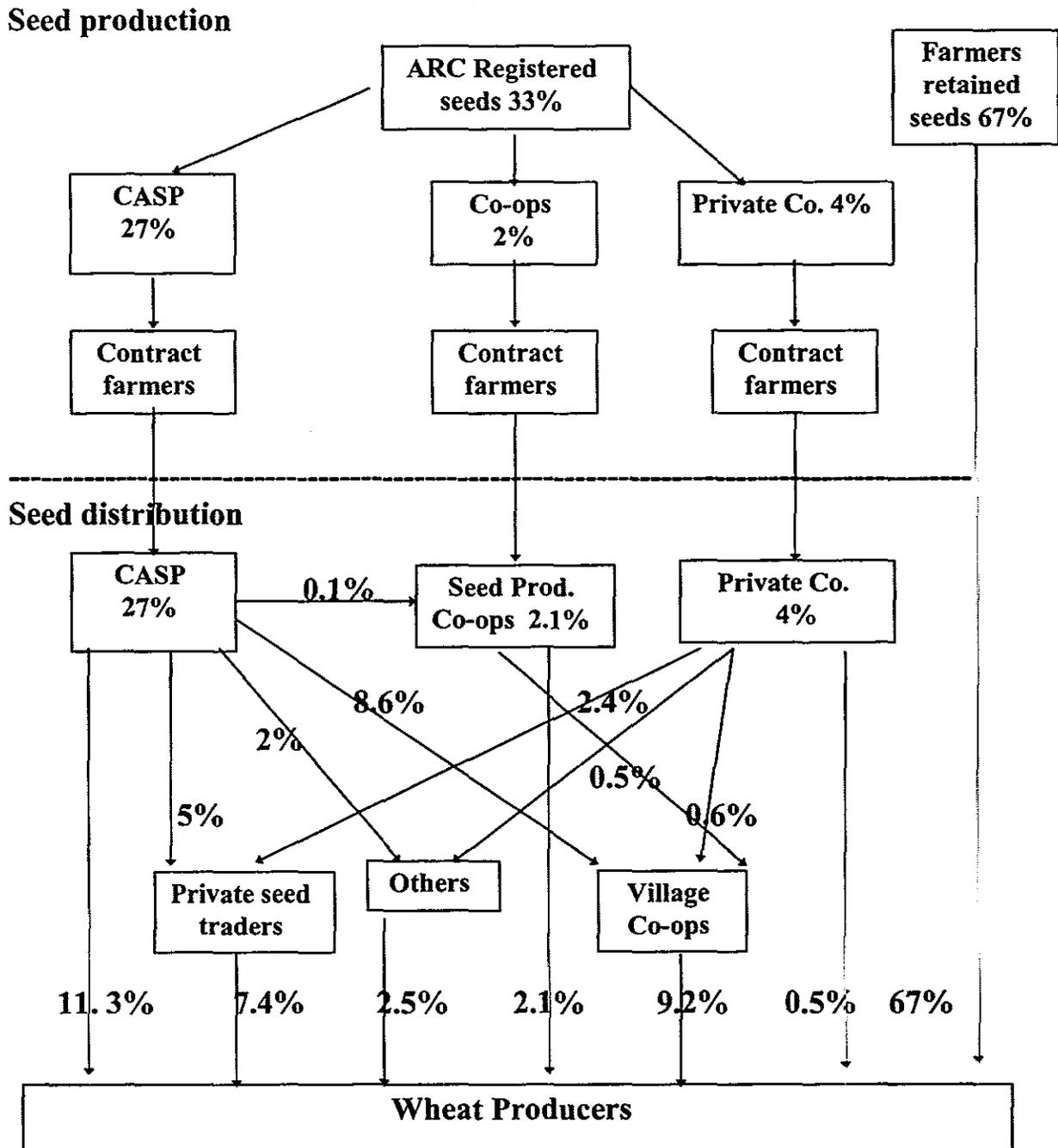
Rice

Of the rice planted in 1998, 62% was planted with seed retained by farmers from the 1997 crop. Of the remaining 38%, which were all certified seeds produced from ARC varieties, 69% was produced by CASP, 21% by private seed companies, and 10% by seed producing co-ops.

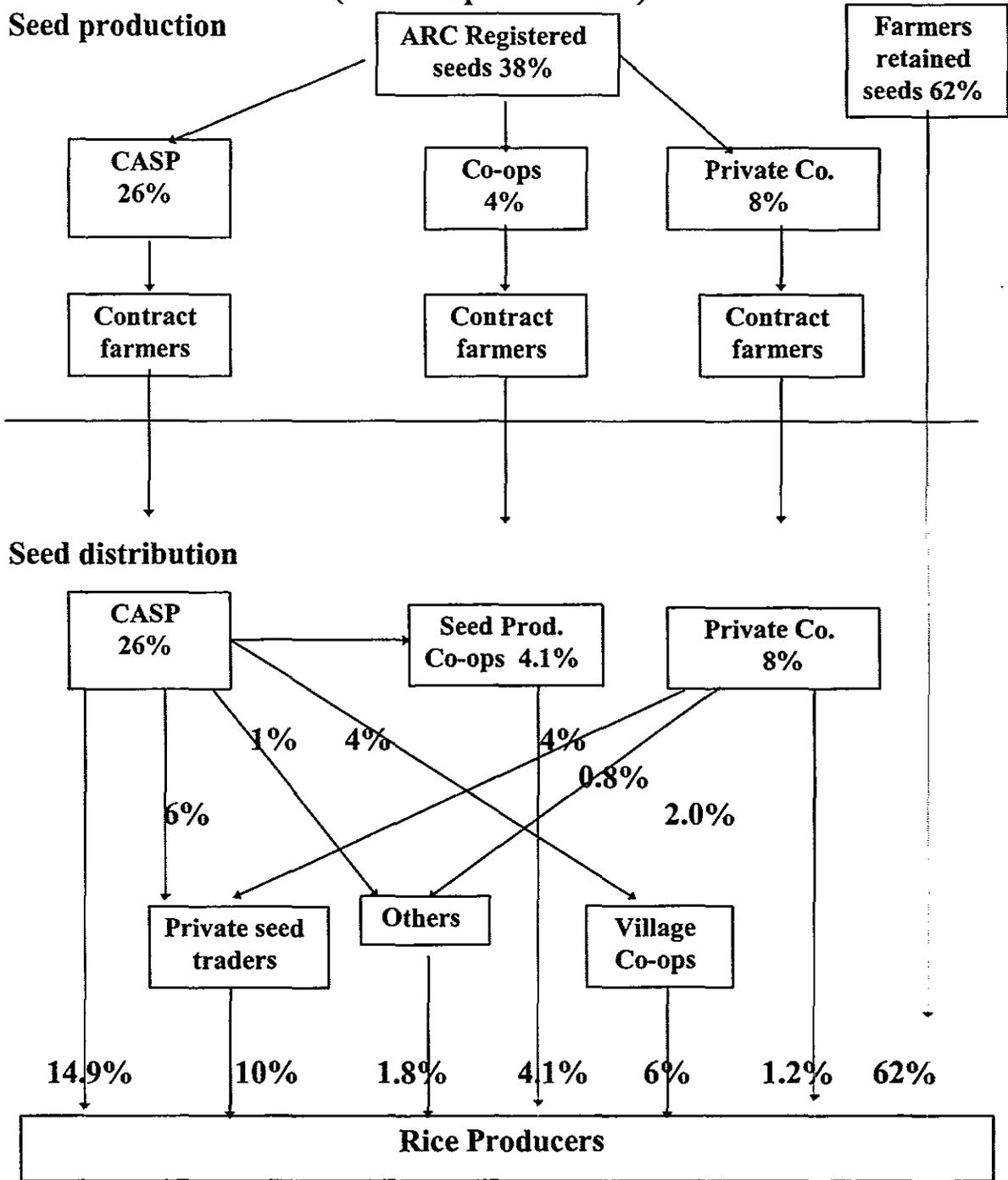
Private seed companies distribute about 50% of the seed they produce to private seed traders, 15% to village co-ops, 15% directly to rice producers, and 10% through other distributors. The seed producing co-operatives sell their production to their farmer members. As a share of the certified seed sold to farmers, CASP has 39% of the market, private traders have 26%, and village co-ops only 16% with all other outlets dividing the remaining 19% of the market.

CASP sold rice seed for multiplication to only 3 private firms in 1997. This indicates a very small number of firms (including co-operatives) in the rice seed business.

**Fig. 3- Wheat seed subsector map
(Share of product flow)**



**Fig. 4- Rice seed subsector map
(Share of product flow)**

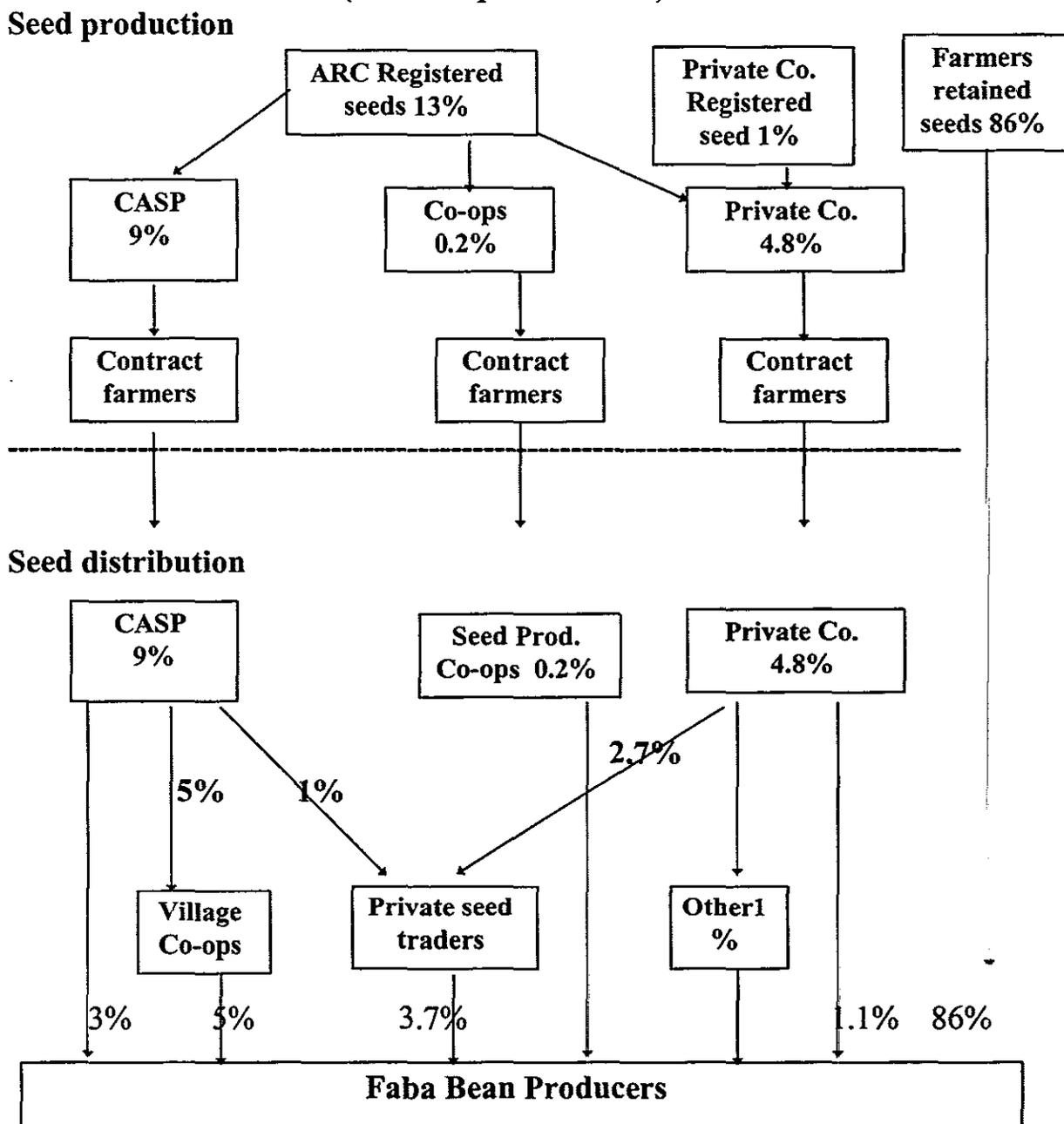


Faba Beans

Farmers retain 86% of the seed used for faba beans leaving a small market for certified seeds. Some registered seed is obtained from private sources. (Earlier it was reported that a popular variety was developed at Assuit University.) CASP reported selling registered faba bean seed to only 5 private seed companies in 1997. These private producers distributed 56% of their faba bean seed to private traders, 25% was sold direct

to farmers and the balance through other distributors. Village co-ops report obtaining faba bean seeds from CASP. CASP also sells about 1/3rd of its faba bean seeds direct to farmers and the balance to private traders.

**Fig. 5- Faba bean seed subsector map
(Share of product flow)**

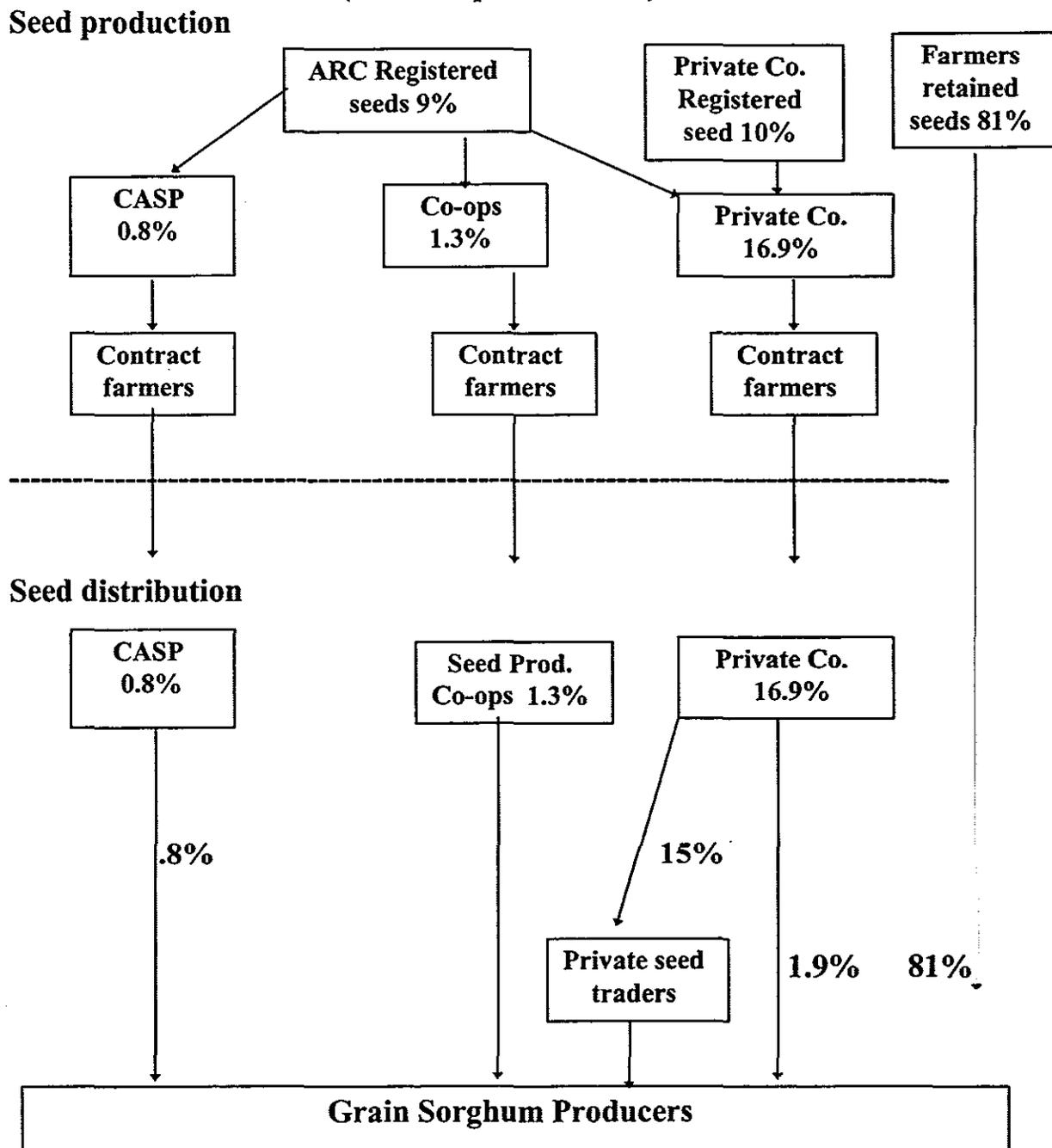


Grain Sorghum

Two private sector seed companies (Pioneer and Hytech) have breeding programs in grain sorghum. These companies, plus EGAS, produce practically all (89%) of the certified grain sorghum seed that is purchased by farmers. These private companies sell most of this seed directly to farmers or through private traders. The Rice and Cereal

Grain Co-op reported production and distribution of a small quantity of grain sorghum seed with registered seed from ARC and distributed through local co-ops. CASP produces less than 1% of the registered seed and sells directly to farmers or to village co-ops.

**Fig. 6- Grain sorghum seed subsector map
(Share of product flow)**

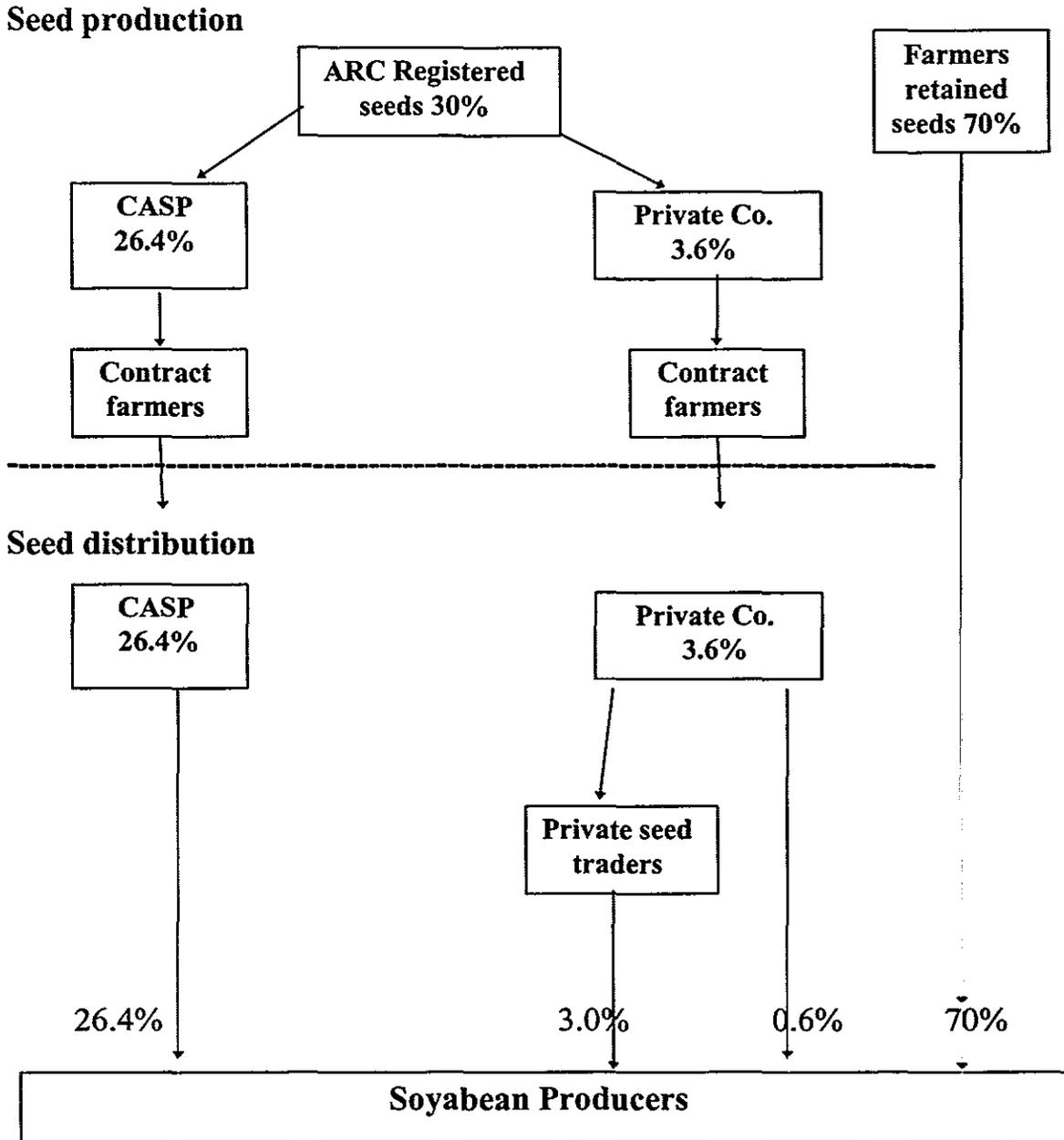


Soyabeans

Farmers retain 70% of required soyabean seed. No private companies are breeding soyabeans. Of the certified seed sold, CASP produces 88%, or 26% of all soyabean seed.

Only one private company, EGAS, reported selling soyabean seed. CASP distributes its seed directly to farmers. Private companies distribute their seed mainly through private traders and a small amount directly to farmers.

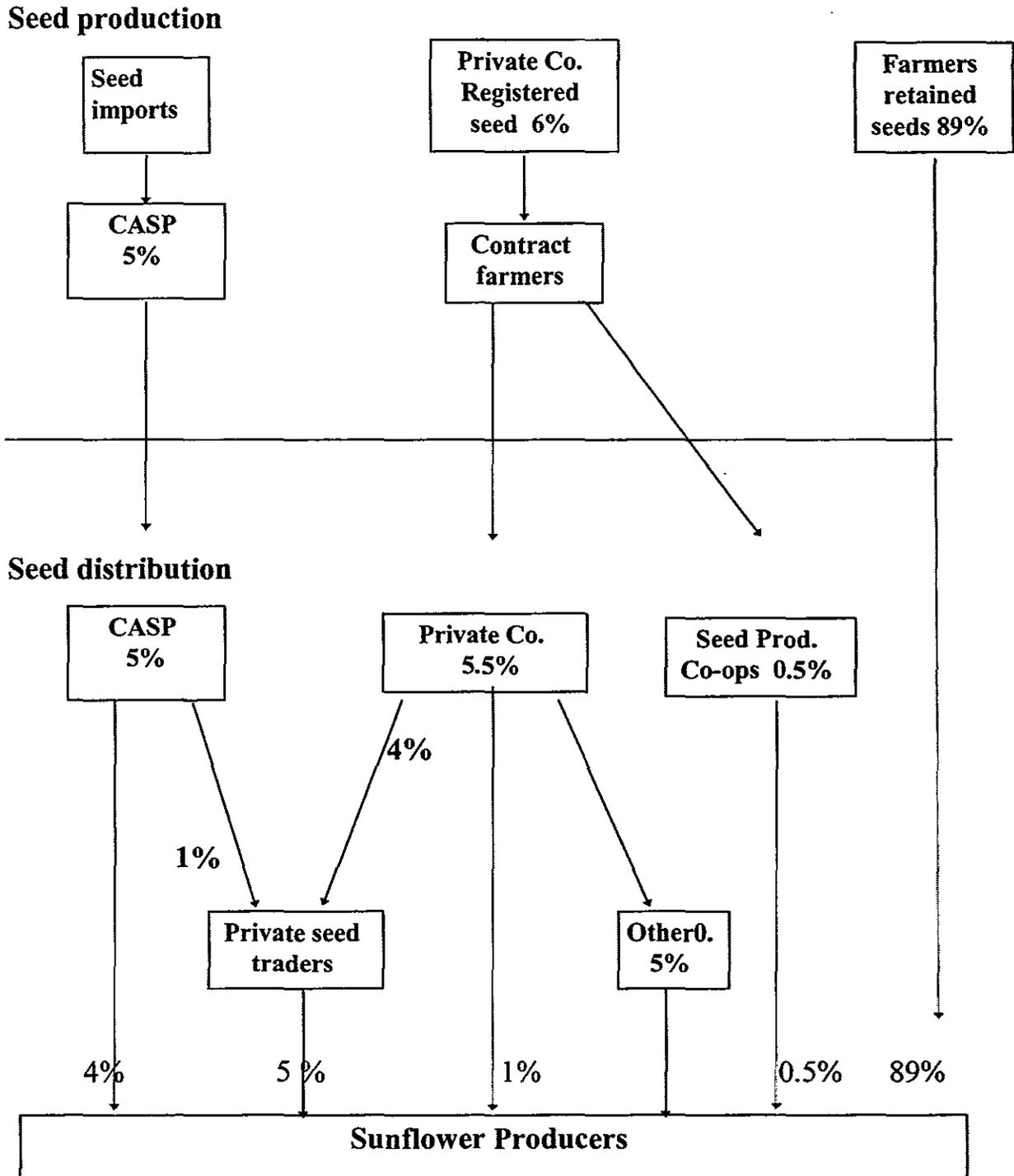
**Fig. 7- Soyabean seed subsector map
(Share of product flow)**



Sunflowers

Farmers retain the bulk (87%) of the seed needed for sunflowers. Less than 100 tons of certified sunflower seed is sold each year. ARC has developed no sunflower varieties. Pioneer has a breeding program in sunflowers and produces most of the certified sunflower seed coming from the private sector. The balance of the certified seeds, estimated at 4%, is imported from France by MALR.

**Fig. 8- Sunflower seed subsector map
(Share of product flow)**



Lentils

Farmers retain 88% of seed requirements for lentils. All certified lentil seed is produced by CASP and distributed directly to farmers.

Barley

Farmers retain 99% of barley seed needs with the balance provided by CASP.

Potatoes

Currently, potato producers can be divided roughly into 2 categories, the traditional, small producers in the Nile Valley and the large, modern producers located on newly developed desert lands. These 2 groups of producers have somewhat overlapping activities but, to a large extent, separate marketing activities. Figure 9 depicts these components of the potato subsector (taken from Fig. 2.2 page 19, Potatoes, Vol. IV, Ref. No. 7). Nile Valley farmers follow older production and marketing practices, with the bulk of their output going to domestic markets. Larger farms located on the new desert lands aim for the certified seed and export markets, including the European market for organically raised potatoes.

Egyptian potato producers face some serious disease problems, including viruses and brown rot (bacterial wilt). Because there are no Egyptian breeding programs attacking these disease problems, either in the public or private sector, Egypt is completely dependent upon imports for disease-resistant potato seed. Fortunately, some reforms in seed laws were made in 1991-94 that allow growers to import seeds with relative ease for their own use.⁷ Control of these diseases is very important to Egypt since disease-carrying potatoes cannot be exported to Europe, the major Egypt market.

Phyto-sanitary experts inspect the potato seed in ports of origin in Europe and again in Alexandria. They inspect for grade and freedom from insects, diseases, nematodes, and viruses. These phyto-sanitary tests cost about LE 100/mt.

The Potato Growers Co-op and the Horticultural Export Union together import seed potatoes for their growers—25,000 tons in 1998. The co-ops report a membership of 45,000 producers with access to the imported seed. Large private potato producing and exporting companies also import seed potatoes for use on their farms and on farms that produce under contract for them. This group of private companies currently imports about 35,000 tons annually for seed purposes. In this manner, most growers have access to imported seed.

New F4 generation tubers from Europe must be imported every year between December and February (the F4 generation is the fourth generation produced from breeder seed). They are planted immediately and much of the F5 generation (the first crop in Egypt, called "local seed") is put into cold storage in May-June and stored until August-November when it is used for seed production for the F6 crop. A large share of the F6 crop, the Nili, and the winter crop are exported to Europe with the balance consumed domestically. Resistance to viral diseases declines with each generation, hence, Egyptian potato exporters use only the F5 and F6 generation for export and again new seed must

⁷ Actually, seed is not imported but the potato tubers which are used for vegetative reproduction

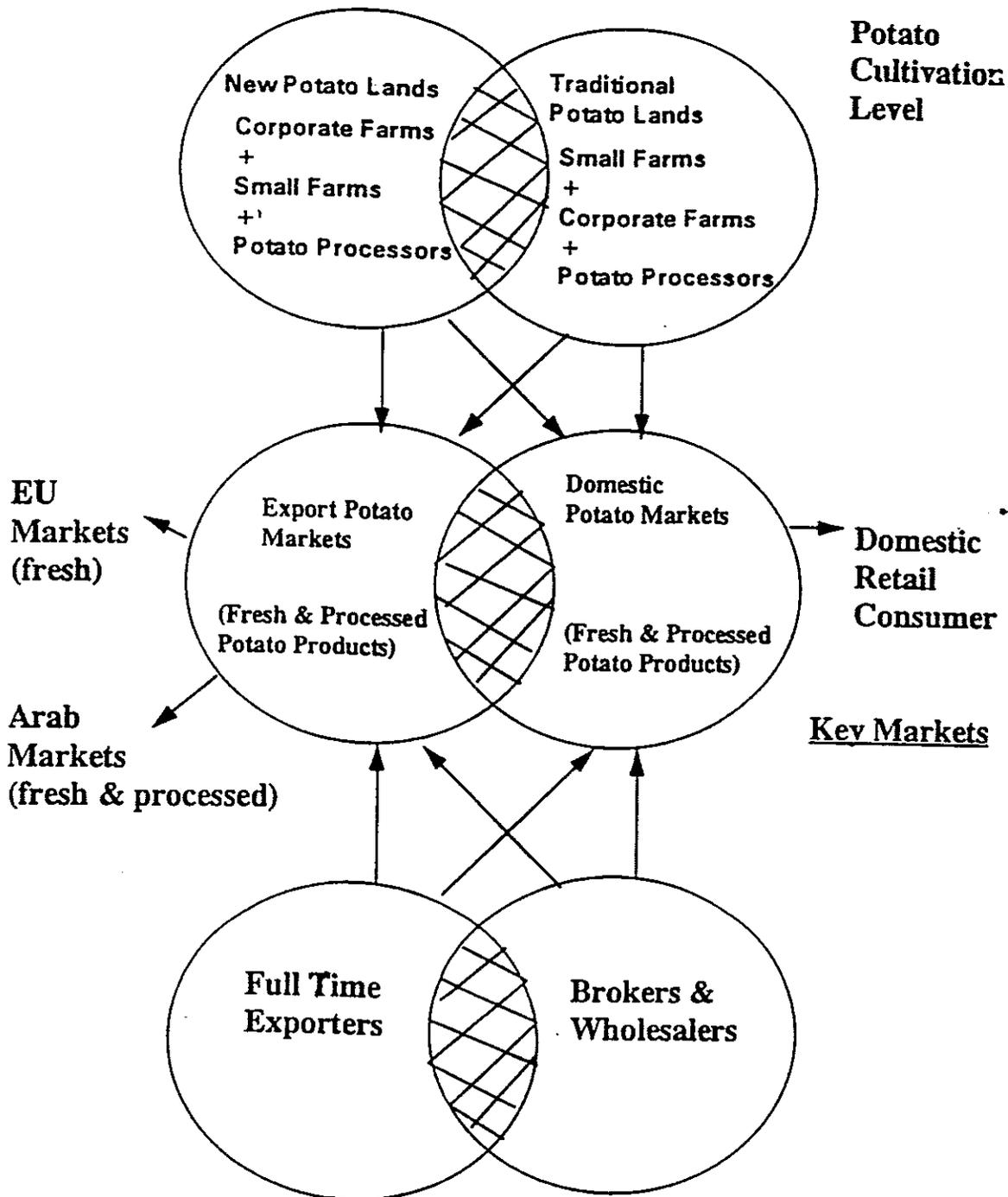
be imported.⁸ Both generations occur during one calendar year in Egypt because potatoes can be grown in Egypt throughout the year.

In total, about 250,000 tons of potatoes are used each year for seed. The seeding rate varies from 750 kg/fd when using imported potatoes to 1,250 kg/fd when using local grown seed.

The major source of seed potatoes is the Netherlands from which 26-27 varieties are imported; 4-6 varieties are imported from France, 6 from Great Britain, and 4 from Denmark. A large number of varieties are imported because of differences in growing seasons and end uses. Between 1979 and 1992 the volume of imported seed potatoes ranged from a high of 53,300 tons in 1985-86 to a low of 16,000 tons in 1991-92. Production is highly variable because exports are highly variable due to competition from other exporters and variations in European production. Currently, imports of seed are 60,000 tons per year because of the steady increase in production.

⁸ The export window to Europe for potatoes is only open for 5 months of the year, December -April and thus potatoes for export must be harvested during that period.

Fig. 9. The Evolving Egyptian Potato Sub-sector



There are 36 private-sector potato seed companies, Daltex, Maba, Sonac, and EGAS, among them, importing seed from Europe. They use it on their own farms or on contract farms, grow two generations of potatoes, and export as much as possible to Europe during the following December-April market window.⁹

Prices for imported seed varied by variety from LE 1,565 to LE 2,394 with an average of about LE 2,000/mt. Private companies' prices for both local and imported seed potatoes are about 35% higher than co-ops are allowed to charge. The total annual cost of imported seed potatoes is about LE 120m.

In 1996-97 local potato co-ops produced about 47,000 tons of CASC-certified seed and private seed companies produced about 143,000 tons through contracts with farmers.

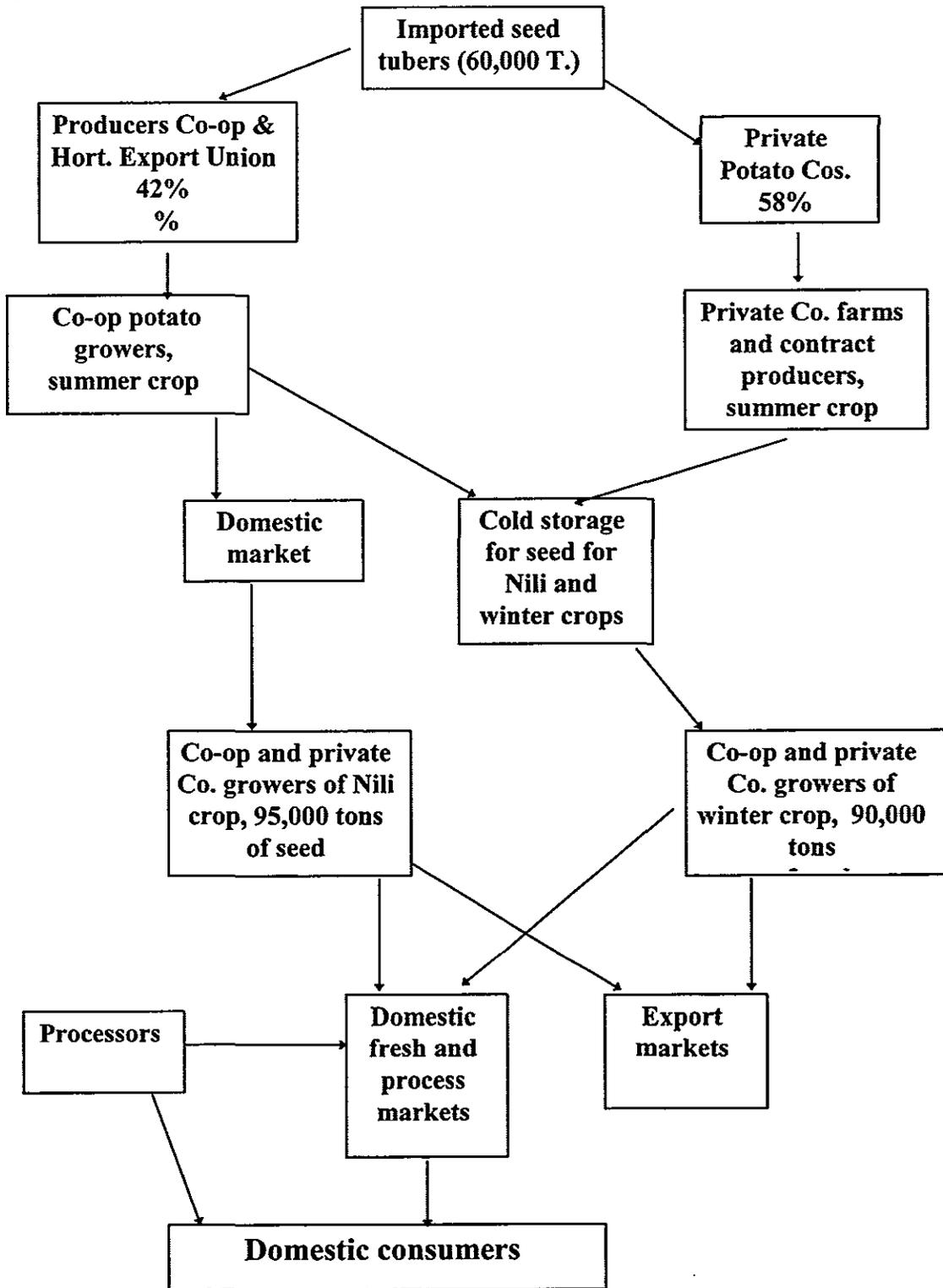
Table 5. Characteristics and production of potatoes by season, Egypt, 1996

	Units	Potato season			Total
		Summer	Nili	Winter	
<u>Characteristics</u>					
Planting season	Months	Feb.	Aug-Sept.	Nov.	---
Harvest season	Months	June	Dec-Jan	March	---
Seed source		F4	F5	F5	---
Market		Local	Local & Exp	Local & Exp	---
<u>Production</u>					
		(1996-97 crop year)			
Area	FD	132,183	96,113	81,032	309,328
Yield	MT/FD	8.57	8.39	8.48	8.49
Production	(000) MT	1,133.0	806.2	686.8	2,626.0
Share of Production	(%)	43.1	30.7	26.2	100

⁹ Lists of potato exporters can be found in Annexes 5 and 6 of reference 7, Vol. IV, or from the Potato Growers Association. Most potato exporters are also the seed importers.

**Fig. 10. Potato seed subsector map
(Quantities and Share of product flow)**

Seed production



Prices of locally produced certified seed potatoes vary widely. Prices charged by the potato co-op are regulated by MALR and are based on MALR-estimated costs of production and storage costs plus a minimum rate of profit. The prices which the co-ops are permitted to charge for local grown seed potatoes range from LE 900 to LE 1,200/mt depending upon variety.

Cold storage of seed potatoes after importation and before planting, and between seasons, is a significant cost item. Cold storage plants are inspected and certified by CASC. Charges co-ops make for cold storage are also regulated by MALR.

As a result of the need to import seed potato, the seed cost is a significant part of total production costs. At the minimum seeding rate of 750 kg/fd and a price of LE 2000/ton, the cost of imported seed would be LE 1500/fd. With local seed at LE 1000/ton the cost/fd would be proportionately less, but as stated above, local seed can only be used one generation before serious disease problems result. In 1994 seed was estimated to represent 31% of total production costs (p.32, Vol IV Ref. 7). Seed prices have risen significantly since then, probably at a faster rate than other costs, so currently seed still is the single major cost item.

Vegetable crop seeds

Not only are there an extremely large number of vegetables grown in Egypt, there are large differences in the sources, quantity, and price of seeds. Farmers are able to retain seeds from some types of vegetables but not others; hence, the percentage of seeds that are purchased varies widely from one type of vegetable to another.

As reported earlier (in Table 2) the private sector has long had a major stake in breeding of vegetable varieties in Egypt. The private sector also has taken the lead in the production and distribution of vegetable seeds.

CASP produces a small number of vegetable crop seeds (Table 6). Farmers retain almost all of the needed seed for 6 of these vegetables. Farmers purchase practically all of the needed seed for only 3 of the vegetables listed—squash, watermelon, and cabbage.

The seed of squash, watermelons, radishes, peas, beans, cabbage, and onions are produced in Egypt. All the seed for hybrid tomatoes, hybrid cucumbers, hybrid peppers, carrots and cantaloupe is imported. Carrot seed must be produced in a cooler climate and imported. There are no breeders producing hybrid tomato or cucumber seeds in Egypt—practically all tomatoes and peppers raised in green houses or under plastic (tunnels) in Egypt are hybrid varieties. Most field-grown crops use local seed.

Table 6. Production of selected vegetable seeds

Crop	Crop area (000) FDs	Rate of seed use (KG/FD)	Total Seed use (000)MT	Purchased seed		
				Retained By farmers (%)	MALR (%)	Private (%)
Watermelon	87.0	1.50	130.0	1.2	8.8	90.0
Squash	66.4	2	132.7	0	10.6	89.4
Cantaloupe	27.2	1.25	34.0	93.7	0	6.3
Snake cucumber	12.3	1.50	18.4	94.6	0	5.4
Beans, French	22.1	40	883.9	93.5	0.7	5.8
Cowpeas	19.6	40	785.5	97.1	0.2	2.7
Dry peas	21.7	40	867.2	82.4	0.8	16.8
Turnips	6.3	4	25.3	83.4	0	16.6
Cabbage	39.3	0.15	5.9	0	19.4	80.6

Source: CASP, 1996

Vegetable seed production

There are about 20-25 private vegetable seed producing companies in Egypt lead by EGAS; National; Nobaseed; Hytech; and Egypt Oil, Seed and Chemical Company (see Annex Table 1).¹⁰ Vegetable seed is produced in much the same manner as field crop seeds and by some of the same companies. However, there are a few private companies that produce vegetable seeds but no field crop seeds. The private companies contract with farmers, preferably on large farms, to grow the seed and provide farmers with the technical expertise and special inputs needed for seed production. The seed companies prefer to work with the same farmers year after year once these farmers have learned the techniques of seed production. Farmers are paid premium prices for the seed produced.

The vegetable seed producing companies have seed cleaning equipment and cleaning procedures. Much of the vegetable seed is cleaned and processed by hand with sieves and small fans because the quantities are small. None of these companies has an interest in obtaining the large seed processing plants owned by MALR.

The 2 largest seed producing companies, EGAS and Egypt Oil, Seed and Chemical Company, each have slightly more than 100 employees. Two other vegetable seed producing companies may be of similar size. The remaining firms range in size from 10-50 employees. A few of the major vegetable seed producing and importing companies also have 7-10 retail stores, one in each major city in Egypt.

¹⁰ The author was informed by several seed companies that there are many other private seed producing companies in Egypt that are licensed and do not appear on Annex Table 1. These companies produce seed and sell to the major seed companies instead of selling to traders or producers.

Vegetable seed imports

Vegetable seeds are imported by 20-30 private sector companies. Three companies, Samtrade; Egyptian Oil, Seed and Chemical Company; and Teemag together import about 70% of the imported vegetable seeds. Vegetable seeds are imported primarily from USA and Europe. Most seeds imported from California because of the similarity of climate, followed by France, Netherlands, and Denmark. Israel is a source of some types of seeds, including illegally exported hybrid tomato seeds. (The government of Israel has restrictions on the export of certain varieties.)

The types and quantities of seed that are imported are shown in Table 7. There were many bean seeds imported in recent years but this has declined because imported varieties are not hybrids and can easily be grown in Egypt.

Varietal registration

Each new imported seed variety must be registered, causing 2 major problems. Seed importers noted that the fee for registration until recently had been US \$5,000, plus testing costs. In addition, registration of new varieties required a 2-year testing period. The lengthy testing period deterred seed importers because vegetable seed varieties are often replaced with new varieties in 3-4 years so that the Egyptian seed importer could only import the new registered variety for 1-2 years before applying for registration of the new varieties. Some recent changes in the seed testing law reduced the monetary charges and relaxed the testing period, but the exact wording of the new decree has yet to be made public.

Table 7. Seed imports from 1995 to 1997

Vegetable seeds

	1995	1996	1997
Crop	KGs	KGs	KGs
Tomato	57,044	60,519	58,675.35
Cucumber	115,863.6	39,878	54,523.1
Cantaloupe	15,493.5	13,241	8,476
Cabbage	3,350	1,497.5	4,009.5
Cauliflower	50	200	154
Watermelon	17,370	26,963	2,025.3
Green Beans	82,216	53,475	105,582
Peas	40,000	2,000	0
Sweet Peas	0	1,750	10,750
Carrot	44,358.5	34,935	29,480
Eggplant	170	917	155
Pepper	12,098.5	2,274	1,894
Lettuce	17	50	33

Table 7. Seed imports from 1995 to 1997

Vegetable seeds

	1995	1996	1997
Squash	1,000	380	508.5
Table Beets	50	0	360
Parsley	1,100	0	0
Endive	0	100	0
Rye Grass	210,000	273,275	254,205
Artichoke	4	0	0
Total	600,185	511,454.5	530,830.75

Source: CASC

Table 7. Seed imports cont.

Field crop seeds

	1995	1996	1997
Crops	KGs	KGs	KGs
Wheat	0	0	54,360
Berseem	40,000	41,000	34,240
Sugar Beet	191,002	282,000	505,600
Fodder Beet	4,100	0	2,000
Yellow Corn	500,000	0	0
White Corn	215,000	364,726	686,307.5
Sweet Corn	589	1,750	10
Sorghum	0	200,000	0
Sunflower	126,521	517	20,252
Onion	11,400	1,750	2,819
Barley	0	2,392	22,050
Sorghum	188,225	362,020	579,037
Faba Beans	0	0	2,100
Chick Peas	0	0	7,940
Ground Nut	0	0	159.25
Flax	186,000	145,000	100,000
Total	1,462,837	1,401,155	2,016,874.8

Source : CASC

Vegetable Seed Distribution

Private sector seed traders are the primary distributors of imported and domestically produced vegetable seeds. As stated earlier, there are 7,554 licensed seed traders in Egypt and many unlicensed traders. Most seed traders that have a shop also have a

license while many unlicensed traders carry their inventory with them. A trader without a license will likely lose his inventory if a GOE inspector finds him selling seeds without a license.

Most seed companies market their products in 100-gram tins. Many vegetable seeds are very expensive, and many small farmers do not want to buy 100 grams of hybrid tomato seed. Thus, the unlicensed seed trader will sell a small farmer a few grams from an open can. These unlicensed traders buy from licensed village traders, producers, or importers and charge a higher price per gram.

Most seed producers and importers sell directly to village traders; however, some importers have retail seed shops in cities in the major vegetable-producing governorates.

As reported earlier, there are few village co-ops that deal in vegetable seeds. The General Co-op Society for Reclaimed Land operates a seed store in Nuberia that obtains field crop and vegetable seeds from Danton and maize seed from Pioneer.

Seed prices and value of seed imports

Table 8 lists prices of some field crop and vegetable seeds. The private sector companies set their prices for open-pollinated crops in relation to the announced CASP prices. Most companies report that they set prices below the CASP prices but some companies set prices above CASP because they feel they have superior seeds. The CASP prices are considered to be close to the average prices of the private sector. Pioneer is probably the price leader in maize seed.

Prices reported in Table 8 for vegetable seeds were obtained from private traders and importers, while prices of seed potatoes were obtained from the potato growers co-operative. The reader should remember that these prices were obtained from a small sample and must be regarded as preliminary.

Prices of vegetable seeds differ widely between types of vegetables and whether the seed is imported or produced locally. The main purpose here was to arrive at a rough estimate of the value of imported seeds.

As Table 8 indicates, costs of importing potato seed are much greater than that of any other crop. Maize is the only field crop with any substantial value of imported seed but this cost is small compared to that of potato seeds. Two other vegetables have substantial seed import costs: tomatoes and cucumbers. The estimated seed import cost is about LE 17m for tomatoes and about LE 15m for cucumbers. These estimates represent only the legal imports. Reports are received of illegal imports of tomato seed with prices to the producer as high as \$10,000/kg. Such imports are not included in Table 8. Costs of all legal imports of vegetable seeds would appear to be in the vicinity of LE 50m/year.

Table 8. Seed prices and value of imports 1997

Crops	Imports (KGs)	Usual range LE/KG	Ave. price LE/KG	Value of imports (Mill. LE)
Wheat	54,360	1.45-1.60	1.5	0.08
Maize	686,307.5	5-15	5	3.43
Sunflower	20,252		1.25	0.03
Barley	22,050		1.3	0.03
Sorghum	579,037		2.5	1.45
Faba Beans	2,100	2- 2.3	2.2	0.00
Potatoes(Tons)	60,000	1,565-2,400	2,000	120.00
Tomato				
Hybrid(Best)	1,000	\$1,000-2,000	5,000	5.00
Other Hybrids	1,500	600-800	700	1.05
Open pollinated	56,200	100-300	200	11.24
Total	58,675.35			17.29
Cucumber	54,523.1	150-400	275	14.99
Cantaloupe	8,476		200	1.70
Cabbage	4,009.5		100	0.40
Watermelon	2,025.3		1,000	2.03
Green Beans	105,582		10	1.06
Sweet Peas	10,750		10	0.11
Carrot	29,480	150-220	185	5.45
Total				168.04

Seed costs to producers

The effect of the seed price on production costs depends upon the seed requirement per feddan. Estimation of production cost is beyond the scope of this study. However, a few examples are given to show the seed cost for some selected vegetables.

Practically all hybrid tomato seed is used in producing tomatoes in green houses and under tunnels (plastic cover) where seeds are planted in trays and transplanted. There are 300,000 tomato seeds/kg. At LE 5,000/kg the cost per seed is 1 1/2 piasters. A feddan of hybrid tomatoes under plastic would need 6-7,000 plants for a total seed cost of LE 100-120 (assuming 100% germination and no losses).

Open-pollinated tomato seed used for field planting has a seeding rate of about 300-500 grams/fd. Seed is LE 100-300/kg, making seed cost LE 30-150/fd. (With hybrid tomatoes the grower has additional labor costs for transplanting.)

Carrot production requires about 1 kg of seed/fd at a price of LE 150-220/kg or LE 150-220/fd. With cucumbers, hybrid seed is used for field planting. The seeding rate is 1 kg/fd and the price is LE 150-400 for a seed cost of LE 150-400/fd. The seeding rate for cantaloupe is 1 kg/fd, the price is about LE 200/kg, and the seed cost is LE 200/fd. These seed costs are substantial but may represent only 5-10% of total costs. They are not relatively as important as in the case of potatoes.

Vegetable Seed Exports

Egypt is also a major exporter of vegetable seeds (see Table 9). There are 25-30 important seed exporting companies. The seed exporters are from among the seed producing companies discussed above. Almost all seed exports go to gulf countries and Israel. Most of these vegetable seeds are for leafy vegetables or herbs. No additional detail was obtained regarding seed export activities.

Subsector map for vegetable seeds

A generalized market channel diagram (subsector map) could be drawn for vegetable seeds but sufficient data are not available to draw such a diagram or map for each type of vegetable. Such maps would be very similar since most private seed companies deal in seeds for many types of vegetables.

A subsector map for vegetable seeds would show seeds coming from 2 major source, imports and local producers. Data are not available on the share coming from each source for each type of vegetable. Estimates could be made for some crops using area planted data and average seeding rates. However, for some of the most important crops such as tomatoes, cucumbers, and peppers, both hybrid and open-pollinated seed are used but the area of each type is not known.

No data were collected on the number of farmers producing vegetable seeds in Egypt. It was determined that there are 20-30 private seed companies that produce vegetable seeds.

Table 9. Seed exports from 1995-1997

Field crops			
	1995	1996	1997
Crops	KGs	KGs	KGs
Onion	6,514	9,062	9060
Berseem	12,179,800	11,563,697	10,310,833
Alfalfa	55,750	83,525	196,435
Maize	41,487	61,490	69,868
Faba Beans	11,005	15,420	6,750
Lentil	280	0	0

Table 9. Seed exports from 1995-1997
Field crops

	1995	1996	1997
Sorghum	0	1,080	480
Fenugreek	0	750	500
Sudan Grass	9,000	577,950	234,800
Millet	0	30	1995
Fodder Beet	25	100	0
Rice	0	12,300	0
Wheat	2,000	0	0
Berseem(Fahl)	0	10	0
Sweet Corn	131,975	0	0
Sunflower	39,235	0	40,950
Total	12,477,071	12,325,414	10,871,671

**Table 9. Seed exports cont.
Vegetable seeds**

	<i>1995</i>	<i>1996</i>	<i>1997</i>
Crops	KGs	KGs	KGs
Jews Mallow	357,920	386,903	363,175
Parsley	30,900	29,650	36,350
Rocket	103,705	77,660	77,950
Portulaca	27,100	28,335	20,150
Leek	21,770	19,330	21,880
Dill	16,025	17,450	14,000
Coriander	9,900	10,800	11,020
Spinach	14,055	18,025	28,890
White Radish	19,762	19,712	10,920
Pumpkin	250	1,070	150
Mallow	33,140	35,870	51,240
Okra	3,330	560	50
Turnip	3,795	3	1,010
Cow Peas	230	301	1,000
Peas	3,135	5,001	25
Squash	1,150	163.8	61
Eggplant	1,437	405	0
Tomato	1,028	356	681.3
Cauliflower	367	303	100
Green Beans	530	2,611	25
Cucumber	2	50	50
Cabbage	275	303	110
Lettuce	1,560	833	335
Chicory	25	200	0
Celery	100	1,100	450
Curled Mallow	1,200	200	0
Pepper	1,300	27	20
Melon	305	431	101
Local Watermelon	0	120	0
Sweet Watermelon	0	15	0
Cantaloupe	308	0	25
Snake Cucumber	105	0	25
Carrot	1,250	0	0
Total	655,959	657,787.8	639,793.3

Source: CASC

	<i>1995</i>	<i>1996</i>	<i>1997</i>
Crops	KGs	KGs	KGs
Marjoram	3,225	3,905	4,200
Sweet Basil	275	200	125
Worm Seed	0	0	500
Ornamental Seeds	1,688	943.25	1,569.5
Total	5,238	5,048.25	6,394.5

Fruits

Mango		20	
Apricot		20	
Lemon		219	
Olive		5.5	
Guava		42	
Peaches		20	
Total		326.5	

Source: CASC

Privatization of Public Seed Conditioning Plants

Annex Table 2 provides a list of the seed conditioning plants under MALR. Privatization of these seed plants has been discussed widely in recent years, including longstanding USAID agricultural policy reform benchmarks for privatization of one or more CASP seed plants. GTZ has worked with CAS and CASP since 1987 to improve seed production by trying to remove subsidies for these plants and to train efficient, effective plant managers who know how to sell seed to farmers in a manner that will produce profits and compete with the private sector. This has proven to be a long and slow process.

Interviews were conducted for this study with most of the private seed production companies. It appears that there are 4 privately owned seed conditioning plants in Egypt, all constructed recently during the time when MALR has had some its plants available for privatization.¹¹ The private companies chose to build new plants primarily because

¹¹ Pioneer, EGAS, National and Hytech each report recent acquisition of seed conditioning plants. A 5th company, Ideal, is reported by some to own such a plant but this could not be verified and is not considered likely due to the estimated size of the company.

MALR plants are regarded as over-priced due to the high value of the land on which they are located.

Among the private companies that do not have plants, some are interested in owning such equipment. However, none expressed an interest in purchasing a plant from MALR, either because their volume of operations is too small or because of the high price of the MALR plants. Realistically, only the largest 4 companies have a volume that can justify ownership of such large seed conditioning plants.

These CASP plants typically have a capacity of 6-7 tons/hour (when processing maize seed). Such plants should operate 3 months/year to process winter season seeds and 4 months/year to process summer season seeds. Such a plant can process 3,400 tons in 3 months working only one 40-hour shift/week or 6,800 tons at 80 hours/week and 9-10,000 tons in 2 shifts operating 4 months.

Only the biggest private seed company in Egypt (EGA Seed) would fully utilize a seed plant of this size. The next 3 largest seed companies each handle only about 4-5,000 tons/year. These 4 largest companies all have their own seed processing plants. The next tier of companies (5th through 8th in size) deal in 2,000 tons/year or less and would utilize less than 20% of the capacity of such a plant. Hence, it is highly unlikely that any private seed company or co-op would be prepared to purchase any of the MALR seed conditioning plants.

MALR plants have the capacity to process on a timely basis about 3.3 million ardeb of seed/year (about 500,000 tons). Their current needs are only about 1.2 to 1.3 million ardeb/year, or 36% of capacity. MALR can best utilize these plants to process seed for the private sector on a per ton basis as shown in Table 10. These seed companies pay LE 30 to LE 50 per ton for seed processing. It is unknown how these rates compare with operating costs, but they should be set at a level to pay all variable operating costs, including maintenance and repairs, plus some return on investment. Such charges would most likely be far below the full ownership costs that would be incurred by a medium-size seed company. The GTZ Seed Improvement Project is equipped to assist in determining the proper charges for these plants.

Table 10. Processing of seeds for private companies by CASP seed plants

Crop and company	1995-96 (Tons)	1996-97 (Tons)
<u>Rice</u>		
EGAS	6,332.7	3,776.4
Agroseeds	0	152.2
Nor Aldeen Assoc.	0	361.1
Co-op for Rice & Cereals	190	409
Danton	101.4	0
Nobaseed	5	0
Total	6,629.1	4,698.7
<u>Wheat</u>		
EGAS	2,764.1	3,103.5
Co-op for Rice & Cereals	1,113	881.2
Land Reform Co-op	0	832.6
Danton	529.9	576.4
CATO	218.8	0
Al Salhila Co.	285.7	0
Al Nile for Storage	60.1	0
Total	4,971.6	5,393.7
<u>Soyabeans</u>		
EGAS	90	N.A.
<u>Faba beans</u>		
EGAS	802.4	997.2
Co-op for Rice & Cereals	0	42.9
Total	802.4	1,040.1

Source: CASC

Issues and Problems

Privatization of the production and distribution of field crop seeds is occurring slowly. Privatization of hybrid maize seed is well along because of the nature of the seed. Hybrid seeds give a very decided yield advantage. Thus, higher prices can be charged for hybrid seeds and greater profit potentials exist for the hybrid seed breeding company. Competition between private companies must be maintained to keep prices at an affordable level for producers.

With open-pollinated crops such as wheat, rice, and faba beans, the producer can retain seed and will gain much less from the purchase of certified seed than is the case with hybrids. He will gain a big yield advantage from new seed if he has been growing an old, low-yielding variety and much better-yielding varieties are being released. In the case of wheat for example, most farmers are now using relatively good-yielding varieties and would gain little by buying new seed.

With open-pollinated varieties the profits to a seed breeder are limited because the breeder cannot control the seed supply. Hence, the public sector must continue to invest money in breeding all open-pollinated crop seeds to maintain the competitive advantage of Egypt vis-a-vis other crop-producing countries.

Cotton is a unique case. Privatization of seed production is not likely to occur soon. Privatization of seed distribution could occur with private ownership of seed delinting plants.

The concentration of control of MALR seed production facilities within the Horticultural Unit and the simultaneous establishment of EMEPAC, a private stock company, managed by the Director of the Horticultural Unit, has caused considerable concern in the private sector. Ministerial decree No. 867 of 1997 prohibited ARC from producing any class of seed other than breeder seed. The Horticultural Unit now has exclusive control of production of all foundation and registered seed for all varieties released by ARC. In 1997 the Horticultural Unit began to charge royalties on foundation and registered seed sold to private companies, in effect doubling the cost of seed to the private sector. The Horticultural Unit also has administrative control of all MALR seed processing stations except those controlled by ARC. The Horticultural Unit also is active in the importation of seeds and the testing needed for registration of varieties imported by private companies. This concentration of public control over seed sources is viewed with alarm by some.

Equal access to public-bred seeds is of great concern to private seed companies. The method of sale of foundation and registered seeds by CASP has raised some difficulties. Private seed producing companies contend that exclusive rights to the production and distribution of new varieties or inbred lines for hybrids should be put on a tender basis. Private companies then should not have to compete with CASP in producing and marketing that variety.

The requirement for varietal registration has caused difficulties in seed importation into Egypt, especially vegetable seeds, and deprived Egyptian growers of the best available genetic materials. New seed laws (now proposed) are needed to protect breeders' rights and to encourage private companies to invest more money in seed breeding or tissue culture, particularly for potatoes. Annual costs of importing seed for potatoes, tomatoes, and cucumbers are very high. The necessary protection of breeders' rights by proposed changes in the seed law may result in new private investments in breeding and tissue culture.

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ANNEXES

Annex Table 1- List of licensed seed producing companies, March 1998.

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1. National (National Company for Seed Production)
 2. Hytech (Hytech International for Seeds)
 3. Ismail Taher- A. Hameed Harraz
 4. Suez Canal Company for Commercial Development
 5. International Company for Investment & Trade
 6. Tanta Agrarian Reform Zone
 7. El-Fouli Agricultural Company
 8. Agro-food Limited
 9. Potato Producers Co-operative
 10. El-Safa (Il-Safa National Company for Trade and Agricultural) Development
 11. El-Mabrouk Seed Company
 12. Nile Company for Storage and Preparation of Agricultural crops.
 13. The Advanced Group for Investment and Development
 14. Pioneer Egypt
 15. Agro-seed/Damanour
 16. Delta Seed Producers and Agricultural Development.
 17. Seed Production, Conditioning and Marketing Co-operative
 18. Agricultural Service for Seed Production & Distribution
 19. Imbarato Egypt
 20. Joint Cooperative/Kafr El Darwar
 21. El-Zahra For Agricultural Inputs
 22. Agricultural Materials Technical Office
 23. High Seed Company (Mohmoud Hamed & Co.)
 24. Arab Seed
 25. Daltex for Agriculture -(Potato)
 26. EGAS (EGA Seed)
 27. Egyptian Company for Seeds, Oils and Chemicals (Shaban)
 28. El-Shalmah for Seed Production and Trade
 29. Fine Seeds International
 30. Extra Inter Seed Company
 31. Commercial Company for Agricultural Development and Seed Production
 32. United Company for Seed Distribution and Production
 33. Central Agrarian Reform Coop/Minya)
 34. United Company for Seed Distribution
 35. G.T. For Seed Production, Conditioning and Distribution
 36. El-Fo'ad for Seed Production and Distribution
 37. Pure Seed
 38. Egyptian Company for Seed Production
 39. Kamal Harb & Co.
 40. El-Sharquia for Seed Production
 41. Danton for Seed and Agricultural Services
 42. The Joint Co-op, Malawi/Minya

Source: CASC

Annex Table 2. Seed processing stations owned by the public sector in Egypt

CASP / ARC / EAO

No.	Governorate	District	Location of Station	Type and Origin of Plant	Operating since (Planned)	Nominal* Capacity Tons/Hours	Nominal** Capacity Tons/Hours
1a	Kafr El Sheik	Sakha	Sakha	Roeber/FRG	1990	3.5	2.5
1b	Kafr El Sheik	Sakha	Sakha	Roeber/FRG	1988	7	6
1c	Kafr El Sheik	Sakha	Sakha	Sortex/ GB	1984	4.5	3.5
1d	Kafr El Sheik	Sakha	Sakha	Si/ France	1996	8	8
2	Gharbia	Santa	El Gemiza	Blount/USA	1987	6	5
3	Beni - Suef	Sids	Sids	Carter Day/ USA	1990	7.5	6
4a	Behaira	South Tahrir	South Tahrir	Si/France	1991	8	7
4b	Beheira	Nobareya	Nobareya	Si/France	1991	8	7
4c	Beheira	Nobareya	Nobareya	Si/France	1991	1.5	0
5a	Sharkhia	Salheya	Salheya	Si/France	1991	8	7
5a	Sharkhia	Kafr Saqr	Kafr Saqr	Roeber/FRG	1994	7	6
6	Dakalhia	Sherbin	Sherbin	Roeber/FRG	1991	7	6
7	Menoufia	Quesna	Quesna	Si/France	1995	8	8
8	Fayoum	Fayoum	Fayoum	Si/France	1991	8	7
9	Minia	Samalut	Samalut	Roeber/FRG	1997	7	7
10	Assuit	Beni Ghaleb	Beni Ghaleb	Si/France	1997	8	8
11	New Valley	El Wady El Gedid	Eikharga	Si/France	1991	1.5	0
Total						108.5	94.00
AGRICULTURAL RESARCH CENTER (ARC)							
12a	Kafr El Sheik	Sakha	Sakha		1987	12	12
12b	Kafr El Sheik	Sakha	Sakha		1987	8	8
13	Gharbia	El Gemiza	El Gemiza		1987	6	6
14	Beni-Suef	Biba	Sids		1986	6	6
15	Souhag	Shandaweel	S. Island		1986	6	6
Total						38.00	38.00
EGYPTIAN AGRICULTURAL ORGANISATION (EAO)							
16	Minia	Minya	Minya	Bob/GB	1955	7	7
17	Gharbia	Tanta	Tanta	Heid/Swiss	1992	30	30
18a	Kalyubia	Shoubra	Bahteem	Heid/Swiss	1985	30	30
18b	Kalyubia	Shoubra	Bahteem	Roeber/ FRG	1989	1	1
Total						68.00	68.00

* Nominal Capacity according to Origin of plant

** Nominal Capacity according to CASP's calculations