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Egyptian policies for rice processing and marketing after liberalization in Egypt

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Introduction

Sometime in 2005, a mother will give birth to a very significant child-our country's 75 million being. Egyptian population will be on its way to the 100 million levels, expected in the 2025. Even if family planning programs cut the birth rate to two children per family, the 100 million person will arrive well before the year 2025.

The exploding population rate grimly dictates the Egyptian food requirements especially for rice. A truly formidable challenge face these involved in the National Rice Research Program struggle to produce more rice. Over the next decade, the Egyptian rice production must increase by at least 20 percent just to maintain current levels of consumption. Otherwise enhance are high for wide shortage and even hunger.

The challenge of increasing productivity is this extra rice must be produced without bringing more land and water. So that the major thrust of rice scientists in the next decade must be to develop improved rice's passes its high yielding ability some other important characteristics, earliness; for decreasing water requirements and more utilization of cultivation area, resistant to pests, diseases and weeds (allelopathy), to prevent the environmental pollution as a result of preventing use of chemicals, tolerant to some adverse conditions such as salinity and drought and finally, excellent grain quality especially milling out-turn minimize the losses during milling.

In order to achieve this goal, the National Rice Research Program in Egypt must explore new directions and apply the vast potential technologies such as developing an Egyptian hybrid rice and utilizing biotechnology, beside the traditional methods of research that have served well. Such accomplishments can have great significance for rice production where the more traditional research techniques have been notably underutilized. In addition to that, improvement the productivity of salinity area and disseminate the new technology under farmers conditions is requested to reduce the gap between rice potential (13 tons/ha) and national average (8.9 tons/ha).

Egypt has continuous and well organized programs for developing activities in the agricultural sector. The agricultural development strategy includes both horizontal and vertical development programs. However, implementation of the economic reform program is a fundamental policy change which has dramatically affected the agricultural sector.

The reform program which includes several consecutive steps has started in mid 1980s, towards liberalization of the agricultural sector by abolishing the state's intervention production, pricing, marketing and foreign trade. Hence, decisions related to such activities are entrusted with the private sector and market forces.

Rice is an important crop in Egypt. It occupies about 590 thousand hectares which represent about 10% of the total cropped area. More attention has been given to rice development especially during the last ten years. Therefore, increase in the rice area during the 1990s is a response to the increase in farmers' net returns (due to the increase in both yield and output price) compared to other crops.

Because rice is considered an essential food commodity preferred by a large segment of the population than any other carbohydrates, domestic consumption of rice increased to reach about 3 million metric tons of milled

rice in 1994/95. However, during the last few years, Egypt has attained a considerable surplus of rice for export. The objective of this paper is to review and analyze the policies related to rice development and the changes in agricultural policies and its impact on the rice economy in Egypt.

I – Recent development in rice production in Egypt

Further increase in rice production by increasing yield per unit area is needed. This can be achieved through variety improvement, optimizing of cultural practices as well as controlling of weeds, diseases and insects.

The objectives of the present rice production policy are:

- 1) Self-sufficiency plus modest surplus for regional export.
- 2) Sustain and improve rice production.
- 3) Shorten the growth duration of the crop to decrease the water requirements and increase crop identification.

Une phrase de transition :

Rice is the preferred food by most Egyptians. It contributes about 20 percent to the per capita cereal consumption.

Rice is an important export crop:

1970	1980	1987	1991	1992	1993	1994	1995	1996	1997	1998	1999	
400 000	25 000	70 000	200 000	177 000	133 000	300 000	350 000	253 000	360 000	280 000	320 000	Tons

Rice occupies about 600 thousand hectares or about 22% of the cultivated area in Egypt during the summer season.

Rice consumes about 10 milliard m³ or about 18% of the total water resources.

Rice farming engages about one million families or 10% Egypt’s population.

Rice average annual value during the period 1994-2000 amounted to about two billion LE. representing about 12% of the average annual value of plant production and about 8% of the total value of agricultural production.

The measures used to assist rice producers are limited, and the floor price of \$200/ton for short grains Japonica rice varieties in 1999 while decreased to \$ 160 for long grains Indica rice varieties, and the impact on selling the long grains varieties not accepted for Egyptian consumption.

Because of fertile soil of the Nile Delta, high intensity of sunlight, few diseases and insect pests, warm weather and good irrigation system, and well organized National Rice Research Program and National Campaign, rice yields in Egypt have been among the world’s highest (8.9 tons/ha). Egypt national average yield of rice is more than double the world average of three tons/ha.

Recently the National average yield of rice increased from 5.71 tons/ha during the base period 1984-1986 to 7.09 tons/ha during 1989-1991 period. It reached 7.71 tons/ha in 1993 and 8.9 tons/ha in 1999 which may be the world highest. Two of the seven rice growing governorates (Beheira and Gharbia) yielded about 9.5 tons/ha.

These high were achieved through:

- Releasing and spreading the new short duration high yielding varieties, Giza175, Giza176, Giza181, Giza177, Giza178, Sakha101, and Sakha102.
- Transfer of appropriate technology to the farming community to improve crop management, and

- ❑ Monitoring production constrains and farmers problems in the season, and prompt follow-up action by various agencies under the umbrella of the National Rice Campaign to alleviate them.
- ❑ Improvement the productivity of the salinity area in the North Delta.

Studies conducted to determine the yield potential and the yield gap showed that yield of the demonstration fields using the best package of recommended technology and improved high yielding varieties averaged 10.76 tons/ha from 1988-1999. Yields of the demonstration fields exceeded the national average yield by about 27 percent. Results in the 1999 season showed that potential yield ranged between 7.36-12.64 tons/ha.

Heavy controls before reforms :

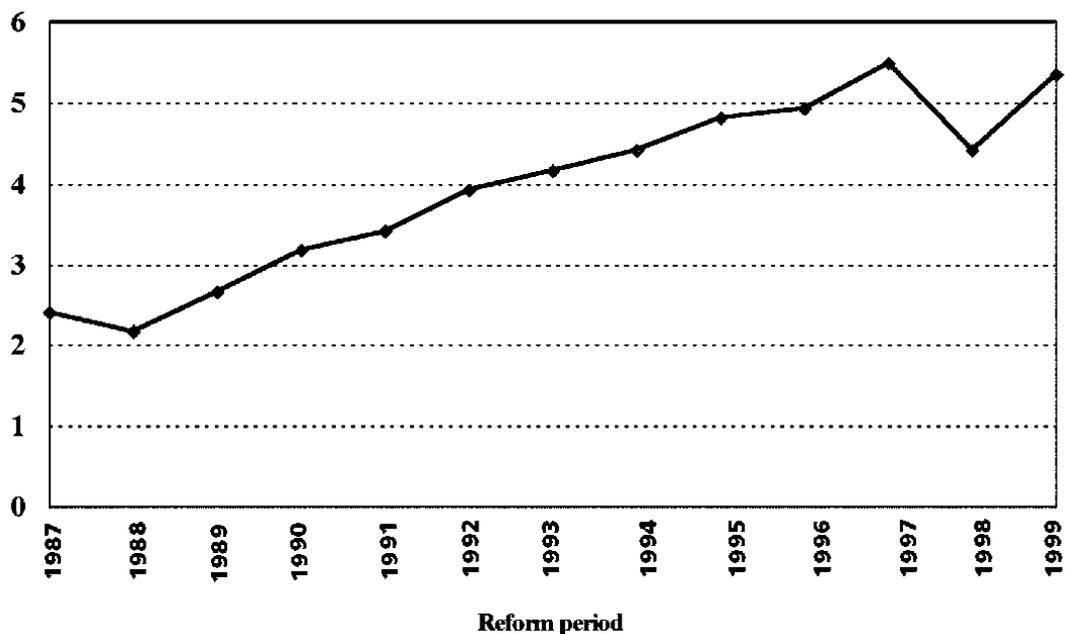
Before 1991, the Government of Egypt heavily controlled the rice sub-sector. Domestic and international trade in rice was a monopoly of the State, and farmers were obliged to sell to State-owned mills at fixed prices through a system of mandatory delivery quotas. Private sector involvement was limited to 37 commercial mills fulfilling government contracts and the operation of small village mills for farmers' household needs. Private traders were forbidden from transporting, storing, or trading rice. In the 1980s, total annual production of paddy averaged 2.4 million tons.

II – Liberalization leads to employment gains in production and trading

In 1991 the GOE changed its rice policies through a series of liberalization measures. The bans on private milling, storage, and trading were lifted, and mandatory delivery quotas were abolished. The market was left to determine rice prices. Steps were taken to prepare the State-owned mills for privatization; although actual privatization of these mills was delayed until 1998 when it was initiated through employee stock programs.

After the reforms, farmers took advantage of the new economic freedoms and higher market prices to greatly expand Egyptian rice production. Between 1990 and 1997, land area planted in rice increased by 45 percent and average yields increased from 3.1 to 3.5 tons per feddan. Total production increased by over 70 percent. This is shown in (Figure 1).

Figure 1. Paddy Production in Millions of Metric Tons



In the seven major rice producing Governorates, the area planted in rice expanded by 461,000 feddan between 1990 and 1997. As rice production expanded, on-farm employment in rice production also expanded. Each feddan of rice requires approximately 45 person-days of labor, thus the expansion in rice planting implies 21 million additional person-days of labor per year (equivalent to 81,000 person-years or full-time job equivalents).

About two-thirds of this expansion in the rice area was made possible by the land reclamation efforts of the MARL, which made more land available in the delta for rice and other crops. About one-third of the increase in area (158,000 feddan) was made possible by the replacement of maize and other minor crops with rice.

If we subtract out the reduction in employment caused by the displacement of maize and other minor crops with rice, we find that the net increase in on-farm employment is approximately 14 million person-days, which is equivalent to 54,000 person-years of employment or full-time job equivalents.

The land reclamation efforts of MALR must get most of the credit for this job creation; however, the reforms in the rice sector also played an important role. These reforms increased the profitability of rice cultivation and created an incentive to expand the amount of land planted in rice. Increased profitability also contributed to the intensification of production, resulting in a 13 percent increase in the amount of rice produced per feddan.

As rice production increased, employment in the trade, transport, and export of rice also expanded, although these types of jobs are difficult to quantify. The study estimates that liberalization in the rice sector resulted in two months of additional trading work to each of 6,000 domestic traders and the creation of 375 new jobs in exporting. This equals about 1,375 additional full-time job equivalents in trade and export.

1. Liberalization and Privatization in Milling Lead to Job Gains and Losses

Rice milling also was liberalized in 1991, resulting in a dramatic expansion in private milling, a decline in public sector milling, and significant shifts in employment.

Immediately after liberalization, private traders began to use the small village mills to process paddy into white rice for commercial purposes. The level of activity and profitability of these mills increased. This inspired new investments in village mills in the rice-growing governorates. The number of traditional village mills expanded by 26 percent to an estimated 4,500 mills by 1997. At the same time, entrepreneurs began importing improved village mills from Asia that produced higher quality rice. An estimated 1,700 of these new types of village mills were in operation by 1997. In addition, farmers began to invest in small, tractor-driven mills. The study estimates total employment in all village and tractor mills to be 8.800 full-time job equivalents, or about 2,100 more jobs than before liberalization.

As the number of village mills was expanding, Egyptians were also making investments in new, commercial mills with capacities of over ten tons per day. These larger mills served both domestic and export markets, and their owners bought up large quantities of paddy for processing. Their competitiveness meant that less paddy was available for purchase by public mills or even by village mills (most village millers saw their volume per machine decline). By 1997 an estimated 350 large private commercial mills were operational, processing nearly half of all Egyptian paddy. Cooperatives also opened five commercial mills. All of these new commercial mills created new employment equivalent to at least 3,870 full-time jobs.

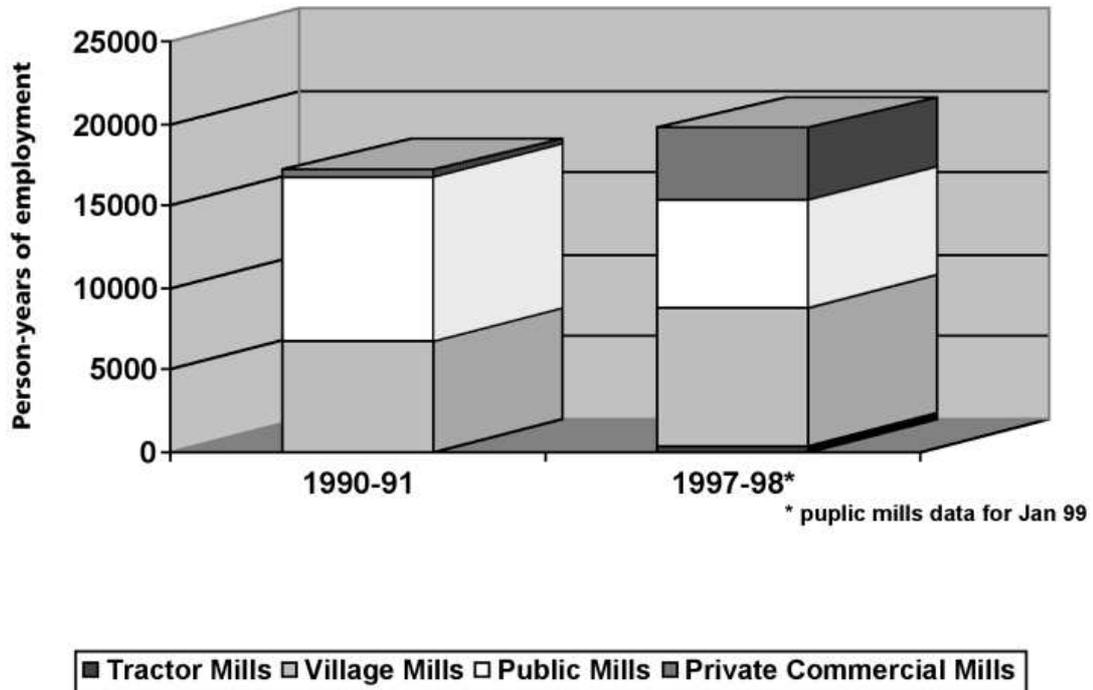
The competition generated by liberalization caused public sector mills to lose business. Since liberalization, the amount of rice that public mills process has fallen by 57 percent, and 15 of the original 59 public mills have ceased operations. Until 1997, this decline in public-sector milling led to almost no reduction in the number of employees, because the government maintained a policy of "no layoffs". But in late 1998, the privatization process was accelerated through an employee stock ownership program, and by January 1999 the number of public-sector employees had been reduced by 3,450.

The effects of the liberalization and privatization measures are illustrated in Tables 1 and 2 and Figure 2.

2. The net effect on employment in milling is positive

A comparison of employment pre-reform with employment after liberalization and privatization shows the net effect of the reform measures on employment in milling (Table 2 and Figure 2).

Figure 2. Evolution of employment in rice milling: Before and after liberalization



These results show that as a result of the reforms, employment in public milling has declined by approximately 3,500 jobs. At the same time, the expansion in private milling has created the equivalent of 6,000 new full-time jobs. Thus the number of new private sector jobs created in milling is 71 percent higher than the number of public sector jobs lost, and net employment creation in milling is about 2,500 jobs.

The situation in milling is likely to evolve over the upcoming years. The privatization program for the public mills calls for further reduction in the work-force through early retirement or transfers. If this program is fully implemented, employment in these mills could be reduced by up to 2,700 more permanent workers. Under this scenario, the total number of public sector jobs may be approximately equal to the number of private sector jobs gained in the milling sector. The reforms will have had basically a neutral effect on the total amount of employment in rice milling, although the productivity of labor will have increased substantially (see below).

3. Productivity in milling has increased

The study yielded evidence that the reforms in the rice sector have led to significant increase in productivity. Before the reforms, an average of 181 tons of paddy was processed per worker employed in rice milling. By 1997, this number had increased to 273 tons per worker – a 51% increase in productivity - with the productivity of private mills far exceeding those of public mills. This increase in productivity helps explain the increasing competitiveness of Egyptian rice on both domestic and export markets. And according to virtually all economists, increased productivity is the key to sustainable improvement in wages and a nation's standard of living (see, for example, Global Competitiveness Report, Michael Porter, 1998).

Table 1. Effects of Reforms on Rice Milling Activity

	Number of units in 1990-91	Number of Units in 1997-98	Metric tons of paddy milled in 1990-91	Metric tons of paddy milled in 1997-98
Public mills	52,000	37,000	1,209,400	517,627
Private mills*	37,000	355,000	163,540	2,536,190
Village mills	3,600	6,200	1,728,000	2,217,000
Tractor mills	-	2,000	-	100,000
Retained for seed	-	-	65,060	112,978
Total Production	-	-	3,166,000	5,483,795

* includes five cooperative mills

Ron Krenz, 1999. Public mill figures obtained through holding company, commercial mill and village mill numbers based on MALR and APRP survey estimates and remainders needed to reconcile total utilization.

Table 2. Effects of Reforms on Employment in Rice Milling (estimates in person-years of employment)

	Jobs in 1990-91	Jobs in 1997-98	Change
Public mills	10,050	6,600*	- 3,450
Commercial mills**	407,000	4,280	+ 3,873
Village mills	6,700	8,490	+ 1,790
Tractor mills	-	333,000	+ 333,000
Total	17,157	19,703	+ 2,546

* The public mills figure is actually a January 1999 figure early 1998 the figure was 9,731).

** Commercial mills category includes five cooperative mills.

Source: Ron Krenz, 1999. Public mill figures obtained through holding company, commercial mill and village mill numbers based on MARL and APRP survey estimates, including Holtzman, John, Abdel-Rahim Ismail, and Mohammed Muselhi "Commercial Rice Milling in Egypt: Sample Survey Findings", APRP-MVE Unit Impact Assessment, forthcoming 1999.

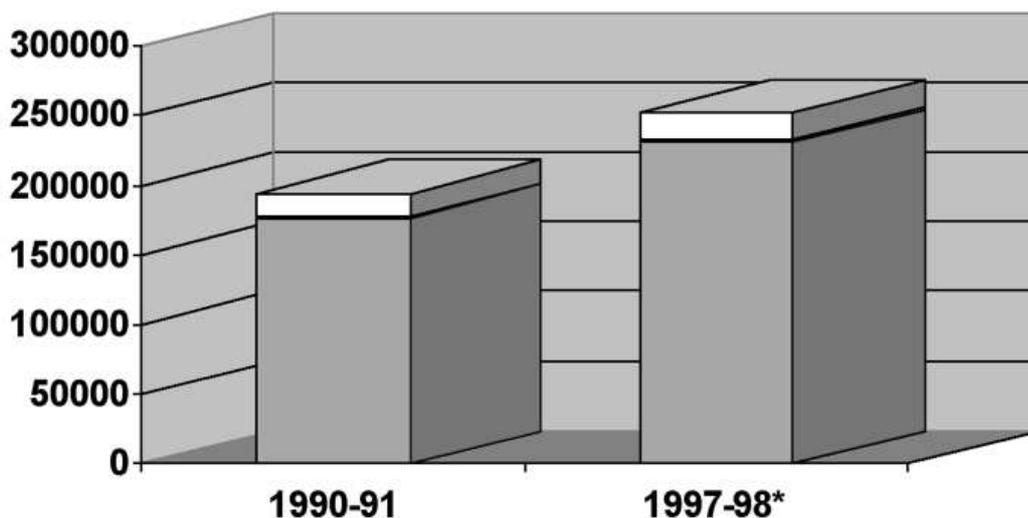
Table 3. Effects of Reforms on Total Employment in the Rice Sub-Sector (estimates in full time job equivalents)

	Jobs in 1990-91	Jobs in 1997-98	Change
Farming	177,000	231,000*	+54,000
Trade and export	340,000	1,715	+1,375
Milling	17,157	19,704	+2,547
Total	194,824	252,371	+57,922

* The 1997-98 farming employment is net of employment reduction in other crops.

Source: Ron Krenz, 1999.

Figure 3. Evolution in Total Direct Employment in Rice Sub-sector Before and After Reforms (in person-years of employment)



*Farming jobs are net of reductions in other crops; Milling figures include public sector reductions through January 1999

■ Farming ■ Trade and export □ Milling

4. Overall, the effects on employment are positive

Table 3 and Figure 3 summarize the estimated effects of the reforms on employment in rice farming, trading, and milling.

The data presented in this figure suggest that the liberalization and privatization measures that the Government of Egypt took in the rice sub-sector led to positive effects on employment – a net increase of almost 60,000 full-time job equivalents. It is worth noting that these data account for only direct job creation if one included estimates for indirect employment creation (through for example input supply and the creation of demand for consumer goods) the actual amount of employment induced by these reforms would be much larger.

5. Are there implications for other sub-sectors?

This study provides that liberalization and privatization can profoundly affect the structure of employment in a given agricultural sub-sector. It shows that while reforms can lead to public sector job losses, they also can lead to private job creation and the overall net effect on employment can be positive. Policy makers considering reforms in other sub-sectors of the agricultural economy – wheat, feed, seed, cotton, etc. – should draw hope from these results because the evidence suggests that reform, when carried out correctly, can result in positive net job creation and at the same time enhance productivity.

IV – Agricultural development policy in Egypt

The Egyptian agricultural development strategy depends on two main dimensions; the horizontal development and the vertical development.

1. Horizontal development

This dimension depends on a number of large programs and projects, designed for reclamation and cultivation of desert land. This is the only means to reduce the pressure of population density in the old land of the Delta and Nile valley. Moreover, these projects contribute to increasing the agricultural production and generate new job opportunities.

More than 1.2 million feddans (500 thousand hectare) were reclaimed since 1952. At present, the large project at "Toshki" aims at reclaiming more than 200 thousand hectares in the short run and about 0.57 million hectare in the long run. Land reclamation projects in Sinai aims at reclaiming about 0.168 million hectares. In addition about 130 thousand hectares will be reclaimed in the New Valley.

2. Vertical development

This dimension aims at increasing agricultural production from the same acreage depending on the following measures:

- Planting of high-yielding, disease resistance varieties.
- Distribution of certified seeds and encouraging the private sector to produce high quality seeds.
- Practicing of agricultural intensification.
- Adoption of the latest and up-to-date technology available used in crop production including the use of machinery.
- Improving the quality of soils and increasing its fertility.
- Using of advanced irrigation methods.
- Improving and supporting the agricultural extension system.

V – Economic reform program of the agricultural sector

Egypt has been moving gradually towards a market based economy since 1986. Liberalization and privatization are the two main elements of the economic reform program.

Nassar S. and Rizk, F. (1993). Summarized the major components of the agricultural economic reform policy in Egypt as follows:

- Abolition of crop area control: Crop area allocations and rotational crop sequencing were phased out.
- Phasing out subsidies to production inputs and reducing subsidies to consumer goods.
- Phasing out subsidies to agricultural credit interest rates and introducing gradual institutional reforms to PBDAC's function, transforming it from monopolizing input trade at prices and quotas regulated by the MOA, into a credit bank.
- Abolition of government constraints on the private sector in the field of production, marketing and importation of inputs. Cooperatives and private companies are encouraged to act as intermediaries between producers, consumers and exporters.
- Liberalizing procurement prices of major field crops and production inputs, in line with the world prices.
- Abolishing the forced delivery system for all crops. Crop delivery has become optional at floor price.
- Eliminating constraints on foreign trade through the private sector.

- ❑ Liberalizing exchange rate for the importation of production inputs. The local currency was re-valued to reflect its real value in import/export trade.

Considering the aforementioned policies, these revolutionary changes allow Egyptian farmers full freedom in the decision making for their cropping program.

VI – Some policy issues concerning development of rice economy

This part of the study presents policy issues and changes and its impact on the development of rice economy in Egypt. Discussion deals with different areas of rice production, marketing, prices, processing, foreign trade and rice consumption.

1. Rice Production

A. Constraints

Despite the large optimistic land reclamation projects, the potential for increasing the area planted to crop is limited. For rice, a variety of factors determine the area devoted to rice, the most important factor is the availability of irrigation water, as a rice is one of the most water consuming crops.

The average annual rice area reached about 583 thousand hectares (1.4 million feddans) during 1994-1996. However, the long-term policy of Ministry of Public Work and Water Resources (MPWWE) recommend that rice area should not exceed about 300 thousand hectares (700 thousand feddans) in order to balance the future expected water supply and requirement. Therefore, the only way for developing rice production in Egypt will be through the vertical expansion programs.

B. Policies

The governmental policy elements which have been used for developing rice production include:

- ❑ Indicative allocation of areas to ensure availability of irrigation water and to cultivate varieties best suitable to each type of soil.
- ❑ Providing high-yielding rice varieties and the latest modern technology in cultivation and farm husbandry including the use of mechanization.
- ❑ Supporting adaptive research aiming to improve yield and quality of rice.
- ❑ Provision of quality extension and supporting technology transfer programs.
- ❑ Intensive and sustainable training for all parties concerned with rice improvement, namely, researchers, extension staff and rice growers.
- ❑ Ensure availability of farm inputs quantitatively and qualitatively.

In addition to the previous policies, rice production affected by the changes in agricultural policy after the implementation of the economic reform program.

C. Impact of policy changes

Table 4 shows some criteria to assess the impact of policy changes. A comparison is made between two periods, 1985-1990 (before liberalization) and 1991-1998 (after liberalization). The following results could be obtained:

- ❑ The average annual rice area, yield, production and cost of production had increased by about 37%, 29%, 77% and 171% respectively.

- ❑ The average net return per hectare increased from LE 817 to LE 2203 (170% increase).
- ❑ The average benefit/cost ratio increased slightly by about 1.3%.

Table 4. Rice area, yield, production, cost of production, net return and return to capital during the period 1985-1998

Year	Area (hectare)	Yield Ton/hec.	Production (000) mt LE/Hec.	Cost of production LE/Hec	Net Return Ratio	B/C
1985	388 223	5.95	2 310	821	524	0.64
1986	423 443	5.77	2 444	907	624	0.69
1987	412 210	5.83	2 404	1 009	300	0.30
1988	351 702	6.06	2 131	1 054	602	0.57
1989	412 813	6.48	2 676	1 131	1 323	1.17
1990	435 439	7.27	3 166	1 242	1 528	1.23
Average	403 971	6.23	2 522	1 027	817	0.79
1991	462 042	7.46	3 446	1 652	1 711	1.04
1992	510 305	7.66	3 909	1 994	1 590	0.80
1993	538 567	7.72	3 159	2 649	1 390	0.52
1994	574 671	7.92	4 551	2 792	2 159	0.77
1995	582 542	8.16	4 755	2 993	2 533	0.85
1996	590 336	8.35	4 929	3 112	2 920	0.94
1997	652 000	8.40	5 484	3 396	2 880	0.85
1998	515 000	8.59	4 411	3 652	2 437	0.65
Average	553 183	8.03	4 456	2 780	2 203	0.80
Change %	37	29	77	171	170	1.30

Source: MOA, Central Administration of Agricultural Economics, Dept. of Statistics.

Moreover, Abd El-Fattah, 1997 pointed out that the economic reform program caused not only increase in cost of rice production but also in the relative importance of the cost items. Comparing the two periods 1989-90 and 1994-95, the relative importance of labor cost, seed, chemical fertilizers and land rent changed from about 41%, 9.9%, 7.35% and 11% to 30.5%, 13%, 21% and 23% respectively.

2. Rice marketing

A. Policies

For many years prior to the implementation of the economic reform program, governmental cooperatives were used to play a significant role in domestic rice marketing. In addition, public sector rice milling companies used to handle most of the produce.

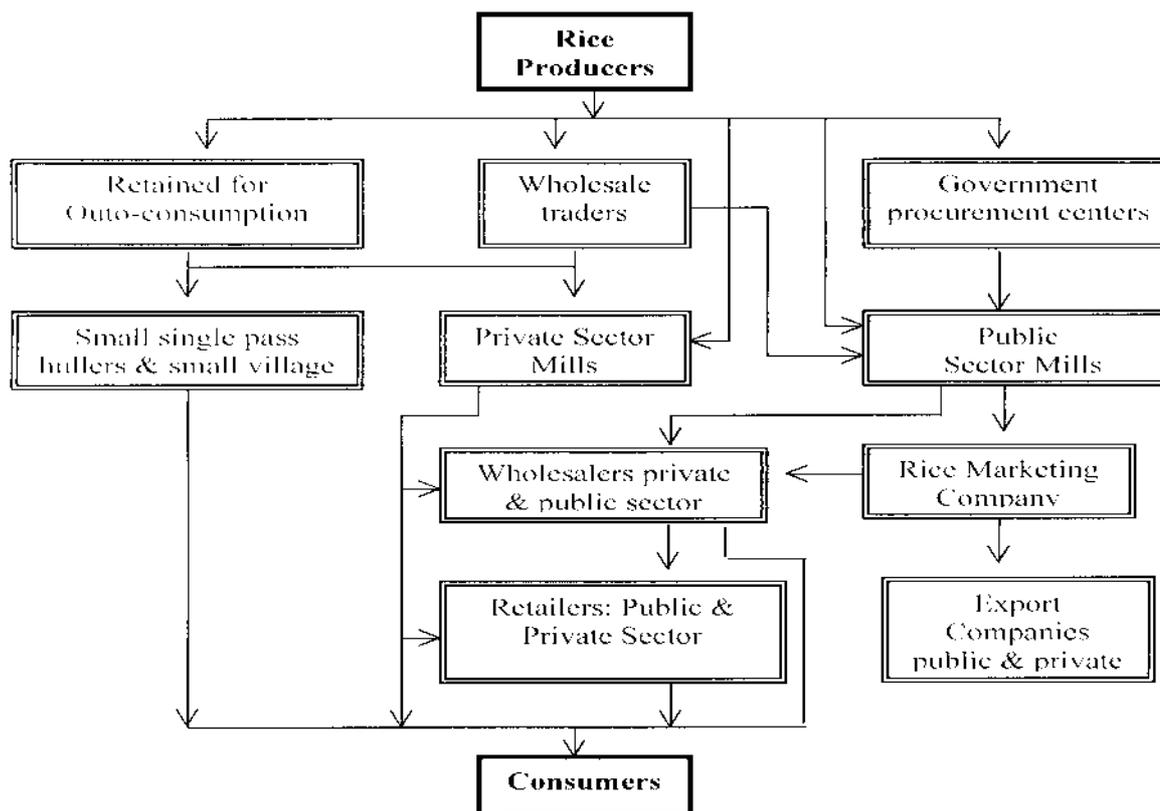
Forced delivery system was applied through the agricultural cooperatives. Each rice grower was required to turn over 1.5 tons per feddan (3.57 tons/ha) to the government at a fixed price. The forced delivery quota represented about 65% of the average yield per unit area at that time.

Moreover, under the government control system private sector companies and traders were not allowed to transfer rice between governorates or to export and/or import rice.

Since 1991, the rice marketing system had changed. These changes could be summarized as follows:

- ❑ Alteration of the marketing system from the governmental cooperative marketing to the free market system. As of 1991/92 season, rice producers were able to sell their production in the free market.
- ❑ Canceling of the forced quota delivery regime.

Figure 4. Rice marketing system after liberalization



- ❑ Free rice storage and transportation of rice among governorates.
- ❑ Private sector was allowed to play the largest role in rice marketing.

Figure 4 is a diagram showing the current rice marketing system (after liberalization).

B. Impact

As a result of liberalizing the rice market, the relative importance of the public sector mills as a rice buyer decreased compared to the private sector. Table 5 shows the quantity of paddy rice received and the white rice produced by the public sector mills during the period 1989/90-1995/96.

Table 5. Quantity of paddy rice received and white rice produced by the public sector mills (000 tons) during 1989/90-1995/96

Year	Total rice production	Quantities received by the public sector mills	%	White rice produced by the mills	Index
1989/90	2 676	1 132	42	680	100
1990/91	3 166	1 021	32	652	96
1991/92	3 446	886	26	601	88
1992/93	3 909	923	24	590	87
1993/94	4 159	572	14	468	69
1994/95	4 551	579	13	363	53
1995/96	4 755	338	7	378	56

* Include some quantities of white rice bought from the private mills and retreated in the public mills.
 Source : Holding Company for Rice & Flour Mills, Annual Reports.

The percentage of rice quantities received by the public sector mills to the total production decreased from 42% in 1989/90 to 7% only in 1995/96. Therefore, the quantities of white rice produced by the public sector mills decreased from 680 thousand tons in 1989/90 to 378 thousand tons in 1995/96 (44% decline). (The impact of market liberalization on rice prices will be discussed later)

3. Rice prices

A. Policies

Under the government controlled system, the forced delivery prices were determined by the Ministry of Supply for the quota procured. Farmers were free to sell the remainder of their production at the free market or retain it for personal consumption.

After the liberalization policy had taken place the rice price was determined through supply and demand forces. To avoid the expected market unstability especially at the beginning of the liberalization period, the government decided to, indirectly, interfere the rice market as a buyer and announced a floor price to insure farmers an equitable price and to lessen the degree of risk in the rice farmgate prices. As the new free market system becomes operational, floor prices set by the government are expected to disappear.

B. Impact

To analyze the price trend, changes and the effects of rice price policy changes, Table 6 shows the average rice farmgate price, forced delivery and floor price, compared to the cost of production per unit during the period 1980-1996.

Table 6. Farmgate prices, forced delivery or floor prices and cost of production at current and constant prices during 1980-1996

Year	Farmgate Price (2)		Forced delivery of floor price (1) (2)				Cost pre Unit (2)					
	Current prices LE/ton	Constant prices Index	Current prices LE/ton	Constant prices Index	Current prices LE/ton	Constant prices Index	Current prices LE/ton	Constant prices Index	Current prices LE/ton	Constant prices Index		
1980	81	100	81	100	75	100	75	100	66	100	66	100
1981	99	122	91	113	85	113	78	104	84	127	78	118
1982	130	160	110	136	95	127	80	107	100	152	84	128
1983	126	156	92	113	105	140	77	103	109	165	80	120
1984	140	173	93	114	105	140	69	92	143	217	95	143
1985	272	336	159	196	125	167	73	97	138	209	81	122
1986	319	394	159	196	165	220	82	109	157	238	78	119
1987	251	310	110	136	200	267	88	117	173	262	76	115
1988	306	378	106	131	200	267	69	92	174	263	60	92
1989	413	510	113	139	275	367	75	100	174	264	48	72
1990	401	495	94	116	275	367	64	85	171	259	40	61
1991	435	537	86	106	400	533	79	105	221	335	44	66
1992	451	557	80	98	400	533	71	95	260	394	46	70
1993	504	622	82	101	350	467	57	76	261	395	43	64
1994	605	747	93	115	450	600	69	92	352	533	54	82
1995	656	810	97	120	550	733	81	108	368	557	55	83
1996	702	867	93	115	550	733	73	97	376	570	50	75

(1) Forced delivery during 1980-1990 and floor price during 1991-1996.

(2) Deflated by the whole sale index number (1980 = 100).

Source: Calculated from MOA, Central Administration of Agricultural Economics, Dept. of Statistics.

The following issues could be observed:

- ❑ During the period 1981-1985, the average forced delivery prices were below the average cost per unit, which means that rice farmers used to achieve losses during this period.
- ❑ When liberalization started gradually after the mid-1980s, the government had increased the forced delivery price. Therefore, producer margin had continuously increased during 1985-1990.
- ❑ Since 1991, farmgate prices, optional delivery prices and cost of production per unit appear to run parallel leaving a reasonable margin to the rice producer.
- ❑ Considering the constant value of prices and costs of production, Table 6 shows a negative trend during the period 1985-1993. Generally, the constant value of farmgate price, optional delivery prices and cost of production per unit were more stable during 1991-1996 compared to 1980-1990.

4. Rice processing

A. Policies

Egypt has enough milling capacity for its rice production. The total rice milling capacity is estimated at 4.2 million metric tons per year. Over half of that capacity (2.7 million MT) is in some 3,000 small privately owned village stone mills. Before 1990 there were three types of rice mills, public sector mills, commercial mills and the small village mills. One of the milling problems is that many of these mills do not produce a highly polished rice. Much of the bran remains with the milled rice.

The public sector mills had upgraded their techniques to reduce broken kernels and to mill longer grain rice. Some mills have installed rubber rollers to mill longer grain rice varieties with less breakage.

Since 1990, a fourth type of mills which is the new commercial rice mills was added to the milling capacity in Egypt. According to "El Amir *et al.* 1996" a comparative analysis of rice mill types was made and pointed out that:

- ❑ The milling structure includes a large number of small village one-pass mills with the lowest milling rates. Most of Egypt's rice is milled by this type of mill. These mills operate at a relatively low level of efficiency.
- ❑ The highest estimated milling margin is reported for the older commercial mills. This is because of reasonable capacity utilization, lower milling costs, relatively low prices paid for paddy rice.
- ❑ The new commercial rice mills are reported to be the least profitable. While they are the most technically efficient with a milling rate of 71 percent and capacity utilization of 93 percent, but they pay the highest prices for paddy rice and sell their white rice at the lowest rate. This may be due to that these firms have not established their markets.

B. Impact

The public rice mills have faced problems immediately following the market liberalization because of high milling costs due to redundant labor and the reduction in rice quantity received by the public mills. However, the public mills are in good position to procure paddy directly from the farmers. The public mills have the equipment to clean and sort in order to improve the quality of the milled rice sufficient that they can obtain reasonable milled rice prices.

Harrison 1995, pointed out that the rapid shift toward private sector dominance in trading, milling and exporting has putting strong competitive pressure on the government procurement and milling component of the system. He added that the public sector approach is no more viable since the collection of paddy through the "cooperative" system faces many problems and proved to be inefficient.

Therefore, the government has initiated programs to privatize its rice mills. On the other side the private merchants have quickly established themselves as the dominant buyers of paddy. They have also indicated a strong preference for using private mills.

5. Rice foreign trade

A. Policies

One of the important policy changes, is the liberalization of rice foreign trade. The public sector mills are the major source for exporting quality rice. Moreover, the private exporters, who can either purchase milled rice or have their own paddy custom milled at private or public mills, have been allowed to play more important role after canceling the government exporting monopoly.

Adb El-Fattah, 1997, classified the targeted markets for Egyptian rice into four groups. The Arab group includes Syria, Libya, Jordan, Lebanon, Sudan, Saudi Arabia and the United Arab Emirates. West Europe group includes Italy, UK, Spain and Austria. East Europe group involves Romania and Albania. African group includes Cameroon, Zaire, Liberia and Kenya. Israel and Cyprus are two additional rice importers. Export price competition is an important criterion in foreign trade analysis. El-Amir *et al.*, 1996, used the California medium grain price as a world reference price in the comparison between the Egyptian rice export price and the international prices for the 1994/95 marketing year. The estimated average export price for Egyptian rice was higher at about \$ 24/mt than the world reference price. In other words, Egypt's price levels at the borders were approximately 5 percent above the reference medium grain border price in 1994/95.

Table 7. Egyptian rice exports during the period 1980-1999 (000 mt)

Years	Quantity (000 mt)	Years	Quantity (000 mt, milled)
1985	16.6	1991	110.3
1986	40.0	1992	186.8
1987	100.8	1993	129.9
1988	71.4	1994	113.9
1989	32.9	1995	156.8
1990	75.7	1996	242.0
		1997	360.0
		1998	280.0
		1999	320.0
Average	56.2	Average	211.1

Source: Abd El-Fatah, Samia Mohamed. "The effect of the free economic policy on the economics of the rice crop in A.R.E." MS Thesis, Department of Agricultural Economics, Faculty of Agriculture, Ain Shams University, Cairo.

B. Impact

Table 7 shows the Egyptian rice exports during the period 1985-1999. It is noticed that the average annual rice exports increased and reached to 211.1 thousand tons during the period 1991-1999 (after liberalization) compared to 56.2 thousand tons during the period 1985-1990 (before liberalization).

Public sector mills are still the major source of export quality rice. Private exporters have become more important after the lifting of the government exporting monopoly.

The future development of the Egyptian of the Egyptian rice exports could be achieved through coordinating the entire process from procurement to export. Exporters could arrange for activities which contribute to make cost reduction and make rice price more competitive. Such activities might be: contract for high quality paddy, efficient transport, using the least cost mills, impose milling quality control, efficient transport to the nearest and most efficient port and contract for efficient sea freight to market destinations. Generally, the increase in the rice exports will be a function of the increase in marketing and processing efficient and reduction in its costs.

6. Rice consumption

A. Changes in policies

Since rice could not be cultivated in all Egypt, there are 6 governorates which have rice surplus, while 22 governorates have rice deficit. Before implementation of the economic reform program most of the rice used for food was distributed through the government outlets. The distribution system was based on a monthly quota of rice to each governorate. Rice and other subsidized commodities were distributed by means of rationing cards so as to guarantee a minimum amount of such commodities for each consumer.

After the implementation of the economic reform program, the Ministry of Supply abolished quota distribution system for all commodities, except for ordinary and patent flour no. (2), sugar and edible oil which are still distributed through rationing cards.

Free rice storage and movement among governorates are important policy changes which allow the private sector traders to deal in rice within all governorates.

B. Impact of policy changes on rice consumption

Table 8 shows the total and per capita domestic rice consumption during the period 1985/86 - 1994/95. The total rice consumption increased generally due to the rapid growth in population. However, it is noted that before adopting the economic reform policies total rice consumption increased from 1625 thousand tons in 1985/86 to 2073 thousand tons in 1989/90 (28% increase), whereas, after following the economic reform policies it increased from 2291 thousand tons in 1990/91 to 3137 thousand tons in 1994/95 (37% increase).

Table 8. Total and per capita rice consumption in Egypt during the period 1985/86-1994/95

Year	Total consumption		Per capita		Years	Total consumption		Per capita	
	M/Tons	Index	Kg	Index		M/Tons	Index	Kg	Index
1985/86	1 625	100	31.4	100	1990/91	2 291	141	38.6	123
1986/87	1 587	98	29.9	95	1991/92	2 542	156	41.7	133
1987/88	1 390	86	25.4	81	1992/93	2 694	166	43.0	137
1988/89	1 785	110	31.8	101	1993/94	3 077	189	48.8	155
1989/90	2 073	128	36.0	115	1994/95	3 137	193	48.4	154

Source: MOA, Central Administration of Agricultural Economics, Dept. of Statistics.

Nassar and Rizk, 1993 mentioned that per capita consumption of white rice before adopting the economic reform policies, was tending downward due both to population growth and unchanged production. They added that after adopting the reform policies, per capita consumption of white rice began to rise tangibly. This increase is basically attributed to the production increase, with no similar increase in exports.

Data presented in Table 8 shows progressive increase in total and per capita rice consumption during the period 1989/90-1994/95 compared to the previous years.

Conclusion

The development of rice economy has been affected by several policy changes resulting from the implementation of the economic reform program. This reform program is principally based on, liberalization and privatization of the agricultural activities. The implementation of the program in the agricultural sector has affected rice production, marketing, prices, processing, foreign trade and consumption of rice.

The changes in agricultural policies include the following: (1) Liberalization of crop production through cancellation of area allotment and phasing out of input subsidy. (2) The forced quota delivery system was phased out and rice marketing became free. The private sector was allowed to play a big role in the rice domestic trade in addition to the foreign trade of rice. As a result rice prices were liberalized and the pricing system is no longer existent and (3) Subsidy for rice consumers was phased out.

The following are some of the impact of policy changes on the rice economy in Egypt: (1) Comparing the two periods 1985-1990 and 1991-1996, there was an increase in the area cultivated to rice by about 34%, increase of yield by 26% and of production by about 70%. Cost of production has also increased by about 146%. Changes in all these variables have resulted in an increase in farmers' net return per hectare by about 151% in addition to improving the benefit cost ratio by 2.5%. (2) The share of the public mills sector in marketing of paddy rice has decreased from about 42% in 1989/90 to 7% only in 1995/96. On the other hand, the share of the private sector mills has increased. (3) Farmgate price of rice, announced floor prices and cost of production appear to run parallel after liberalization leaving a reasonable margin to the rice producer. (4) Public sector mills have faced problems because of high milling costs and the reduction in its received quantities. These public mills are targeted for privatization. (5) The annual rice exports have increased from 56.2 thousand tons (average of 1985-1990) to about 156.6 thousand tons (average of 1991-1996); an increase of about 179 and (6) Total domestic and per capita rice consumption have increased tangibly during the period 1991-1996.

