

## CONDITION AND DEVELOPMENT PROSPECTS COTTON BRANCH IN KAZAKHSTAN

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Cotton is cultivated in the south of Kazakhstan at up to 43-44 degrees North latitude. In this northernmost cotton-growing area in the world, the average annual air temperature amounts to 13.3-14.5 degrees Celsius, while the annual precipitation ranges from 210 mm to 320 mm. The soil in the south of Kazakhstan is made up of typical and light serozems.

As a valuable industrial crop, cotton is annually planted over an average of 180,000 to 200,000 hectares; in 2008, the total area planted to cotton constituted 178,000 hectares. Since the average crop yield is 22-23 cwt/ha, the annual production volume amounts to 400,000-440,000 metric tons of seed cotton.

Over the 1975-1980 period, under favorable soil conditions and the use of cotton-alfalfa crop rotation systems, the average cotton crop yield amounted to 28-30 cwt/ha.

From 1990 on, as large state farms were privatized and broken up into a host of small farms, the effectiveness of irrigated land use deteriorated and the average cotton crop yield dropped to 17-18 cwt/ha.

Starting in 2001, thanks to the introduction of new domestic, competitive cotton varieties and science-based short-term cotton-alfalfa crop rotation systems as well as increasing attention to cotton production and significant government support, the average cotton crop yield has risen to 23-24 cwt/ha.

In recent years, the government of the Republic of Kazakhstan has been putting in a lot of effort into solving the many outstanding problems and achieving a stable rate of development of the cotton sector.

If stable and high yields of agricultural crops are to be achieved, good soil fertility and advanced farming techniques are required.

One of the most effective means of achieving stable, high cotton crop yields and improving soil fertility is to employ science-based cotton-alfalfa crop rotation systems.

At this time, farmers generally prefer cotton as the most profitable cash crop, which means that the same lands are planted to cotton year in year out with the upshot that the area under alfalfa has dropped from 25-30 percent to 0.7-1.5 percent, cotton has become a monoculture, and soil fertility has been deteriorating.

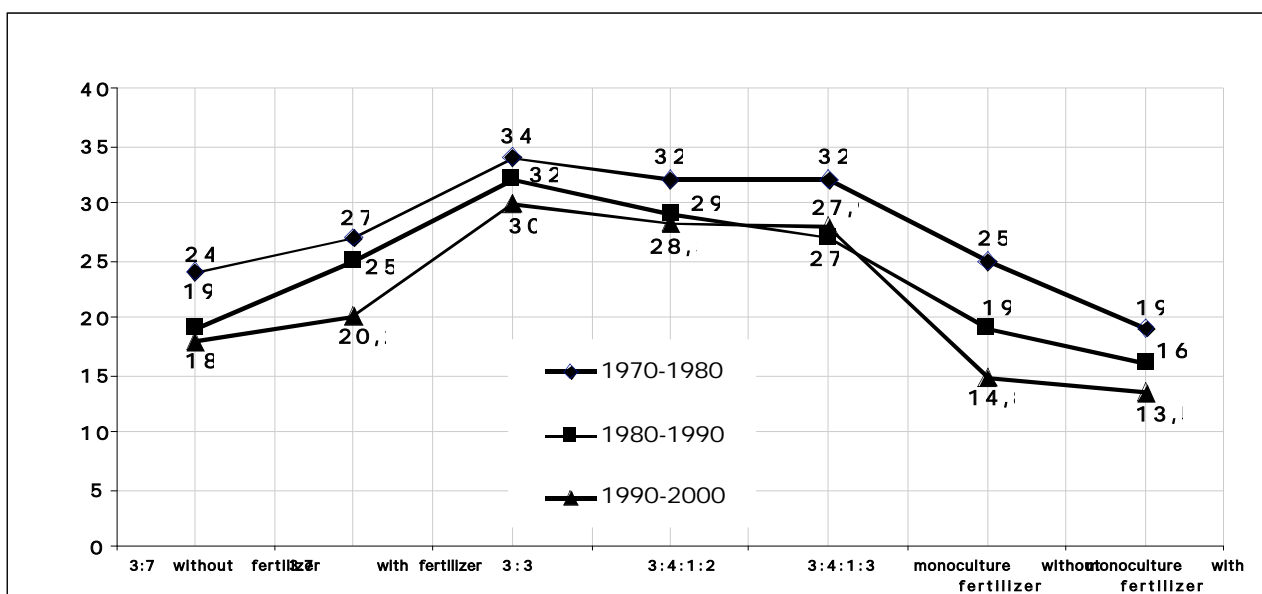
### Influence of crop rotations on fertility soil and productivity of a cotton in the Maktaaralsky Region

Years	Maintenance humus in soil (In horizon of 0-30 cm), in %	Cotton Yield tons/hectares
1970	1,115	30,5
1975	1,180	28,7
1980	1,125	28,0
1985	1,070	28,2
1990	1,012	25,3
1995	0,950	23,0
2000	0,953	21,8
2007	0,979	22,6

Since 1970, the soil humus content has been steadily declining, paralleled by diminishing cotton crop yields. Worst of all, it would take not less than several decades to restore soil fertility to acceptable levels.

Another major problem preventing the implementation of the cotton-alfalfa crop rotation systems developed by Kazakh scientists is the tiny size of farms. In the Maktaaral District, over 70 percent of the 21,000 farms possess 1-5 hectares of arable land, which effectively puts cotton crop rotation systems out of their reach. For the Republic as a whole, the average planted area of 65 percent of cotton farms ranges from 3 to 10 hectares.

Productivity of a cotton in a crop rotation, ts/hectares

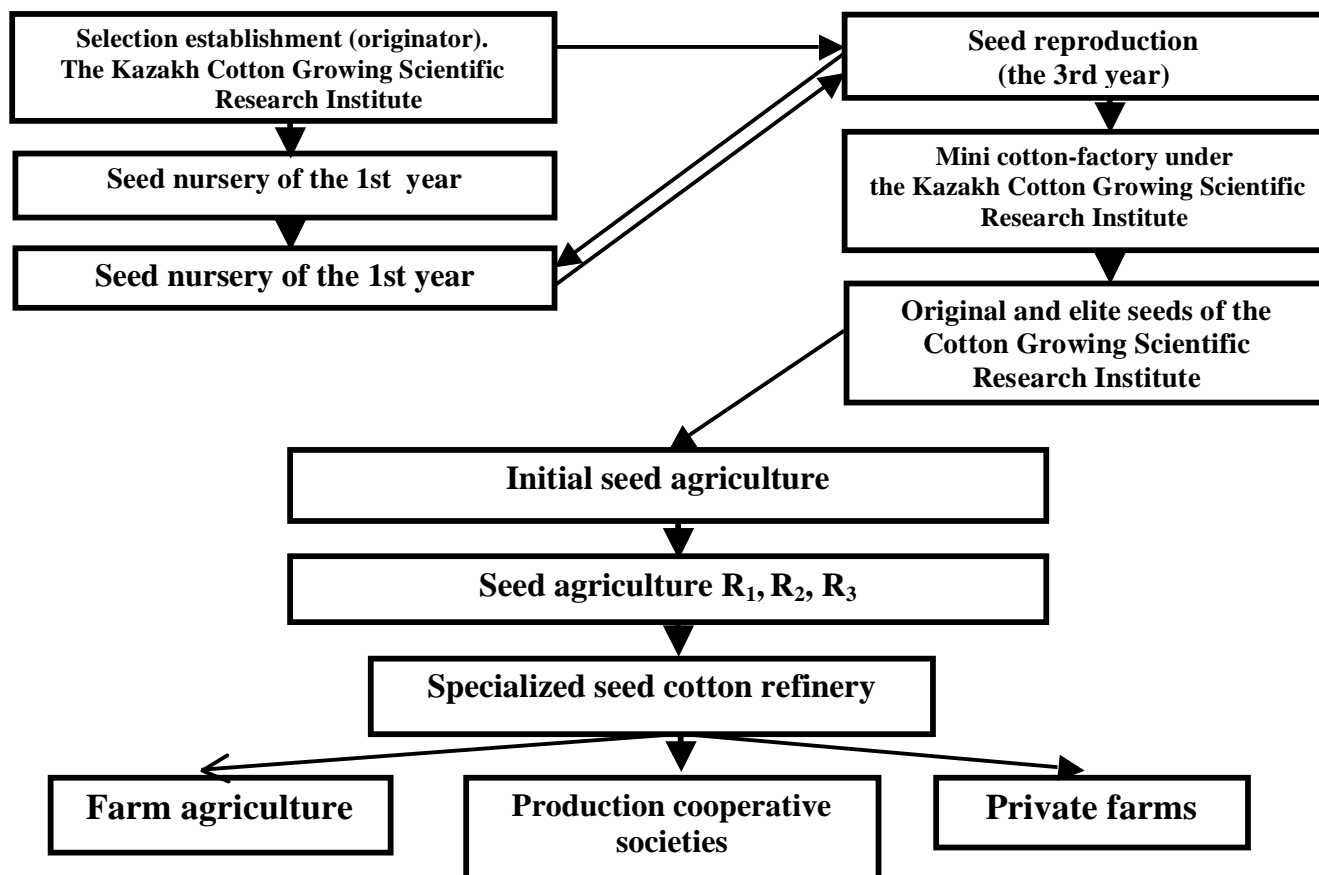


The Kazakh Scientific Research Institute of Cotton Breeding has developed two efficient short-term cotton-alfalfa crop rotation systems: 3:3 (three years of alfalfa and three years of cotton) with 50% of the total planted area under cotton, and 3:4:1:2-3 (three years of alfalfa : 4 years of cotton : one year of cereals : two or three years of cotton) with 60% of the total planted area under cotton. The intensive, short-term 3:3 crop rotation system with a 50:50 planting ratio offers the best prospects of improving soil fertility and boosting cotton crop yields.



Since 2000, the scientists working at the Kazakh Scientific Research Institute of Cotton Breeding have developed eight new, competitive cotton varieties (PA-3031, PA-3044, M-4005, MA-3047, M-4003, M-4007, M-4011, and Bereke-07) four of which (PA-3031, PA-3044, M-4005, M-4007) have been entered into the State Register of Breeding Accomplishments and authorized for commercial use in the Republic.

The scheme of manufacture of seeds of grades of a series «Maktaaral»



The new, domestic cotton varieties are up to the international standards in terms of crop yields and fiber quality and are highly competitive from the viewpoint of the textile industry. Their chief advantage consists in their earliness; given the northern geography of the cotton-producing areas, it takes the cotton plant just 110-121 days to reach full maturity.

In terms of the main cotton characteristics, the new domestic cultivars compare very favorably with the standard variety, PA-3044.

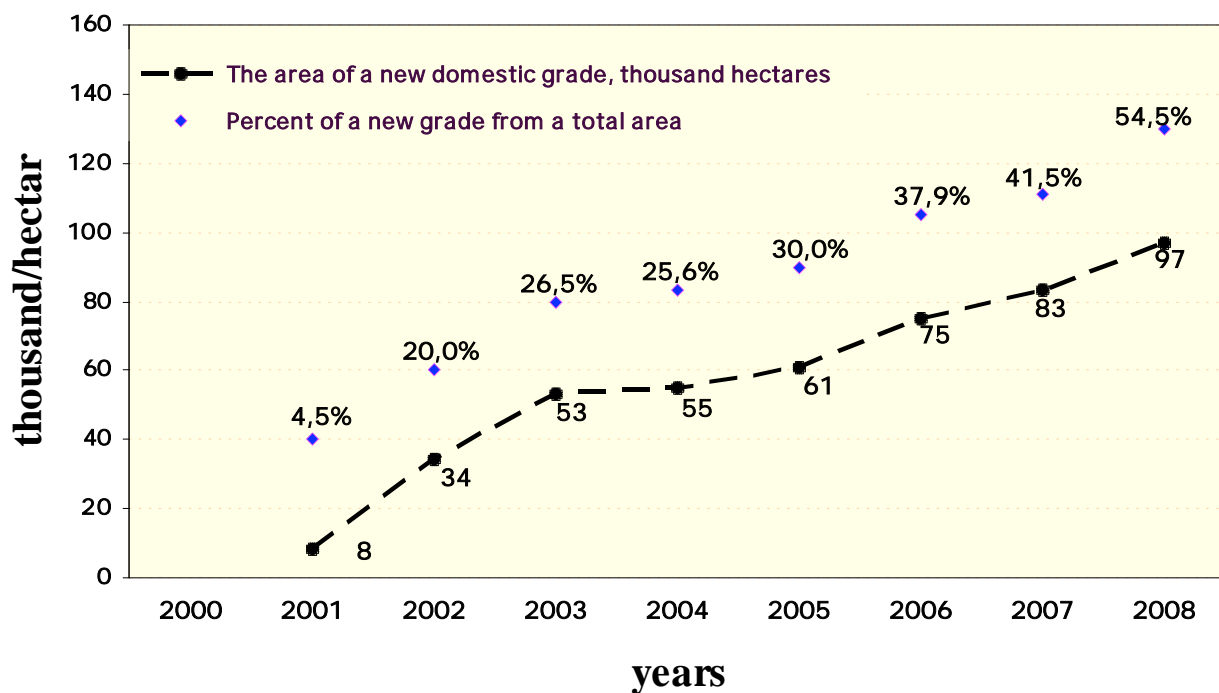
Indicators of new domestic grades of a cotton

Indicators	-3044 (Control)	-3031	-3047	-4003	-4005	-4007	-4011	Bereke-07
Time to mature, days	122-124	121-123	121-124	117-120	110-117	117-120	119-120	119-120
Yield, ts/hectares	39-43	39-41	39-43	39-40	38-39	40-41	40	39,0-42,0
Ginning Ratio, %	37,0-38,0	36,5-37,0	38,0	37,0-38,0	38,0-39,0	38,7-39,3	38,7-40,0	38,5
Fiber Length, mm	32,9	32,7	32,3	33,5-34,0	33,4	34,1	34,1	33,4

Micronaire	4,6	4,7	4,6	4,5	4,6	4,5	4,5	4,6
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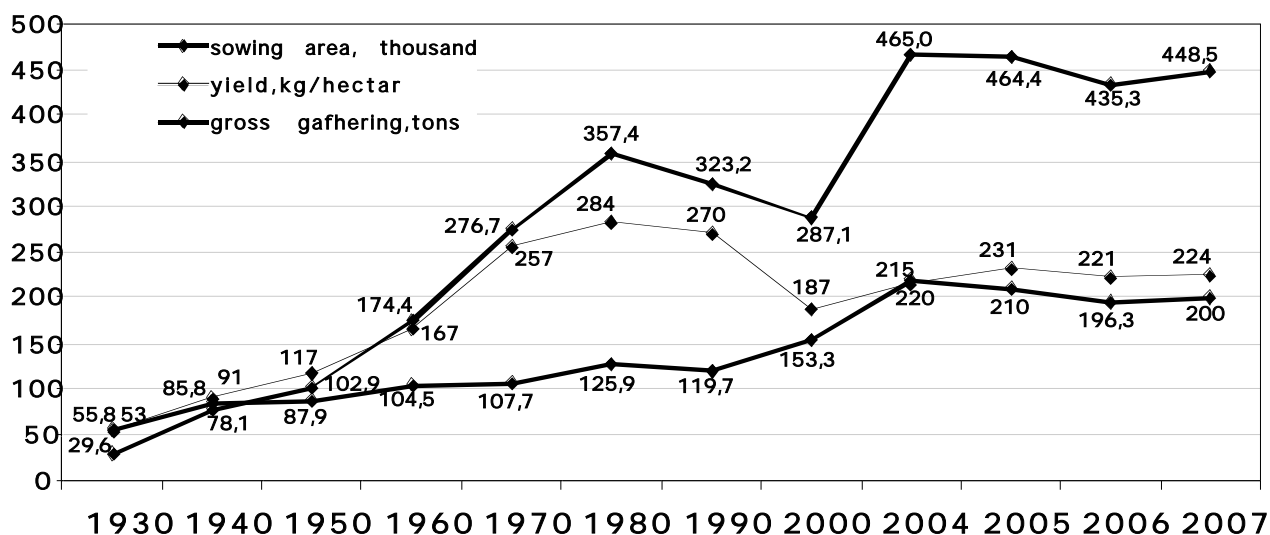
Introduction of the new, domestic cotton varieties began in 2001. Since 2003, the number of seed-breeding farms and their planted areas have increased substantially; domestic cotton varieties are currently planted over 97,000 hectares, which is 54.5 percent of the total area under cotton in the South-Kazakhstan Region.

Dynamics of introduction in manufacture  
New, domestic grades of a cotton



The average cotton crop yields in the South-Kazakhstan Region have been rising due to the introduction of new, domestic varieties developed by the Kazakh Scientific Research Institute of Cotton Breeding. The planted area has also increased thanks to the use of improved cultivation techniques.

Productivity, the area of crops and total gathering of a clap-row  
In Republic Kazakhstan



With the large-scale introduction of new, domestic cotton varieties, the average cotton crop yield in the South-Kazakhstan Region has increased from 17 cwt/ha to 23 cwt/ha, and in terms of this all-important characteristic the Republic of Kazakhstan now ranks 15<sup>th</sup> among the world's leading cotton-producing countries.

If domestic, competitive varieties took over the entire cotton plantings in the South-Kazakhstan Region, the average crop yield would rise to 27-28 cwt/ha, increasing the total production volume by some 100,000 metric tons of seed cotton and boosting the Republic of Kazakhstan into the top ten of the most productive cotton producers in the world.

According to the World Bank, the breakdown of cotton farms in Kazakhstan by size is as follows: 20.3%, 5-10 ha; 40%, 10-50 ha; 11.8%, from 50 ha and up. Of the 21,000 cotton farms in the Maktaaral District, 76% are 1-5 ha in area; 19%, 5-10 ha; and the remaining 5%, over 10 ha.

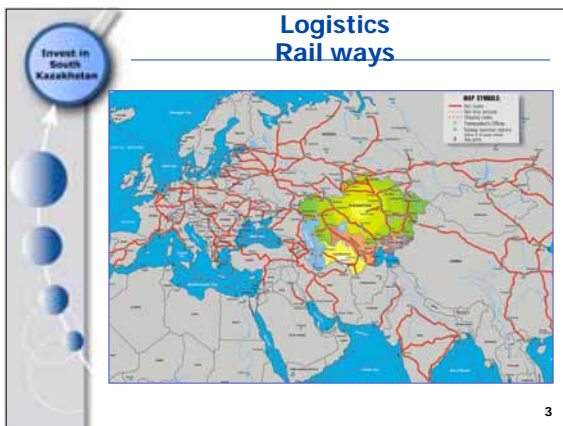
Because of the high population density, some 80 percent of small farms were allotted land plots when the holdings of the collective farms and state farms were privatized and divvied up. In a free market environment characterized by private ownership of arable land, profit maximization is the most important concern of producers, and large farms stand to reap the most benefits. Small farms with plantings of 5-10 ha or less can rarely achieve cotton crop yields higher than 15-17 cwt/ha, which is too low to make cotton production profitable and hence, economically feasible.

It follows that small farms must aggregate into larger production units capable of leasing agricultural inputs or buying them on credit. Large farms achieve profitability thanks to efficient patterns of labor utilization and timely and more diligent implementation of all cultivation techniques, from fall plowing to mechanized harvesting of the crop.

At this time, production units capable of planting cotton over areas of 150 ha to 200 ha or even larger are deemed to be the most efficient model for the cotton-growing sector of the Republic.

#### Economic efficiency of crop rotations

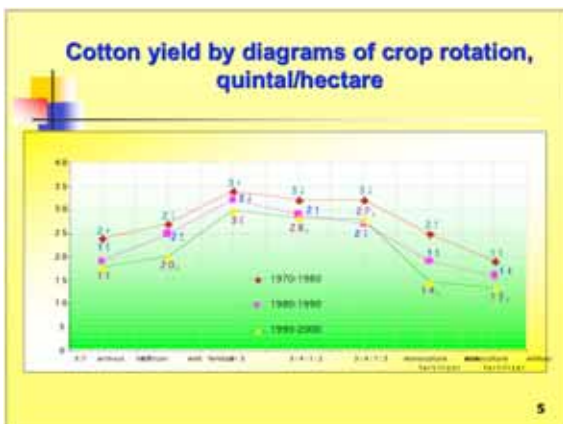
Farm sizes, hectares	Crop rotation	Cost of production, \$US per hectare	Yield, 100 kg/ha	Average sale price, \$US/ton	Average sale price, \$US/ha	Net profit, US \$
3-5	No	473	15	375	562	89
6-10	No	483	17	375	637	154
50-70	Yes	485	20	375	750	265
100-120	Yes	508	25	375	937	429
130-150	Yes	508	26	375	975	467



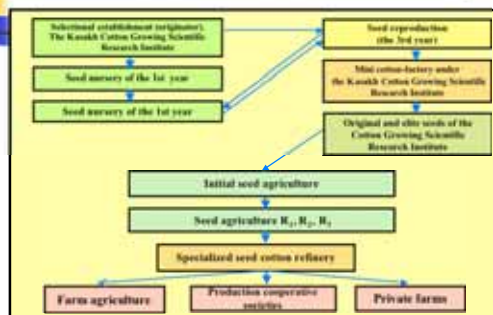
**Influence of crop rotations on fertility of soil and productivity of a cotton in Maktaaralsky region**

Years	The expenditures money to soil for fertilization for 1000 sq. m	Productivity Cotton in t/ha
1970	1,115	30,5
1975	1,180	28,7
1980	1,125	28,0
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4



### The production chart of sowing seed of new sorts of cotton in Kazakhstan



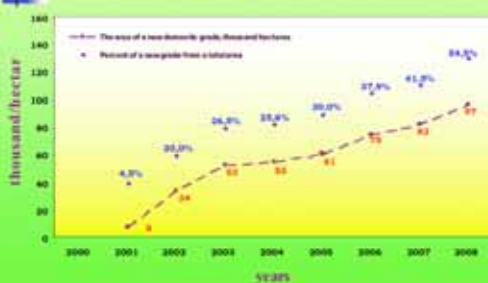
7

### The primary indicators of new sorts of cotton-plant, which brought in Kazakhstan

Indicators	1A-3044	1A-3031	M-3047	M-4003	M-4005	M-4007	M-4011	Series-07
Period of mature, days, $\alpha$	122-124	121-123	121-124	117-120	110-117	117-120	119-120	119-120
Yield, quintal/hectare	17-19	19-41	19-43	19-40	19-40	40-43	40	19-42
Output of fiber, %, $\alpha$ 1	17,6-18,0	16,5-17,0	18,0	17,0-18,0	18,0-19,0	18,7-19,3	18,7-40,0	18,5
Length of cotton-plant/mm	32,9	32,7	32,3	33,5-34,0	33,4	34,1	34,1	33,8
Microsept	4,8	4,7	4,6	4,5	4,5	4,3	4,3	4,6

8

### Dynamics of introduction in manufacture New, domestic grades of a cotton



9

### Sowing area, yield and gross gathering of cotton-plant in Kazakhstan



10

### Economic effectiveness of farm agriculture enlargement in cotton growing of Kazakhstan

Average on 1 hectare

Area of farm agriculture, hectare	Crop rotation	General costs, US\$/hectare	Yield, quintal/hectare	Average realization price, US\$/ton	General price of realization, US\$/hectare	Net profit, US\$
3-5	No	473	15	375	562	89
6-10	No	483	17	375	637	154
50-70	Yes	485	20	375	750	265
100-120	Yes	508	25	375	937	429
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11

I Thank for attention!

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12