

# THE RELATIONSHIP BETWEEN MECHANIZATION AND COTTON GINNING INDUSTRY

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**Abstract:** Irrigated agriculture has brought mechanization applications and thus has increased cotton production area, yield and production quantity in Southeastern part of Turkey. This increase has led to the development of ginning industry in the region. Also it has become important to standardization the cotton ginning and baling. In this study, were investigated and evaluated current situation of the ginning factories in Diyarbakir province. The study was conducted by applying the survey methods to the visited factories. In the survey, respondents were asked questions regarding general information about the factory, current situation, capacity, raw material procurement, marketing, sales and general problems. In study, 50 factories were investigated, which were registered to Diyarbakir Chamber of Trade and Industry. The results obtained from the study show that the 17 factories have closed for several reasons. In particular, it was found that ginning factories do not operate efficiently with regard to the labour force employed and the amount of capital invested. In addition, it was determined what processed and baled cotton sold out of the province of Diyarbakir. Also, it was determined that factories had difficulties working low capacity, were between 60-120 days of annual working time, lack of qualified employee, financial difficulties, couldn't find quality cotton, insufficient agricultural supports and unstable pricing policies.

**Keywords:** COTTON MECHANIZATION, GINNING INDUSTRY

## 1. Introduction

Turkey is one of the important countries in terms of the magnitude of total cotton production and it is Europe's largest textile manufacturer and ranks seventh in the world cotton production. The Turkish textile industry continues to be the one of the leading sectors in the Turkish economy providing 17.5 percent of total exports in 2014. A total of 53.000 companies operate in the sector, providing a total of about 0.4 million jobs in the garment production alone (Paulson and Sirtioğlu, 2015). Cotton is cultivated primarily in the Aegean Region, Çukurova Basin and Southeast Anatolia Region. With GAP (Southeastern Anatolian Project) irrigation project in Turkey, the irrigated farmland and cotton production in Southeast Anatolia region has developed rapidly since 2000. That is, cotton production area was shift Aegean and Çukurova region to Southeastern Anatolia region and last 15 years and nowadays, more than half of the national cotton production is produces in Southeastern Anatolia region. The increase in cotton production has increase provided the development of the cotton industry (Sessiz and Esgici, 2015). The ginning rate averages about 41 percent in the Aegean region, about 39 percent in the GAP and 38 percent in Cukurova (Basal ve Sezener, 2012). Therefore, cotton plant has strategic importance for the region's cotton ginner and agricultural mechanization improvement. Major cotton producer provinces in this region are Şanlıurfa, Diyarbakır and Mardin. Cotton production figures of region's are given in Table 1.

**Table 1.** Cotton production and yield in Southeastern Anatolia Region, Turkey (Turkish Statistical Institute, 2015).

	Production area (ha)	Production (tones)	Yield (kg/ha <sup>1</sup> )
Adıyaman	7.950	34.872	4390
Batman	80.00	321	4010
Diyarbakır	30.899	141.289	4570
Mardin	8.655	41.319	4770
Şanlıurfa	206.035	916.298	4450
Gaziantep	6.605	32.368	4900
Kilis	39.00	139	3550
Şırnak	4.202	20.636	4910
Siirt	50.00	223	4460
Total	264.517	1.187.465	4490
Turkey	430.000	1.639.055	3811

As shown in Table 1, total cotton production of Turkey is 1.639.055 tons obtained from 430.00 ha total cultivated area, meanwhile 1.187.465 tons and 264.517 ha for Southeastern Anatolia region respectively. GAP region produces 61.5 % of Turkey's total cotton production area in the 2015 (TUIK, 2015). This has led to the development of industries based on cotton in the

region. This production ratio in region is important for region's development, human resources development and rural development. Therefore, increasing cotton production and yield, reducing of cotton losses and protection of fiber quality are very important for sustainability of the production in Diyarbakır province. Cotton industry is mainly composed of cotton ginning factories.

Also, there are close relationship between mechanization practices and cotton ginner and cotton industry. Agricultural mechanization has been developed depends on cotton production and textile industry in province of Diyarbakır. Mechanization applications and number of technological equipment have increased in throughout the province with cotton crop. Rise in number of especially powerful and new tractors, pneumatic planter, mounted and self-propelled sprayers for defoliant applications, self-propelled cotton pickers have occurred. However, there are some problems in the cotton production. Production costs have risen sharply, but at the same time cotton prices have declined, so it is seen a significant decrease in the area under cotton cultivation (Adanacioglu and Olgun, . 2011). Corn production areas increases in all province of the region as an alternative crop of cotton, depends on increase in the cost of cotton production in the last few years. This negative situation has affected farmers and industrialists who invest in technological machines such as seeders and self-propelled cotton pickers in the cotton industry.

Despite these adversities, Government provides grant support to industrialists and this has led to the opening of new factories. The one hand while new cotton ginner factories are opened, on the other hand the many ginners are closed. Increasing operating costs such as price instability and fluctuation of prices, ruinous prices, amount of production cotton seed do not meet the demand of the industry sector, increases the production costs of the cotton that purchasing from outside the region, purchase requirement new ginning machines due to become mandatory bale standards, made strict controls for bale standardization cause to become idle and close factories.

In the Southeast Anatolia Region, most of the cotton ginners are located in province of Şanlıurfa and Diyarbakır. These two provinces are two important cotton producers and considerable amounts of cotton are cultivated last 15 years. However, there are many problems related to production and processing of cotton.

The objective of this study was to determine the relationship between mechanization applications in the cotton farming and cotton ginners. In addition to determine current situation analysis and problems, solution for problems, and future activities in Diyarbakır.

## 2. Material and Methods

The study is mainly based on survey data. The data were obtained from 50 cotton ginners in the 2015 ginning season in Diyarbakır province of Turkey. Before starting this study, the ginners that are registered to Diyarbakır Chamber of Trade and Industry were determined. Then all cotton ginner were visited for interview in the survey. Visits were took place with authorities or owners of the factories to get information about cotton ginner. Pre-prepared questionnaire was filled with the data about the factories and were evaluated. Briefly, general information about the factory, current situation, capacity situation, raw material procurement, sales and marketing situations and about the general problems was questioned.

## 3. Results

### 3.1 General properties of cotton ginners

All of Turkey's estimated 500 gins are privately owned. The majority of the gins in the Aegean region are roller gins, more suitable for longer staple cotton, while about half of the gins in Çukurova and the Southeast are roller gins and half are saw gins. However, the recent increase in machine harvesting has triggered the construction of new saw gins (Paulson and Sirtioğlu, 2015). In 2015, there were 50 ginning factories registered to Diyarbakır Chamber of Trade and Industry. However, it was determined that 33 of these factories are active, while 17 of the factories are closed due to various reasons. All of the ginning factories that surveyed and active was established since 1990. 14 factories (42%) were established between years 1990 and 2000, 19 factories (58%) were established after 2000 that period increased of cotton production areas. The number of these ginning factories in Diyarbakır is adequate, but it was found that not to be integrated plant. Therefore, a planned industrialization based on cotton plant is not realized.

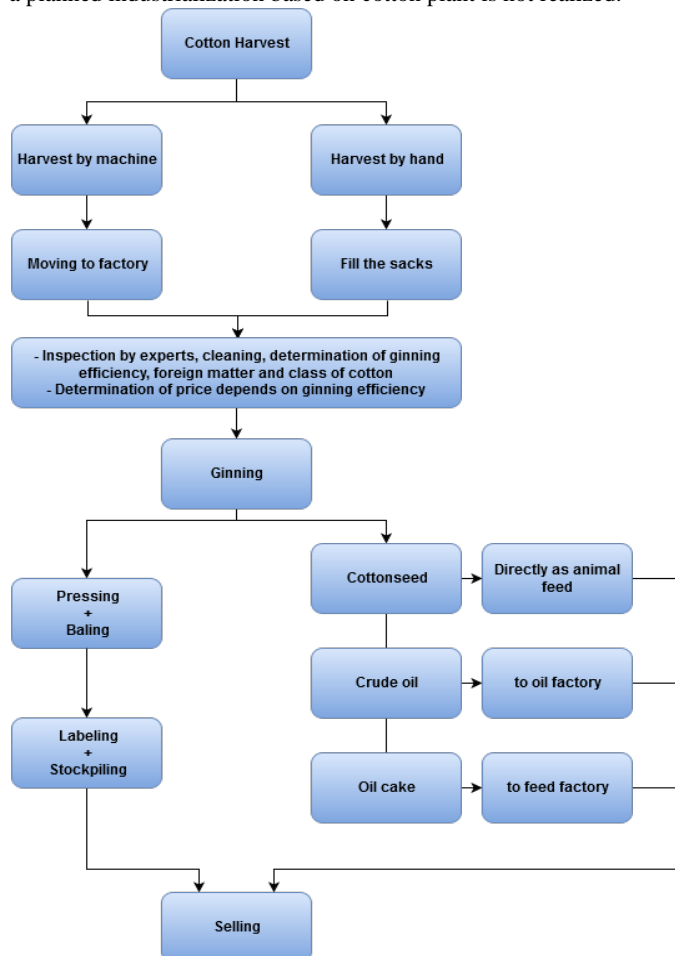


Fig 1. The general flow of cotton after harvest in Southeastern part of Turkey.

This situation negatively affects investment to mechanization equipment of cotton farmers. Therefore, while decreasing annual

use time of the machines, increasing production costs and mechanization equipment are becoming idle. Only 3 of the 33 active factories saw-gin type, other factories are roller-gin type. In other words, 91% of factories have got roller-gin type machines. 9% have got saw-gin type ginning machines. The general process of cotton from harvest to selling in Diyarbakır is shown in Figure 1. After harvest, cotton grower typically sells seed cotton a private ginner.

### 3.2 Working Capacity and Capacity Utilization in the Ginneries

In factories, the number of ginning units depending on the factory size ranges from 100 to 150 units for 97% and from 150 to 200 units for 3%. 33% of the proprietors had sublet due to they are not managed. 66% of factories are managed by owners.

Factories that analyzed in terms of area size had major differences. The total area of 70% of factories ranges from 10.000 to 25.000m<sup>2</sup>, 30% of factories ranges from 26.000 to 50.000m<sup>2</sup>. Annual capacity of factories ranges from 10.000 to 30.000 tons year<sup>-1</sup>. Daily capacity of factories ranges from 50 to 100 tons day<sup>-1</sup> depending on economic and technological characteristics of factory. However, all of the factories are operated at low capacity. Effective working times are 4 months a year on an average depending on factory's capital and cotton stock. Annual working days were denoted by authorities between 60-90 days year for 73% of factories. The main reasons works with low capacity of factories are lack of raw materials (seed cotton), redundancy capacity and number of factories, inadequate capital.

One of the main factors affecting cost is harvest. Harvest usually is done with machine. 61% of the proprietors have their own cotton harvest machines and they are also farmers. There aren't cotton harvesters of 30% of the proprietors. 64% of the proprietors who have cotton harvester stated that much clean of cotton harvesting with machine than hand-picking. Other 36% of the farmers who haven't cotton harvester stated that much clean of cotton with hand-picking than harvest with machine.

All authorities said they have obtained cotton from province and neighboring provinces. Obtained cotton's fiber ratio is between 32-35%, seed rate between 50-55% and foreign matter ratio between 5-8%. After the ginning process, the cotton lint (fiber) is pressed into bales of between 200 and 230 kg in size.

### 3.3 Staff Situation

Factories were analyzed in terms of number of employees and were determined that number of employees between 10 and 12 , number of administrative personnel between 2 and 5. However, it was seen that consist of family members majority of administrative personnel. Most of the factories stated that they don't need engineering services. 85% of the factories stated that they only needed cotton experts and technical staff for maintenance-repair of ginning machines.

Factories works for 1 or 2 shifts and the total time is 16 or 18 hours per day. The number of shift is increased in the intense works period. Almost all of the factories close by ending stocks. During non-working period are made preparation for next season.

### 3.4 Marketing and Sales, Capital Situation and Future Activities

30% of the factories supplies cotton from Diyarbakır. Other 70% supplies cotton from neighboring provinces. Authorities said that they purchased cotton cash (21%), on trust (49%) and installment (30%). They said also all of the ginning cotton sells out of the region, all sales made by them, they made cash selling. In addition, it was determined that produced cottonseed sold to Diyarbakır (30%), to region (67%), and to out of region (3%).

Ginning factories continue their activities that 79% of them with equity capital, 21% of them with joint capital. Unconsciously made

investments seen becoming idle sometime later. Already 1/3 of factories have been closed, 1/3 have been given rent. It was seen that are also farmer almost all of factories who continue activities. These factories have made serious capital investments with mechanization. Therefore, 88% of the proprietors have stated that they intend to change the scope. More than half of these factories (60%) are located outside of zoning area. Furthermore, there are no licenses due to be installed in convenient place to agriculture.

#### 4. Conclusion

With the beginning of irrigation, depending on GAP project cotton production areas have increased, mechanization application and diversity of machine have increased in Diyarbakır. As a result of this, there are considerable increases in the industry based on cotton since 2000.

Although Diyarbakır province has a considerable amount of cotton production, it was determined that cotton ginners have inadequate technical capability and capacity utilization is very low. The results obtained from the study show that unit production costs of ginning factories are high and that they have low operating profits. In particular, it was found that ginning factories do not operate efficiently with regard to the labor force employed and the amount of capital invested. Therefore, mechanization level has been negatively affected.

It is not possible to find a solution for these problems instantly. Searching permanent solutions with well analyze of the problems is important. The development of the industrial sector and expansion into foreign market should be supported and it should be allowed a planned development in the industry based on cotton. Cotton price should be provide consistency and should be continue to grant support. At the same time mechanization tools and management support should be provided to both factories and cotton growers.

#### 5. References

- Adanacioglu, H., F.A. Olgun. Profitability and Efficiency in the Cotton Ginning Industry: a case study from the aegean region of Turkey. *Custos e @gronegocio* on line - v. 6, n. 2 - Mai/Ago - 2010. ISSN 1808-2882. [www.custoseagronegocioonline.com.br](http://www.custoseagronegocioonline.com.br) 2011
- Basal, H., V. Sezener. Turkey Cotton Report. <https://www.icac.org> 2012.
- Paulson, J.K., I. Sirtioğlu. Turkey Cotton and Products Annual 2015. USDA Foreign Agriculture Service. Gain Report . Global Agricultural Information Network 2015
- Sessiz, A., A. K. Eliçin. Diyarbakır İlinin Tarıma Dayalı Sanayinin Mevcut Durumu, Sorunları ve Çözüm Önerileri. TMMOB Makine Mühendisleri Odası II. GAP ve Sanayi Kongresi Diyarbakır 2001
- Sessiz, A., R. Esgici. Effects of cotton picker ages on cotton losses and quality. Scientific Papers. Series A. Agronomy, Vol. LVIII, 2015. ISSN 2285-5785; ISSN CD-ROM 2285-5793; ISSN Online 2285-5807; ISSN-L 2285-5785; S:417-420 2015
- TURKSTAT. Turkish Statistical Institute ([www.turkstat.gov.tr](http://www.turkstat.gov.tr)) 2014
- TURKSTAT. Turkish Statistical Institute ([www.turkstat.gov.tr](http://www.turkstat.gov.tr)) 2014