

# Effect Of Agricultural Machinery Grant Scheme On The Agricultural Mechanization Development In Turkey

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**Abstract**—Since 2007, machinery-equipment group has been included under the scope of granting by the state in Turkey. In a period of a total of 7 years, from 2007 to 2013 and under the scope of 50% grant, an assistance of 221620 machine-equipment from 41 different tool-machine types have been provided to 81 provinces under this scheme in Turkey. With this study, the annual change of the types and numbers of the machines assisted in Turkey under the grant scheme, and their effect on the development of mechanization have been set forth. At the end of the study; it has been observed that the grant assistance for the widely used tools and machines has contributed between 4.14-616.44% to agricultural mechanization. Thanks to these assistances, not only has the aging equipment park in Turkey been renewed, but also, the opportunity to use high-tech new machinery has been increased.

**Keywords**—Turkey, agricultural machinery, grant scheme, assistance, mechanization

## I. INTRODUCTION

Even though Turkey is above world average in terms of the criteria defining the current agricultural mechanization, it is still necessary to increase the current production level and productivity, in order to highly increasing demand for agricultural production. Planning the agricultural mechanization level of Turkey per regions; would be possible by increasing the variety of tractor and agricultural machinery park, thus making it more effective [1].

For modernization, agricultural mechanization is highly important. It is a well known fact that the level of mechanization is an effective factor in terms of reducing the dependency to the conditions of nature, increasing work productivity, getting higher productivity per unit area and minimizing the level of product waste [2]. With the current agricultural mechanization level, Turkey is one of the few self sufficient countries, however it is necessary to meet

the rapidly expanding agricultural product demand, increase the current production level and increase productivity. It is necessary to plan agricultural mechanization level at the agricultural zones in Turkey, and to increase the number and efficiency of tractor and machine park and diversity[3]. Unlike other agricultural technology applications, use of machinery in agriculture does not directly affect the productivity increase; however it ensures the use of new production methods in rural areas. With this aspect, it increases the efficiency and economy of other technological applications and improves the working conditions. As such, it provides the opportunity for the use of appropriate technologies and ensures higher productivity [4].

In an agricultural enterprise, product income and machinery costs are closely related. Little deviations in the lowest cost machine highly increases the total costs and this increase rate is higher at the lower cost section. Product income decreases noticeably with the decrease in machine size, and in bigger machine sizes, it shows a relatively smaller increase. However, where product income can possibly decrease due to late performance of certain works, maximum earnings can be acquired with a bigger size machine. Same evaluations also apply for the dimension of tractor power. Under the scope of the "Rural Development Machine and Equipment Assistance" project, which started in 2007 for increasing the use of machinery in agriculture, generalizing the adoption and usage of the newly developed technologies by the manufacturers, ensuring higher quality manufacturing by meeting the market demands, simplifying the works which are based on human labour, decreasing the production costs and bringing them to a internationally competitive level, the Ministry of Food, Agriculture and Livestock has provided 50% grant for a period of 7 years, between 2007 and 2013. The grant was provided to manufacturers for 41 different types of machine and equipment, for a total of 221620 machines for vegetable and livestock production [5].

Since 2007, the state has taken machine-equipment group under the scope of grant scheme to assist the purchase of machine and equipment in particular, in order to increase agricultural production, ensure the use of advanced agricultural techniques, and to ensure consistency. With this study, it has been aimed to display the annual variety and number of the machines supported by the Republic of Turkey Ministry of Food, Agriculture and Livestock grant scheme, and the effect on agricultural mechanization.

## II. MATERIAL AND METHOD

Data for this study has been acquired from the machinery equipment grants 2007-2013 statistics report, prepared by the Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Reform, Rural Development and Credit Department Machinery and Equipment Work Group, and the annual agricultural tools and their numbers have been acquired from the Turkish Statistical Institute, and all these data make up our material. In this study, the park size of the relevant machine and equipments for the 2007-2013 periods and the amount acquired through the grant assistance have been taken into account. For the total amount and the grant assistance, the following equation has been used in this study for the evaluation of the park development (PD) for the 2007-2013 [4,6].

$$PD (\%) = \frac{(\text{Park size}_{2013}) - (\text{Park size}_{2006})}{(\text{Park size}_{2013})} * 100 \quad (1)$$

The contribution provided by the addition of the new machinery and equipment to the park is being expressed by the park renewal rate (PRR) [4]. Tables and figures have been prepared by the use of such data.

## III. RESEARCH FINDINGS

Under the Scope of the "Program on Assisting Rural Development Investments" (KKYDP) and the Program on Assisting the Purchase of Machinery and Equipment, grants have been provided in Turkey to 41 different types of machines. The machine and equipments included to the grant scheme are "Stubble direct seed drill, beekeeping machinery and equipment, vessels fishing in the cold storage, baler machine, binder, live fish transport tank, grass shearing machine, rice transplanting machine, disc harrow, hand tractors and equipment, file system, chemical fertilizer distributor machine, solar collector, harvest table, grain threshing machine, canola divider cutter bar, sheep shearing machine, soil levelling equipment, seed drill, rotary brush cutter, cotton picking machine, beet lifter machine, potato lifter machine, sprayer, wind machine, stalk shredder machine, chop thresher, spading machine, silage machine, cold air fitting transport implement, aquaculture hatchery machine, ice machine, milking unit and cooling tank, tambour filter, farm irrigation, stone picker machine, rotary spading machine, feed preparation tools, olive harvester, branch shredding machine and nuts collection machine". Machine-equipment distribution made through 50% grant during the 2007-2013 periods has been given in Table 1.

Table 1. 2007-2013 machinery-equipment distribution

Assisted Machine-Equipment	Total
Stubble direct seed drill	596
Beekeeping machinery and equipment	1132
Vessels fishing in the cold storage	6
Baler machine	5432
Binder	1897
Live fish transport tank	19
Grass shearing machine	12462
Ice transplanting machine	3
Disc harrow	8846
Hand tractor and equipment	40230
Filet system	162
Chemical fertilizer distributor machine	2503
Solar collector	7
Harvest table	251
Grain threshing machine	4987
Canola divider cutter bar	1
Sheep shearing machine	258
Soil levelling equipment	319
Seed drill	37031
Rotary brush cutter	25422
Cotton picking machine	161
Beet lifter machine	2552
Potato lifter machine	1070

Sprayer	35310
Wind machine	11
Stalk shredder machine	2760
Chop thresher	1553
Spading machine	2127
Silage machine	5212
Cold air fitting transport implement	482
Aquaculture hatchery machine	36
Ice machine	43
Milking unit and cooling tank	14998
Tambour filter	7
Farm irrigation	5611
Stone picker machine	571
Rotary spading machine	3827
Feed preparation tools	4277
Olive harvester	4545
Branch shredding machine	214
Nuts collection machine	118

Reference [5]

The tools and machines provided during the 7 year period of 2007-2013 under the grant scheme have been classified into three different groups, based on their numbers. Machine and equipments between 1-1.150 pieces have been given in Figure 1, 1500-40250 pieces of machine-equipment in Figure 2. The

annual change in the number of the machines bought under the grant scheme has been given in Figure 3, and the annual grant assistance amounts, paid by the state for the tool-machines has been given in Figure 4.

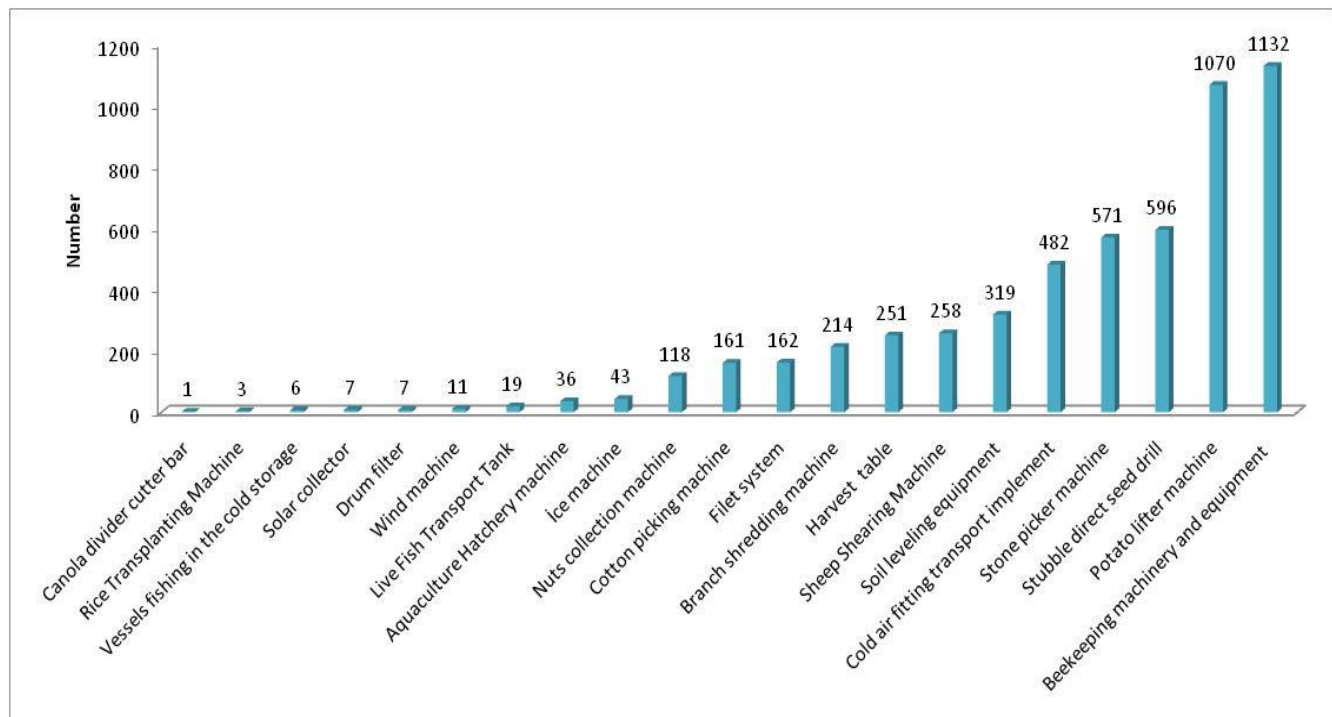


Figure 1.1-1150 between machine and equipment numbers

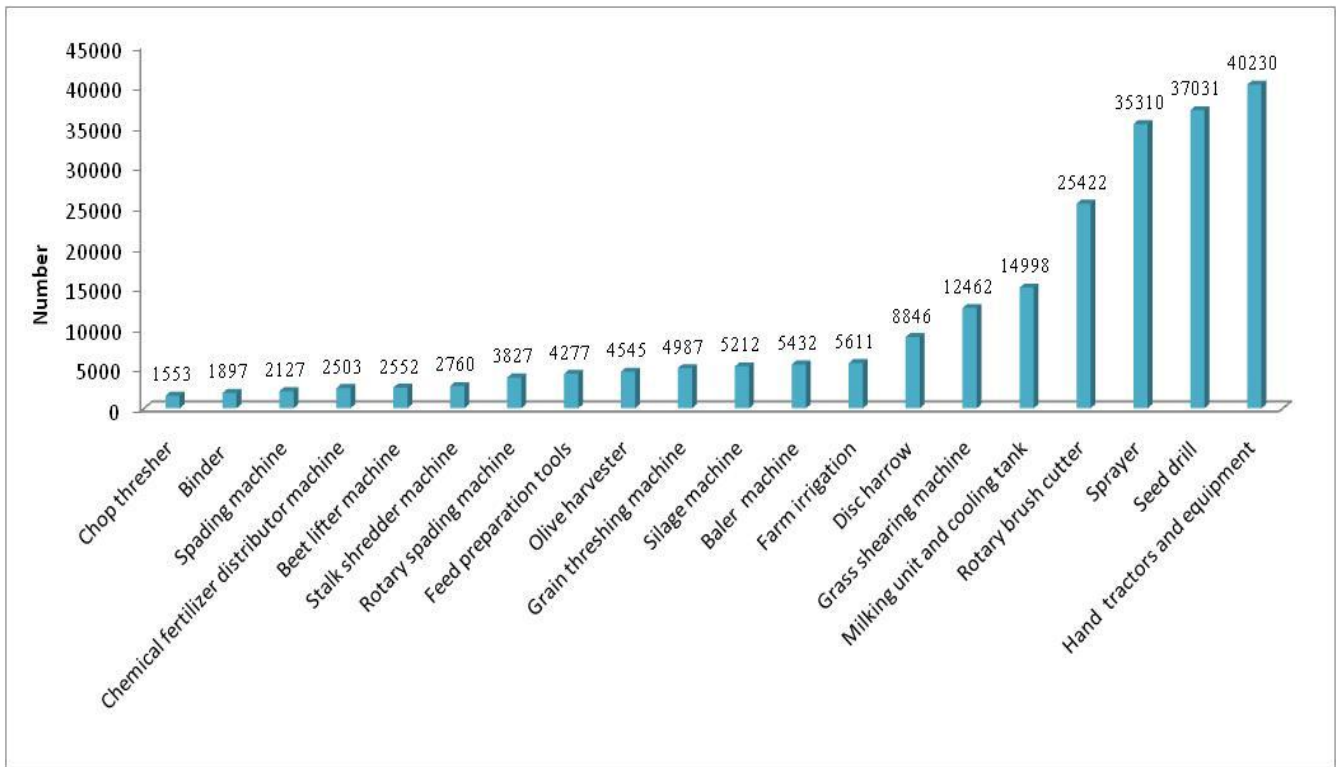


Figure 2.1500-40250 between machine and equipment numbers [5]

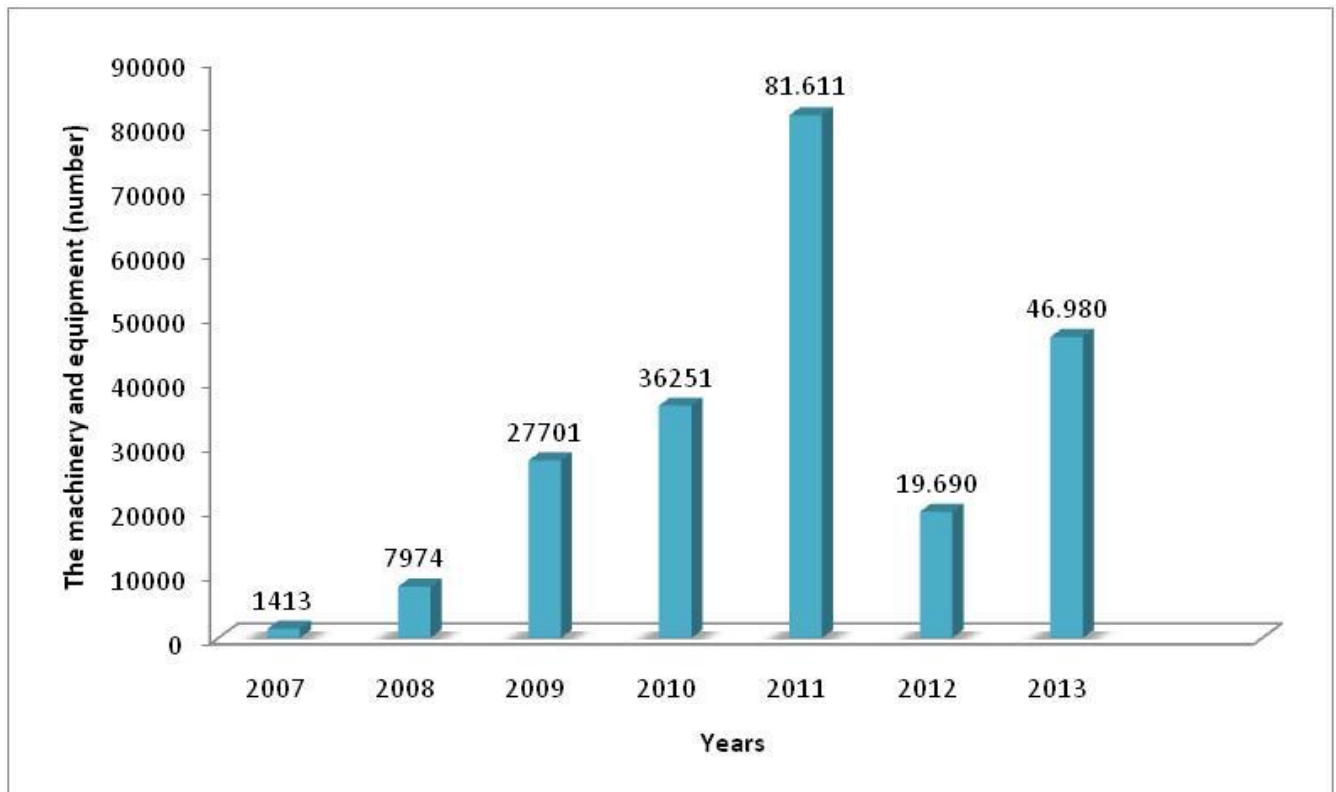


Figure 3.The annual change in the number of the machines bought under the grant scheme [5]

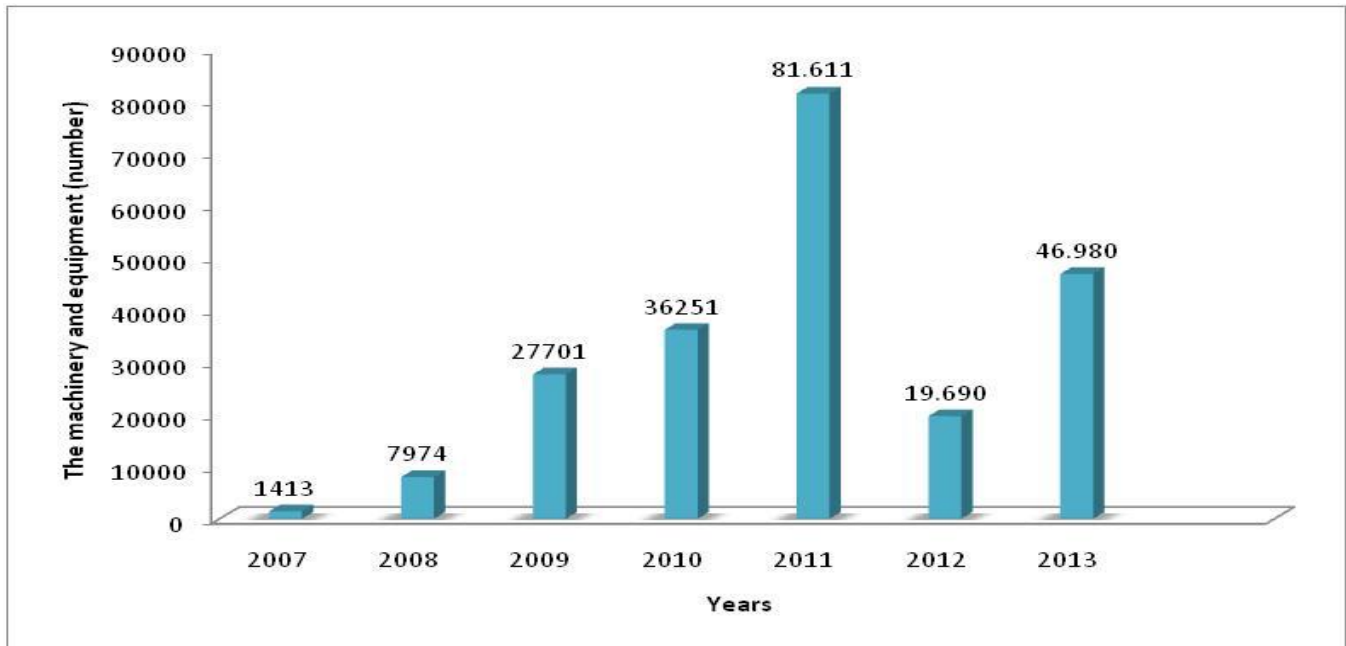


Figure 4. The annual grant assistance amounts, paid by the state for the tool-machines under the grant scheme

According to TUIK data's, the number of tools and machines popularly used in agriculture (excluding harvester and tractor) is 83 [7]. During the period of 2007-2013, there were a maximum of 41 types of agricultural tools and machines in Turkey, which have been included to the 50% grant scheme by the Ministry of Food, Agriculture and Livestock. The park

renewal rate (PYO) of some tools and machines, which have been purchased under the grant scheme and whose annual statistics are being kept by TUIK, is given in Table 2. According to Table 2, between the years of 2006 and 2013, park renewal rate for some agricultural tool and machines has ranged between 12.13% and 78.41%.

Table 2. Park renewal rate for some agricultural tool and machines

Equipment and Machinery	2006	2013	PYO (%)
Stubble direct seed drill	637	1046	39.10
Baler machine	10185	18024	43.49
Binder	4950	8468	41.54
Grass shearing machine	46213	73314	36.97
Disc Harrow	191360	232278	17.62
Chemical fertilizer distributor machine	334461	389918	14.22
Soil levelling equipment	15515	17657	12.13
Seed drill	164524	202915	18.92
Rotary brush cutter	14034	65013	78.41
Cotton picking machine	349	950	63.26
Beet lifter machine	10400	15125	31.24
Potato lifter machine	16243	19756	17.78
Sprayer	245311	312651	21.54
Stalk shredder machine	13881	17889	22.40
Chop thresher	12942	16445	21.30
Silage machine	9734	21887	55.53
Milking unit and cooling tank	5763	8182	29.56
Farm irrigation	160629	318413	49.55
Stone picker machine	410	990	58.59
Rotary spading machine	36601	46716	21.65
Feed preparation tools	19957	25891	22.92

Park renewal rate with the agricultural tool and machines was the highest in rotary brush cutter with 78.41%, and the lowest rate was in soil levelling equipment with 12.13%. Some agricultural tools and machines, which have been purchased under the grant scheme between the years 2007 and 2013, and

the rate of the grant contribution for the tools and machines in those years has been given in Table 3. The grant assistance rate for these renewed tool and equipments was the lowest for field irrigation by a rate of 4.14%, and highest for the milking unit, by a rate of 616.44%.

Table 3. The rate of the grant contribution for the tools and machines in 2007-2013

Tools and machines	2007	2013	Renewed tool and equipments (number)	Assistance tool and equipments (number)	Grant assistance rate (%)
Baler machine	10998	18024	7026	5432	77.31
Binder	5039	8468	3429	1897	55.32
Grass shearing machine	50669	73314	22645	12462	55.03
Disc harrow	198548	232278	33730	8846	26.23
Chemical fertilizer distributor machine	339461	389918	50457	2503	4.96
Soil levelling equipment	16471	17657	1186	319	26.90
Seed drill	169695	202915	33220	37031	111.47
Rotary brush cutter	17400	65013	47613	25422	53.39
Cotton picking machine	500	950	450	161	35.78
Beet lifter machine	10845	15125	4280	2552	59.63
Potato lifter machine	16802	19756	2954	1070	36.22
Sprayer	255582	312651	57069	35310	61.87
Stalk shredder machine	14933	17889	2956	2760	93.37
Chop thresher	12980	16445	3465	1553	44.82
Silage machine	11998	21887	9889	5212	52.71
Milking unit and cooling tank	5749	8182	2433	14998	616.44
Farm irrigation	182991	318413	135422	5611	4.14
Stone picker machine	416	990	574	571	99.48
Rotary spading machine	37604	46716	9112	3827	42.00
Feed preparation tools	21435	25891	4456	4277	95.98

#### IV. CONCLUSION AND SUGGESTIONS

Our country has achieved noticeable developments in terms of agricultural mechanization, however, she was still unable to create opportunities for the usage of production technologies, which are required for our agricultural production to develop and become sustainable in the global competitive environment. With this purpose, under the name of "Machine and Equipment Purchasing Project", 221620 units of machine-equipment and 822120340 million TL (387971990,6 \$ ) worth of grant assistance was provided to producers in 81 provinces, between the years of 2007 and 2013. Regarding the agricultural machines which have been included to the 50% grant by the Ministry of Food, Agriculture and Livestock, the machine-equipment assistance numbers were as follows: 1413 units in 2007, 7974 units in 2008, 27701 units in 2009, 36251 units in 2010, 81611 units in 2011, 19690 units in 2012, and 46980 units in 2013.

In this study, 20 different types of tool and machines of 83 tool and machines with TÜİK statistic data, excluding combine harvester and tractor, have been evaluated. Following the evaluation, it has been determined that the effect of the grant assistance on agricultural mechanization is between 4.14% and 616.44%. Thanks to the machine and equipment

assistance which have been into the 50% grant scheme since 2007 by the Republic of Turkey Ministry of Food, Agriculture and Livestock, we had the opportunity to renew our old machine park. This machine-equipment assistance has naturally given an important economic and technologic momentum to the agriculture machines production industry.

Under the Scope of the Program on Assisting Rural Development Investments, the Machine and Equipment Purchase Assistance Program has been put into force with the purpose of enhancing the agricultural sector in terms of the much needed agricultural tools and machine infrastructure, improving income and social standards, and also, promoting and generalizing the new technologies developed for agricultural activities; in order to ensure higher quality production which meet the market demands, to simplify the heavy working conditions of our producers, and to reduce production costs in order to be more competitive at the international stage, by financing the purchase of certain agricultural machine and equipment at rural zones, [8]. It is highly important for the grant assistance programme to continue, as it is vital for Turkey's agriculture.

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