Projection of Technology Equipment Usage in Agriculture in Turkey

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Abstract

Agricultural mechanization is the most critical factor that provides effective usage of agricultural inputs. In order to increase the technical efficiency in mechanization. Organization quality and mechanization operation need to be increased. In this study, it was aimed to determine the projection of the usage of technology equipment in agriculture in Turkey. Projection coefficients were calculated based on past ten years production and usage amounts of the technology equipment used in agriculture. Next ten year projections of technology equipment used in agriculture in Turkey have been determined in line with the increase or decrease of the projection coefficients. Within this framework, the projections of 40 agricultural machinery equipment widely used in Turkey are taken into consideration and the usage projection of these tools and machines are determined. It has been concluded that the projections of 35 technology tools and machines technology used in agriculture in Turkey will increase up to 2026 in accordance with determining positive projection coefficients and 5 tools and machines usage in agriculture will decrease in line with determining negative projection coefficients.

Key words: Turkey, agricultural machinery, mechanization, projection.

Introduction

Agricultural Mechanization is an agricultural machinery sector, aims to make the agricultural areas healthier, to increase the diversity of agricultural production and to use agricultural products more effectively and variously and in this
respect. Agricultural Mechanization can be defined as one of the sub-sectors of the manufacturing sector which produces, manufactures, develops, and markets, sells and manages many different mechanical designs (Anonymous, 2017a). The most important indicators that define the degree of agricultural mechanization of a country are the quantitative and qualitative status of the tractor park, the development according to years, the relation with agricultural machinery, the density and the level of power in unit farming (Evci et al., 2010).

Agricultural mechanization is the field that covers the utilization of tools, instruments and machines for agricultural land development, harvesting, product production, storage and farm processing. Power sources used in agriculture can be classified under three main terms, namely; human, animal and mechanic. Within this framework, it is important to understand how farm mechanization inputs can be provided efficiently and effectively. To do that the production, distribution, repair, maintenance, management and utilization of agricultural equipment, appliances and machinery must be understood clearly (Banaeian and Zangeneh, 2011).

The use of machinery in agriculture, unlike other agricultural technological applications, allows the use of new production methods in rural areas, but does not directly affect the productivity increment. This improves the efficiency and economic coverage of other technological applications and improves working conditions. Thus, to ensure higher productivity in agricultural mechanization equipment that utilized must provide the use of appropriate technologies opportunities (Saral et al., 2000).

Turkey is above the world average of agricultural mechanization with regard to the conditions that determines the current standards. However, in order to increase the current production and productivity level, it is necessary to raise the demand for agricultural production significantly in this area. In addition, determination of agricultural mechanization level according to Turkey per regions, would make it possible to increase the diversity of the machinery park as well as more efficient of tractors and other agricultural machinery (Altuntaş and Demir, 2004).

The agricultural sector, as in all developing countries, is the basis of the national economy in our country. When the sectoral distribution of employment is viewed, it is seen that approximately 20.9% of the total employment is working in the agricultural sector according to the data of July of 2017 (Anonymous 2017b). A strong agricultural equipment and machinery sector has been formed as a result of such a large agricultural sector in Turkey (Anonymous 2017b). Within the scope of this study, the projection of the usage of some technological farmer equipment, of which farmers used intensively in agriculture sector of Turkey, has been determined.

Material and Methods
The material data of the study, agriculture tools and machines data for the years 2007-2016, are obtained from Turkey Statistics Institution (Anonymous 2017c). By taking ten years (2007-2016) production and usage amounts of agricultural machinery into consideration in Turkey, percentage ratios of increase and decrease in numbers are calculated and then the average coefficients of these percentage ratios are determined. Depending on the number of machines belonging to the previous years, the coefficients determined for that machine as mentioned above and the projections of the agricultural equipment and machines until 2026 are calculated by using the same calculation method as in ref. (Demir and Kuş 2016).

Positive gain of the projection coefficient means an increase in the number of available instruments and machines while a negative gain result means a decrease for same equipment that are taken into consideration (Demir 2013; Demir and Kuş 2016).

Results and Discussions
Processing of the soil in accordance with the technique of the soil by means of the soil cultivation tools and machines facilitates the growth, ripening and fruitfulness of the plants. In line with this objective, soil cultivation equipment and machines are widely used in Turkey. The past years change numbers and the projection coefficients of some tillage machines and machinery commonly used in Turkey calculated according to past ten years production and usage amounts are given in Table 1 and Table 2. Moreover, the projection coefficients with other information mentioned above for the sowing-planting and fertilizing machines, harvesting machines, spraying machines and tractor & trailer with silage, mowing and baling machines are shown in Table 3, Table 4, Table 5 and Table 6 respectively.

When Table 1 is examined, it can be seen that the highest projection coefficient is occurred in case of subsoiler with 4.66 % among those reviewed and usage numbers of this equipment is raised from 23.708 to 36.515 for 2007 and 2016. It is possible to say that with the projection coefficient of 4.66%, the subsoiler will rise to 57.591 units in 2026. When other soil cultivation
equipment and machines are examined, it is quite obvious to say that disc harrows, furrow opener plough, disc type tractor plough and disc type stubble plough have positive projection coefficients with percent of 2.23, 1.23, 0.94 and 0.92 respectively. On the other hand, when 2007 and 2016 usage units are compared, wooden plow and toothed harrow have a decreasing trend resulting in negative projection coefficients with percent of 10.44 and 0.34 respectively.

The projection coefficients, calculated according to past years data, of another group of soil cultivation equipment and machines are given in Table 2. When this table is examined it is obvious to say that the highest projection coefficient with positive percent of 4.85 value is occurred in case of stubble plough (moldboard type) among those taken into consideration. Rototiller, rotary cultivator, cultivator, land roller and mouldboard type tractor plough are followed stubble plough with positive projection coefficient value of 4.10%, 3.79%, 1.58%, 1.58% and 0.77% respectively. Furthermore, harrow combination (combicurum) has negative projection coefficient with a percent of 0.29. Projection units of soil cultivation equipment and machines, which can be seen in Table 2, are calculated according to those percentage averages for 2017 to 2026 year.

Table 1. Projections of some soil cultivation equipment and machines widely used in Turkey

| Soil cultivation equipment and machines (1) | Subsoiler | Disc type stubble plough (one way) | Disc harrows | Disc type tractor plough | Toothed harrow | Furrow opener plough | Wooden plow |
|-------------------------------------------|-----------|-----------------------------------|--------------|--------------------------|----------------|---------------------|-------------|
| 2007                                      | 23708     | 41725                             | 198548       | 66491                    | 355991         | 60475               | 84304       |
| 2008                                      | 24654     | 41964                             | 204665       | 66933                    | 353128         | 61198               | 77175       |
| 2009                                      | 26150     | 42280                             | 205804       | 67838                    | 348587         | 61456               | 68463       |
| 2010                                      | 27688     | 43642                             | 213909       | 67954                    | 351866         | 63926               | 58695       |
| 2011                                      | 27541     | 43251                             | 221884       | 67452                    | 350406         | 64402               | 51889       |
| 2012                                      | 29054     | 44220                             | 229761       | 68332                    | 350968         | 66664               | 49543       |
| 2013                                      | 30401     | 44387                             | 232278       | 68773                    | 343906         | 66791               | 49565       |
| 2014                                      | 32568     | 45405                             | 235594       | 70701                    | 341050         | 66150               | 40695       |
| 2015                                      | 35132     | 45002                             | 240303       | 71829                    | 343954         | 66879               | 37455       |
| 2016                                      | 36515     | 45365                             | 243310       | 72448                    | 345533         | 68117               | 34643       |

The past ten years production and usage amounts, rates of change in previous years and the projection coefficients, which are calculated according to these numbers, of some 4 kinds of sowing, 2 kinds of fertilization and 1 kind of planting equipment widely used in Turkey are in...
shown in Table 3. Projection coefficients of all equipment seem to be positive and the highest one is occurred in case of manure spreading machinery with the percent of 8.47. When types of sowing machines in Table 3 are examined, it is seen that stubble drill tool was 690 units in 2007 and then it reached 1292 units in 2016. With the 5.94% projection coefficient stated in the table, it can be seen that the stubble drill tool will raise 2301 units by 2026 year. Besides, when other projection coefficients of other sowing machines in Table 3 are viewed, it can be seen that pneumatic precision drill has 5.23%, tractor-drawn seed drill has 3.51% and combined seed drill has 2.40% projection of coefficient.

Furthermore, planting machines projection coefficient is calculated as 0.84%. Based on this calculation, it is anticipated that the planting machines will be 9879 units in 2026. From Table 3, it is possible to say that, the stubble drill tool will raise 2301 units by 2026 year. Besides, when other projection coefficients of other sowing machines in Table 3 are viewed, it can be seen that pneumatic precision drill has 5.23%, tractor-drawn seed drill has 3.51% and combined seed drill has 2.40% projection of coefficient.

### Table 2. Projections of other soil cultivation equipment and machines widely used in Turkey (Table 1 Continued)

| Soil cultivation equipment and machines (2) | Harrow combination (Cultivacurum) | Stubble plough (moldboard type) | Cultivator | Mouldboard type tractor plough | Land roller | Rotary cultivator | Rototiller |
|---------------------------------------------|-----------------------------------|---------------------------------|------------|--------------------------------|------------|-----------------|-----------|
| 2007                                        | 24891                             | 28304                           | 451214     | 986291                         | 75682      | 37604           | 9584      |
| 2008                                        | 24984                             | 29411                           | 457711     | 996013                         | 77445      | 38937           | 9807      |
| 2009                                        | 24600                             | 33791                           | 466727     | 1002734                        | 77294      | 40739           | 10297     |
| 2010                                        | 25971                             | 36797                           | 479972     | 1014188                        | 81094      | 41685           | 10760     |
| 2011                                        | 26029                             | 37752                           | 488802     | 1025892                        | 82100      | 42649           | 11080     |
| 2012                                        | 24840                             | 39834                           | 500126     | 1041903                        | 83033      | 43972           | 11640     |
| 2013                                        | 24495                             | 39909                           | 503786     | 1045122                        | 83487      | 46716           | 11942     |
| 2014                                        | 23555                             | 42483                           | 508218     | 1046048                        | 84819      | 50100           | 12870     |
| 2015                                        | 23881                             | 44151                           | 515172     | 1050237                        | 86139      | 51860           | 13443     |
| 2016                                        | 24352                             | 44579                           | 520970     | 1057870                        | 87374      | 53301           | 13978     |
| Change rates over years                     |                                    |                                 |            |                                |            |                 |           |
| 2007-2008                                   | 0.37                              | 3.76                            | 1.42       | 0.98                           | 2.28       | 3.42            | 2.27      |
| 2008-2009                                   | -1.56                             | 12.96                           | 1.93       | 0.67                           | -0.20      | 4.42            | 4.76      |
| 2009-2010                                   | 5.28                              | 8.17                            | 2.76       | 1.13                           | 4.69       | 2.27            | 4.30      |
| 2010-2011                                   | 0.22                              | 2.53                            | 1.81       | 1.14                           | 1.23       | 2.26            | 2.89      |
| 2011-2012                                   | -4.79                             | 5.23                            | 2.26       | 1.54                           | 1.12       | 3.01            | 4.81      |
| 2012-2013                                   | -1.41                             | 0.19                            | 0.73       | 0.31                           | 0.54       | 5.87            | 2.53      |
| 2013-2014                                   | -3.99                             | 6.06                            | 0.87       | 0.09                           | 1.57       | 6.75            | 7.21      |
| 2014-2015                                   | 1.37                              | 3.78                            | 1.35       | 0.40                           | 1.53       | 3.39            | 4.26      |
| 2015-2016                                   | 1.93                              | 0.96                            | 1.11       | 0.72                           | 1.41       | 2.70            | 3.83      |
| Projection coefficient (%)                  | -0.29                             | 4.85                            | 1.58       | 0.77                           | 1.58       | 3.79            | 4.10      |

When the projection coefficients of the various fertilizer machines in Table 3 are further examined, it is seen that manure spreading machinery has 8.47% while fertilizer broadcaster machine has 2.04% value. The projection coefficients calculated according to past years predicts that manure spreading machinery and fertilizer broadcaster machines will increase to 500.137 and 15.158 units in 2026 year respectively.

When the projection coefficients of the various fertilizer machines in Table 3 are further examined, it is seen that manure spreading machinery has 8.47% while fertilizer broadcaster machine has 2.04% value. The projection coefficients calculated according to past years predicts that manure spreading machinery and fertilizer broadcaster machines will increase to 500.137 and 15.158 units in 2026 year respectively.
Table 4 that the units of combine harvester was 12,775 in 2007 year in Turkey and this number reached to 16,247 units in 2016. It is possible to say that the number of combine harvesters in Turkey will rise to 21,063 units in 2026 year with help of calculated 2.63% projection coefficient in Table 4.

### Table 3. Projections of some sowing-planting and fertilizing machines widely used in Turkey

| Sowing-planting and fertilizing machines | Stubble drill | Combined seed drill | Tractor-drawn seed drill | Pneumatic precision drill | Manure spreading machinery | Fertilizer broadcaster | Transplanter (transplanting machinery) |
|-----------------------------------------|---------------|---------------------|-------------------------|--------------------------|----------------------------|-----------------------|--------------------------------------|
| Years                                   |               |                     |                         |                          |                            |                       |                                      |
| 2007                                    | 690           | 169695              | 101633                  | 22048                    | 339461                     | 12900                 |                                      |
| 2008                                    | 743           | 173654              | 106533                  | 22919                    | 346471                     | 12960                 | 1967                                 |
| 2009                                    | 814           | 179048              | 111049                  | 23165                    | 354973                     | 13016                 | 2223                                 |
| 2010                                    | 633           | 187459              | 117276                  | 25390                    | 366781                     | 13270                 | 2282                                 |
| 2011                                    | 736           | 196147              | 119889                  | 27153                    | 371771                     | 13036                 | 2508                                 |
| 2012                                    | 860           | 199640              | 128675                  | 29377                    | 385149                     | 13391                 | 2519                                 |
| 2013                                    | 1046          | 202915              | 131471                  | 30921                    | 389918                     | 13894                 | 2915                                 |
| 2014                                    | 1209          | 205286              | 134786                  | 32048                    | 392908                     | 14145                 | 3628                                 |
| 2015                                    | 1257          | 208403              | 136846                  | 34589                    | 399451                     | 14188                 | 4090                                 |
| 2016                                    | 1292          | 211348              | 140329                  | 35850                    | 408737                     | 13939                 | 4382                                 |

### Change rates over years

| Change rates over years | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Projection coefficient (%) | 5.94      | 2.40      | 3.51      | 5.23      | 2.04      | 0.46      | 1.47      | 11.52     | 5.59      |

### The projections

Projection coefficients of other harvesting machines commonly used in Turkey are calculated as positive percent of 32.66, 6.44, 5.57, 5.17, 4.95 and 1.07 for harvesting machinery (fruit), binder, maize harvester, complete beet harvester, combine potato harvester and hazelnut thresher respectively. In case of thresher, negative projection coefficient of 1.70% is calculated due to decreasing trend of units between in 2007 and 2016 years.

Spraying machines are widely used to protect the agricultural production and storage of obtained product against diseases, harms and adverse effects of weeds (Anonymous 2017d). Referring Table 5, PTO (Power take off shaft) driven sprayer units was 255,582 in 2007 and reached to 338,625 in 2016. It is possible to say that with the 2.63% projection coefficient calculated from given numbers of covered years, PTO driven sprayer will rise to 458,190 units in 2026 year. Furthermore, projection coefficients of other widely used spraying equipment and machinery in Turkey have an increasing trend and are calculated as 2.29%, 1.66% and 0.83% for engine driven sprayer, atomizer and knapsack sprayer respectively. Besides, due to decreasing trend of barrow duster and combine sprayer units between in 2007 and 2016 years, projection coefficient has found to be negative.
Tractors can be described as self-propelled force machine used in agricultural activities wheeled, tracked or both present together. The tractor, which means drawing something, is a French word and they are being used extensively not only for drawing purposes but also for pulley, power take-off, loading and unloading objectives (Anonymous 2017e).

Table 4. Projections of some harvest-threshing machines widely used in Turkey

| Harvest-threshing machines | Combine harvester | Binder | Thresher | Complete beet harvester | Combine potato harvester | Harvesting machinery (fruit) | Hazelnut thresher | Maize Harvester |
|----------------------------|-------------------|--------|----------|-------------------------|-------------------------|-----------------------------|------------------|----------------|
|                            | 2007              | 2008   | 2009     | 2010                    | 2011                    | 2012                        | 2013             | 2014           | 2015 |
|                            | 12775             | 13084  | 13360    | 13799                   | 14313                   | 14813                       | 15486            | 15899          | 15998 |
|                            | 5039              | 6107   | 6139     | 6451                    | 6987                    | 7409                        | 8468             | 8882           | 9210 |
|                            | 194847            | 192440 | 190856   | 187978                  | 188153                  | 185327                      | 181320           | 173555         | 170836 |
|                            | 3593              | 3716   | 3932     | 4271                    | 4590                    | 4921                        | 5288             | 5448           | 5593 |
|                            | 608               | 612    | 630      | 766                     | 811                     | 839                         | 902              | 993            | 924  |
|                            | 320               | 510    | 647      | 1535                    | 2522                    | 4119                        | 6655             | 8117           | 10556 |
|                            | 5315              | 5409   | 5276     | 5309                    | 5362                    | 5474                        | 5621             | 5616           | 5687  |
|                            | 677               | 726    | 749      | 863                     | 915                     | 987                         | 1019             | 1030           | 1043  |

By reviewing Table 6, it can be seen that the tractor units was 1.056.128 in 2007 year and rise up to 1.273.531 in 2016 year. It is possible to say that the number of tractors in Turkey will increase to 1.560.252 in 2026 with 2.05% projection coefficient calculated from data of past ten years units. In case of trailers (agricultural cars) used together with tractors generally, it is seen that the units of trailers was 1.026.389 in 2007 year and rose up to 1.137.709 in 2016 year. It can be calculated that the projection coefficient of ten years average for trailer (agricultural car) is 1.14% and by using this projection it is obvious to say that the agricultural car in Turkey will increase to 1.273.763 in 2026. Furthermore, the calculated projection coefficients of the other agricultural equipment in Table 6 are: 8.31% for corn forage harvester (Silage maize), 7.16% for Baler, 6.48% for forage harvester (Haysilage) and 5.29% for tractor drawn mower. 

Projection coefficients of agricultural equipment and machines are given in Figure 1. When Figure 1 is examined in detail, it can be seen that harvesting machinery (fruit) has the biggest projection coefficient among all equipment considered. Besides it can be predicted that, wooden plow, toothed harrow, thresher and barrow duster and combine sprayer units will decrease by 2026 year because of negative
The projection coefficient calculated by data units of past ten years.

**Figure 1.** Projection Coefficient of agricultural equipment and machines widely used in Turkey

**Table 5.** Projections of some spraying equipment and machinery widely used in Turkey

| Spraying equipment and machinery | Engine driven sprayer | PTO driven sprayer | Barrow duster and combine sprayer | Atomizer | Knapsack sprayer |
|--------------------------------|-----------------------|--------------------|-----------------------------------|----------|------------------|
|                                 | 2007                  | 2008               | 2009                              | 2010     | 2011             |
|                                 | 2007                  | 71015              | 72171                             | 72494    | 73745            |
|                                 | 2008                  | 71715              | 72442                             | 75945    | 78151            |
|                                 | 2009                  | 72474              | 72494                             | 78151    | 80457            |
|                                 | 2010                  | 73176              | 75945                             | 78151    | 80457            |
|                                 | 2011                  | 73974              | 77876                             | 77876    | 80457            |
|                                 | 2012                  | 74794              | 79752                             | 79752    | 80457            |
|                                 | 2013                  | 75614              | 81631                             | 81631    | 80457            |
|                                 | 2014                  | 76445              | 83545                             | 83545    | 80457            |
|                                 | 2015                  | 77276              | 85475                             | 85475    | 80457            |
|                                 | 2016                  | 78107              | 87486                             | 87486    | 80457            |
|                                 | 2007-2008             | 1.60               | 1.50                              | 0.60     | 0.16             | 0.47 |
|                                 | 2008-2009             | 0.45               | 1.87                              | -0.80    | 1.47             | -0.35|
|                                 | 2009-2010             | 1.70               | 5.14                              | 1.64     | 6.83             | 0.48 |
|                                 | 2010-2011             | 2.85               | 4.37                              | -1.20    | 0.79             | 1.02 |
|                                 | 2011-2012             | 2.87               | 4.52                              | 1.98     | 0.69             | 1.47 |
|                                 | 2012-2013             | 2.87               | 2.35                              | 0.15     | 2.02             | 1.02 |
|                                 | 2013-2014             | 4.32               | 2.96                              | -3.72    | -0.68            | 1.70 |
|                                 | 2014-2015             | 2.19               | 2.30                              | -8.48    | 0.76             | 0.78 |
|                                 | 2015-2016             | 1.73               | 2.62                              | 0.55     | 2.92             | 0.87 |
|                                 | **Projection coefficient (%)** | **2.29** | **3.07** | **-1.84** | **1.66** | **0.83** |

**The projections**

- 2017: 89485, 349021, 12566, 122404, 638845
- 2018: 91531, 359736, 12335, 124400, 644136
- 2019: 93623, 370781, 12108, 126509, 649471
- 2020: 95762, 382164, 11885, 128613, 654849
- 2021: 97951, 393897, 11667, 130751, 660273
- 2022: 100190, 405990, 11452, 132926, 665741
- 2023: 102479, 418454, 11241, 135136, 671255
- 2024: 104822, 431301, 11034, 137383, 676814
- 2025: 107217, 444542, 10831, 139668, 682419
- 2026: 109668, 458190, 10632, 141990, 688071
**Table 6.** Projections of some tractor & trailer/mower & balers and silage machines widely used in Turkey

| Tractor & trailer / mower & balers and silage machines | Years   | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---------------------------------------------------------|---------|------|------|------|------|------|------|------|------|------|------|
| Tractor                                                 | 1026389 | 1036613 | 1041239 | 1061656 | 1074764 | 1126166 | 1137709 | 1150633 | 1163705 | 1176924 | 1190294 |
| Trailer                                                 | 1056128 | 1070746 | 1073538 | 1096683 | 1125001 | 1260358 | 1273531 | 1299655 | 1326315 | 1353521 | 1381286 |
| Corn forage harvester (silage maize)                    | 11998   | 14000 | 15287 | 16627 | 18507 | 19988 | 21887 | 24486 | 24886 | 25370 | 26347 |
| Forage harvester (hay/silage)                           | 2853    | 3087  | 3156  | 3471  | 3778  | 3917  | 4248  | 4674  | 4714  | 4908  | 5227  |
| Tractor drawn mower                                     | 10998   | 11839 | 12613 | 13303 | 14524 | 15887 | 18024 | 19459 | 20446 | 21520 | 22508 |
| Baler                                                   | 50669   | 54072 | 55762 | 61248 | 66193 | 68579 | 73314 | 79115 | 81480 | 82899 | 86476 |

| Change rates over years                                  |        | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 | 2011-2012 | 2012-2013 | 2013-2014 | 2014-2015 | 2015-2016 |
|---------------------------------------------------------|--------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Years                                                   |        | 0.99       | 0.44       | 1.92       | 1.22       | 2.20       | 0.98       | 1.02       | 0.43       | 1.01       |
| Trailer                                                 |        | 1.37       | 0.26       | 2.11       | 2.52       | 4.52       | 2.91       | 2.39       | 1.35       | 1.03       |
| Corn forage harvester (silage maize)                    |        | 14.30      | 8.42       | 8.06       | 10.16      | 7.41       | 8.68       | 10.61      | 3.48       | 3.71       |
| Forage harvester (hay/silage)                           |        | 7.58       | 2.19       | 9.08       | 8.41       | 3.55       | 7.97       | 9.11       | 4.77       | 6.10       |
| Tractor drawn mower                                     |        | 7.10       | 6.14       | 5.19       | 8.58       | 8.96       | 11.86      | 7.37       | 4.83       | 4.99       |
| Baler                                                   |        | 6.29       | 3.03       | 8.96       | 3.48       | 3.03       | 6.46       | 7.33       | 2.90       | 1.71       |

| Change rates over years                                  | Projections coefficient (%) |
|---------------------------------------------------------|-------------------------------|
| Years                                                   |                               |
| 2007-2008                                               | 1.14                          |
| 2008-2009                                               | 2.05                          |
| 2009-2010                                               | 8.31                          |
| 2010-2011                                               | 6.48                          |
| 2011-2012                                               | 5.29                          |
| 2012-2013                                               | 7.16                          |
| 2013-2014                                               |                               |
| 2014-2015                                               |                               |
| 2015-2016                                               |                               |

**Conclusion**

There are 4 basic elements of agricultural mechanization. These are people, environment, tractors and agricultural machinery. Strategic planning of agricultural mechanization can be described as the optimization of these four basic elements to minimize the costs of agricultural mechanization (Anonymous 2017f). Mechanization equipment, which are utilized to achieve the goal of basic agricultural jobs, constitutes 30-60% of agricultural production costs depending on the product type and manufacturing technique (Dilay and Ozkan, 2007).

In this study, the utilization projections of 40 agricultural machines extensively used in Turkey are taken into consideration. In Turkey, the projection of technology utilization of 35 tools or machines in agriculture will increase by 2026 year in the direction of obtaining the positive projection coefficients and the projection coefficients of 5 tools or machines determined to be negative which projects a decrease in the units of these tools and machines.

The low level utilization of technology equipment result low projection values in agriculture also suggests that the usage of machinery in Turkey is low. For that reason, the main purpose should be to disseminate agricultural technology applications and increase awareness of increasing agricultural production.
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