

# **An Evaluation on Classification Maps in Project Applications of Land Arrangement in Turkey**

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**Key Words:** Land Arrangements, Classification Maps, Distribution

## **SUMMARY**

Today, one of the most important problems our country has ever faced is the rapid increase in population and having limited lands which is to respond agricultural needs of the increasing population. It is necessary to investigate to get more production from the limited lands and take measurements to improve agricultural content.

One of the most important applications of agricultural development in Turkey is land arrangement. In our country, taking the applications into investment program is a phenomenon itself. For that reason, it is necessary for the preparations of the projects which are taken into the programs to be done and applied rapidly. Correctness of the first information is very important in solving the problem. Project factors are obtained according to the first data. The classification maps are one of the most important project factors. Classification maps are one of the main criterions in distribution of parcels that are made after project.

In this paper, problems occurred from classification maps in land arrangements and solutions will be studied.

# Türkiye’ de Kırsal Alan Düzenlemesi Proje Uygulamalarında Derecelendirme Haritaları Üzerine Bir Değerlendirme

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**Anahtar Kelimeler:** Kırsal Alan Düzenlemeleri, Derecelendirme Haritaları, Dağıtım

## ÖZET

Bugün ülkemizin karşılaştığı en önemli sorunlardan birisi hızlı nüfus artışı ve artan nüfusun tarımsal ihtiyacını karşılayacak toprakların sınırlı olmasıdır. Bu sınırlı arazilerden daha fazla verim alabilme yollarının araştırılması ve tarımsal yapının ıslahı için gerekli tedbirler alınması gerekmektedir.

Türkiye’de tarımsal kalkınmanın en önemli uygulamalarından bir tanesi de kırsal alan düzenlemeleridir. Ülkemizde bu uygulamaların yatırım programına alınması başlı başına bir olaydır. Bu nedenle yatırım programlarına alınan bu projelerin tüm hazırlıklarının yapıp çok hızlı bir şekilde uygulamaya geçirilmesi gerekmektedir. Projelerin çözümünde ilk bilgilerin doğruluğu çok önemlidir. İlk bilgilerden elde edilen verilere dayanılarak bir takım proje faktörleri elde edilmektedir. Bu proje faktörlerinin en önemlilerinden biride derecelendirme haritalarıdır. Derecelendirme haritaları proje sonrası oluşacak yeni parsellerin dağıtımında ana etken kriterlerden biri olmaktadır. Bu çalışmada kırsal alan düzenlemelerinde, derecelendirme haritalarından kaynaklanan sorunlar ve çözüm önerileri üzerinde durulacaktır.

# An Evaluation on Classification Maps in Project Applications of Land Arrangement in Turkey

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## 1. INTRODUCTION

Today, Projects of Land Assembly in Turkey are performed according to “Turkish Civilized Law (TMK)”, “Land Assembly Regulations (ATT)” originated from the law about Topraksu organization and duties, **3083** numbered “Agriculture Reform Concerning Land Arrangement in Irrigation Areas” and “Application Regulations” and “Technical Instructions” connected with this law.

The land assembly procedures as one pleases in Turkey are valid by preparing 24.09.1979 date and 7/18231 numbered Land Assembly Regulations. This Regulation is used in performing the previous assigned works by binding to country private managements with 13.01.2005 date and 5286 numbered Law about abolishing Village Duties General Directory and making changes in some laws.

The soil evaluation essentials in Land Assembly projects according to Land Assembly Regulations are performed with respect to Land Assembly Instructions prepared by which they are based on 11 items of this regulation.

One of the most important components of Agricultural Improvement Programme in Turkey is the arrangements of rural areas. The rural area arrangements called as Land Assembly Procedure is giving in appropriate sizes including blocks designed with way and water connections by considering the parcel index of more than one parcel of Land owners in different places with different sizes. One of the most significant factors affecting the project in order to perform the Land assembly projects carefully is to determine the soil grades of parcels correctly. Determination of parcel index correctly will affect the time and economics of the project directly. Graduation procedures of the soil closely concern the owners of land. The owners of the parcels which are in the borders of assembly projects as a result of re-arrangement according to graduation results should neither profit nor be damaged.

Probable objective criterions should be considered while finding the Parcel Index (PE) of parcels in project region. The efficiency and situation of the soil should be evaluated correctly by good analyzing the physical and chemical structure of the soil. The truth ratios of these data as long as being high will affect positively the land assembly projects in point of economy and time (Erkan, 1985).

## **2. MAKING SOIL RESEARCH AND EVALUATION OF THE LAND, FORMATION OF EVALUATION**

### **Committee Members:**

Evaluation Committee in Land Assembly Procedures according to Land Assembly Regulations (ATT); it's formed of six members on the point of being an agriculture engineer as the president responsible for the project. The agriculture engineer of these members who is the president is responsible for the presidency of evaluation committee as well as for each step beginning from giving the work to contractor until the acceptance of it after project assigning in land assembly procedures. He/She follows the engineering services of the work and also carries out the construction works. One of the other members of the committee is an agriculture engineer being an expert in soil study procedures and an agriculture engineer being an expert in research procedures. Except these members, the mayor or mukhtar of this assembly land or any representative selected by them forms the two people who have good information about locations in project region and product planting types. The committee usually assembles, decides with vote majority and decision will be taken according to that of the president in case of vote equality.

The Evaluation Committee that forms the evaluation maps will reach different soil index values if frequent soil samples are not taken while putting forth soil index (TE) values for consideration after chemical analysis and this will upset the social justice balance in society by forming grade differences between fields. Furthermore, it'll be suitable for map engineer to take part in Evaluation Committee as a member in determination of location index which is active in parcel index calculation.

### **2.1. Taking Soil Samples, Making Research and Determination of Soil Index (TE)**

Sections of Land Assembly Zone are obtained. The locations of samples on these sections are determined. Generally, the zone is divided into equal and fitting gapped-squares and soil samples are taken from these places with 30-40 cm deep by using corkscrews and they are filled in numbered bags. These samples are carefully observed and analyzed in the laboratory. After evaluation of results of the analysis, the point of each factor is determined. The committee member, Soil research engineer evaluates according to the following factors while forming the soil index.

- A) Soil depth and profile group
- B) Upper soil structure
- C) Slope of the land
- X) Variable factors (Salinity, alkalinity, Drainage, stony, YON, MICROROLIYEF)

These A,B,C,X factors are each given points varying from zero to hundred. Under ideal conditions, these factors take hundred points over hundred. As the number and intensity of problems in restricting plant growth increase, the points relatively decrease.

## 2.2 Determination of Soil Index

After making detailed planned soil studies on ownership map, the soil group of each closed soil border, upper soil structure, slope of land and points of factors relating to other variable properties of soil are determined from "SOIL INDEX DETERMINATION TABLE" and soil index is calculated according to the following equation (TAKKA, 1993).

Soil Index (TE) = A\*B\*C\*X is the product of these factors. A point is given between 0-100.

## 2.3 Determination of Efficiency Index (V.E.)

The agriculture engineer responsible for efficiency observes the product, yield and productivity factors in assembly region. He/She determines the sample parcels in adequate numbers with different sizes, in different locations and distances according to the greatness of the project as good, medium, bad efficient ones in accordance with his/her experiences as well as soil properties and according to local traditions and efficiency abilities between parcels or land sections in the project region. In these sample parcels, the type of the product is evaluated by considering its efficiency. If required, the laboratory analysis values of soil samples taken from the region before can be used. The land except the sample parcels in the project region is given points between 0-10 in accordance with assembly regulations by comparing with sample parcels.

## 2.4 Determination of Location Index (K)

The Evaluation Committee will give points during evaluation in determining the location of parcels by considering its distance to city center, road connections, arrival state, its connection to irrigation system, the geometric shape of parcel, being near a stream. However, since this determination is very difficult for each parcel, circles of each 500 m are drawn being the city center as the center of the circle. 20 points is given to the first 500 m-circle and other circles are evaluated by descending points according to the committee. If this application becomes a problem between land owners, then it's required to provide adaptation between the grades of lands, to obtain the grade numbers as demanded so to take into consideration the advices and opinions of local committee members and land owners. This can be provided just by location point. Only one index point is given to location index between 0-20.

## 2.5 Calculation of the Parcel Indexes (PE)

Seventy percent of index (TE) obtained as a result of soil studies is taken, index points of efficiency and location are added and parcel index is determined.

Parcel Index (PE) = TE %70 + V + K

## 2.6 Evaluation Procedure

The parcels in project region belonging to real and legal people are graduated by considering the soil index, efficiency and the locations of parcels and the equation of each grade to other grades or its transformation is provided. 10 grades are suggested for agricultural parcels which are subject to assembly. According to the 4th item of Land Assembly Regulations, the

agricultural parcels are assembled beginning from 1st grade to 7th in their own and the ones between 8th and 10th grades are assembled in their own. The parcel grades are given in Table-1 according to parcel index values. The evaluation of parcels is done according to the following table showing the determined parcel index (Çay, 2001).

Grade	Parcel Index	Grade	Parcel Index
1	91-100	6	41-50
2	81-90	7	31-40
3	71-80	<b>8</b>	<b>21-30</b>
4	61-70	<b>9</b>	<b>11-20</b>
5	51-60	<b>10</b>	<b>0-10</b>

**Table 1.** Evaluation Table According to Parcel Index Value

## 2.7 Arrangement of Evaluation Map and Hanging of it

After determination of the efficiency index, soil index and location index in land assembly region, these values are marked with different coloured-lines on pafta having readable parcel numbers which show the land assembly region completely. Connecting ways, known stable facilities, the locations that the owners of fields know on the pafta are written. The scale of the pafta and its north sign should be specified. The names of Graduation Committee members and their appellations should be written on the appropriate site of the pafta.

Members of Graduation Committee examine this map, re-evaluate unsuitable grades and sign these maps when they come to an agreement. Three copies of these maps are prepared. The map related with the graduation of the parcels, list of ownership and the table indicating the equality of grades with each other are announced in anywhere in the village or on municipality board for fifteen days. Hanging and taking down are determined by a record. The announcement of map, list and table is also announced by usual means in the town or in the city center to which the village and the municipal are connected. The owners of land can demur for graduation map, list and table to the president of graduation committee with a written letter in 20 days beginning from the announcement. The committee decides about these objections in fifteen days. The decisions are declared in written to the concerned people. People can demor about this decision to ministry in ten days beginning from declaration date by project management. The graduation will become definite by the decision of ministry in thirty days. This decision will also be declared to the concerned people in the same way.

## 2.8. Application of Interview-based Model in the Formation of New Parcelation Map and the Effect of Parcel Index (PE)

The project area is first divided with roads and blocks between channels in land assembly project. The areas of cadastral parcels and block areas are multiplied with their grades and divided to one hundred and then parcel value number of all parcels and blocks is calculated

$$F * PE$$

$$F = \text{Parcel area}$$

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FIG Working Week 2007

Hong Kong SAR, China, 13-17 May 2007

$$\text{PDS} = \frac{\text{-----}}{100}$$

**PE=Parcel Index**  
PDS=Parcel Value Number

The Ratio of Arrangement Partnership Apportionment (DOPO) is calculated by these values as amount of deduction which will be applied to the parcels in the project area.

$$\text{DOPO} = \frac{(\text{KPDS}) - (\text{BDS}) - (\text{THDS})}{(\text{KPDS})}$$

(KPDS)= Sum of value numbers of Cadastral Parcels

(BDS) = Sum of Block value numbers

(THDS)= Sum of value numbers of places except registration

The net amount of parcels is found. Then the net amounts are determined which will be given to the plants.

After these procedures, the first preference is allocated by considering its grades according to the interview of number one plant in the medium of main window image with the order of plants in block distribution menu of computer. First allocation procedure is completed by taking the first demands of all plants into consideration. The parcelation procedure is completed block by block taking the advantage of parallel or perpendicular parceling out command by converting to areas according to PE of the area to which PDS values will be given.

### **3. PROBLEMS BASED ON THE FORMATION OF GRADUATION COMMITTEE MEMBERS**

Graduation committee as stated before includes six people. The agriculture engineer responsible for the project is not very effective in the formation of PE values but has an active role in formation of location index. This is due to positive or negative interventions of other members of the committee. Since there is no map engineer being expert on location subject, the required sensitivity cannot be illustrated. The person responsible for the project does not obey the criterions necessary for location index in order to provide the continuity of the project and to satisfy the members of local committee while determining the location index. If the parcel values are good or bad according to Soil Index and Efficiency values and if this is not supported by local committee members, the agriculture engineer responsible for the project equalizes the parcel grade by giving upper or lower values to location index in order to reach the values they say or to decrease. To do this equalization, the parcels close to residential places will be pointed as K =15 and the ones far away from residential places will be pointed as K = 17 points. Since the Soil Index and Efficiency Index obtained after chemical analysis are assumed as correct and unchangeable, Parcel Indexes that will not take the response of the plant owners by using location index are obtained. New parcelation plans are obtained with the values formed like this. The differences between grades are not too much while obtaining these parcelation plans. This causes decreasing or increasing in land in large amounts. This situation causes loss of shares of plants. If there is no objection against grade maps causing this will become definite and employments of members other than

agriculture engineer responsible for the project in the committee will end. The person responsible for the project will stay alone with these casualties

An engineer of the committee members responsible for study procedures gives the most effective value (70) for Parcel Index. This value arises as a result of chemical analysis of soil samples taken from the land. In order to take correct values, soil samples with adequate frequency and depth from assembly land should be taken. These engineers expert in their subjects cannot be found adequately in related institutions. They examine the soil study procedures of three or four countries. Therefore, soil samples cannot be taken from these assembly lands frequently. The Soil Index obtained from inadequate samples negatively affects the PE and causes the division into very different grades of the same parcel. The cadastral parcels found in assembly lands have very different TE values as a line. For example, the north is TE = 70 from the middle of the parcel while its south can be TE = 40. Furthermore, the soil samples collected cannot be evaluated in every country and as a result, the laboratories in which these evaluations can be done are very stacked.

The increase in demand causes a delay in the works. The research engineer cannot participate sufficiently to graduation committee meetings because of the intensity of works.

The member of graduation committee members responsible for efficiency should choose the sample parcels as they will cover the assembly land in order to determine the efficiency ability between parcels and the index points given to the parcels chosen should be in proportion with the efficiency of land. This member cannot travel around the land due to the lack of time and inadequate opportunities. Also he/she cannot interview with more land owners except local consultative authority and so he/she cannot get adequate information about the product, yield and quality of the land. His/her evaluations produce solutions to projects by using his/her individual experiences. These committee members are very few in numbers since they are not adequately employed in the institutions. For this reason, they cannot participate too much in Graduation committee meetings. After giving the efficiency points of parcels, the occurred TE value when TE and location values are given is seen that it's not in accordance with previous sample parcels. Furthermore, when the TE point obtained by chemical analysis is 75 then V value is 6 points and when TE point is 40 then V value is given 5 points. This indicates the presence of other parcels having different efficiency among selected sample parcels.

The other three members of graduation committee are local members. The first one of these members might be municipality president or mukhtar or will be the one whom is determined by them according to the situation of assembly land. Generally, presidents or mukhtars do not transfer their rights. Although these people who are members of Graduation committee due to regulations are considered as a bridge between plant owners and the institution making this assembly, they couldn't succeeded this aim. Because these people get these positions by selection, so there occurs a prejudice among the people who didn't vote for them or the ones who voted for them and then aren't pleased with the management and they think about being in one side in graduation. On the other hand, the people who voted for them become dependent on their works and they do not examine the results of graduation adequately. This situation causes the graduation maps not examined by a homogeneous plant group. This emotional approach of the plants causes them to overlook this situation which concerns them

closely. The clear differences between grades after formation of new parcels cause parcels to decrease or increase in unfair way. The plants knowing this situation especially object to the person responsible for the project when there is a decrease in parcel amounts and ask for a reason. The reply given is that there is nothing to do, this situation arises because of graduation map and the period of objection is passed.

The other local members participated in graduation studies represent the farmers in assembly land and they are the people having parcels on this land. These people know the land very well, have experiences about farming, follow the technological developments in agriculture, have extensive information about assembly and believe in assembly, be impartial, trustworthy and be selected among the people settling in assembly center. This is usually not so in application. Generally irrigation cooperatives are established in order to use water correctly and regularly in assembly land and there is a president and management committee of this cooperative who are selected. The president of the cooperative and one of the members of this management committee are generally the members of graduation committee. These selected people usually do not have those stated characteristics. When they participate in graduation studies, they might behave personally with the effect of knowing that they are selected and they might let the technical members in trouble. The committee president wants these members to determine the location of the fields and to control whether TE and V values used in graduation have harmony or not, to determine stable foundations and places used as gardens in the formation of location index, to minimize the objections to graduation maps by consulting the subjects of excess or scarcity of grade numbers formed in assembly land.

### **3.1 Problems Due to Formation of Graduation Maps and Originating from Hanging**

The graduation maps are usually produced in the sizes suitable for hanger. The parcel numbers on the paftas produced with this size are not enough in bigness. All location and regions are not shown in graduation maps which will facilitate for local people to find their parcels. Stable foundations on the parcels of plants are usually not shown in understandable writing with enough bigness, on the contrary, they are shown in map symbols which cannot be understood by farmers. Since farmers do not have enough information about pafta, they generally cannot find the parcels completely that they own. Especially the farmers who are old having sight problems as well as having problems in reading and writing cannot directly get information from these maps and want help from other people who have information about pafta. This also causes deprivation of shares in nowadays.

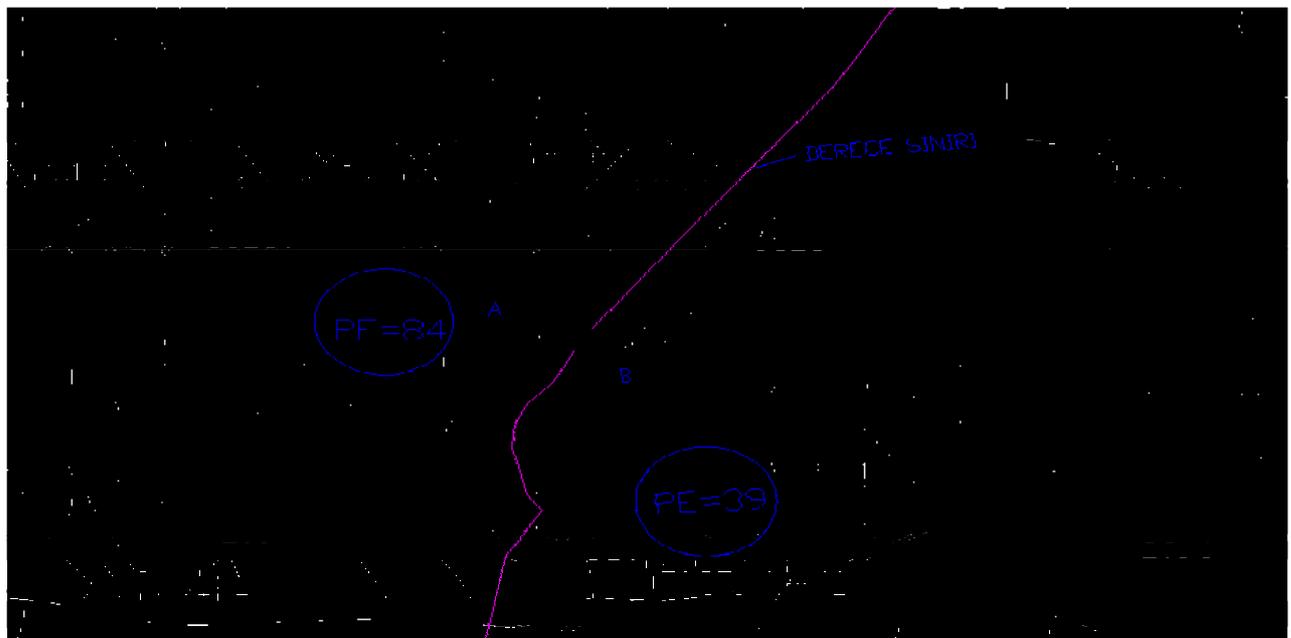
One of the serious problems is that where to hang the graduation maps in assembly places. If the assembly place is a municipality, then the announcement wall panel can be used. The groups who are opposing to municipal president do not go for examination of gradual map and so they complain seriously to related authorized associations. If the assembly place is muhktra's office, since there is no announcement wall panel, it might be hanged to café if present, but in this situation, the people who do not go to café or the ladies cannot see the graduation maps and so cannot evaluate the state of their parcels. If there is no café, it can be hanged to village mansion or mosque courts but this creates problems about protection of the maps.

During hanging of graduation maps, it's a well-known reality that vocalic announcements are not frequently made due to lack of technical opportunities during hanging and taking down period. The people who do not settle in places of assembly give oral objection like "we are not informed about this map".

Furthermore, no formal objection was determined in examined places so this shows how the farmers are sensitive about the subjects they are concerned.

### 3.2 Problems about the Formation of Parcel Index and Occurring Unjust Treatments

In assembly land, Soil Index, Efficiency Index and Location Index were determined on separate maps, these values were combined on one map and different coloured pencils were used. The obtained PE values are written on maps in sizes that can be discriminated. The authorized person of the firm that will make the new parcelation plan calculates the Parcel Indexes separately for each parcel by using this grade map. On the grade borders passing through parcel borders are calculated as  $PE = TE * \%70 + V + K$ . For the grade borders passing through the middle of parcels, PE values of both sides are found and its PE value is determined by taking its average value.



$$2948 \text{ PE} = \frac{(A * PE) + (B * PE)}{A + B} = \frac{(6207 * 84) + (6133 * 39)}{12340} = 61,63 = 62$$

PE values of parcels with numbers 2947, 2946, 2945, 2967 and 2942 seen in Figure will be calculated as seen above. When the map is examined, parcel number 2928 on the left hand side of parcel number 2948 has PE = 84 whereas parcel number 2929 on right hand side has PE = 39. The grade differences between these parcels which are 20 cm far away from each other indicate a difference

about hundred percent. In the formation of new parcelation map of these parcels, if it's thought that it's evaluated from different point of grades, we can get Table 2 as follows.

Parcel No	Area	DOPO 0.0977 96	Net Area	Index (PE)	Value Number (PDS)	DOPO (0.09779 6)	Value Number (PDS)	Index (PE)	Area (m <sup>2</sup> )
2928	13667	1336.5 8	12330.41	84	11480.28	1122.73	10357.55	84	12330.41
2929	18188	1778.7 1	16409.2	36	6547.68	640.34	5907.34	84	7032.55
2948	12340	1206.8 0	11133.20	62	7650.80	748.22	6902,58	84	8127.36

**Table 2.** The table that is formed if three parcels are given from the block having **PE=84**

Parcel No	Area	DOPO 0.09779 6	Net Area	Index PE	Value Number (PDS)	DOPO (0.09779 6)	Value Number (PDS)	Index (PE)	Area (m <sup>2</sup> )
2928	13667	1336.58	12330.41	84	11480.28	1122.73	10357.55	36	28770.97
2929	18188	1778.71	16409.29	36	6547.68	640.34	5907.34	36	16409.29
2948	12340	1206.80	11133.20	62	7650.80	748.22	6902,58	36	19173.83

**Table 3 :** If three parcels are given from the block having **PE=36**

As it can be seen from Table 3, if the owner of parcel number 2928 is given a new parcel with the same grade from a block, there is only a change as the amount of **DOPO** in the area. The owner of parcel number 2929 is given a parcel which decreased with 9376.74 m<sup>2</sup> reduction from 16409.29 m<sup>2</sup> to 7032.55 m<sup>2</sup>. In the same way, the owner of parcel number 2948 has a decrease of 3005.84 m<sup>2</sup> from 11133.20 m<sup>2</sup> to 8127.36 m<sup>2</sup>.

If the authorized person forming the parcelation plan made a block planning to the same people as in the form in Table 3:2, i.e. if he gave the parcel from the block having PE = 36 grade, then there would occur a different case. The owner of parcel number 2928 is given the place of 12330.41 m<sup>2</sup> as 28770.97 m<sup>2</sup> with an excess amount of 16440.56 m<sup>2</sup> parcel whereas the owner of parcel number 2948 is given the place of 11133.20 m<sup>2</sup> as 19173.83 m<sup>2</sup> with an excess amount of 8040.40 m<sup>2</sup> parcel.

The person responsible for the project who is also planning the parcelation makes these choices depending on the evaluation of interviews of farmers. Because of this, to avoid from these decreases and increases is impossible. It's also difficult to describe this situation to farmers. Because, the farmers state that his old field and new given parcel are in the same location, the amount of product per one-tenth of a hectare will be approximately same so as much as this decrease or increase is not logical and they state that they are aggrieved. The person responsible for the project does not evaluate the objections of farmers by indicating that he cannot give every parcel with its own grade so this is not his fault but this occurs due to grade map and indicates that the objection period of

grade map has been expired so there is nothing to do. This result causes some farmers to be aggrieved seriously and some of them to obtain unearned income.

#### 4. RESULT

Soil samples of adequate depth and frequency should be taken from the land of assembly and the regions of having soil samples which form excess grade difference between TE values should be eliminated.

The engineer responsible for Efficiency Index should choose parcels which show completely the fields distribution homogeneously in assembly land and should travel around the assembly land during dragging and harvesting of the field.

It should be provided to organize meetings for graduation committee members more frequently and completely. The duties of members should not end with taking down the grade maps from hangings and with evaluation of objections and its continuity should be provided until the end of project.

Local members of graduation committee should be impartial and experienced local experts and it's necessary to take maximum advantage of these people's experiences (Takka,1993).

Local committee members should be informed seriously about the subject of assembly and the importance of parcel grades and what kind of things occur that the faults made can produce should be described.

A map engineer should be included in the members of graduation committee. In the determination of location index, absolutely take advantage of a map engineer and faults resulting from location index should be eliminated (Çay and etal, 2005).

The graduation maps should be hanged on announcement board wherever the farmers can see everytime, the parcel numbers and indexes should be in appropriate sizes and all locations and stable foundations should be indicated on them.

It's necessary to extend the hanging period of graduation maps from fifteen days to thirty days. Also unjust treatments of plants that do not reside in the location of assembly should be eliminated.

During the hanging period of these graduation maps, one of the members of local committee should necessarily be in the location where the map is and if required should answer the questions of farmers and give information about graduation.

The grade lines should be passed through parcel lines if possible. If the differences are more than two or three points, then the studies should be re-examined.

Since it can't be like one side of the field is with PE = 84 and the other side is with PE = 36 in case of the grade lines are on one line, it'll be suitable to show them as point curves.

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