BIBLIOGRAPHIC DATA SHEET

1. CONTROL NUMBER
PN-AAH-547

2. SUBJECT CLASSIFICATION (695)
AN00-0000-G831

3. TITLE AND SUBTITLE (240)
Introducing new agricultural technology on the Anatolian Plateau; some preliminary findings

4. PERSONAL AUTHORS (100)

Gencaga, Hasan; Kapil, Iris; Duman, Sadi; Mann, C. K.

5. CORPORATE AUTHORS (101)

AID/NE/USAID/Turkey

6. DOCUMENT DATE (110)	7. NUMBER OF PAGES (120)	8. ARC NUMBER (170)
1973	70p.	TU630.94961.G324

9. REFERENCE ORGANIZATION (130)
Turkey

10. SUPPLEMENTARY NOTES (500)
(In Discussion paper no. 11)

11. ABSTRACT (950)

12. DESCRIPTORS (920)

Turkey
Agricultural machinery
Tractors
Agricultural technology
Machinery
Technology transfer

13. PROJECT NUMBER (150)

14. CONTRACT NO.(140)
Turkey

15. CONTRACT TYPE (140)

16. TYPE OF DOCUMENT (160)

AID 590-7 (10-79)

PN-AAH-541

ECONOMIC STAFF PAPERS

[illegible]
Reference Center
[illegible]

UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT
ANKARA, TURKEY

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Discussion Paper No. 11

INTRODUCING NEW AGRICULTURAL TECHNOLOGY ON THE ANATOLIAN PLATEAU: SOME PRELIMINARY FINDINGS

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January 1973

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INTRODUCTION AND HIGHLIGHTS

by

Charles K. Mann

A major objective of the Ministry of Agriculture/AID/Oregon State University wheat project is to raise wheat yields through improved moisture conservation. For the most part this implies new types of machines, more power, and improved management of fallow land - in short a greater degree of mechanization.

This collection of studies is an attempt to gain some insight into the present extent of and further prospects for farm mechanization in Anatolia. Ths first study by Gençağa and Mann deals broadly with 25 selected provinces on the Anatolian plateau. These provinces are those included in the Ministry of Agriculture/AID/Oregon State University wheat project plus the five poppy provinces not included in that wheat project. It presents information on the present degree of tractorization of this area. It also contains some commentary on the "case studies" prepared by Kapil, Gençağa and Duman which comprise papers III, IV, and V. Paper number II by Kapil provides an interesting insight into how the tractor owner as entrepreneur appears to be displacing the land-owner in the traditional patron-client relationship of the area.

The village "case studies" deserve a word of explanation as to how the particular samples were selected and how the studies came to be done.

Mrs. Kapil and Mr. Gençağa have been carrying out research funded jointly by AID/Turkey and the Government of Turkey on rural to urban migration from Iskilip İlçe to Ankara.[1] USAID asked them if in the course of their interviewing and investigations they could attempt to develop information relative to mechanization on the plateau. They agreed to do so and both Paper II and Paper IV on mechanization in Çorum province are the direct result of this request.

In the course of developing the information on Çorum, Mr. Gençağa and Mr. Duman both volunteered to develop information relative to mechanization in their own home villages where they had excellent access to information sources. Papers III and V present their extremely insightful and perceptive reports.

In publishing these findings we make no attempt to be presenting a definitive statement on conditions affecting mechanization on the plateau. Since the primary source information included in this report was developed almost as a byproduct of another study, the three areas sampled may or may not be representative of the plateau. In any event, as the conditions differ greatly in the three areas at least the report can convey some flavor of the disparity of institutions which characterize farming on the plateau. Whether representative or not, we believe that the insights and observations of these researchers will prove of interest to those concerned with introducing new technology to the plateau. They are thus presented in the spirit of sharing preliminary

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1/ Iris Kapil and Hasan Gençağa Discussion Paper No. 1 "Migration and Urban Social Structures", Discussion Paper No. 10 "Urbanization and Modernization in Turkey - A Case Study".

findings on conditions in a few selected areas, without drawing any definitive conclusions.

Other than editorial changes, no attempt has been made to coalesce the findings of the three researchers into a cohesive document. However, because this document does consist of a number of separate papers and therefore is rather lengthy it may be useful to make some summary observations on what appear to be some of the implications of the conditions reported.

A. TRACTORS

1. Extent of Tractorization:

While the villages in the samples were fairly well tractorized, 1970 census data suggest that about 70% of the wheat grown in the 25 provinces is grown without use of tractors. In one sense, this may be viewed simply as an indication of "backward agriculture". However, numerous studies suggest that peasant farmers do respond to changed technological and economic incentives within the limitations of resources available to them. 1/ There are at least some who believe that the soil conditioning needed for significant yield increases can be done with animal power, albeit perhaps with less dramatic yield effects. If this is true and if the needed implements are available, there is every reason to expect farmers to use them. The finding that only 30% of the wheat in the

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1/ See, for example, Walter P. Falcon, "Farmer Response to Price in a Subsistence Economy: The Case of West Pakistan", American Economic Review, Papers and Proceedings, Vol. LIV, No. 2 (May 1964), 580-91.

25 province area is tractorized suggests the need for research on appropriate animal powered tillage systems as well as tractor powered if the benefits of the yield increases are to be widely shared.

It is also apparent both from the samples and from the provincial data that there is a tremendous spread in the degree of tractorization of the various provinces. It was hypothesized that the degree of tractorization might be related to either size of farm or amount of credit extended per farmer by the Agricultural Bank. The research findings suggest that at least using aggregated data, there is no connection apparent between either the size of the farm and tractor ownership or the amount of credit extended per farmer and tractor ownership. Of course, the only correlations attempted were with province-wide data so it is possible that within provinces farm size and tractor ownership are related. Nonetheless from aggregated provincial data no such relationship is apparent.

2. Tractor Ownership Patterns:

One of the rather startling findings of the case studies was that the typical institutional arrangement of tractorized farming is not the owner-operated tractorized farm. In the Kayseri case, about 71% of the land farmed by tractors is done under custom arrangement with only about 9% of the tractor-farmed land being farmed by owner-operated tractors.

In the Konya case, the most important pattern is one where the tractor-owner, operating as entrepreneur, share-crops land with the landowner. This has several interesting ramifications for the introduction of the new technology. If the technology is incorporated in machines then the full cost of the new technology falls on the tractor-owner not the landowner. Yet the tractor-owner receives only one-half of the increased

benefit. The Gençağa/Mann paper contains a numerical example suggesting some implications of this fact. Even without taking into account the capital cost of the machinery (no cost figures were available) a yield increase of 25% raises the machinery owner's net income by only 6%. Thus, counting machine capital costs, he stands to receive a lower net even with a 25% yield increase. Something like twenty-five to thirty percent increases may represent a lower bound in the yield increase needed to induce change.

Another aspect of this share-cropping entrepreneurial tractor-operator is that the size of the management unit or entrepreneurial unit may bear little relationship to the size of farm holdings in the area. For example, there may be six relatively small farms all operated by one share-cropping entrepreneur tractor driver, thereby constituting a single decision-maker for the six farms. For example, in the Konya village the 22 tractor owners would appear to be the effective decision-makers for about two-thirds of the village's land. The variety of equipment ownership patterns represented in this study and their differential impacts on the rate of adoption of new technology suggest that the extension worker should understand the type of machinery-use pattern in any given area.

A useful point is made by Gençağa in Paper III concerning the great variation in the number of hectares plowed per tractor in the Konya village. If the majority of tractors could be used to plow the same number of hectares that the most efficient plow, there would appear to be considerable under-utilized tractor capacity. This point is important, for whoever owns the scarce resource may have the determining voice in how the land will be cultivated. For example, if there are many tractor owners competing for land to farm, the purchase of new cultivating machinery by a tractor-owner could give him

a competitive advantage in bidding for land against other tractor-owners. This suggests tractor-owners as the target group for machinery introduction. If land is the scarce resource, and the land-owners were persuaded of the value of the new practices, they could force the tractor-owners to buy the machinery with the threat of letting the land out to a more modernizing tractor-owner. Thus in the land constraint case, the land-owners would be the likely target group.

3. Social Aspects:

Turning to purely social aspects it is likely that the tractor will continue to displace animal power. The degree of hardship which this displacement causes will depend importantly on whether or not the user of animal-power owns his own land. If he owns his own land and decides to hire a tractor and give up his animal, presumably he considers his welfare improved thereby or he would not do so. This kind of displacement would not seem to cause great hardship (although it could induce considerable migration).

If on the other hand the animal owner is a tenant farmer who does not own the land and the land-owner decides to hire a custom tractor (r buy his own tractor) the tenant farmer's livelihood will be displaced. Therefore it would appear that the tractorization of areas now using both large amounts of animal power and having high tenancy rates would represent more dislocation potential than the displacement of animal power in an area where the farms are largely owner-operated. Thus, given a choice of where to push mechanization, selecting areas with owner-operated rather than tenant-operated farms would cause less social dislocation.

An interesting case where something like "over-tractorization" seems to have occurred is cited by Duman in Paper V where he notes that the number of tractors rose then declined in the Kayseri village. The reasons he suggests are outside competition and decreasing fertility of land.

Another social aspect of the findings of the studies concerns Land Reform. While detailed consideration is outside the scope of this paper, the findings relative to the extent of sharecropping may have important implications for Land Reform if "50 percenting" is to be prohibited as is now proposed in pending legislation. On the one hand it could lead relatively large landholders to evict tenants. (See Kapil Paper No. IV, Comment 2.) On the other hand it could disrupt the institution of the share-cropping tractor-owner/entrepreneur, an institution which appears beneficial to both parties and to agricultural modernization generally. Neither of these possible casualties of land-reform - the tenant farmer and the tractor-owner/entrepreneurs - are likely targets of such reform, but they may become unintended victims if "50 percenting" is abolished and no real land redistribution effected.

B. Value of Fallow Land:

It is apparent that at least in Kayseri land in stubble is used for pasturage after the wheat is cut. Moreover, after the stubble has been plowed the fallow is allowed to yield grass and forage which has an economic value. Therefore in considering the benefits from a technology designed to eliminate all growth on the fallow one must consider the opportunity cost foregone by giving up this traditional source of forage. Also since the benefits to be gained by cultivating the fallow are not realized until the following year's wheat crop, any kind of share-cropping arrangement must extend through at least one cycle so that the machinery owner will benefit from the work of his previous season's cultivation. Further it should be noted that to the extent that grass and forage grown on the fallow accrues 100% to the land owner, the cost of any practice which removes this source of income falls entirely on the land owner while the share-cropping machinery owner receives half of the benefits.

It will be very important whether or not the new technology for handling the fallow reduces the total amount of land which can be contracted by a tractor owner under a share-crop arrangement. If it does then his income from the land foregone must be counted as a cost against the benefits which he will realize from the new technology.

Another interesting aspect of the value to the fallow land emerged from the Kapil study in Çorum. Here it appears that share-croppers are kept on

the land in part to maintain the owner's claim to the land and act in sort of a "watchman" capacity. In return they are allowed to grow limited amounts of crops on the "fallow" land. This institution deserves more study. If this practice is very wide-spread, owners may allow things to be grown on part of their fallow for reasons that escape the conventional cost and returns calculation. If these share-croppers are required to maintain title to the land they must have some means of growing their subsistence crops.

Conclusion

One clear conclusion that emerges from this research is that bringing new technology to the plateau will not be an easy task nor will all the consequences be predictable. The purpose of presenting these findings is not to argue against mechanization, but to attempt to identify what obstacles and problems must be dealt with if mechanization is to proceed. Even if one wished, further mechanization could probably not be prevented. However, it should be possible to influence the type, scale and even principal locus of mechanization so as to minimize dislocations.

There are likely to be areas where it will fit rather easily, others where the fit will be painful. For example, the situation found in the Konya sample would appear to lend itself to the new practices with less social disruption than the Çorum model. Similarly, tractorization of the lightly tractorized southeast may cause more dislocation than would occur in either Konya or Çorum. Unfortunately we have no sample from that area.

So far most of the work on the definition of the technology has been agronomic and technical and its success judged on purely technical grounds. One thing this report does highlight is the fact that other considerations - economic and social - will be vitally important in defining success. We are just beginning to learn something about these dimensions of the environment into which the technology will be introduced. How well it suits that total environment will determine its success. Therefore these other dimensions of the environment should be considered in designing the final form of the technology to be introduced. While much more remains to be learned, the papers in this report represent a first attempt at delineating some of the economic and social factors which will condition the success of technological innovation on the Anatolian Plateau.

PAPER I

Some Considerations Relating to the Mechanization of Wheat Production on the Anatolian Plateau

By: Hasan Gencağa and Charles K. Mann

The Government of Turkey and USAID have been working on a "moisture conservation" program since 1969. The aim of the project is to increase the wheat yields through conserving moisture in the soil, and thereby eliminating an immediate constraint on increased wheat yields. The program involves a number of changes in the agricultural practices presently employed in addition to high yield seed varieties and improvements in the use of fertilizers.

The adaptation of the new technology will require more capital investments than evidenced at present. A number of devices will have to be added to the package of tools that tractor owners already own such as subsoiler, rodweeder, etc. The package of the new cultural practices will require further tractor power input into the process of cultivation. However, due to the seasonal distribution of the work pattern these increased power requirements are not expected to reduce the total amount of wheat which can be cultivated per tractor. However it seems that the adaptation of the new cultural practices will cause major changes in the use of fallow land. In fact, the term "better seedbed" is used almost synonymously as not using the fallow at all for grazing or a second crop.

It is expected that there will be changes in the work cycle. The extent of the changes in the seasonal work cycle will depend upon the

technology chosen. At present two different systems are under experimentation. The experiment related to early seeding through deep drilling will shift the work cycle more than the system involving moisture conservation only through better seedbed preparation.

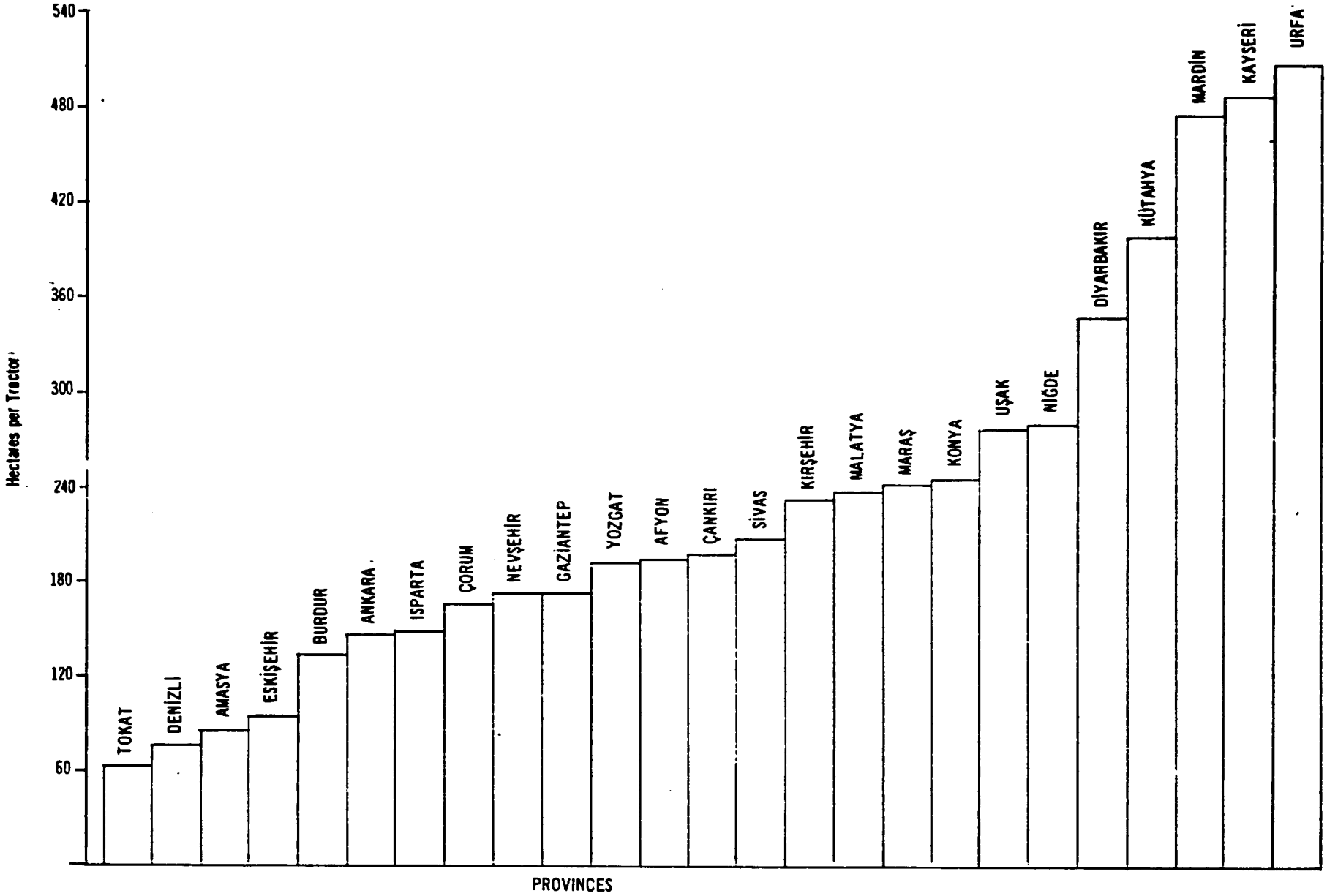
The technicians dealing with the new cultural practices seem to have no doubt that there will be spectacular increases in the yields per unit area. The research on the type of cultural practices and increases in yield has not been completed as yet, but it appears that there are likely to be significant increases in the net income per unit area in wheat.

THE EXTENT OF TRACTORIZATION:

All the machinery currently under experimentation is tractor-drawn. This fact means that the areas in which the new cultural practices can be adapted most easily are probably those that are already mechanized (basically tractorized). To indicate the extent of tractorization, the number of hectares in cereals in each province was divided by the number of tractors in the province to derive the number of hectares per tractor. The results of this calculation are summarized in Figure 1.

The average number of hectares per tractor is 231 for 25 provinces. The Ministry of Agriculture assumes that a tractor is sufficient to operate 75 hectares. The figure will vary for a number of reasons, but if this figure is accepted it would mean that 70% of the area sown in cereals is not cultivated by tractors.

Figure I – HECTARES IN CEREALS PER TRACTOR SELECTED PROVINCES



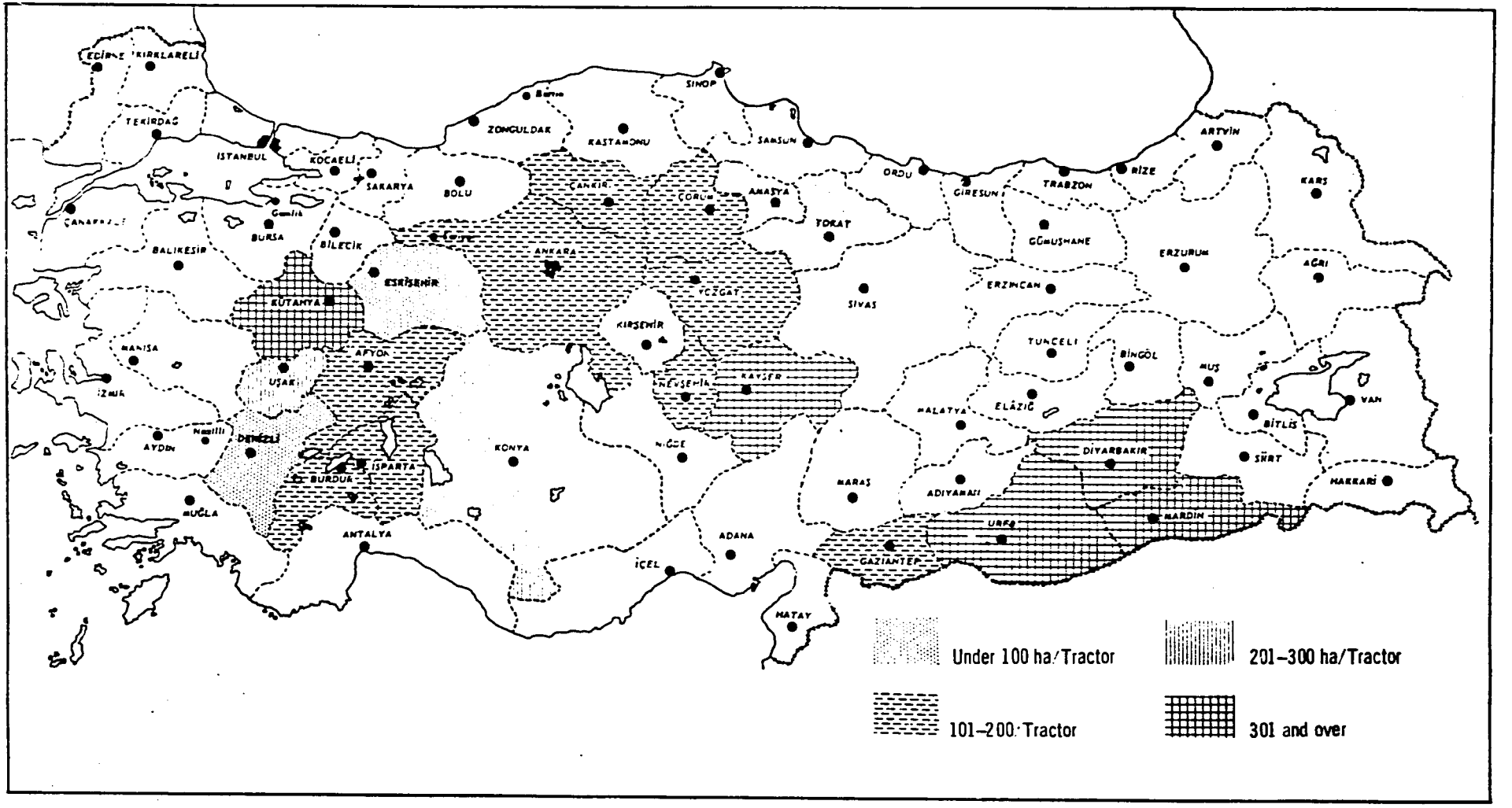
Source: Summary of Agricultural Statistics, 1970.

However, there are significant variations among the provinces. In four provinces (Tokat, Denizli, Amasya, Eskisehir) the hectares per tractor arebelow 100; in five provinces over 300 (Diyarbakir, Kutahya, Mardin, Kayseri, Urfa). Figure II presents this same information on a map to indicate more clearly the spatial dispersion of tractorization. The area of greatest tractorization is generally a broad arc stretching up from Denizli through Eşkişehir and Ankara and continuing to Amasya and Tokat. The southern and eastern portion of the plateau is relatively un-tractorized with the exception of Gaziantep. Insofar as the proposed mechanization requires tractors, those provinces which are most highly tractorized would appear to be the ones which could most readily adopt the new technology. 1/

In introducing a new technology, it would be useful to know not only which provinces were relatively mechanized already, but to have some idea of the factors which led to the mechanization. In an attempt to shed some light on factors that may influence the degree of mechanization, data regarding the size of holdings and credit availability were examined.

1/ One point which should be borne in mind, however, is the fact that simply because the tractor is registered in a particular province does not necessarily mean that it is working there. For example, Burdur has a relatively large amount of tractors. When we were studying a Topraksu project in Izmir we encountered several "Burdurlus" with their tractors doing land leveling work. Thus provincial registry does not necessarily mean the tractors work there.

Figure II – HECTARES PER TRACTOR, SELECTED PROVINCES



SOURCE: Derived from Figure I Data

Table I presents information on the percentage of land held by families owning less than 50 decares and more than 200 decares. Part of this same information is displayed in Figure III where the horizontal scale indicates the percentage of land in holdings over 200 donüms. The farther to the right on the chart the province is located, the larger the percentage of land which is held in large holdings. The vertical scale presents the percentage of families holding land of this size. This gives a further indication of the concentration of land ownership. Thus in both Maraş and Ankara roughly 30% of the land is in holdings over 200 dönüms, but in Maraş these holdings are concentrated in the hands of less than 1% of the families, whereas in Ankara they are dispersed among about 10% of the families. The proportion of large land holdings is relatively large in Ankara, Nigde, Konya, and Eshişehir. The proportion of such holdings (holdings with more than 200 decares) is still higher in the Southeastern Anatolian provinces of Diyarbakir, Mardin, Gaziantep and Maraş, but there the percentage of families that control these holdings is very low compared with the stated Central Anatolian provinces.

The hypothesis tested was that provinces with larger size family land holdings could be expected to be relatively more mechanized. This hypothesis was rejected in that there appears to be no relationship between the average size of holdings by province and the number of hectares per tractor. 1/ Indeed to the extent there is a relationship, it appears to

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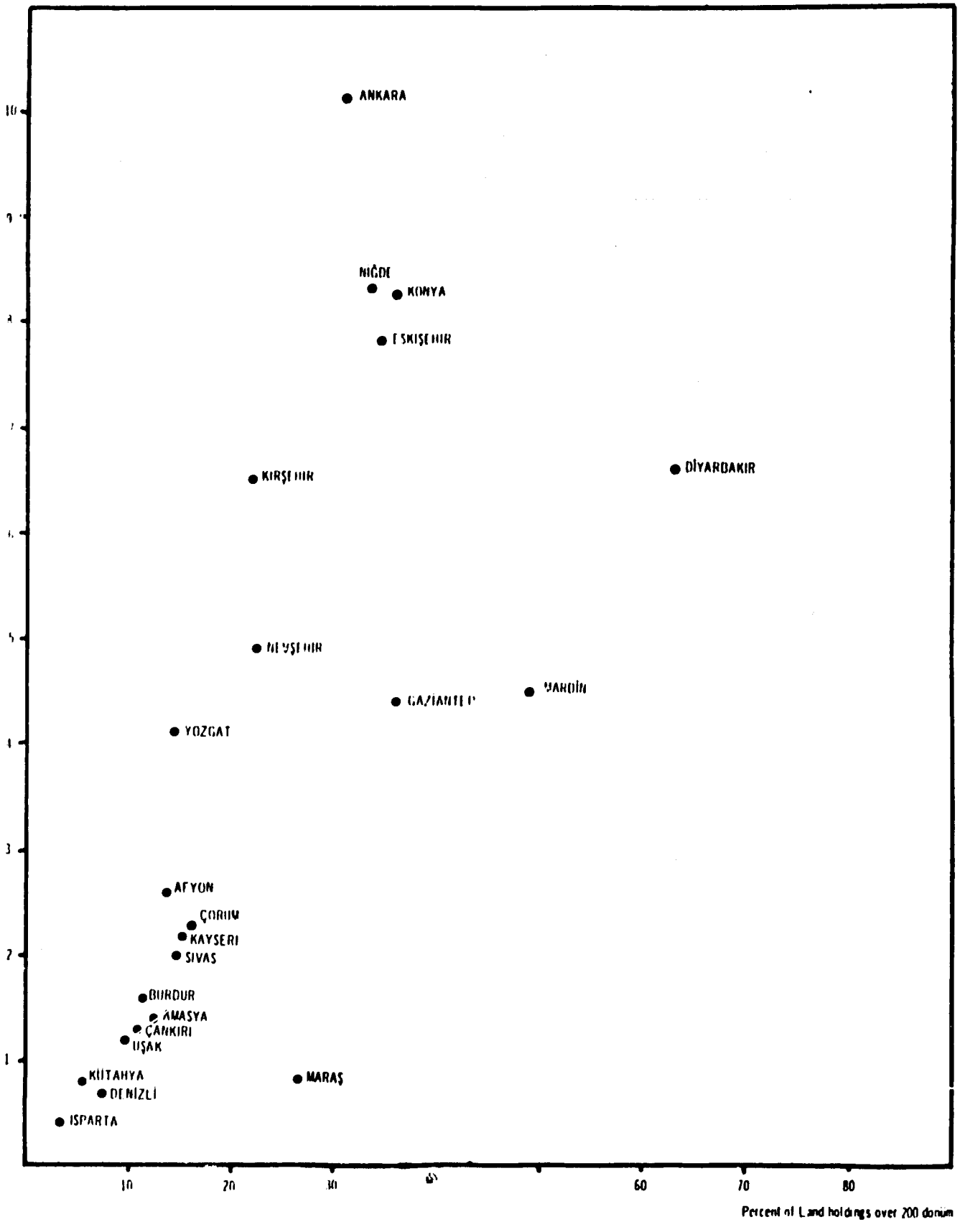
1/ The average size of family holding is used, because the data on average parcel size is not available. It is most likely that the average parcel size is very highly correlated with the average size of family holdings.

TABLE I

PERCENT OF LAND OWNED BY THOSE WITH LESS THAN 50 DECARES AND MORE THAN 200 DECARES

	% of land owned by families who own more than 200 decares	% of land owned by families who own less than 50 decares
Diyarbakir	63.0	13.5
Mardin	49.0	21.2
Ankara	36.8	12.8
Gaziantep	36.0	24.7
Konya	35.8	15.6
Eskişehir	34.4	14.7
Nigde	33.4	15.7
Maraş	26.7	38.2
Nevşehir	22.2	19.3
Kirsehir	21.9	12.1
Çorum	16.0	37.8
Kayseri	15.7	23.3
Sivas	14.6	33.9
Yozgat	14.2	23.8
Afyon	13.8	28.7
Amasya	12.6	44.5
Burdur	11.5	37.5
Çankiri	10.4	42.2
Uşak	9.9	42.4
Denizli	7.7	50.1
Kütahya	5.4	44.1
Isparta	3.2	62.8

Figure III- LAND IN HOLDINGS OVER 200 DÖNÜM



be the reverse situation, i.e., the two provinces having the greatest percentage of land in holdings over 200 donüms - Mardin and Diyarbakir - have relatively few tractors per hectare. However, even this sort of relationship is not systematic: Maraş and Gaziantep, also have relatively large and concentrated land holdings yet rank more or less in the middle on tractorization. Denizli and Kütahya rank about the same in having less than 10% of the land in large holdings, yet Denizli is one of the most tractorized and Kütahya one of the least. These data suggest that it would be very difficult to predict very much about mechanization potential by looking at the pattern of land holdings.

Regarding agricultural credit, one might think that there should be some relationship between the amount of agricultural credit extended to farm families and the level of mechanization. This hypothesis was investigated. (Credit was defined as that given through the Agricultural Credit Cooperatives as well as the Agricultural Bank.) The investigation indicated that there is no apparent relationship between the amount of credit available and the level of mechanization.

While the analysis of the available data does not provide any insight into precisely what facilitates mechanization, it is likely that the same kinds of factors which facilitated tractorization will also facilitate the addition of new types of tractor-drawn machinery. Thus it would appear reasonable to expect that those provinces most heavily tractorized would be the most promising provinces for the

introduction of the new machinery. 1/

In an attempt to understand better the structure of existing mechanization and also some of the possible opportunities and consequences of further mechanization, detailed studies were carried out in three regions where AID researchers had particularly good access to information. Data were collected on 86 villages of the İskilip county of Çorum province, one village in Kayseri, and one village in Konya. In contrast to the provincial averages, these data show that 87% of the area sown in cereals is cultivated by tractors. Details of these studies are presented elsewhere in this report, but a few observations may be made here.

In Konya, the number of hectares in cereals per tractor is 246. The same statistic is 102 in the sample village. The number of hectares per tractor is 165 in Çorum province, and 115 in the sample. Comparisons for Kayseri are difficult, because a major part of tractor operations is done by tractor owners from outside the village.

Nonetheless, one fact seems to be confirmed. The area operated by a tractor annually is 91 hectares in Konya (sample village) and 52 hectares in Iskilip of Çorum. The two figures seem to confirm the figure

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1/ The major potential flaw in this assumption appears to be the possibility that a number of tractors licensed in the province are actually operating outside it. People working in the field in these provinces should be able to get some notion of the extent of the absentee tractor operators by making inquiries of local farmers.

of 75 hectares per tractor given by the Ministry of Agriculture.[1/] Thus, it seems to be safe to conclude that at least half of the area in cereals in the 25 provinces is not cultivated by tractors. This suggests that if the new technology is to reach the majority of the farmers on the plateau animal drawn machinery as well as tractor drawn must be available. While few efforts in this direction have yet been made, AID's equipment engineer advisor, Mr. Marvin Parker, has indicated that he believes such machinery could be designed and produced. Efforts in this direction would appear worthwhile.

Returning to tractorized operations, while tractorization may facilitate the adoption of the new practices, it does not insure actual adoption. The institutional arrangements relating to machinery ownership and land cultivation will condition the rate of adoption of the technology. Therefore planning the introduction of the new practices requires an understanding of the present systems of land cultivation. Detailed data gathered on Konya, Kayseri, and Çorum reveals the land operation systems presented in Table II.

1/ The difference in the area cultivated by a tractor between Çorum and Konya is likely due to three factors. (1) A tractor can work much more efficiently when the land is flat and in large holdings as in Konya; (2) The tractors in the Konya village are big tractors, mostly 65 horsepower; (3) There is considerable use of tractors for non-agricultural uses in Iskilip, Çorum. This is discussed in detail in the separate report on Iskilip.

TABLE II: The Systems of Land Operation in the Three Sample Provinces 1/

	KAYSERI Area (decares)	KAYSERI % of Total	KONYA Area (decares)	KONYA % of Total	ÇORUM (decares)	ÇORUM Total	TOTAL Area (hectares)	TOTAL % of Total
1. Owner Operated By own tractor	1,780	9.4	4,950	13.4	30,300	18.0	325,764	13.1
2. Owner Operated By own animals	--	--	550	1.5	80,513	47.8	171,989	7.0
3. Share-Cropper - with a tractor owner	100	16.3	17,280	46.8	5,050	3.0	866,831	35.0
4. Share-Cropped - with Animal owners	--	--	--	--	12,271	7.3	22,484	1.0
5. Custom Operation - plowing and seeding by tractors	9,220	48.6	14,120	38.3	40,200	23.9	959,151	39.0
6. Custom plowing - plowing by tractors, seeding by own animals	4,240	22.3	--	--	--	--	116,183	4.5
TOTAL	18,980	100.0	36,900	100.0	168,334	100.0		
Total Area sown in wheat in the province	521,533 hect.		1,651,499 hect.		308,733 hect.		2,481,765	100.0

1/ Note: This province wide data is based on a tiny sample and should be taken as suggestive only. It could prove to be incorrect by a large factor. Moreover, since the percentages in the "Total" column are weighted by province size, the Konya sample dominates due to the province's large area.

Of the land cultivated by tractors, about forty percent of the area is done through share-cropping with a tractor owner, and roughly half through custom plowing and seeding. The success of the adaptation of the new practices will depend to a great extent upon the system of incentives within these two groups in areas that are already mechanized. The areas that are not mechanized as yet are likely to follow the same path. The system of share-cropping with a tractor owner will be different from custom operations in its receptivity to the new cultural practices.

Share-Cropping with a Tractor Owner:

A complete description of how the system operates is given in Iris Kapil, Paper number II in this volume. The question "will the tractor owner be willing to increase the machinery input into cultivation given the fact that he receives only half of the increased yield?" is crucial for the assessment of problems that are likely to be encountered. For example, under the present system of share-cropping the tractor owner provides plowing, seeding, harvesting and half of seed and fertilizer if used.

Since the new practices involve largely changes in the tractor owner's contribution (i.e., more and different cultivation of the fallow land), virtually the full cost of the innovation falls upon him, yet any increased output is shared with the landowner. Thus if the cost of cultivation increases by 20 TL/decare the gross revenue must increase by more than 40 TL/decare for the tractor owner to become better off than he is under the present cultivation system. The problem can be illustrated using the figures of Table III which show the division of gains due to the new technology as between tractor owner

and land owner. Section A of the table shows the situation before the new technology, section B with a machinery based technology raising yields 25% and section C with an increase of 50%.

TABLE III

Relative Tractor Owner/Land Owner Costs and Returns on One Decare of Wheat

	Total	Tractor Owner	Land Owner
A. Before New Technology (yield 120 Kg/dec.)			
Costs			
Tillage (2 plowing's)	20	20	-
Drilling Seed	10	10	-
Seed	16	8	8
Fert. 25 Kg @ .45	11	5.5	5.5
Harvest (10%)	12	12	-
TOTAL	69	55.5	13.5
Revenue (wheat)	120	60	60
(straw) 200 Kg. @ 0.3/Kg	60	30	30
TOTAL	180	90	90
Return to labor, land, capital	111	34.5	76.5
B. After New Technology, (yield +25%			
Costs			
Tillage (2 plowing's)	20	20	-
New Fallow Tillage	20	20	-
Drilling	10	10	-
Seed (1/3 less)	11	5.5	5.5
Fert (25 Kg)	11	5.5	5.5
Harvest (10%)	15	15	-
TOTAL	87	76	11

Continued Next page

TABLE III (Continued)

	Total	Tractor Owner	Land Owner
Revenue (wheat)	150	75	75
(straw)	75	37.5	37.5
TOTAL	225	112.5	112.5
Return to labor, land, capital	138	36.5	101.5
% increase in returns with new technology	24%	6%	35%
C. After New Technology (yield + 50%) (Complete Package)			
Costs			
Tillage (2 plowing's)	20	20	-
New fallow tillage	20	20	-
Drilling	10	10	-
Seed	11	5.5	5.5
Fert. (40 Kg)	18	9	9
Harvest (10%)	18	15	-
TOTAL	97	79.5	14.5
Revenue (wheat)	180	90	90
(straw)	90	45	45
TOTAL	270	135	135
Return to labor, land, capital	173	55.5	120.5
% increase in returns with new technology	56%	61%	58%

Because the machine owner must bear the cost of the new tillage, a 25% increase in yields increases his net income by only 6% giving him very little incentive to shift to this system. However, once yields go up above 25% his net gains substantially. It should be noted that machinery fixed costs are excluded, since they are not yet known. With these costs included, the "break-even" yield increase will be higher. Since sharecropping appears to be a common arrangement with the tractor owner as decisionmaker, the share of the net increase accruing to him becomes of vital importance and requires further study.

One approach to the incentives for the tractor owner share-cropper would be more flexible conditions of share-cropping. If the tractor owner would be able to get 2/3 or 3/5 of the yield, instead of the present half, he might be willing to increase the machine input into land operation. The same result can come about if the land owner is powerful enough to dictate the conditions under which he would share-crop his land. In this way, the land owner may demand that his land is worked in such a way as to apply the new tillage practices. This may force the tractor owner to purchase the new equipment and use it on land share-cropped. However, this kind of flexibility does not now appear to exist.

A problem would arise in sharecropping if the new practices entail a reduction in the area serviced per tractor or tractor horse power. This would reduce the number of heatares the tractor owner could control and hence the added income from the new practices would have to more than offset that which came from the "lost hectares". An accurate estimation of the changes in the

number of hectares a tractor could service requires added data on changes in demand on tractor power and time, and the specific timing of each operation, which may be different for each province.

Custom Operations:

Custom operations account for about half of the total area cultivated by tractors. At present, there are variations in the cost of plowing from 4 TL to 10 TL per decare within each province depending on the type of soil plowed. The same variations exist for seeding as well. There seems to be no reason why the tractor owner cannot charge additional fees for the proposed new practices.

The Use of Fallow Land:

The mechanization of agriculture has often lead to the displacement of masses of farm laborers. The replacement of labor by machines is particularly easy in wheat farming and the results are felt immediately. This is partly because of diminishing demand for laborers, and partly due to land polarization that seems to accompany large investments in machinery which breaks self-sufficiency farming and polarizes wealth.

Sudden changes in technology seldom result in complete breakdown of the traditional systems. The examples of this are found in handicrafts as well as agriculture. A case where buffer mechanisms emerge to cushion the effects of change is discussed in Mrs. Kapil's Paper No. IV in this volume. In this case fallow land acts as such a mechanism since it is used by landless families who share-crop the land to raise labor intensive crops such as lentils, melons,

watermelons, etc. It appears that a large proportion of the 4,500 landless farm families in the Çorum sample make a living in this way. If the profits of adopting the new tillage practices offset the gains that accrue to land owners through this sort of share-cropping, a major displacement of labor may occur. Clearly the present uses of fallow land should be carefully investigated in areas where the new technology is to be introduced.

A similar situation where fallow land produces a direct economic return is described in Sadi Duman's piece about the Kayseri village in this volume. Here sheep are grazed both on the post harvest stubble and on the fallow. In some instances, forage is harvested from the fallow land. He has calculated the opportunity cost of giving up these uses of the fallow and these costs must be deducted from the benefits of the new technology. Also the possibility that the sheep owner who grazes the fallow may be stronger than the man who owns it poses some further complications.

Conclusion

This report does not attempt to present answers to all the questions it raises. However, it does suggest that the commonly accepted model of the owner-operated tractorized farm may be less widespread in Anatolia than previous thought. Share-cropping tractor owners operating as entrepreneurs may indeed be a more common practice. Fallow may have unexpected economic and social value. The divergence found among the three samples of this report suggest the complexity of the environment, technical, economic and social into which the new technology must fit. Hopefully as information is developed on the various questions raised in this report it can be used to help fashion the technology so that it fits as comfortably as possible the total, - not just the physical, - environment of the plateau.

PAPER II

THE OWNERSHIP AND DEPLOYMENT OF FARM MACHINERY IN A SET OF ANATOLIAN VILLAGES *

By Iris Kapil

The following discussion of the social organization of the ownership and deployment of modern farm machinery is not intended as a definitive statement; it is a brief outline of the social system that has evolved in one set of villages near Konya.

The Traditional System:

The present patterns of ownership and labor on the land must be viewed against an historical background. Traditional agriculture in Turkey has frequently involved a landlord-sharecropper tenant relationship. This description of the institution of landlord-sharecropper is very general and the reader must be cautioned that regional variations exist, the details of which could be crucial to the planner. In the southeast, for example, the landholdings are large and the landowner may control many sharecropping tenant villages. In iskilip the picture is complex, but certain town families define themselves as landlords in the traditional manner. They each own approximately 10 to 50 hectares of land in surrounding villages and have this land operated by sharecropping families.

In the landlord-tenant relationship the landlord supplies seed, draft animals, and the simple equipment needed. The tenant family

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* Villages located in Cihanbeyli county Konya province.

supplies the labor and makes most decisions on how to use the land, and independence derived largely from the fact that the landlord is absentee.

From the tenant the landlord receives half or more of the harvest and the deference accorded to the member of an upper caste. Formerly the tenant had almost no legal or social rights nor protection against a landlord. However, the tenant did, and does, receive certain services which would be expected in a modern society to come from other institutional sources. The landlord extends credit to his tenant sharecroppers; he assists in expenses for weddings and funerals; he is mediator and protector in interfamily disputes. Importantly, in case of natural disaster it is the landlord's responsibility to provide a minimum of food to his dependents.

This is one variety of the patron-client relationship, a theme throughout the culture. There is a discussion of these roles in our report. 1/

The Present System in One Set of Villages:

In the Konya villages considered in this discussion, land has been ordinarily owner operated, but the sharecropping system is part of the larger cultural context and the model for the present system. Traditionally the raising of sheep was dominant in the economic base

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1/ Iris Kapil and Hasan Gençağa, Migration and Urban Social Structures, Discussion Paper No. 1, USAID/Turkey, page 28.

of the villages. With the introduction of the tractor and combine harvester in the early 1950's communally owned grazing land went to private ownership in various sized parcels and was henceforth used for wheat growing.

A number of men in the large, central village own tractors and combine harvesters. The machine-owner farms his own land and he also contracts with small landowners to sharecrop their land. The contract is written, witnessed, legal.

The small landowner turns his land over to the machine-owner, who plows, plants, and harvests the land with his own equipment and hired labor. Each of the two parties to the contract provides half the seed and half the fertilizer. At harvest time each takes half the crop. Each man is responsible for marketing or otherwise disposing of his share. The machine-owner's demand for contracting exceeds the supply of land. Perhaps the continuation of traditional role expectations is partially a result of that fact.

The role relationship of machine-owner to landowner is one of patron to client and, with a somewhat unexpected twist, it is the landowner who is in the subordinate client role. Some aspects of the relationship are:

1. The borrowing of money: The landowner has the right to take interest free loans from the machine-owner although the machine-owner himself may need to borrow the money and pay interest on the loan in his name. At harvest time the machine-owner could force repayment

from the debtor but the consequence would be to lose his sharecropping rights to a competitor. Instead, the loan is generally extended, interest free. Often the debt exceeds the value of the harvest and the two are locked into the contract. Another possibility is that the machine-owner arranges with another machine-owner to pay him that money and take over his end of the contract. Expenses are high for the machine-owner: labor, gasoline, repairs, etc. He may be wealthy, deeply in debt, or both.

2. Transportation: The landowner does not own an automobile or truck. When he needs wheeled transport he has the right to free use of his patron's tractor. His needs are: taking wheat to the mill, hay to the barn, bringing material for house repair, possible emergency trips to a hospital or elsewhere.

3. A guarantor for credit: The machine-owner is obligated to guarantee loans from other sources other than himself.

4. A concern for the family: There is a personal involvement in the welfare of family members, occasional favors are done. For example, the machine-owner will shop for the landowner's household during visits to the city and then, of course, write the expenses against their account. A similar patron-client relationship exists between the machine-owner and the drivers who work for him.

Interestingly, certain agricultural innovators in the large, central village have not followed the traditional model. Two families from another area of Turkey came into the village to grow melons and

vegetables for marketing in the village and in a nearby town. The outsiders contracted with a landowner. They provide all the labor and other inputs and give a share of the produce to the landowner. However, there are no traditional patron-client roles involved. The explanation may lie in the type and prestige of the crops.

Another exception is the small number, less than ten percent, of machine-owners and landowners who have a contract based on a strict rental basis, with profit taking and no patron-client relationships. It would be interesting to learn under what special conditions the profit motive is moral and legitimate in a traditional society in transition.

In summary, traditional agriculture in Turkey has frequently involved an absentee landlord-tenant relationship. The landlord supplied the simple inputs, for which he received a half or more of the harvest plus the psychological and material rewards of an upper caste status. The tenant sharecropper contributed his and his family's total life and labor in return for subsistence. Although he was disadvantaged in the relationship the sharecropper had the right to minimal security from the landlord, attention to his ceremonial needs at ritual occasions, and the services of a prestigious outsider in settling conflicts that disrupted communal life. The landlord-tenant relationship parallels the patron-client roles that are a dominant theme in the culture.

Whatever modernization or progress may be coaxed into being necessarily emerges from existing reality. As technological change requires change in the social system, new roles are modeled on the old. In at least one set of villages in Anatolia, the machine-owner and the small landowner enter into a sharecropping contract, with the former as patron and the latter as client. The relationship between them is multidimensional, and the machine-owner extends to the landowner the traditional services of credit, security, and various personal attentions. In return he receives a share of the crop and the prestige of the ağa.

PAPER III

ONE VILLAGE IN KONYA

By Hasan Gençağa

The following data has been gathered and analyzed within the framework set by Iris Kapil in her paper "The Ownership and Deployment of Farm Machinery in a Set of Anatolian Villages." The village of Yeşilkaya on which data has been presented by Kapil and a set of 8 - 10 villages around it are administratively tied to Cihanbeyli county of Konya province. The village has 36,900 decares of land, all of which are cultivated in field grains, more than 90% of the area being in wheat. The rest is in barley, with rye and oats being insignificant.

There are 283 farming units. 1/ The amount of land by size is given in Table 1. More than half of the households that do not own any land are newly established. The land will not be distributed among the male children (females are not given a share at all) until the father, who claims legal rights over the land, is dead. The rest of the landless families are those who were not given land in 1953 when the grazing land was distributed among the landless or families with very little land. The fact that the number of families who own land between 1 - 49 decares is very small (10 families) compared with 50 - 99 decare group (101 families) is due to this distribution of grazing land among the landless families. The families who owned less than 80 decares were given enough land to increase the total amount of land owned 80 decares. (72% of holdings in 50 - 99 category are exactly 80 decares).

1/ The farming unit does not correspond to household. The married son or brother who established his own house may remain a part of the same unit, and harvest the land with his brother or father.

TABLE 1

THE SIZE OF LAND HOLDINGS BY FARMING UNIT

Size Groups (in decares)	Number of Families	% of Families	Total land in that group (decares)	% of Land	Average size of holdings in that group
Family with no land	28	9.9	-	-	-
1 - 49	10	3.5	360	1.0	36.0
50 - 99	101	35.7	8040	21.8	79.6
100 - 199	110	38.9	14790	40.1	134.4
200 - 399	25	8.8	6570	17.8	262.8
400 +	9	3.2	7140	19.3	793.3
Total	283	100.00	36,900	100.00	

The relatively high average of the (400 +) group (793.3 decares) is due to one family that owns 3000 decares. Other holdings in that group (8 units) are 600 or less.

Table 2 presents the land owned by each tractor owner (s) and the amount of land he sharecrops, together with the tractor horse power. The 22 tractor owning families 2/ constitute 7.78% of families in the village, but 4 out of 9 families with more than 400 decares own a tractor.

The total amount of land operated by a tractor either an owner's land or sharecropper varies greatly (custom plowing not included for the moment). The land per tractor horse power varies from 72.9 decares to 2.4 decares.

2/ One person owns more than two tractors, and there are 23 tractors in the village.

TABLE 2

TRACTOR SHARECROPPING AND LAND OWNERSHIP IN THE VILLAGE

Tractor Number	Land owned by tractor owners (decares)	Land share-cropped (decares)	Tractor Horse Power	Total land Operated	Decares/ horse-power	Land owned by each owner if more than one person owns the tract
1	500	-	45	500	11.1	500
2	200	450	65	650	10.0	100/100
3	200	2690	65	2890	44.6	100/100
4	210	1060	37	1270	34.3	100/110
5	220	4520	65	4740	72.9	220
6	175	180	35	355	10.1	175
7	600 1/	-	60	600	10.0	600
8	210	580	45	790	17.6	140/ 70
9	500	440	65	940	14.5	500
10 2/	70	2110	65	2180	16.8	70
11	680	1440	65	2120	32.6	600/ 80
12	350	1110	65	1460	22.5	350
13	160	380	37	540	14.6	160
14	380	330	45	710	15.8	290/175
15	130	880	65	1010	15.5	130
16	110	-	45	110	2.4	110
17	220	2060	45	2280	50.7	160/ 60
18	130	280	65	410	6.3	130
19	230	80	65	310	4.8	230
20	90	840	45	930	20.7	90
21	160	110	35	270	7.7	80/ 80
22	200	80	65	280	4.3	200
	5725	19620	1194 3/	25345	21.2	

1/ Sharecrops his land with another tractor owner. His tractor is not used at the moment, thus his tractor is not included in the total of 22 tractors used in deriving per h.p. data.

2/ Owns two tractors.

3/ Excludes tractor No. 7 See note 1.

Moreover, these figures exclude custom plowing of land in the village and land plowed in other villages by these tractors. In all, 36,250 decares of the village's total of 36,900 decares are plowed by tractors in the village and in addition 3,940 decares are sharecropped with the villagers in other villages. Thus the village's 22 tractors currently plow 40,190 hectares over a two year crop cycle. This averages out to 1,826 decares per tractor or 913 decares per tractor per year. It amounts to about 33.7 decares per horsepower in the village. While this overall average is not radically different from the Ministry of Agriculture's average of 750 decares per tractor, it does mask an important point. The wide descrepancy in decares plowed per tractor within the village suggests that a fully utilized tractor can do considerably more than the average figure indicates. To explore this possibility, data is presented below on those seven tractors plowing over 20 decares per horsepower.

Table 3

Selected Data on Seven Tractors Plowing Over 20 dec/hp

Tractor No.	HP	Land Owned & Sharecropped (dec.)	Dec/HP
3	65	2890	44.6
4	37	1270	34.3
5	65	4740	72.9
11	65	2120	32.6
12	65	1460	22.5
17	45	2280	50.7
20	45	930	20.7
Total	387	15,690	40.5

On the average this group is able to operate about 40.5 decares per horsepower. Since this is over a two year cycle, this means 20.2 decares per horsepower annually. This figure is understated because it excludes a large amount of custom plowing done by these tractors. Nevertheless the figure gives a sort of minimum figure for tractor capacity derived from the upper third of the tractors which may be said to represent "best practice" in terms of capacity utilization. If all of the tractors in the village worked to this rather conservative (due to exclusion of custom plowing) capacity they could plow in a one year cycle about 24,000 decares; with the fallow system they could work about 48,000 decares compared to the 25,000 presently worked. From this calculation we conclude that there appears to be excess underutilized tractor capacity in the village.(1)

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(1) There is a possibility that these seven tractors may have done even more decares of custom work than they did sharecropping. If so this implies a considerably greater potential capacity than that suggested above. However, due to some data problems, there is presented only the more conservatively derived capacity figure based on sharecropped area. In either case the fact remains that there appears to be considerable underutilized tractor capacity. The question of how much is less important than the existence of significant underutilization.

PAPER IV

SOME CONSIDERATIONS RELATED TO AGRICULTURAL MECHANIZATION IN ISKILIP İLÇE, ÇORUM PROVINCE

By
Iris Kapil

The Iskilip administrative boundaries extend over two different ecological zones: the north and northwest mountainous area and the south and southeast plain. The nature of life and land in the mountain villages is such that it will remain outside our concern at this time. A brief description will suffice.

THE MOUNTAIN ZONE

Three-fourths of the ilçe lies in the mountain zone, but the area has only forty percent of the arable land. Land is opened to cultivation by the cutting of trees. The sizes of the fields are small, a few dönüm at most. Soil erosion leaves the fields barren within three to five years, after which the land is used for penning of sheep in the hope that it may be cultivated again after some years.

Family land holdings average five to seven dönüms scattered into several different parcels. The land is worked by horse or oxen drawn plow and by hoeing. The crops are diversified: wheat, lentils, beans, some vineyards, some vegetable and fruit gardening. If all the produce is sold, the

yearly income from a dönüm of mountain land is about 200 TL.

Because of the extreme scarcity of land in the mountain area, sharecropping is rare and outside ownership of land does not account for even 5% of the land cultivated. Sharecropping does occur when a couple has migrated to the town and has no family left behind to take over the fields.

THE LAND SUITABLE FOR THE NEW TECHNOLOGY

Most of the agricultural land is in the plain and this land is most amenable to modern methods of cultivation. Before presenting information on the ownership and operation of land and machines, a few basic facts should be set forth:

There are 101,000 dönüms of agricultural land in the plain.

(The local measurement, the dönüm, is a field approximately 33 meters by 33 meters, or about one decare. A decare is 1/10th of a hectar or 1/4th of an acre.)

For the entire ilçe there are 11,634 farm families, of which 7,080 own land. For those 7,080 land-owning families, the average farm size is 23.7 decares. Of the 101,000 dekars of land in the plain, 76,330 decare of land is owned by families residing permanently in the town. (This information is from our own sample of households.) 1/ Of the 101,000 decare of land in the plain, 10,000 decaresare held by large (more than 500decares land-owners.

1/ Hasan Gençaga & Iris Kapil Discussion Papers No. 1 on Migration and Urban Social Structures; No. 10 "Urbanization and Modernization in Turkey - A Case Study"

VILLAGE LAND OWNED FROM THE TOWN

Townsmen are large landowners in the villages for several reasons: primarily it is due to the central and dominant position of the town. The villager is chronically short of money and must frequently borrow from those merchants or salaried men who have cash in order to cover wedding and other ritual xpenses or simply for subsistence. When the peasant cannot pay the debt, he gives up land to his creditor.

If a peasant has large landholdings, it is not uncommon for him to turn over the working of the land to others and move to the town. The succeeding generations of these once peasant families become merchants and white collar workers but continue to hold their village lands and even to accumulate more. In fact, this was the group that first saw the commercial value of farming and bought up land before recent sharp increases in land prices. (A year ago, land sold for 500 TL a decare in Iskilip.)

Another factor that has contributed to the concentration of land in the hands of town residents is the large number of village migrants in the town. There are approximately 620 village families in Iskilip. Most have not sold their small land holdings. These families may account, however, for only a small proportion of absentee landowners.

METHODS OF CULTIVATION

The land in the plain is cultivated by both tractor and by animal power. The twenty thousand of the 101,000decares cultivated with horse or oxen drawn plow is generally land on a slope or in such small plots that it is not suitable for tractor operation; but, for reasons discussed below, some large and flat areas are also worked with traditional technology. The remaining eighty-one thousand decare of arable land are cultivated by tractor. The combine harvester is used on less than 10% of the total harvested area.

An interesting adaptation of modern machinery to a particular environment is the use of the tractor in Iskilip. The tractor owner has alternative uses for his vehicle. Because of the rough terrain and the poor roads and the small scale of operations, trucks are not much in evidence. Instead, tractors are hired for the hauling of lumber, building stone, sand and for taking grain to the markets in Iskilip and Çorum.

OWNERSHIP AND OPERATION OF LAND AND TRACTORS

There are five types of arrangements in the Iskilip plain for the ownership and operation of land:

1. The land owner operates his land with his own oxen or horses.

   This type of traditional, independent peasant families is small in number.

We could not get a statistic, but since 80% of the land is worked by tractor, the number must necessarily be small.

2. The land owner cultivates his own land with his own tractor.

This category includes both villagers and townsmen. A special case is the tractor owner with large land holdings who continues employing families on the farm in the guise of sharecropper rather than hired labor. He hires a man to drive the tractor; and he then contracts with an animal owner, who is given a portion of land, generally of lower quality, to sharecrop in the traditional manner. One reason for the arrangement is that the farming combines the growing of several crops and the keeping of animals as well as the raising of wheat. The resident family cares for the animals and supplementary crops (melons, wild vetch, sunflower, etc.) and shares the produce with the land owner. We assume that if there is marketing of the surplus, it is done by the townsman land owner.

Certain other labor intensive crops, of which rice is important, require in this social environment, some sharecropping. Seasonal labor and hired labor are employed in addition to the labor of the resident family.

Sharecropping continues partly because of the need to protect the crop. Landless men try to move in and take over the land when an owner is absentee, and gun fights are not unknown. Large land-owners have also had their fields burned before harvest time by resentful villagers.

3. The land owner contracts with a sharecropper who owns draft animals.

This category covers different situations. One situation may be a villager who has more land than men in his family to work the land and therefore may choose to sharecrop. Less than 2% of the land is farmed in this way.

A more important category is where the townsmen land owners have traditional sharecroppers. This is diminishing but not as fast with small land owners as with large land owners. The system continues because of crops other than wheat, where the need for intensive labor is met by the family of the sharecropper. This pattern may account for some 15,200 decares

4. The tractor owner who cultivates land owned by another, as sharecropper.

This is less than 5% of the land cultivated. The pattern of the Konya area has not emerged, although some of this type of contracting is done on land owned both by townsmen and by villagers. The reasons are several, among which would be that the tractor owner in Iskilip does not have capital in sufficient quantities to operate on a large scale and the land is fragmented and scarce. Moreover, the tractor owner has the alternative, as mentioned above, of non-agricultural uses for his vehicle.

Perhaps the emergence of a strong tractor owner group in an area is affected by the availability of grazing land that they can turn into fields. The terrain and dense population of Iskilip seems to have prevented the availability of large lands that an owner of a new tractor could plow. It seems that the land suitable for tractor operation was already cultivated when the tractor came to Turkey, and therefore did not make the impact it made in Konya. The existence of sharecropping in the past indicated that there

was no uncultivated land available.

5. Custom plowing and harvesting

Approximately 20,000 of the 101,000 decares are tractor plowed through custom arrangement and less than 10,000 decare are put to the combine harvester. The cost of plowing is seven to ten liras per decare, depending on whether or not the land is irrigated. The cost of harvesting varies from 3% to 10% of the yield, depending on the yield per decare. The cost of harvesting increases as the production per decare decreases.

COMMENTS

1. Mechanization of wheat farming does not lead to complete destruction of the traditional sharecropping or agricultural practices. As long as there are other crops that contribute to the agricultural income, sharecropping may remain profitable to both parties.

The practice of fallowing is affected. With traditional practices, lentils and melons are planted on land, between wheat years, in the belief that these crops do not "weaken" the soil. (In Konya, this is done on only 1 or 2 percent of the land.) This fact should be taken into consideratic especially where land holdings are small. Probably the share of these extremely labor intensive crops decreases to total area sown in cereals as the land per family increases.

2. There is pressing demand for farm land. Of the 11,634 farm families in the ilçe 4,554 do not own land. We may assume, given the low rate of

outside ownership of land in the mountain area, that the landless families are concentrated in the plain, where mechanization of agriculture is feasible. While these families could be legally removed from the land, they may have difficulty finding employment.

One land owner we know displaced sharecropping families when he realized that if he did not farm his own land, he would lose it with the land reform bill. He brought in a man from a different village to manage the farm. Still, there have been gun battles over his land and his wheat fields have been burned by resentful, landless men.

3. Seasonal migrant labor is already used. From our information at least 200 men follow the crops within the area. They work in the vineyards and gardens in spring and fall and then are available for harvesting the wheat. The migrant workers come from the mountain villages, so they can leave women and children behind. Seasonal migrant labor is used in rice cultivation and these workers come from as far away as Tesya.

4. There is one set of land owners who would appear particularly receptive to group ownership and use of the new machinery, as well as the new schedule of land working. These are the townsmen elite. They already own the largest landholdings; the elite is small; they are kinsmen; and they already have business arrangements among themselves. They also have capital to invest and are looking for investment opportunities. To further increase their wealth may not be just, but at the moment this may be the only existing element within the social structure with the potential for the sorts of changes needed with the new technology.

Much has been written on how the village, town and city are all part of a complete social system. Nevertheless, changes are often instituted in one part of the system without due consideration for the ramifications of these changes on other parts of the system. For example if mechanization were to render the labor of large numbers of villagers unnecessary a sharp increase in migration to town and city would likely follow. Thus, as mechanization is considered, its impact on the rest of the social system should be also considered. Unfortunately we do not yet know enough about the nature of the economic and social changes which will result from mechanization. For example, it could raise yields successfully yet be judged a failure from the point of view of the system if it caused major social dislocations. Its success must be judged in terms of its impact on the social system as a whole; not just on the agricultural segment of that system.

PAPER V

KAYSERI

A Village on the Uzunyayla Plateau: Uzunpinar

By: Sadi Duman

LOCATION:

The village is located on a high plateau called Uzunyayla - approximately 1,500 m from sea level. Uzunyayla is between Kayseri and Sivas. The village is related to Pinarbaşi which is a district of Kayseri. The distance between Kayseri and Pinarbaşi is 100 km and from Pinarbaşi to the village 70 km.

There is rocky and mountaneous area on the east and south of the village. On the west and north there lies a high, plain covered with a thick soil layer. The mountaneous area is used for grazing, and almost all of the rest of the village area is cultivated (nearly 19,000 dn.) There are 119 households and the population is 730 (in 1970). There is a primary school with 70 students.

CLIMATE:

The climate is cold. There are about 120 days with snowfall, generally from November till March. It rains mainly in Spring and Autumn. Annual average rainfall is about 600 mm.

ROADS AND TRANSPORTATION:

Field roads connect the village with the nearby villages. It is 25 km to the highway that goes to the town. The transportation between the village and near villages is mainly by tractor and horse drawn carriage during Spring, Summer and Fall. Sledge is used in winter between villages and the highway.

Starting at the end of March there is a bus going to the town every day except Monday and rainy days. It moves early the morning (4 p.m.) from the village and picks up passengers and their loads from three more villages on the way to the highway. Usually it gets overloaded with people, their loads and sometimes with a few sheep and chickens by the time it reaches the highway. About six o'clock in the morning three or four more busses reach the highway and race to take as many people waiting on the way as they can. They arrive to the town at 7:00 or 7:30 a.m. In the afternoon - at 3:00 p.m. usually - they move from the town and after dropping their passengers in 10 or 12 villages on their way, they reach the village which they left in the morning. The trip of 70 km takes nearly 3 hours with these busses. They work between the town and villages like a dolmuş.

SOURCE OF INCOME:

The land owned by the villagers is the main source of income. On the average, 11,000 dn is sown out of 19,000 dn.

The average yield is about 120 kg per dönüm and if the average cost of sowing is 50 TL per dn, then they have an income of 660,000 TL.

(110 - 50) X 11,000 = 660,000 TL.) from land. The income from one sheep is about 50 TL. (calculated on page 16.) Since there are about 3,000 sheep this means about 150,000 TL from sheep raising. We may assume that from other sources, (working in cities in some months and in iron mining), 70,000 TL of additional income is generated. This means that about 880,000 TL is the annual total income of the village. 75% of total income is from wheat, barley and rye production, 17% from sheep raising, and 8% from other sources.

The total population is 730 and average family size is 6.1. From total income figure we get per capita income: 1,200 TL. This figure may change depending upon the harvest year. Per capita income may be near to 2,000 TL if it is a good harvest year such as 1971 which was exceptionally good.

NEARBY VILLAGES AND THE CHANGE IN TRACTOR NUMBER:

The central village, say U, has village boundaries with seven villages. Two of them, say M and C are on south and south-east with very small amount of land suitable for cultivation. They mainly live on sheep raising.

The other five villages have large mountaneous area on the east, north and north-east. They have most of their land cultivated on the south - on the high plain. We can name them as Y, H, A, D, and P.

In the village - A, there is a mill (for flour) with a diesel motor. Near to the mill, there is also a repair shop to which most of the tractor owners in U, Y, H, A and D go. Minor repairs like welding or replacing

a broken part of motor with a new one is done in that shop. It employs 3-4 persons in summer and has electrical welding equipment. The village A, like the others does not have electricity except that the repair shop has a generator.

There has been a marked change in the number of tractors in these villages in the last five years.

Current Number of Tractors Compared to Five Years Ago

Villages	Cultivable Area (Approx)	No. of Tractors	No. of Tractors (5 years ago)	Household No.	Distance from Village
U	20,000	4	9	120	-
Y	10,000	10	2	70	7 km
H	7,000	1	2	50	7 km
A	30,000	20	38	80	10 km
D	20,000	6	8	100	10 km
P	15,000	-	-	90	20 km

The number of tractors has decreased in village-A from 38 to 20, in village-U from 9 to 4, in village-D from 8 to 6 and in village-H from 2 to 1. Only in village-Y the number of tractors has increased from 2 to 10. The causes of these changes may be as follows:

(a) the tractor with its many uses in crop production and transportation is also a symbol of prestige and richness in these villages. In 1960 there was still some uncultivated land. It was relatively easy and

profitable for some households to buy a tractor on credit - usually 4-6 years term. The land newly cultivated or cultivated after 2 or 3 years rest gave high yields in the first two or three years and decreased sharply afterwards. This decrease in yield affected the profitability of owning a tractor very much. (Newly cultivated land may give, as an average, 15 or 20 kg of wheat per kg of wheat seeded, whereas land cultivated for many years has an average yield of 7 or 8 kg per kg seeded in these area.)

(b) Being the first tractor owners the people from village-A got a large amount of land in village U and Y as share-croppers or by "rehin" system (i.e. land used without rent and credit given without interest.) But as the yield of newly cultivated land has decreased and the competition of the outsiders (i.e. tractor owners from Yerköy, Ankara) started as share-cropper or as "rehin" (pledged land) taker, the former sharecroppers found themselves in a difficult position, burdened with their debt.

Also when the iron ore mine opened on the boundaries of the village-P and D, many people from village-Y (30), from village-U (20) and from village-H found jobs there. By saving most of their wages (500-800 TL per month) they were able to get back their pledged land or to start to operate their land through custom work, if it had been held by a share-cropper. The outsiders' competition reduced the profitability of share-cropping while the iron-mining income enabled land owners to redeem their pledged land. Thus the amount of pledged land held by tractor owners in village-A fell sharply and this had been a very profitable business for them.

(c) Tractor owners in village-A and (some) in U started to borrow from usurers (tefeci) - to pay for their debt to merchants or banks - with very high interest (40-50%) The most common practice in this kind of credit system was to sign a paper saying "the borrower owes, say, 15,000 TL to the usurer which will be paid back in September" where as borrower received only 10,000 or 11,000 TL in the winter or spring of the same year. To this contract a promise is added to give usurer 15,000 TL worth of wheat for his debt at fixed prices - usually the last year's price. Therefore this kind of credit is called "wheat money" (buğday parasi) in those villages.

It is difficult to estimate the amount of credit received under this system because it is illegal and considered not honorable for both parties. Contracts are made in secret. Nevertheless there are known to be many households who had to sell their tractors and even land because of this sort of debt.

(Number of the households in village-A was 120 and now it is 80)

(d) Prices of tractors and fuel has increased in the last few years without a corresponding increase in yield or production. This caused a higher cost of maintenance and custom work.

Out of five villages only the village-Y has acquired more tractors than it had before. Iron mining must have an effect on this by providing employment and income for the people of that village enabling them to save their land from sharecropper or "rehin". Secondly as the number of tractors has decreased in village-A and -U, sheep owners in village-Y started to buy

tractors in expectation of profit through custom work and sharecropping.

In the case of Village-U, the number of the tractors was 9 and fell to 4. In one instance, there was a 70 HP tractor owned by the household (1) with two more partners. Household (1) had about 150 sheep. Half of the tractor belonged to household (1), and the other half was shared by two partners. Three years ago they sold it because of unprofitability and problems they had with each other. Number of sheep owned by household (1) has fallen from 150 to 20 during this period.

As in the example given above two more tractors were bought by four households. Two other household had one for each. In addition to high prices of fuel, high cost of maintenance and decrease of pledged land available, partnerships experienced major problems related to operation of land ie, who would receive priority in ploughing and sowing when their land were separated; how to account for differences in yield and amount of land when their lands were partnership's capital. Also, disagreement on how to share expenses made was a source of trouble. For all these reasons partnerships failed to operate satisfactorily and they, too, disposed of the tractors.

LAND DISTRIBUTION

The distribution of the family holdings in village-U by size group is given below:

Size Distribution of Land

Size groups (in decares)	Number of Families	% of Families	Total land in the group	% of land	Average holding size in the group
Families with no land	19	16.1	-	0.0	-
1 - 49	3	2.5	100	0.5	33.3
50-99	7	5.9	460	2.4	65.7
100 - 199	55	46.6	7230	38.3	131.4
200 - 399	26	22.0	6200	32.8	238.4
400 +	8	6.7	4840	25.6	605.0
Total	118	100.0	18890	100.0	190.8 1/

1/ The landless families are not included in calculation of the overall average.

FARMING:

a) Crops and Yield:

The village-U has very little land irrigated - about 150-200 dn out of 19,000 dn. The rest of the land is used for three crops: wheat, barley and rye. Approximately 11,000 dn is sown and 8,000 dn is left as fallow land. That is 25-30% of the land is sown for two successive years. This ratio may reduce to 15-20% after a bad harvest year because of inability and unwillingness of households to have some of his land sown. 80% of the total land sown is used for wheat and 20% for barley and rye production (ie, 8800 dn for wheat and 2,200 dn for barley and rye.)

In village-U, 14 or 16 kg wheat is seeded per dönüm. Ten years ago the most common practice was to seed 8-10 kg per dönüm. Wheat seeding is made

in two seasons, Autumn (September-October) and Spring (April-May). Last year 70% of wheat seeding was in October, and 30% in Spring, or 6200 dn in Autumn and 2600 dn in Spring. It was nearly 50% for each a few years ago. Farmers seem to prefer Autumn seeding but they don't have facilities to do so.

The yield was also different in two cases: Those seeded in Autumn gave approximately 150 kg per dönüm, but those seeded in Spring gave only 60-75 kg per dönüm. Total wheat production was about 1,125 tons during last year.

For barley production half of 2,200 dn is used, the other half being of rye 200-300 dn of rye is cut when it is green for sheep feeding. This area may change depending upon the grass that is on the fallow land, and its amount varies quite a bit from year to year.

(b) Sowing and Plowing:

Autumn sowing is made in September - starting on September 15th till October 15th. Spring sowing starts in the second week of April and continues for 20-25 days. In June plowing starts and takes nearly one month. Some households who are unable to plow their land at that time and some others who want to cut the grass growing on fallow land plow in August. However, their number is small and majority finish plowing by August.

Cutting green rye and grass on fallow land takes 7-10 days in August. Towards the end of August harvesting starts lasting till September 10th or 15th. Then comes Autumn sowing and the cycle is complete.

Harvesting is done by combines in 85% (approx.) of the area. Combines are not used in barley harvesting however. The price of combines was 5 TL per dönüm in this year (1971). The price of plowing was 10 TL per dönüm and sowing 5 TL per dönüm.

c) Fallow Land

After a harvest, land is left for fallow and is plowed in June of the next year. Then it is sown either in fall or spring. But sometimes land may be left for fallow after sowing for two successive seasons, instead of one. The amount of land sown for two seasons is about 3,000 dönüm in a year.

When land is left for fallow it will have grass unt. 1 June. It is considered useful in fertilizing the land to plow when the grass gets 10-15 cm. Nearly half of the fodder used in the village for sheep and cow feeding is obtained on fallow land. If a farmer thinks that it is worth while to cut/the grass at the expense of some fertility of the land or if he is unable to plow in June, then he gets the grass on the fallow land in August and afterwards plows. The fallow land on which grass is cut amounts to 1,000 dn in a year. Normally one "araba" of that sort of fodder is obtained from 3-4 dn. One "araba" of fodder weighs nearly 300 kg and its price is 100 TL.

A sheep owner normally stores one "araba" of fodder (either fallow land grass or green cut rye) for every 5 sheep for winter. Sheep owners can easily do without fallow land grass since there is a good substitute for it in green rye grass. People cut "haris"* (fodder from fallow land) because it is obtained without any previous expense. However, it is a common belief that obtaining fodder from fallow land decreases the fertility of the land. The amount of

* Haris (a local term) grass cut on fallow land.

grass on the fallow is considered as a sign of fertility of land: the more the grass on the fallow the more fertile it is. For this reason some of the land cultivated for two successive seasons may be left for two years as fallow land. If after the first year as fallow the land gets very little grass on it, it may be left as fallow for one more year. This sort of land is not much compared with total land sown.

d) Fertilizer:

Farmers in the villages believe that use of fertilizers increase the yield by 40-50 kg per dönüm (or 3-4 kg per each kg seeded). In spite of this belief they can't use enough fertilizers basically because of financial difficulties and scarcity of fertilizers. Those, who are able, use 10-12 kg of fertilizer per dönüm, and they do not differentiate the kinds of fertilizers. Total amount used in a year in the village is less than 20 tons.

OPERATION OF LAND:

The following systems of land operation exist in the village:

Systems of Land Operation

	Amount of land (decares)	% of total land	% of village families
Custom plowing and custom seeding:	9,220	48.8	44.1
Custom plowing but seeding by own animals:	3,990	21.1	20.3
Sharecropped with a tractor owner:	3,500	18.5	11.9
Owner operated tractor:	1,700	9.0	3.4
Sharecropped with a villager who operates the land with animals:	200	1.0	1.7
Landless families:	-	-	16.2
Others:	280	2.0	2.5
Total	18,890	100.0	100.0

Most of the land in the village is operated by the owners in two ways: First, land owner has no tractor or no horse and has his plowing and seeding done by custom work (by tractor). Secondly, the owners may have horses but plowing is done by tractor custom work with seeding done by his horses. The tractors in the village do about 10% of the custom work. The rest of the custom work is done by tractors owned by outsiders..

In addition to these two systems, 18.5% of the land is operated by share croppers. The percentage was much higher a few years ago (maybe 30-35%) With the decrease in number of tractors and with the rumor of land reform the amount sharecropped has decreased significantly.

In the sharecropping system, the land owner gives only the land and the seed needed. All the other services are provided by sharecropper, including the transportation of the crop from field to owner's house. Except as related to the operation of the land the sharecropper has no other obligation to land owner.

Terms of the agreement is usually 2-3 years and based on verbal contra . Only in the case of credit giving is a written document used. That is, if the land is large, say 1000 dönüm or more, the land-owner may demand, say TL 10-15 thousand as credit to be paid at the end of the contract period. One land owner with 1400 dönüm of land received 25,000 TL as credit when he gave his land to a sharecropper.

In sharecropping system both parties share the benefit and the loss. Therefore they usually don't have problems on the date and on the way of cultivation. In the case of a disagreement on use of land, the land owner can get back his land since there is no legal document. Usually, however,

they have confidence or have no alternative but to accept whatever the share-cropper does - they are usually 65 h.p. tractor owners with good equipment. Harvesting in all of the cases is mainly done by combines.

PLEDGED LAND: "REHIN"

The Land Commission (Toprak Komisyonu) distributed land in 1953 from grazing land to the households who owned no land. The amount given was 120-150 dönüm for each household. Some of these new land owners (and some other, too), have created the "rehin" system (pledged land.) A new owner cannot sell his land until 1977; title - deed was not given. Those who wanted to sell it or who were unable to cultivate it - without capital - gave a written contract stating the amount of credit received and stipulating that his land was to be used until he paid the amount back. Rich farmers took (and used for years) this sort of land, giving an amount of credit near to half of the real price of the land. Until the last few years there were in the village-U about 10-15 households whose land was pledged i.e. taken as "rehin". This number was higher in village-Y.

The inflation and iron mining which started in 1968 (near to village-U) helped those owners to save their pledged land.

TRACTORS:

There are 4 tractors in the village-U. One of them is 1952-model with one cyclinder, It has a small trailer and a plow and is enough only for its owner's land: 200 dönüm.

The others are 1962-model 45 h.p. (Minneapolis). Two of them were bought in 1963 for 42,000 TL - 9,000 TL in advance and the rest over four years - on government credit (Zirai Donatim Kredisi). The third one was

bought in 1967. There is a trailer, a disk plow and a one-way with each of them. One of them has also a grain drill bought in this year for 19,000 TL. A trailer may be sold for 7,000 TL, disk plow for 8,000 and one-way for 10,000 TL. Similar tractors have a price of 20,000 TL without equipment. On an average quality of land one of these tractors can plow 3 dönüm or sow 7 dönüm in an hour. In plowing 2.5 litre of fuel is needed for each dönüm of land.

TRACTOR WORK:

In January, February and March all the tractors are idle. Starting in the second or third week of April they work for 20-25 days in Spring seeding. After that they are again idle for 30 days. In June and July they plow for one month with breaks on rainy days. In August there is 7-10 days of carrying fodder from field to houses. Towards the end of August transporting crops may take a week or so. From September 15 to October 15 Autumn sowing takes place, and after that they are again idle till April of next year. That is, tractors work for nearly 3 months in a year. In other times they are used for transportation between villages, but not very much - a few times in a month.

ANIMAL HUSBANDRY:

Total number of cows is about 500 and quite equally distributed among households. Only one has ten calves and others a few. Cows graze on mountains for 8 months and do not cost much. They are not an important source of income because of poor feeding.

About 40 households own 3,200 sheep. And 12 of these own more than two thirds and 3 household nearly one third of the total sheep. Those three owning one third of total sheep have sheepfolds ("ağıl") on mountains which reduces the cost of sheep keeping.

In the village one stores 100 TL worth of fodder for every five sheep. But in the sheepfolds on mountains less than half of that amount is enough since grazing is possible during winter, too.

The grazing pattern is as follows:

Until February 15, fed with fodder and no grazing. Some grazing and some fodder from February 15 to April. From April till September 15th, grazing on mountains. From September 15th till November, grazing on fields after harvesting (called "grez"), 30-40 days. In the first two weeks of November grazing again on mountains. From November 15th on kept in sheepfolds and fed with fodder.

In a year 9 herds of sheep graze on fields for 30-40 days after harvest. In these days the grass on the mountains is dry. If sheep are not grazed on fields for these days it will either result in additional cost of feeding or in a decrease in their numbers by nearly 1,000. Income from sheep raising: for 100-sheep we can make following calculations for one year.

Annual milk
20 days X 35 lt. = 700 lt.
20 " X 25 lt. = 500 lt.
20 " X 20 lt. = 400 lt.
20 " X 10 lt. = 200 lt.
Total = 1,800 lt.

Income from milk 1,800 X 1.50 TL = 2,700 TL.

Wool:

100 sheep X 2 kg (of wool) = 200 kg

Income from wool = 200 X 12 = 2,400 TL.

Income from lamb - 30 X 200 = 6,000 TL.

Total income from 100 sheep is 2,700 + 6,000 = 11,100 TL.

Costs:

20 "araba" of fodder X 100	= 2,000
For shepherd	= 2,000
Other expenses	= 2,000
	6,000

Net income from 100-sheep is 11,100 - 6,000 = 5,100 TL. Average net income from one sheep is 50 TL.

If the number of the sheep in the village is reduced by 1,000 - in the case of not grazing on fields - the loss will be around 50,000 TL. Assuming that these are near estimates of real costs and income it may be said that introduction of any new technology which prevents field grazing will cover the loss if it increases the yield per dönüm by 5 kg. (11,000 dönüm (sown) X 5 = 55,000 kg., which makes nearly 50,000 TL). If increase in yield is 10 kg per dönüm the village will get an extra income of 50,000 TL with reduced number of sheep. The total income will be higher in the village even if sheep owners may loose some of their income because of new technology.

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