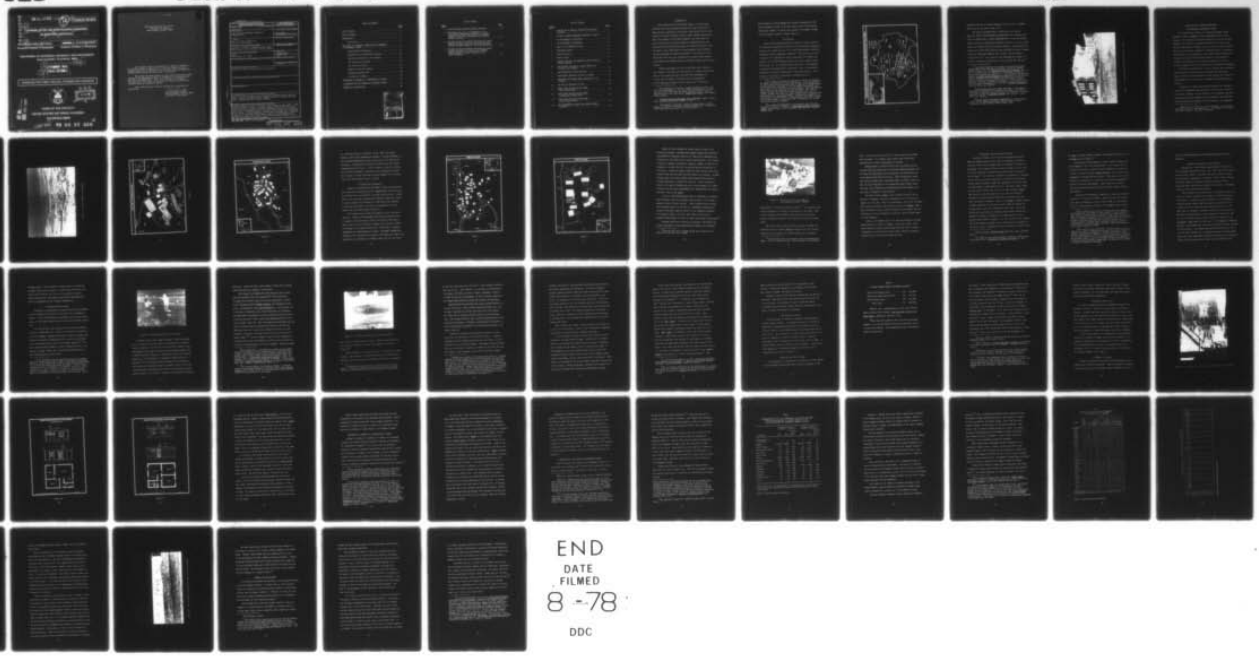
AD-A055 568 AIR FORCE ACADEMY, COLO F/G 8/11
CHANGE AFTER AN EARTHQUAKE DISASTER IN WESTERN ANATOLIA.(U)
JAN 78 W A MITCHELL , C T BARNES
UNCLASSIFIED USAFA-TR-78-5 NL

1 OF 1
AD A055 568



END
DATE FILMED
8-78
DDC

12 B.S.

14 USAFA-TR-78-5

6 # CHANGE AFTER AN EARTHQUAKE DISASTER IN WESTERN ANATOLIA.

10 MAJOR WILLIAM A. MITCHELL
Associate Professor of Geography

[redacted] C. TAYLOR BARNES
Assistant Professor of Geography

DEPARTMENT OF ECONOMICS, GEOGRAPHY AND MANAGEMENT
USAF ACADEMY, COLORADO 80840

11 JAN[redacted] 1978

12 61p.

9 FINAL REPORT.

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

DEAN OF THE FACULTY
UNITED STATES AIR FORCE ACADEMY
COLORADO 80840

Editorial Review by Lt Col Elser
Department of English
USAF Academy, Colorado 80840

This research report is presented as a competent treatment of the subject, worthy of publication. The United States Air Force Academy vouches for the quality of the research, without necessarily endorsing the opinions and conclusions of the author.

This report has been cleared for open publication and/or public release by the appropriate Office of Information in accordance with AFR 190-17 and DODD 5230.9. There is no objection to unlimited distribution of this report to the public at large, or by DDC to the National Technical Information Service.

This research report has been reviewed and is approved for publication.

Philip J. Erdle

PHILIP J. ERDLE, Colonel, USAF
Vice Dean of the Faculty

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER USAFA-TR-78-5	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) CHANGE AFTER AN EARTHQUAKE DISASTER IN WESTERN ANATOLIA		5. TYPE OF REPORT & PERIOD COVERED FINAL REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Major William A. Mitchell and Captain C. Taylor Barnes		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Economics, Geography and Management United States Air Force Academy, Colorado 80840		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DFEGM USAF Academy, CO 80840		12. REPORT DATE January 1978 13. NUMBER OF PAGES 58
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for Public Release; Distribution Unlimited

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Disaster; Disruptive natural force; Earthquake; Earthquake induced loss; Epicenter; External employment; Heavily damaged; Intensity; Internal migration; Lightly damaged; Magnitude; Moderately damaged.

ABSTRACT

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Planned development has led to relatively rapid changes in rural Turkey. Based on field research in Turkey, this report examines and describes some of the changes which occurred when an unplanned disruptive natural force confronted a rural area of a developing country. Detailed relative change over a three-year period between a village damaged by the 1970 Gediz earthquake and an undamaged village in the same region is analyzed, followed by an interpretation of surrogates of change from a group of thirty-four earthquake damaged villages and thirteen undamaged "control" villages.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Turkey inherited from the Ottoman Empire a socio-economic structure that was dichotomized between the urban population of administrators, merchants, and affluent land owners, and the rural population of poor villagers living in small isolated settlements. After the founding of the Turkish Republic, the State began to pursue both direct and indirect goals of industrialization and westernization which slowly narrowed the differences between rural and urban. Since 1963 Turkey has been guided by three different five-year programs of planned development.[1] As evidenced by the Second Five-Year Plan, the government has placed renewed emphasis on involving rural Turkey within the national economic and political system.[2]

Planned development has led to relatively rapid changes in rural Turkey. The purpose of this paper is to examine and describe some of the changes that have occurred after earthquakes in a rural area of Turkey.[3] This goal will be accomplished by (1) examining in detail relative change over a three-year

---

[1]The importance of national economic planning was made clear with the establishment of the State Planning Organization in 1960. See Jane Perry Clark Carey and Andrew Galbraith Carey, "Turkish Industry and the Five Year Plans," Middle East Journal, XXVI (Summer, 1971), 333-354.

[2]Second Five-Year Development Plan, 1968-1972 (Ankara, Turkey: State Planning Organization, 1969), p. 260.

[3]See William A. Mitchell, "Turkish Villages After an Earthquake: An Analysis of Disaster Related Modernization," (unpublished PhD dissertation, University of Illinois, 1974).

period between a village damaged by the Gediz earthquake of 1970 and an undamaged village in the same region, and (2) interpreting explanatory examples of change from a group of 34 damaged villages and 13 undamaged "control" villages (Fig. 1).[4]

The Setting

Gediz (pre-earthquake population 7,500) is a focal point for the marketing of agricultural products from surrounding villages and serves as the capital for one of the seven administrative districts in Kütahya province (population 439,967).[5] The province, one of 67 in Turkey, is an agricultural region containing 615 villages and extends over a 11,875 square kilometer area in the western part of Turkey (Fig. 1). It is a mountainous region that is interspersed with plateaus averaging 900 to 1,500 meters, and is surrounded by mountains rising above 2,000 meters in the south and west. The nature of the terrain is reflected in Kütahya province's

---

[4]The village as a whole was selected as the unit of analysis for group interviewing and direct observation. About 75 percent of the 135 villages which were officially recognized as damaged (based on interviews with officials of both the Ankara headquarters and Gediz field team of the Ministry of Reconstruction and Resettlement) were located in the districts of Gediz and Emet. Thus, the 34 damaged villages were drawn from these two districts. The 13 control villages were from the closest administrative districts that had minimal or no earthquake damage. Villages were sampled by the senior author in 1970 and 1973. Respondents in most cases included the village headman, a large land owner, occasionally the village teacher, and several villagers.

[5]For a detailed geography of the province, see: William A. Mitchell and Edward A. Glowatski, A Geography of Kütahya Province, Turkey, United States Air Force Academy, USAFA-TR-76-4, Colorado, January 1976.

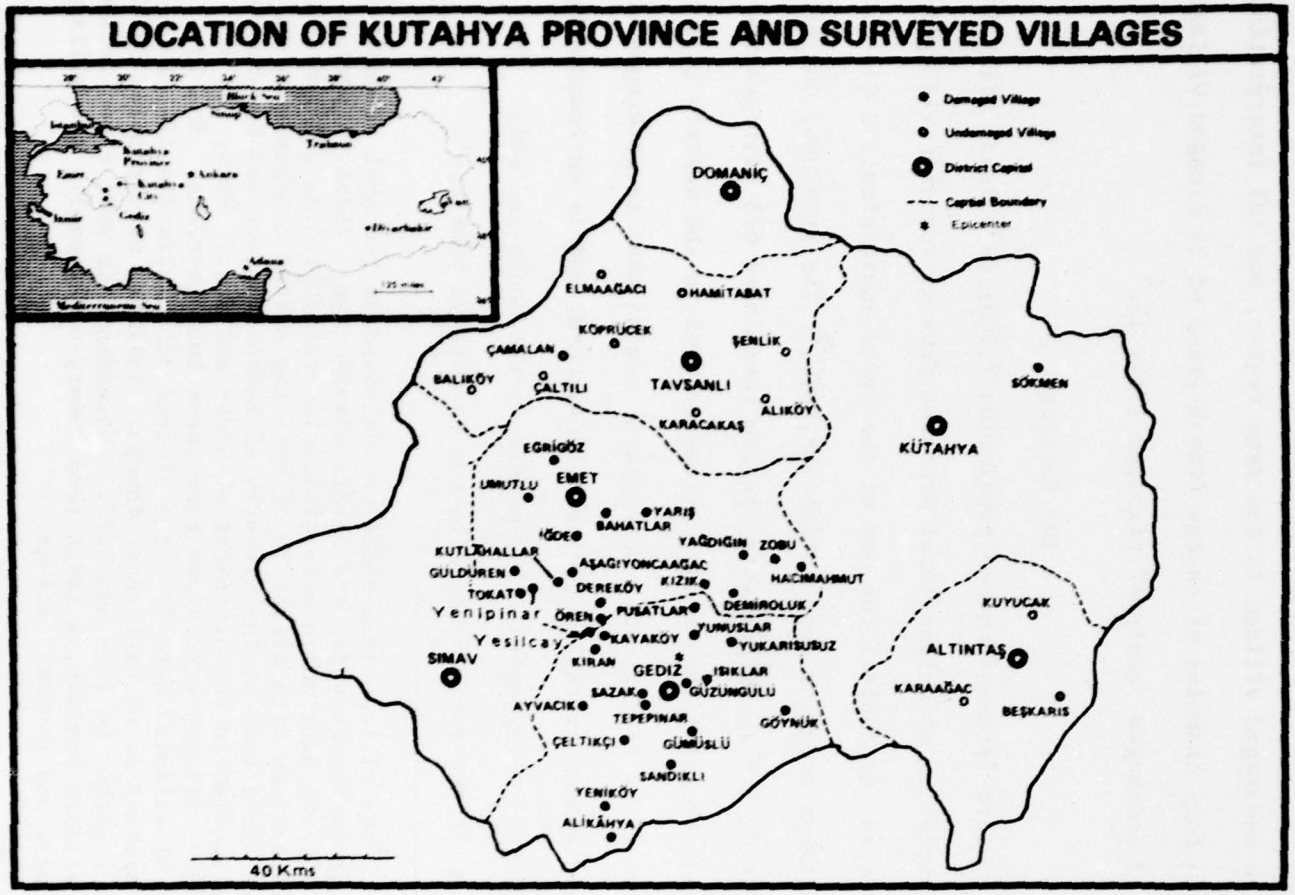

LOCATION OF KUTAHYA PROVINCE AND SURVEYED VILLAGES
Damaged Village
Undamaged Village
District Capital
Capital Boundary
Epicenter
DOMANIÇ
ELMAAĞACI
HAMITABAT
KÖPRÜCEK
ÇAMALAN
ŞENLIK
BALIKÖY
ÇALTILI
TAVŞANLI
ALIKÖY
KARACAKAŞ
SÖKMEN
KÜTAHYA
EGRIGÖZ
EMET
UMUTLU
YARIŞ
BAHATLAR
ÖĞDE
YAĞDIĞIN
ZOBU
KUTLUHALLAR
AŞAĞIYONCAAĞAC
GÜLDÜREN
DEREKÖY
KIZIK
HACIMAHMUT
TOKAT
Yenipinar
ÖREN
PUSATLAR
DEMIROLUK
KUYUCAK
Yesilcay
KAYAKÖY
YUNUSLAR
YUKARISUSUZ
ALTINTAŞ
SIMAV
KIRAN
GEDIZ
IŞIKLAR
KARAAĞAC
SAZAK
GÜZÜNGÜLÜ
BEŞKARIŞ
AYVACIK
TEPEPINAR
GÖYNÜK
ÇELTIKÇI
GÜMÜŞLÜ
SANDIKLI
YENIKÖY
ALIKAHYA
40 Kms

Figure 1

population density per square kilometer which, at 37, is somewhat lower than the national average of 45.

The Gediz earthquake began at 2302 hours local time on March 28, 1970.[6] The epicenter was measured at 39.1 degrees north and 29.4 degrees east. Richter magnitude was 7.1, and the maximum Modified Mercalli intensity was reported to be VIII. At least 1,086 people were killed and about 1,200 were injured. Nine thousand five hundred and twenty-eight dwellings were destroyed or heavily damaged, 9,840 were moderately damaged, and at least 7,737 were lightly damaged (Fig. 2).[7] Loss caused by the earthquake was valued at 23 million dollars and extended over an area of about 35×10^4 km^2.[8]

---

[6] A technical report on the disaster is provided by Mehmet Taşdemiroğlu's "The 1970 Gediz Earthquake in Western Anatolia, Turkey," Bulletin of the Seismological Society of America, Vol. 61, No. 6, December 1971, pp. 1507-1527. An excellent descriptive report (with numerous photographs) is: Joseph Penzien and Robert D. Hanson, The Gediz Turkey Earthquake of 1970, Report to the National Science Foundation for the Committee on Earthquake Inspection, National Academy of Sciences, Washington, D.C., 1970. Also see William A. Mitchell and Edward A. Glowatski: "Some Aspects of the Gediz (Turkey) Earthquake, March 28, 1970," Journal of Geography, Vol. LXX (1971), pp. 224-229.

[7] Problems associated with human adjustment to the disaster, particularly concerning the reconstruction phase, are examined in William A. Mitchell, "Reconstruction After Disaster: The Gediz Earthquake of 1970," Geographical Review, Vol. 66, No. 3 (July 1976), pp. 296-313.

[8] Kütahya Deprem İcra Heyeti Başkanlığınca, "Gediz depremi, 28 Mart 1970," (Kütahya Earthquake Executive Board, "Gediz earthquake, 28 March 1970"), Gediz, Turkey, 1973.

Figure 2. A Heavily Damaged Government Building in Gediz

CASE STUDY OF A DAMAGED (TEPEPINAR) AND UNDAMAGED (KARACAKAŞ) VILLAGE

The following case study of an earthquake-damaged village (Tepepınar) and an undamaged village (Karacakaş) serves several purposes. The systematic, detailed comparison of the two villages provides a micro view of earthquake influence at the local level. Detailed description of Turkish culture at the micro level provides data for cross-cultural comparison by anthropologists, sociologists, urban planners, and geographers. Also, natural hazard specialists recognize the need for microzonation studies. The villages of Tepepınar and Karacakas are not unique in themselves but were selected randomly from their respective group, damaged and undamaged.

Punctilious reading of the case will indicate that earthquake-induced changes are not necessarily flagrant when examining a single village but become conspicuous when villages are compared in the aggregate (as in the section on damaged and undamaged groups, page 45).

Tepepınar is a small agricultural village of 195 residents located five kilometers west-northwest of the new town of Gediz.[9] Its closest neighbors are the villages of Ece, Yumrutaş, and Yelki. Tepepınar was severely damaged by the earthquake, whose epicenter was approximately 30 kilometers from the village. The undamaged

---

[9]The new city of Gediz is almost completed. It is located three miles south of the original city. See Mitchell, "Reconstruction After Disaster: The Gediz Earthquake. . . ."

village of Karacakaş is located approximately 56 kilometers north of Tepepınar (about 48 kilometers north-northeast of the epicenter). It has neighboring villages named Güzelgün and Kuruçay.

Tepepınar is situated on a series of hills at about 1,000 meters, approximately 100 meters above the Gediz valley. Mountains rise abruptly to the west and reach an elevation of 2,200 meters (Eğrigöz dağı). Very little of the village land is flat; most is located on slopes or rounded hilltops (Fig. 3). However, an area of relatively flat and treeless land about the size of an American football field adjoins the village on the north side. This area is used for winnowing and as a recreational area for children. A wooden bench, placed under a large tree on the southern edge of this field, served as a social gathering point for the older men during much of the day.

Karacakaş is situated in a relatively wide valley with relatively level terrain (Fig. 4). Hills rise to the north, south and west. Compared to Tepepınar, Karacakaş' relief is flatter and more favorable for agriculture. Grain fields adjoin the village on the east and south, and vegetable gardens on the west, northwest and southeast.

The land use arrangements in both Tepepınar and Karacakaş are rather typical of most villages in the province (Figs. 5 and 6). Vegetable gardens require frequent attention and are located close to the village. Most villages have streams nearby and vegetables

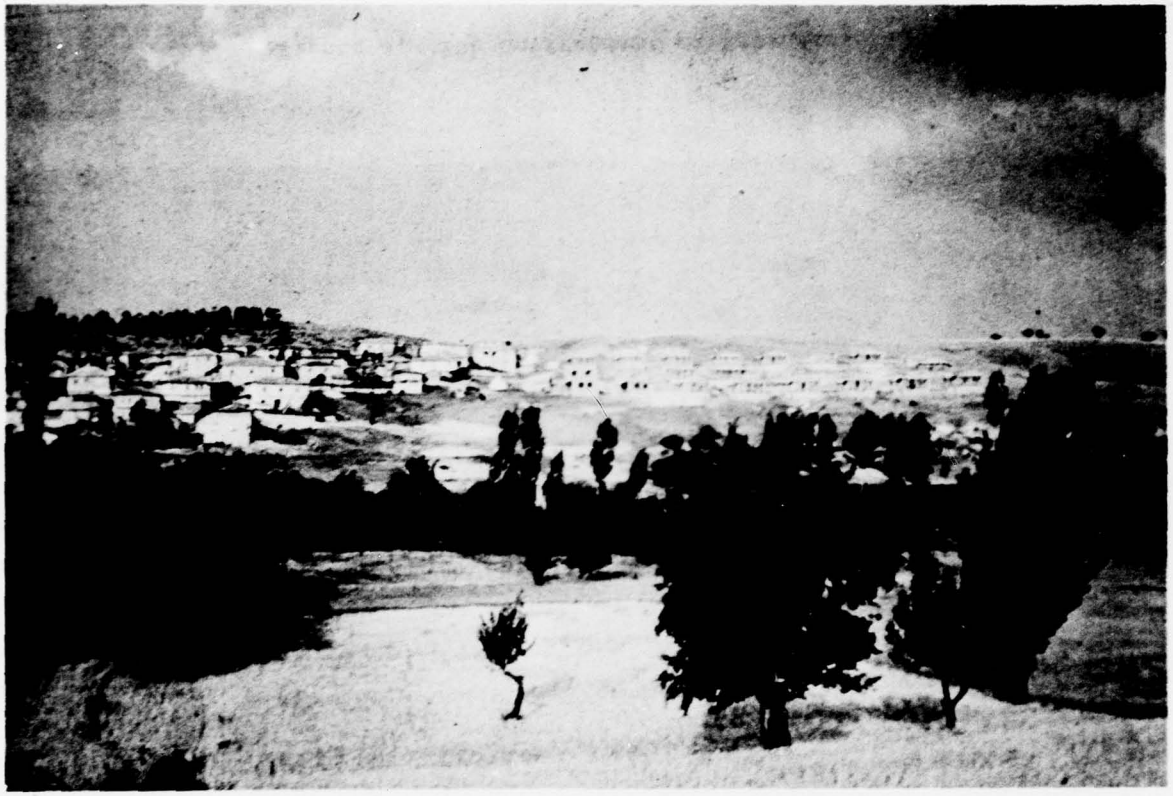


Figure 3. The Environment of Tepepınar

Figure 4. The Environment of Karacakaş

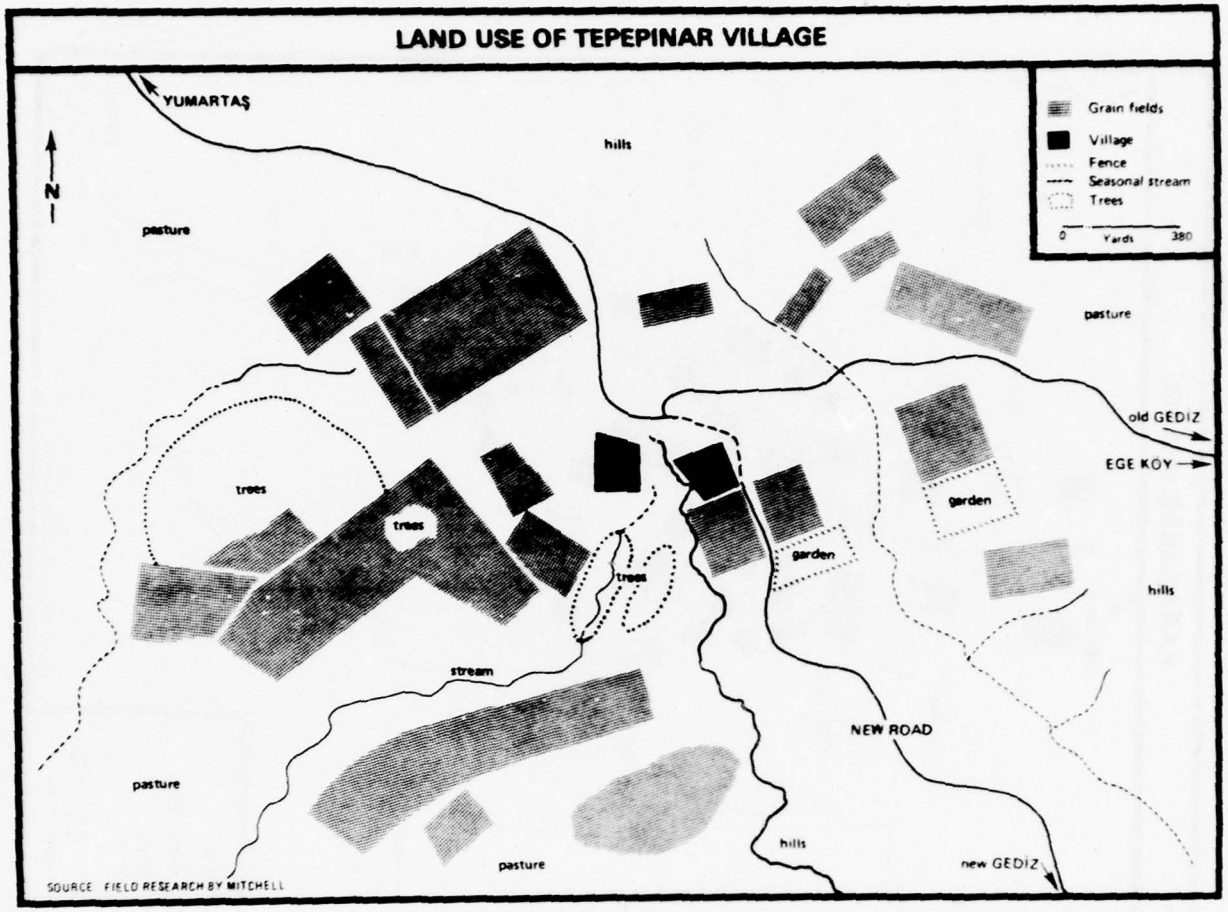

LAND USE OF TEPEPINAR VILLAGE
YUMARTAŞ
hills
N
pasture
Grain fields
Village
Fence
Seasonal stream
Trees
0
Yards
380
pasture
old GEDIZ
EGE KÖY
trees
trees
trees
garden
garden
hills
stream
NEW ROAD
pasture
hills
pasture
new GEDIZ
SOURCE FIELD RESEARCH BY MITCHELL

Figure 5

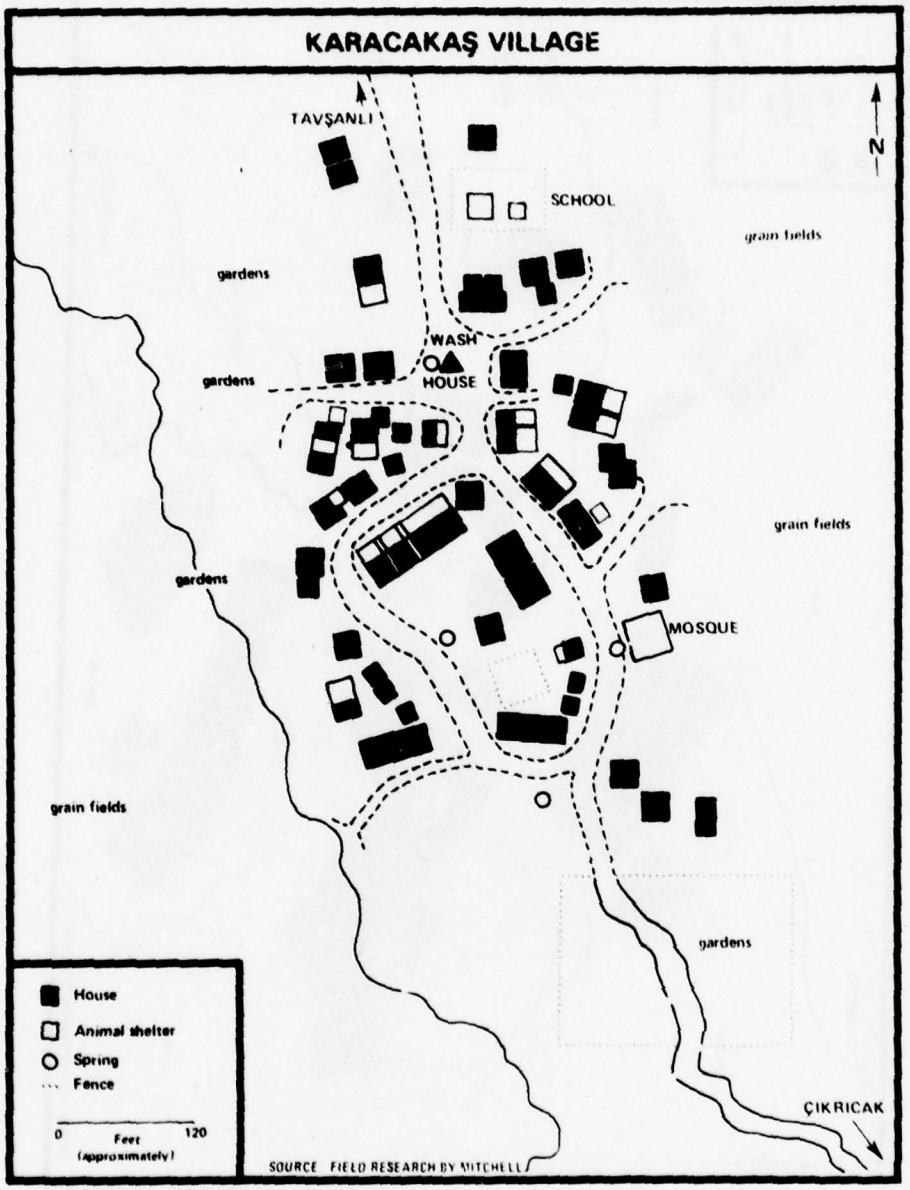

KARACAKAŞ VILLAGE
TAVŞANLI
N
SCHOOL
grain fields
gardens
WASH
HOUSE
gardens
grain fields
gardens
MOSQUE
grain fields
gardens
ÇIKRICAK
House
Animal shelter
Spring
Fence
0 Feet 120
(Approximately)
SOURCE FIELD RESEARCH BY MITCHELL

Figure 6

are cultivated close to this water source. When the terrain permits, grain fields surround the villages. In many villages, as in Karacakaş and Tepepınar, grain fields reach to the edge of the settlement. Grazing land is generally farthest from the village, depending again on terrain. In some villages, forests are located close to the settlements, resulting in more dispersion of fields. The villages of Isıklar and Tokat are good examples of how forests affect the field patterns (Figs. 7 and 8).

Accessibility and Mobility

Tepepınar is administratively linked to Gediz which provides the village with a marketing outlet, communication facilities such as telephones and a post office, and other urban services. Similar services are provided to Karacakaş by Tavşanlı (population 16,625). A recently graded five kilometer dirt road leads from Tepepınar to new Gediz and access to old Gediz is provided by an older, rougher dirt road which passes through Ece.

Even though roads do exist, the quality is far from satisfactory. Villagers from Karacakaş report that mechanized travel to Tavşanlı from Karacakaş is greatly restricted during winter months, since the four kilometer ungraded dirt road that connects the village to the Tavşanlı graded dirt road becomes a quagmire, impassable for weeks during that season. Karacakaş' neighboring villages can be reached by dirt wagon trails during the summer only. Walking the ten kilometers to Tavşanlı takes just over two hours.

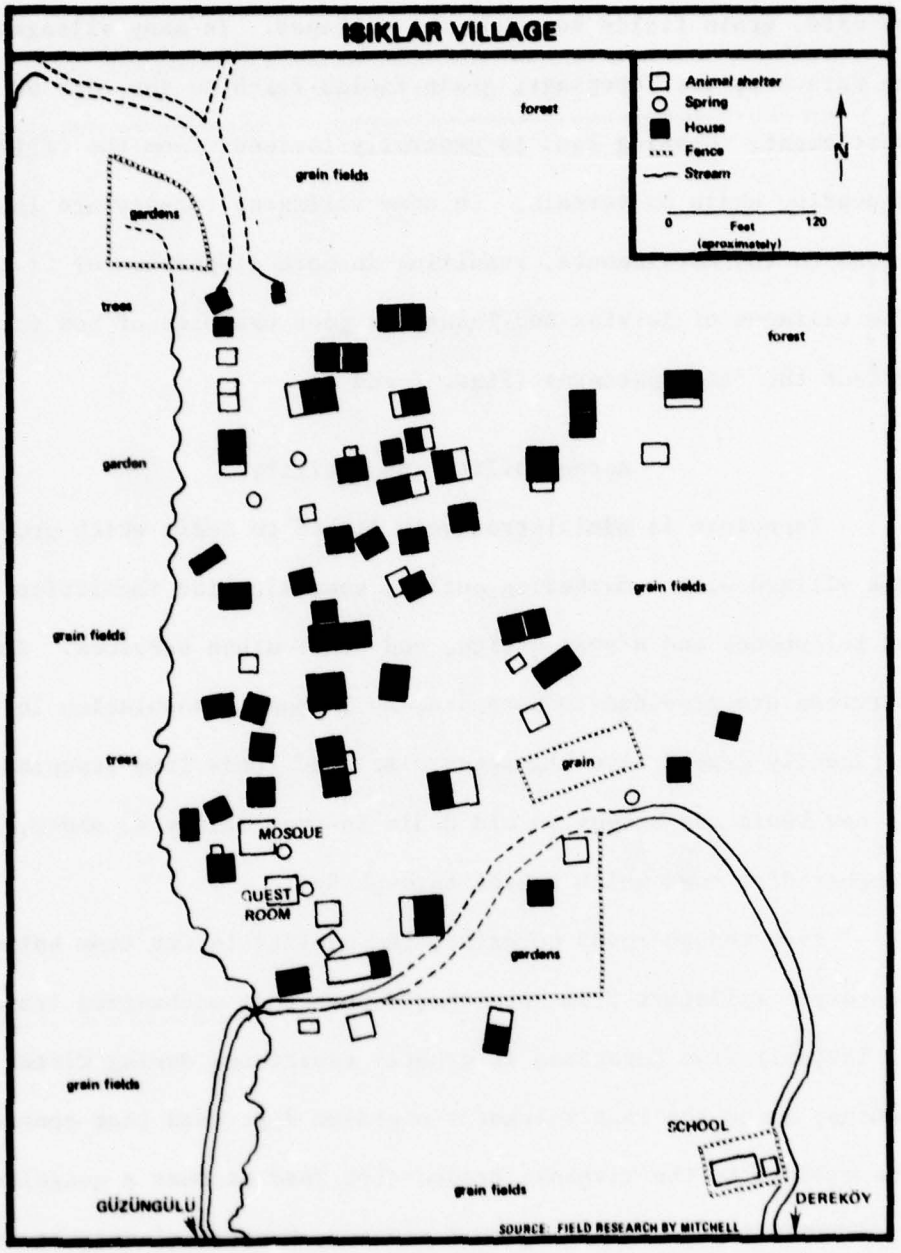

IŞIKLAR VILLAGE
Animal shelter
Spring
House
Fence
Stream
N
0
Feet
120
(approximately)
forest
grain fields
gardens
trees
forest
garden
grain fields
grain fields
trees
grain
MOSQUE
GUEST ROOM
gardens
grain fields
SCHOOL
GÜZÜNGÜLÜ
grain fields
DEREKÖY
SOURCE: FIELD RESEARCH BY MITCHELL

Figure 7

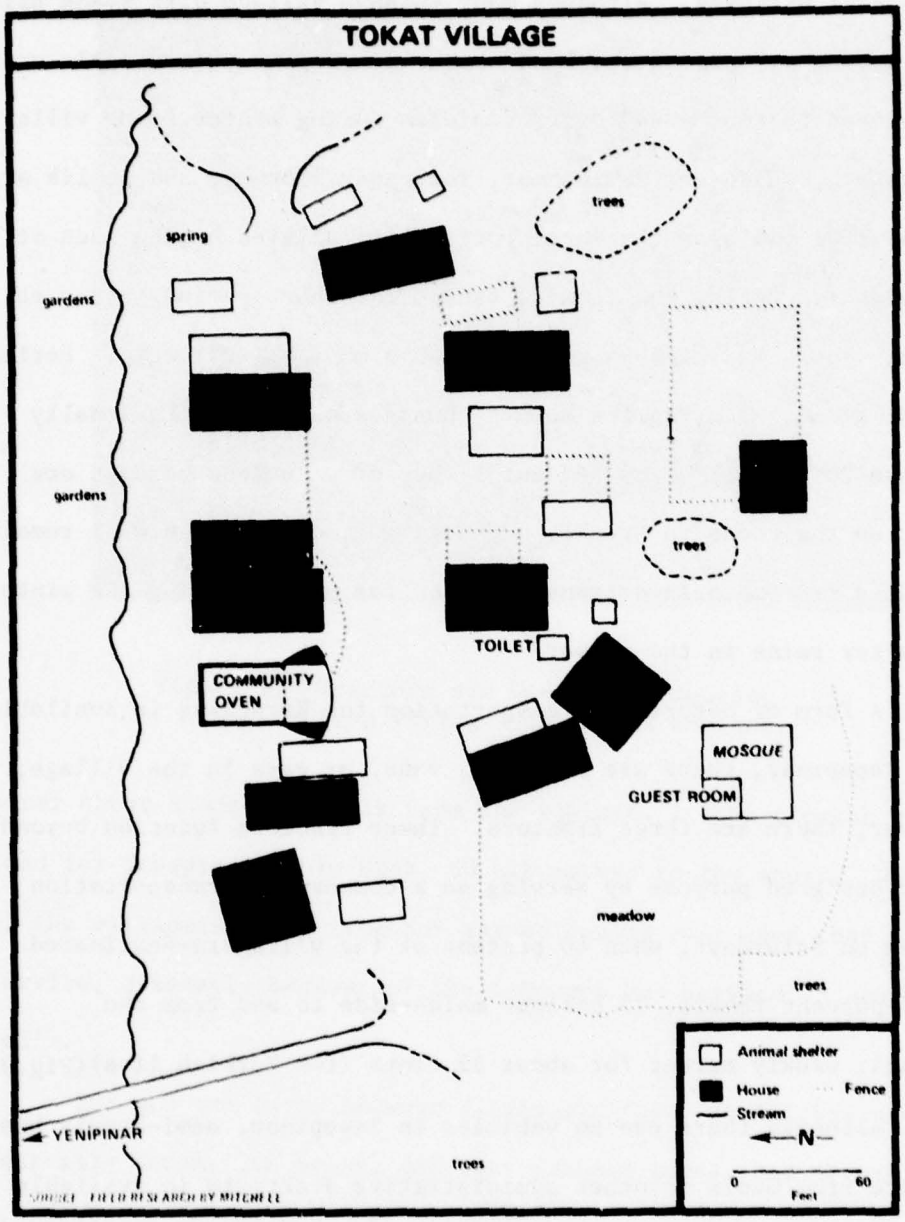

TOKAT VILLAGE
spring
gardens
gardens
trees
trees
TOILET
COMMUNITY OVEN
MOSQUE
GUEST ROOM
meadow
trees
trees
YENIPINAR
Animal shelter
House
Fence
Stream
N
0
60
Feet

Figure 8

Roads for both villages are rather typical of many of the provincial villages. Although many Kütahya village dirt roads have been graded by bulldozers, most are at least partly impassable and restricted to four wheel drive vehicles during winter. The villages of Ayvacık, Güldüren, Hacımahmut, Yenipınar, Sökmen, and Şenlik are examples of villages that are practically isolated during much of the winter. During the summer, except for short periods after rainstorms, jeeps and mini-buses can reach almost all villages. Periodic flooding does occur during summer thunderstorms and occasionally village roads will be closed until they dry. Unless bridges are built on the roads to Örenköy and Kızık, these villages will remain isolated from motorized transportation for months during the winter, and after rains in the summer.

A form of motorized transportation for Karacakaş is available. Like Tepepınar, there are no jeeps, vans, or cars in the village; however, there are three tractors. These tractors function beyond their designed purpose by serving as a commercial transportation system on Saturdays, when 40 percent of the villagers--estimated at 25 percent female, 75 percent male--ride to and from the Tavşanlı weekly market for about 15 cents (two Turkish lira)(Fig.9).[10]

Although there are no vehicles in Tepepınar, semi-hourly bus service from Gediz to other administrative districts is available

---

[10]The official rate of change during this research was 14 Turkish lira for one U.S.A. dollar.

Figure 9. Tractors are Used for Commuting from Villages to Market Centers.

after about a one-hour walk from the village.[11] The closest railroad for Tepepınar is in Uşak, 80 kilometers to the south. None of the villagers could remember anyone having ever used that service, evidently because of the frequent bus service in nearby Gediz.

Bus and van fares between cities and towns in Kütahya are generally fixed, but jeeps, dolmuşes (shared taxi), and tractors traveling to and through the villages bargain for the highest

---

[11] An all season paved road connects Gediz with Kütahya and Simav. A road of similar quality connects Tavşanlı with Kütahya.

price. Prices increase drastically in winter months when village roads are muddy. For example, jeeps charge about $10.50 (150 Turkish lira) to come to Karacakaş in the winter.

Although much of the male adult's time is occupied in agricultural field activities, and in repairing farming implements near his home, his opportunity for socializing in the village and town is far greater than that of his wife. Some of Tepepınar's males make fairly frequent trips, sometimes weekly, to Gediz. Trips are made far less frequently to the neighboring towns of Emet, Simav and Uşak. Male villagers from Karacakaş report that almost every male goes to Tavşanlı at least monthly.

The weekly market (pazar), held on Friday in Gediz, and on Saturday in Tavşanlı, provides an opportunity for both males and females to visit town. Early in the morning on these days, villagers with surplus vegetables, dairy products (cheese and yoğurt), eggs, and occasionally a goat or sheep converge on local markets from all directions, by foot, on donkeys, on tractors, and by various means of motor transport.

Except on the market day or for a medical emergency, village women seldom go to Gediz or Tavşanlı or any other towns. Their duties and the accepted social customs keep them close to home, a circumstance no different from other female villagers throughout Kütahya province and in other Anatolian areas.

Demographic and Occupational Patterns

Tepepınar villagers stated that their village was earlier known as Arapşah, and that the village is estimated to be about 400 years old, 100 years younger than the villagers' estimate for Karacakaş. The villagers referred to both villages as "very old," as did the residents of *Sakaltutan* during Stirling's research in that village.[12] The villagers estimated the population of Tepepınar to have been 195 in 1970, consisting of 104 males and 91 females. Average annual income per farmer was estimated to be between $280 to $350 (4,000 to 5,000 Turkish lira).[13] The lowest family income was $70 (1,000 Turkish lira) paid to the night watchman (bekçi). This position is usually taken by one of the least ambitious villagers, who often becomes subservient to the mayor and most other influential villagers. Duties of the bekçi in sampled villages included preparing tea, serving food and laying out bedding for village guests, and later cleaning the guest room. Duties also include policing fields and assessing fines against herders and shepherds or owners of animals whose animals grazed in other peoples' grain fields or gardens. The fine varied in some villages, but in most Kütahya villages it was 5 Turkish lira per animal for the first offense. Subsequent offenses are subject to higher fines.

---

[12] Paul Stirling, Turkish Village (New York: Wiley and Sons, 1965).

[13] In 1970, the per capita national income was 3,488 Turkish lira (about $250). Statistical Pocketbook of Turkey, p. 161.

The imam (religious leader), herders, and shepherds are paid, as is the bekçi by the villagers.[14]

In Tepepınar and Karacakaş, as in most Turkish villages, the mayor (muhtar) is the chief administrator. He is elected by the villagers and receives a small fee from the Ministry of Interior. A council or board of elders (ihtiyar meclisi), also elected, aids the muhtar in village judiciary matters. Most quarrels are settled locally, but assistance, if requested, is provided by gendarmerie soldiers from Gediz and Tavşanlı. These soldiers visit both Tepepınar and Karacakaş and most other villages regularly during good weather.

Population in Karacakaş is comparable to Tepepınar, with 262 residents: 133 males, 129 females. Average income is estimated lower than in Tepepınar, at $210 to $280 (3,000 to 4,000 Turkish lira).[15] All households contribute to the bekçi's salary which,

---

[14]Each village in the study area had herders and shepherds who remained with the animals as they grazed on village pastures. Since Turkey has practically no fencing and no private grazing land, the need for these men is obvious. Since there is no restriction on the number of animals that an individual can graze with the village flocks and herds, the total carrying capacity of the village pastures is almost always exceeded, resulting in severe overgrazing and greatly denuded conditions. These conditions are quite obvious throughout Turkey.

[15]This figure is not surprising. Villagers often are conservative in certain estimates, particularly in terms of income and numbers of animals per household. Average income was at first greatly understated, but after five or six "correction" estimates by different villagers, all of the respondents in Karacakaş agreed on the above figure. All of the village estimates are offered to indicate trends and general comparisons. No claim on the exactness of animals and income is intended.

at $105 (1,500 Turkish lira), was considerably higher than for Tepepınar.

Education and Health in the Villages

Tepepınar has a new village elementary school built since the earthquake destroyed the former one. There are now 31 students and one school teacher. Including the school children, literacy was consistently estimated at 70 percent. This is higher than the average in almost all Anatolian regions, and higher than in Karacakaş, where literacy was estimated at 45 percent. Karacakaş' school has one teacher and 38 students.

Most villages in the province have an elementary school, and there is a legal requirement for children to attend through the fifth grade. In practice, school attendance is not stringently required and when family labor shortages exist, children do not attend classes, but help with agricultural activities. At the same time, the villagers in Kütahya are aware of the need for an education, and occasionally a more prosperous villager will send his son to a nearby town for further secondary education in an orta okul or lise (middle or high school). The muhtars of Beşkarıs, Çeltikci, and Elmaağacı had sent their sons away from their villages for this purpose. No villages mentioned any girls who were sent out from their village for a continuing education, and when asked about this, most respondents considered the question a bit humorous. Practically all agreed that the girls were not permitted this

privilege. A continuing education is expensive by village standards, so it is reasonable that when only one person from a family can be sent away, that it be a future head of a household.

New village elementary schools have been built in many of the damaged villages.[16] Pusatlar had no school before the earthquake, but now has one. A new school was built in İğde, and although the original one was damaged, it has been repaired and both are in use. These new schools are viewed by the villagers as very prestigious assets, and in Çeltikci, Kayaköy and Sazak, the school facilities were used during the senior author's interviewing. The authors believe that these new schools will become village social centers, eventually replacing some of the coffee house and guest room functions.

Health services are provided in Gediz and Tavşanlı, where doctors and nurses are available. However, villagers rarely obtain medical treatment because of the expense.

Lack of proper sanitation contributes to a high occurrence of intestinal parasites in the villages. A small drain off stream from the village well flows through both villages and provides a breeding place for flies, which are a serious problem here as in other villages (Fig. 10). A contaminated pond formed from one of the three wells in Karacakaş unfortunately served as a mosquito

---

[16]There were 79 elementary and five secondary schools built after the earthquake.

Figure 10. The Fountain Continually Drains through the Center of the Village.

breeding ground. The government has made efforts to inform the villagers about personal hygiene. Several guest rooms have wall posters which show the life cycle of the parasites, and the effectiveness of DDT. The senior author did not determine the effect of sanitation on the villagers productivity.

The Agricultural Economy

Tepepınar is an agricultural village and out of the 40 homes presently inhabited, 80 percent of the work force is engaged in farming. Of the 45 households in Karacakaş, all cultivate fields except the two family heads who work in the nearby chicken cooperative.

Over 70 percent of the agricultural crops in both villages consists of wheat (Fig. 11). Barley is also grown, but mainly as a food for animals. Vegetable gardening is limited to small plots irrigated by seasonal streams which are located on the periphery of the settlements and by runoff from village fountains.[17] The more commonly grown vegetables in these irrigated plots are corn, tomatoes, peppers, onions, and occasionally beans and lentils. Both villages had very little fruit.

---

[17] These fountains near the house supply water for domestic purposes, and are gravity fed by means of pipelines from springs higher up in the nearby hills. Some of these springs dwindle down to a trickle and some dry up during the summer. In such cases, obviously little is available for irrigation. Because of this unreliability of water, residents of several villages expressed a desire for government financial assistance in purchasing motor pumps to bring water into village fields from the closest stream.

Figure 11. Wheat Harvesting in the Province.

Tepepınar and 24 other sampled villages raised opium poppy as a cash crop up until 1971, when the government decree banned further production. The United States and Turkey planned a joint aid program to introduce new cash crops and improved animal stock in these and other villages as a substitute for the loss from the poppy crop. The opportunity for elements of modernization to penetrate into agricultural practices seemed quite promising in 1971, since the government planned to expedite relief in the form of new sunflower crop seeds, healthy bulls for breeding, and some cash assistance for fertilizer. However, the modernizing influence

never materialized, and only eight sampled villages have received token assistance for ceasing to raise poppy.

The village of Karacakaş has three tractors, two of which have been obtained since the earthquake.[18] Quite often when villages have tractors, they will also have purchased a tractor-driven threshing machine (harman makinası) for threshing village grain. Karacakaş has three harman makinası(s). Many villages, as in the case of Tepepınar, have no motorized means of threshing, and wheat must be threshed by the more primitive method of having a pair of oxen pull a heavy, sharp stone-embedded board over the piles of grain (Fig. 12). After the kernels are separated from the straw, the women (and occasionally men) winnow by pitching the threshed piles into the wind and catching the kernels in a wire bottomed covered pan. The straw blows off and is collected for animal fodder.[19] In both villages, grain for home consumption is collected first; then the remainder is used to pay local debts or to sell to the grain buyers in Gediz or Tavşanlı. Neither village

---

[18] After World War II, thousands of tractors entered Turkey offering a beginning for the transformation of traditional agriculture. The numbers of tractors have steadily increased from: 40,000 (1955); 42,000 (1960); 55,000 (1965); 96,000 (1969); and 106,000 (1970). Statistical Pocketbook of Turkey, p. 108. In December 1972, tractors were estimated at 135,000. "Turkey Annual Supplement," Quarterly Economic Review, The Economist Intelligence Unit, Ltd. (London: Spencer House, 1973), p. 9.

[19] See Jacques Bordaz, "The Threshing Sledge: An Ancient Turkish Grain-Separating Method Still Proves Efficient," Natural History, LXXIV (1965), 26-29, for detailed specifications on construction characteristics of the sledge.

Figure 12. Traditional Threshing of Wheat in Turkey.

has a mill for making wheat into flour. Milling requirements are met by milling facilities in Gediz and Tavşanlı or in nearby villages.[20]

Animal husbandry is an important part of subsistence in both villages. The villagers estimated that there were approximately 500 sheep and goats, 40 cows, 20 donkeys, and 30 oxen in Tepepınar

---

[20]Several water driven mills were destroyed by the earthquake. In Yunuslar, villagers plan to replace their destroyed one with a motor driven mill which they claim to be preferable.

at the time these data were collected.[21] Other animals included 8 dogs and 30 cats. This compares to an estimate of approximately 1,500 goats, 250 sheep, 95 cows, 47 oxen, 15 donkeys, 3 horses, 15 dogs, and 20 cats in Karacakaş. In 1971 a chicken cooperative was opened nearby which now raises 500 chickens for Karacakaş.

Tepepınar has been troubled with various animal diseases for the past five years. These diseases have killed dogs, cats, and chickens. Normally the village would have 50 to 100 chickens. Now, there are 75 recently purchased chicks, but no egg laying hens. The villagers believe some recently purchased medicine will eradicate the diseases. Although a veterinarian was available in Gediz, the villagers hesitated to use his services because of the expense involved.

Yields have improved in many Turkish villages in recent years with the application of artificial fertilizer. Tepepınar villagers use some chemical fertilizer now, but state it is too expensive to use the desired amount. Karacakaş villagers consider the cost of artificial fertilizers prohibitive and state they use very little. Both villages, as were all of the other sampled

---

[21] Animals are a source of both wealth and prestige. Although numbers of village animals may at times seem large, the generally poor nutrition and breeding practices contribute to low meat and milk yields. For example, the herds and flocks include animals of all ages and both sexes and various conditions of health. Breeding is seldom controlled. Disease organisms and parasites pass quickly through entire herds. In the winter, when animals are contained in closed quarters, their diet is usually lacking in protein and vitamins. It should be mentioned that the government is well aware of this problem and is attempting to alleviate it.

villages, were aware of the increased yields which can be derived with proper application of fertilizers. In Isıklar village, a villager showed the senior author his wheat field on which he had applied proper amounts of fertilizer over three-fourths of the field. The remainder of the field had no fertilizer. The fertilized wheat appeared to be very healthy, with tall, thick stalks, and full heads. The unfertilized area had thin, short stalks, and few grains on the head. The farmer had used up his fertilizer before completely covering the field, and did not have the means to purchase more. Some villagers use animal manure to fertilize gardens and fields.

Many villagers were aware of Mexican wheat, but claimed not to use it for two reasons: first, it was considered too expensive; and secondly, its image was not favorably perceived.

In early summer, the farmer and his wife contribute significantly to the agricultural economy. Essentially, the woman's duties can be divided into household and field work. Household work includes sewing, baking a seven to fourteen day supply of bread (yufka) at one time, milking sheep, goats and cows, and washing the weekly laundry, which is done in the community wash house in Karacakaş, and as a semi-group effort in Tepepınar. Women assist in all phases of field work; however, men play the main role in the plowing. Hoeing, harvesting, threshing, and tending livestock are all common tasks frequently accomplished by women.

During field work seasons, the average day for both man and woman in this area is quite arduous by American labor standards; however, it appears more tolerable than the field labor requirements described by Hinderink and Kiray for their four Turkish villages in the Çukurova.[22] In Tepepınar, most villagers rise about 5:00 A.M., eat a breakfast of bread, cheese, onions, tomatoes when in season, and sometimes soup, yogurt, drink one or two glasses of tea, prepare a substantial lunch and then most males and many females head for the fields by six o'clock. After working in the fields all morning, the workers eat the main meal of the day (öğle yemeği). Sometimes the villagers may return to the village, but usually they eat their lunch of bread, onions, tomatoes and cucumber (occasionally green beans and rice) in the field. Öğle yemeği is followed by a short nap, then field work continues. Around seven or eight, they return to the village. After an evening meal that consists of food similar to breakfast and lunch, the women tend the animals while the men may do other chores. Very likely the men will visit the guest room which serves as a tea house for Tepepınar, or the guest room or store (bakkal dukkâni) which serves as a coffee house in Karacakaş.[23] Some

---

[22] Jan Hinderink and Mubeccel B. Kiray, Social Stratification as an Obstacle to Development: A Study of Four Turkish Villages (New York: Praeger Publishers, 1970), pp. 110-115.

[23] For an excellent discussion on the coffee house as a social institution see: Brian W. Beeley, "The Turkish Village Coffeehouse as a Social Institution," Geographical Review, XL (October 1970), 475-493.

women converse for a brief time at the village wells in the evening. Some men may remain up for the eleven o'clock prayer but, except on Friday, the majority will not.

Children in both villages assist in practically all phases of production. Boys work in the field and tend cattle from the age of six or seven. Girls between the ages of nine and twelve occasionally assist with the cattle, but their contribution to the family is mostly in housework or gardening.

The Scarcity of Water

Water shortage is a problem in Tepepınar and Karacakaş, as in many Turkish villages. In Tepepınar a gravity flow spring is piped into a fountain near the mosque in the center of the old village; however, the new housing (west of the old village) has no water at all. The occupants in the new section must carry all the water for domestic use from the central fountain. Although Karacakaş has three fountains, the flow of water is very light. A nearby seasonal stream is helpful, but not adequate. Insufficient water supplies are a problem throughout the province and is illustrated quite clearly in Table 1.

Migration from the Villages

Heavy migration to urban areas is a relatively recent phenomenon for Kütahya province and Turkey, with its beginning in the

TABLE 1

VILLAGE DRINKING WATER FOR KÜTAHYA PROVINCE[a]

Wells with adequate water	449	(54.29%)
Wells with insufficient water[b] . . .	118	(14.27%)
Wells without water	260	(31.44%)
Total wells	827	(100.00%)

[a]Adopted from: Recommendations of the Joint Turkish/American Agricultural Mission, Improving Farm Income in the Poppy Region, Appendix B, Table B-17, n.p.

[b]These data were published after the Gediz earthquake; however, it is unclear whether wells were inventoried prior to or after the disaster. The earthquake did have a detrimental effect on many wells.

late 1940s.[24] Most rural areas in Turkey have now experienced some form of migration, and Tepepınar is no exception.[25] Twenty-five male villagers from Tepepınar are employed in tobacco factory work in the Aegean region during the summer months.[26] There are no seasonal migrants from Karacakaş, although two men are employed in a chicken cooperative near the village. Since the earthquake, 14 young adult men from Tepepınar village have migrated to Germany (Almanya işçi) for employment. Three adult male villagers had left Karacakaş for Germany before the disaster. This migration is representative of other villages and has been accelerated in those damaged by the Gediz earthquake. The government permitted those from earthquake damaged villages highest priority for foreign employment, and 6,796 from Kütahya province took advantage of this program.[27] After one or two years of foreign employment, the

---

[24] Irene B. Taeuber, "Population and Modernization in Turkey," Population Index, XXIV (1958), 101-122.

[25] Eröl Tumertekin, Internal Migrations in Turkey, Publications of Istanbul University, No. 1371 (İstanbul: Istanbul University, 1968).

[26] Manisa was the city drawing most of the seasonal workers, followed by İzmir, Kütahya, and Uşak. The grape vineyards and tobacco factories in Manisa provided most of the employment.

[27] Provided from unpublished data by Statistical Services Office, Ministry of Labor, Ankara, in an interview on 23 June 1973. For an early study of this problem see Nermin Abadan, Batı Almanya'dakı Türk İşçileri ve Sorunları ("Turkish Workers in Germany and Their Problems") (Ankara: Devlet Planlama Teskilati, 1964).

workers return to their village for a short vacation, bringing back high value portable electronic items such as radios, tapes, cassette recorders, etc., and cash which they most often invest in agriculture and housing improvements.

Earthquake Induced Loss

In terms of human loss from the earthquake, Tepepınar was extremely fortunate. There were no deaths and only six major injuries. Although there are some poorer one-story homes, houses in both villages, as in the province, are usually two stories high with timbered wall frames infilled with adobe bricks, cobblestones, or kiln bricks (Fig. 13). Pitched roofs are usually covered with tile. Six two-story houses in Tepepınar were lightly damaged, 20 heavily damaged, 19 totally destroyed, and 15 were undamaged.

A team from the Ministry of Reconstruction and Resettlement surveyed the village for damage soon after the earthquake. The residents requested that 19 new houses, at a cost of approximately $1,143 (16,000 Turkish lira) each, be constructed for their settlement (Fig. 14). Plans for the new types of village houses are shown in Figures 15, 16, and 17.

A Summary of Changes

During the three-year period after the earthquake, several changes have occurred in Tepepınar. Radio sets owned by villagers have increased over two and one-half times in number, from 10 to

Figure 13. Representative Wooden Frame Structures in the Village

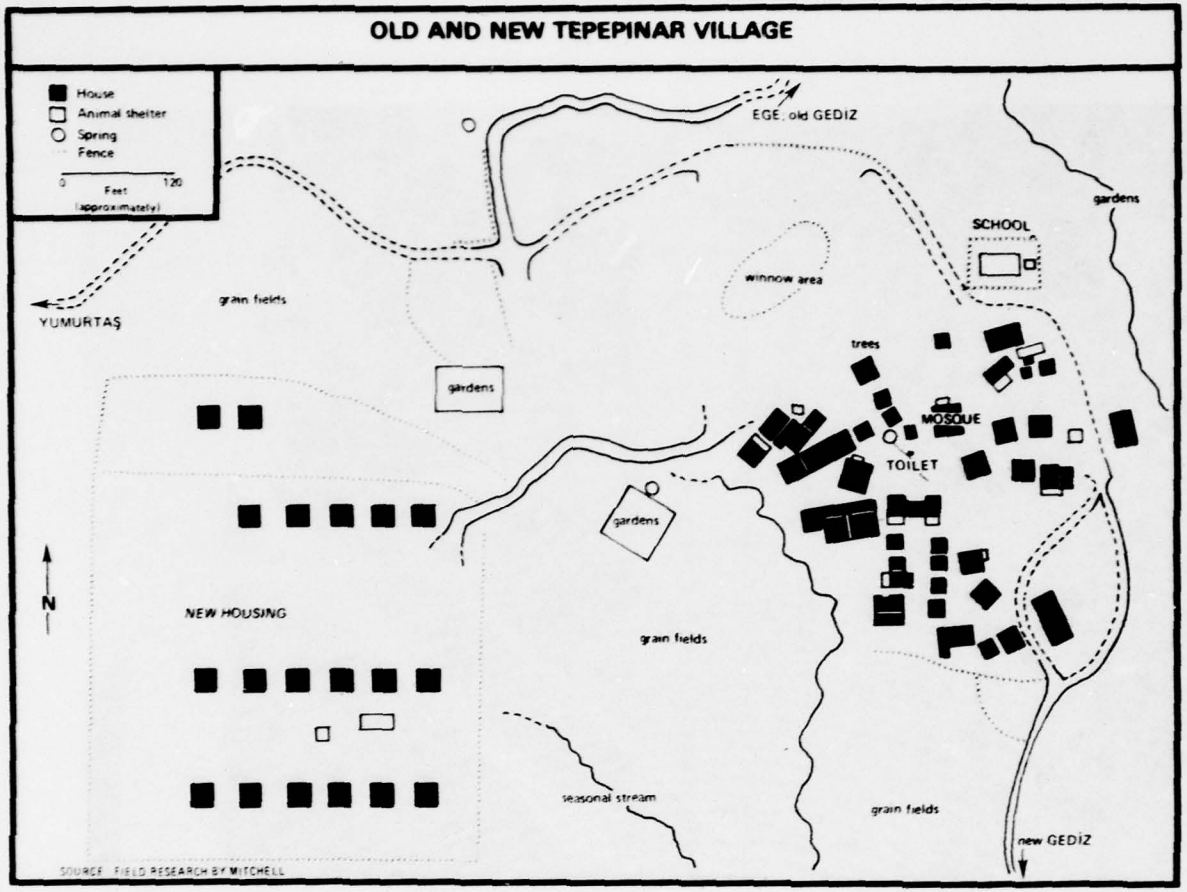

OLD AND NEW TEPEPINAR VILLAGE
House
Animal shelter
Spring
Fence
0
120
Feet
(approximately)
EGE, old GEDIZ
gardens
SCHOOL
winnow area
grain fields
YUMURTAŞ
trees
gardens
MOSQUE
TOILET
gardens
N
NEW HOUSING
grain fields
seasonal stream
grain fields
new GEDİZ
SOURCE: FIELD RESEARCH BY MITCHELL

Figure 14

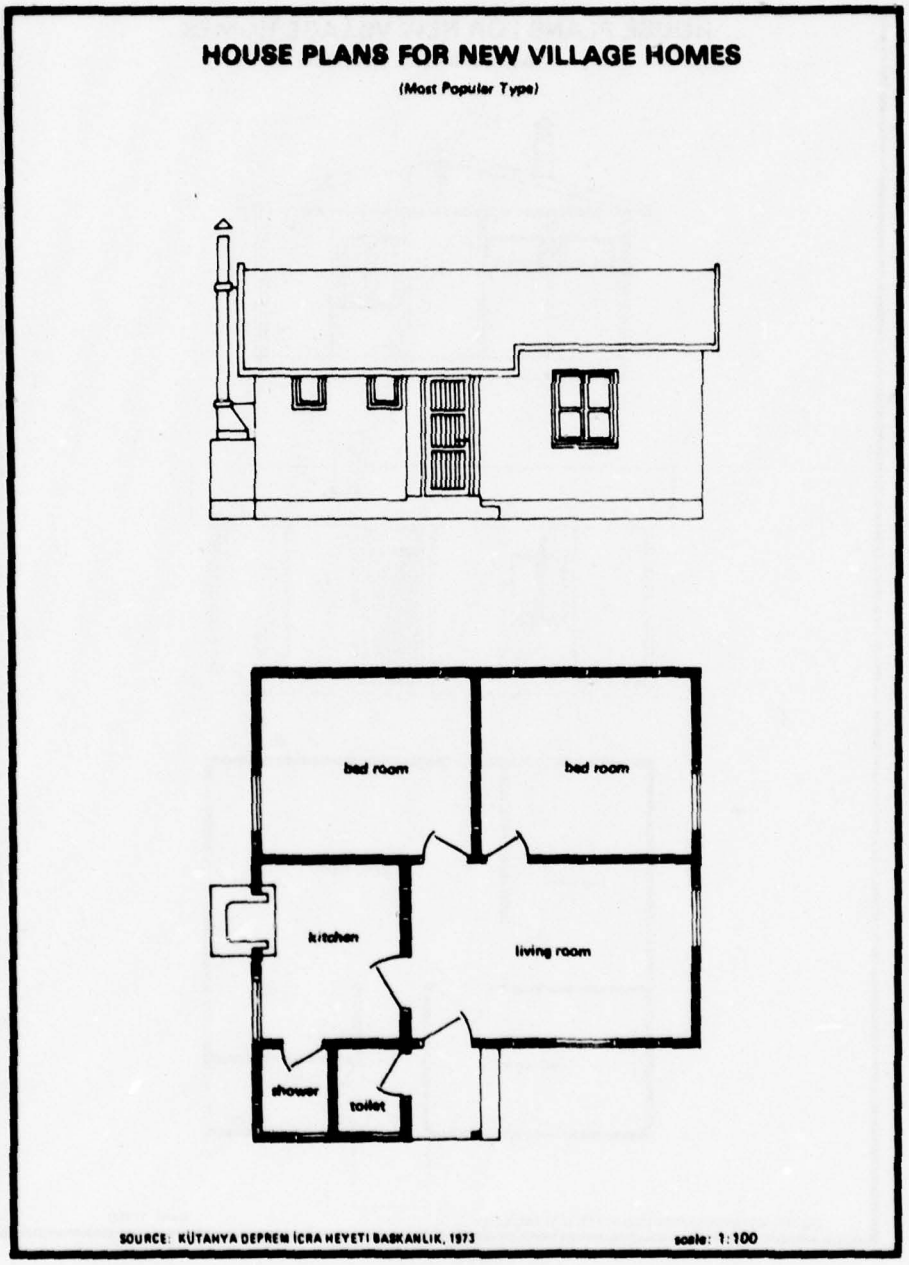

HOUSE PLANS FOR NEW VILLAGE HOMES
(Most Popular Type)
bed room
bed room
kitchen
living room
shower
toilet
SOURCE: KÜTAHYA DEPREM İCRA HEYETİ BAŞKANLIK, 1973
scale: 1:100

Figure 15


HOUSE PLANS FOR NEW VILLAGE HOMES
(Second Most Popular Type)
bed room
living room
kitchen
bed room
toilet
shower
SOURCE KÜTAHYA DEPREM ICRA HEYETI BASKANLIK, 1973
scale: 1:100

Figure 16

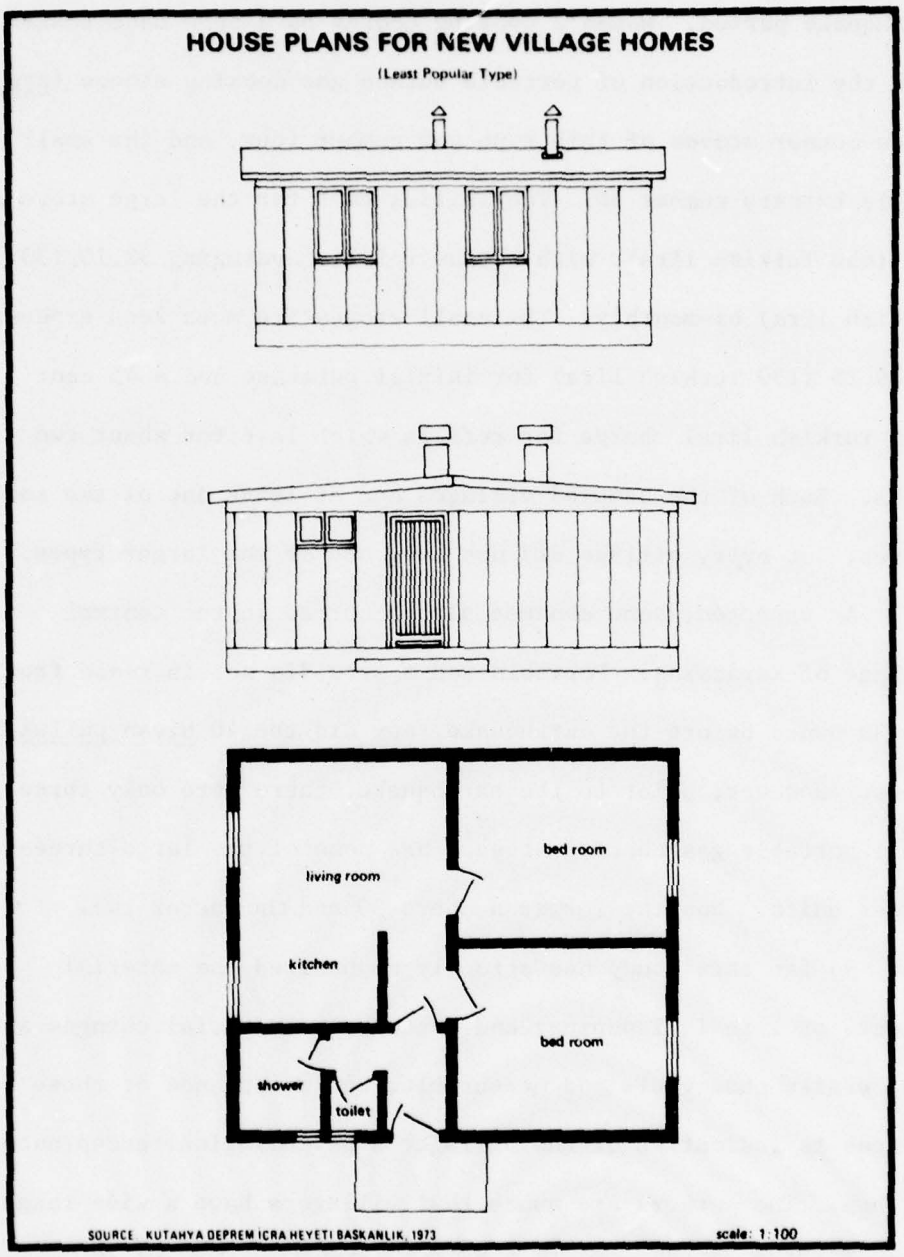

HOUSE PLANS FOR NEW VILLAGE HOMES
(Least Popular Type)
living room
bed room
kitchen
bed room
shower
toilet
SOURCE KUTAHYA DEPREM ICRA HEYETI BASKANLIK, 1973
scale: 1:100

Figure 17

27. There are now 20 steel plows (havan pulluk), twice the pre-earthquake period. Women's cooking chores have been made easier with the introduction of portable butane gas cooking stoves (aygaz). Three-burner stoves of this type now number four, and the small single burners number 30. The initial cost for the large stove is $32 (450 Turkish lira), with butane refills averaging $2.10 (30 Turkish lira) bi-monthly. The small stoves are much less expensive, at $9.25 (130 Turkish lira) for initial purchase and a 45 cent (six Turkish lira) charge for refills which last for about two weeks. Each of the sampled villages had at least one of the small stoves, but every village did not have one of the larger types.

As expected, some changes also occurred in the control village of Karacakaş. Portable radio sets did not increase from the 30 owned before the earthquake, nor did the 40 havan pulluk plows. However, prior to the earthquake, there were only three small portable gas cooking stoves, and none of the large three-burner units. Now the former numbers 30 and the latter two.

So far this study has strongly emphasized the material aspects of life in Tepepınar and Karacakaş. Material changes are most easily observable and measurable, and acceptance of these changes is indicative of the villager's psychological acceptance of them. The authors are aware that villagers have a wide range of social and psychological needs, but these are beyond the scope of this study.

These village comparisons have shown that change from the traditional is occurring in both Tepepınar and Karacakaş. Before examining the entire groups that these villages represent, it is necessary to explain the source of much of the increased income which has contributed to many changes in the damaged villages.

EMPLOYMENT IN GERMANY AS A CONTRIBUTOR TO CHANGE

Perhaps the greatest contribution to change in the damaged villages has resulted from the unexpected increase in opportunity for employment in Germany.[28] As we shall see, the potential increase in external employment opportunities was directly related to the intensity of damage in the villages. Tens of thousands of villagers have desired external employment for the past several years, and because of governmental decisions motivated by the disaster, hundreds of Kütahya villagers have achieved their desires.[29]

---

[28]This discussion is based in large part on an interview by Mitchell with Bay Ali Tabanlı, Director of Statistical Services, Labor and Employment General Directorate, Ministry of Labor (Genel Mudurluğu, İş ve İşçi Bulma Kurumu, İstatistik Servisi) in Ankara on 10 July 1973, and on numerous interviews with village mayors.

[29]A bilateral agreement regulating migration of Turks to Germany was concluded on October 30, 1961. In an interview by Mitchell with Bay Ali Tabanlı on July 10, 1973, it was revealed that at the end of 1972 there were 429,885 men and 114,351 women employed outside of Turkey in European countries, and that most were in Germany. Remittances from the migrant workers have steadily increased, and reached 468 million dollars in 1971. OEDC, Turkey, pp. 18-19. For a general background and references to further studies concerning Turkish workers in Germany and other European countries, see: John Kolars, "Turkish International Migrant Labor," Geographical Review, LX (1970), 262-264; and Robert Huyck Eldridge, "Emigration and the Turkish Balance of Payments," Middle East Journal, XX (1966), 296-316.

In early April, 1970, the Ministry of Reconstruction and Resettlement was charged by the Turkish government to provide a list of all earthquake affected villagers who desired employment in Germany. Since government work permits, which grant permission for external employment, are in great demand by many Turks, stringent controls were imposed to insure only those most eligible received permits. The administrator (müdür) of each administrative sub-district (bucak ilçesi) reportedly traveled to each village in his sub-district and appraised the damage of each house. Based on this appraisal, one male--from each house which was more than 80 percent damaged--was eligible for priority consideration. Müdürs forwarded their lists to Kütahya city, where they were consolidated and transmitted to the Ministry of Reconstruction and Resettlement, and Ministry of Labor in Ankara. A few weeks later the list was returned with approval to Kütahya city. Eligible villagers were notified and invited to Kütahya for counseling and for a medical inspection by a German team. Seven thousand and five hundred villagers were registered at the Kütahya Central Disaster Coordinating Office for German employment in this process. Two months after the disaster the first group of villagers left for Germany, and by May 1972, 5,341 villagers had arrived in Germany. Medical or other disqualifications delayed 1,455 villagers initially, but as of July 1973, only 704 out of the original 7,500 were awaiting permission to depart.

Employment in Germany proves to be very important to the process of change because population interchange allows not only for material goods and cash to flow into the village, but for the flow of new ideas. Throughout the study area, in village after village, discussions in the coffee houses continuously referred to German employment as a desirable achievement. This is understandable. In villages where the average annual income for the head of a family is between $285 and $357 (4,000-5,000 Turkish lira),[30] an opportunity to receive around $2,500 (35,000 Turkish lira)[31] annually is impressive and inviting to many. The villagers were well aware of this disparity in incomes, and so it often dominated their discussions.

A COMPARISON OF THE DAMAGED AND UNDAMAGED GROUPS

After visiting several damaged and undamaged villages in a pre-survey test, variables were selected which represented various forms of village change.[32] Statistical significance of these

---

[30] Based on reported annual income in the 47 sampled villages.

[31] Based on a 40-hour work week with hourly wages of $1.30. These wages were considered representative by several villagers who were on a 30-day visit to their village from Germany. Eldridge reported that the gross earnings for Turks in Germany were about $150 to $175 per month. Since his figures are prior to the summer of 1966, his estimate and the one above are consistent. Eldridge, "Emigration and the Turkish Balance of Payments," p. 308.

[32] It is quite apparent that no one can make an exhaustive inventory of all the potential variables that may change after an earthquake. Individual judgment is necessary, and obviously others might select other variables. A major problem in any research project is to select variables which actually can be measured under

variables has been reported elsewhere.[33] The intent here is to discuss the various types of changes. Some changes were definitely not progressive, but were instead negative in nature such as houses, guest rooms, water supply, and animals; however, most changes were positive and beneficial.

Field research quickly revealed a net loss of houses in the damaged group, even after the reconstruction in villages was completed (Table 2). However, there were no losses from depreciation in the undamaged villages, since the time period of three years is very short. Guest rooms were also expected to suffer net losses, since most heavily damaged villages suffered losses of entire houses, and the new style houses are in many cases too small for a guest room. Obviously, there would be no such problem in the undamaged villages.

Animals were killed in some undamaged villages; however, there was a net loss in both groups. The loss in undamaged villages was generally explained as a trade-off for agricultural and living expenses.

---

field conditions. Often the researcher is overly optimistic and arrives in the study area with a check list or survey form of variables which quickly proves to exceed what one person can realistically measure. Andrews argues that indicators should be: reasonably limited; comprehensive enough to include most aspects of society; relevant to each other; and should indicate some aspect of change over time. Frank M. Andrews, "Social Indicators and Socioeconomic Development," Journal of Developing Areas, XIII (October 1973), 3-12.

[33]See Mitchell, Chapter IV, "Turkish Villages After an Earthquake. . . ."

TABLE 2

DIFFERENCES AND 1973 AS A PERCENTAGE OF 1970 FOR SELECTED INDICATORS OF CHANGE IN VILLAGES DAMAGED BY THE GEDIZ EARTHQUAKE AND UNDAMAGED CONTROL VILLAGES

	Undamaged Villages			Damaged Villages		
Variables	1970	1973	1973 as a % of 1970	1970	1973	1973 as a % of 1970
Agricultural co-operatives	1	4	400	0	8	*
Animals	29,700	19,800	66	80,370	73,966	92
Coffee houses	10	12	120	33	51	154
External migrations	69	243	352	203	1,044	514
Gas stoves	134	849	633	409	2,211	540
Guest rooms	52	52	100	127	82	64
Houses	1,382	1,382	100	4,354	4,151	95
Internal migrations	563	563	100	1,161	1,413	121
New schools	N/A	N/A	N/A	0	13	*
Radios	387	783	202	650	1,849	284
Threshers	8	24	300	9	56	622
Tractors	15	48	320	18	66	366
Vehicles	12	32	266	19	50	263
Village stores	41	44	107	47	60	127
Wells	45	52	115	127	146	114

*Since there were no cooperatives in the group prior to 1970, there is a net gain of 8. Thirteen new schools were built during the three-year period.

Source: Field research by Mitchell.

Migrants to Germany and within Turkey significantly increased in the damaged group, but not in the control villages. The most heavily damaged villages showed a far greater rate of increase in villagers going to Germany, although numbers in the lightly damaged villages also increased.

Internal migration is occurring throughout Turkey, but it significantly increased in this province after the disaster. Radios are readily available on the Turkish market and are relatively inexpensive. With the extra income from external employment it is understandable that these relatively low cost consumer products would be purchased before higher cost agricultural items. They serve the villager as a means of communication and as a symbol of prestige.

Since new schools were built only in damaged villages, no control villages had this improvement. The factor of isolation is not as great in the damaged villages which now have a far lower mean distance to transportation access. This is in part attributable to the disaster, since many damaged villages did have their village roads improved after the earthquake.

Gas stoves, as the radios, are readily available on the Turkish market, and are relatively inexpensive consumer items. Stoves increased at a greater rate in the damaged villages.

The most expensive consumer items in Turkey are automotive

vehicles.[34] Yet, as reflected in Tables 3 and 4, one-half of the 34 damaged villages gained between one to four vehicles, compared to about one-third of the control group. Out of the 11 heavily damaged villages, six had a gain of two or more vehicles. Only three of the 13 control villages gained two or more. The larger increase of German migration from damaged villages contributed to more capital for these investments. Tables 3 and 4 should be referred to as the remaining changes are discussed.

Money from external employment has also contributed to an increase in village stores. Eleven, or about one-third of the damaged villages, had an increase in this indicator of commercialization. This compares with only two out of the 13 control villages showing a gain in this service. Respondents overwhelmingly attributed this to an input of capital from villagers working in Germany.

Tractors also require a large initial cash outlay even though a substantial balance can be financed by agricultural and commercial banks.[35] By closely examining the figures in Tables 3 and 4, one

---

[34] For example, in August 1973, a small van (küçük otobüs, "minibus") cost $10,179 (142,500 Turkish lira). A three axle truck (üç dingilli kamyon) cost $19,000 (266,000 Turkish lira).

[35] A 72 horsepower model 724 International Tractor cost $6,928 (97,000 Turkish lira) in August 1973, according to the general distributor in İstanbul (Türkiye Genel Distribütörü, Motorlu Araçlar Ticaret, İstanbul). Credit for these and other agricultural implements is obtained from the Agricultural Bank (Ziraat Bankası). Interest varies depending on the loan period, but ranges between 7 and 9 percent. The agricultural cooperative (ziraat kredi koopertif) is affiliated with this bank.

TABLE 3

NET GAIN OR LOSS OF SELECTED INDICATORS OF CHANGE BETWEEN THE YEARS 1970 AND 1973 IN THIRTY-FOUR TURKISH VILLAGES DAMAGED BY THE GEDIZ EARTHQUAKE

Villages	Variables														
	Agricultural Cooperatives	Animals	Coffee Houses	External Migrations	Gas Stoves	Guest Rooms	Houses	Internal Migrations	New Schools	Radios	Threshers	Tractors	Vehicles	Village Stores	Wells
GEDIZ DISTRICT															
Alikaya	0	500	0	0	4	0	3	0	0	8	0	0	0	0	0
Ayvacık	0	0	0	30	5	0	0	0	1	37	0	0	0	0	-1
Çeltikçi	0	0	1	23	55	-2	28	0	1	51	0	1	0	1	3
Göynük	0	500	0	8	6	-1	0	3	1	7	0	0	1	0	0
*Gümüşlü	0	-500	1	10	1	1	-5	0	0	41	0	0	2	1	1
Güzüngülü	0	-2000	1	13	30	0	-3	0	0	13	1	0	1	1	0
Isıklar	1	1000	0	19	45	0	-1	0	1	11	0	0	0	1	0
*Kayaköy	1	-1000	0	32	215	-8	-12	0	1	100	3	2	4	0	-9
*Kıran	0	0	2	15	16	0	-95	0	0	12	0	1	0	0	6
*Pusatlar	0	-2000	1	20	24	-3	-15	10	1	32	0	0	0	0	2
Sandıklı	0	0	1	20	20	0	-1	25	0	5	2	3	1	2	0
Sazak	0	-500	0	9	32	-3	-26	0	0	12	0	0	0	1	0
Tepepınar	0	0	0	14	34	0	12	0	1	17	0	0	0	0	0
Yeniköy	1	0	1	55	20	0	-1	0	0	40	5	5	0	1	6
*Yeşilçay	1	0	2	38	160	0	43	0	0	69	1	0	3	4	0
*Yukarısusuz	1	0	0	32	30	0	19	0	1	60	1	3	0	-1	0
*Yunuslar	1	0	-2	21	103	-1	-46	87	1	130	6	2	3	-1	1
EMET DISTRICT															
Asağıvoncaağaç	1	0	1	22	31	0	2	30	0	13	0	1	1	2	0
Bahatlar	0	0	0	21	24	0	-18	0	0	28	0	0	0	0	0
Demiroluk	0	0	1	25	30	0	-25	5	0	28	2	2	0	0	0
*Dereköy	1	-500	1	55	150	2	36	15	1	65	1	2	3	0	0
Eğrigöz	0	0	1	40	130	0	-8	0	0	180	1	1	2	0	1
Gulduren	0	0	0	2	16	0	0	0	0	3	0	0	1	0	0
*Hacimahmut	0	-1500	-1	85	96	-12	-41	60	0	50	4	5	1	0	0
*İğde	0	-56	1	23	32	0	-1	2	1	27	3	4	2	0	1
Kızık	0	0	1	60	66	-10	-63	0	1	97	3	3	0	0	0
Kutluhallar	0	-45	2	40	98	-3	-2	0	1	9	2	2	3	-1	-3
*Örenköy	0	-400	-1	10	27	-1	15	0	0	6	1	1	0	0	2
Tokat	0	0	0	2	2	0	0	0	0	0	0	0	1	0	0
Umutlu	0	0	0	18	47	0	-1	0	0	8	0	0	0	0	0
Yağdığın	0	0	0	17	20	0	8	0	0	15	1	1	0	0	0
Yarıs	0	0	2	39	47	0	-3	0	0	14	5	2	2	1	0
Yenipınar	0	0	1	10	20	0	0	10	0	5	0	0	1	1	1
Zobu	0	-15	1	8	21	0	-1	5	0	6	2	5	0	0	0

*Denotes the villages that were heavily damaged or destroyed. Villages were categorized by weights depending on severity of house damage as determined by the Turkish Ministry of Reconstruction and Resettlement and provided to the senior author in August 1973.

Source: Field research by Mitchell.

TABLE 4

NET GAIN OR LOSS OF SELECTED INDICATORS OF CHANGE BETWEEN THE YEARS 1970 AND 1973
IN THIRTEEN TURKISH CONTROL VILLAGES UNDAMAGED BY THE GEDIZ EARTHQUAKE

Villages	Variables														
	Agricultural Cooperatives	Animals	Coffee Houses	External Migrations	Gas Stoves	Guest Rooms	Houses	Internal Migrations	New Schools	Radios	Threshers	Tractors	Vehicles	Village Stores	Walls
Alıköy	0	0	1	5	42	0	0	0	0	35	0	4	3	1	3
Balıköy	1	0	0	12	75	0	0	0	0	20	1	1	2	0	0
Beşkarış	0	0	0	52	290	0	0	0	0	155	3	6	3	0	4
Çaltılı	0	-5500	1	25	14	0	0	0	0	15	2	2	0	2	0
Çamalan	0	0	0	16	24	0	0	0	0	35	0	6	0	0	0
Elmaağacı	0	0	0	12	10	0	0	0	0	20	0	0	0	0	0
Hamitabat	0	0	0	12	10	0	0	0	0	10		0	0	0	0
Karaağaç	0	0	0	18	23	0	0	0	0	0	1	3	0	0	-1
Karacakaş	1	0	0	2	29	0	0	0	0	0	2	1	0	0	0
Köprücek	0	0	0	10	108	0	0	0	0	60	2	2	0	0	0
Kuyucak	1	0	0	2	56	0	0	0	0	6	3	7	1	0	0
Senlik	0	0	0	5	40	0	0	0	0	40	0	1	0	0	1
Sökmen	0	600	0	0	12	0	0	0	0	4	0	0	0	0	0

Source: Field research by Mitchell.

can partly explain how and why tractors were influenced by the disaster. For example, in the 11 villages that were heavily damaged, seven had a net gain of between two and five tractors. Before the earthquake only 29 percent of the 34 damaged villages had even one tractor. Afterwards, 61 percent of these villages had at least one. Eleven villages previously without a tractor now have at least one. But the control group also had impressive gains in numbers of tractors. Only five of the 13 control villages (about 39 percent) had one or more tractors before the disaster. Afterwards, about 77 percent had at least one. In fact, ten villages in this group now have at least one tractor, and the total number of tractors has risen from 15 to 48. This compares to an increase from 18 to 66 tractors for the damaged villages. One can reasonably attribute a large part of the increase in the control villages to the gain in capital received from foreign employment. Partly because of the terrain, it is probable that fewer tractors are needed in the Gediz and Emet districts. If the Gediz and Emet districts had better terrain, it is possible that the increase in tractors would have been far more significant in the villages damaged by the earthquake.

Of course, mechanization of agriculture is advanced not only by tractors but by the use of various agriculture implements such as threshers, steel plows, drills, and combines. Since the disaster, 18 of the damaged villages gained threshers compared to a gain of

eight in the control group. Also for each tractor there was a corresponding gain in steel plows.

Another potential contributor to advancement in agriculture is the establishment of agricultural cooperatives. These cooperatives indicate a potential for improved and increased inputs for villagers. About one-fourth of the damaged villages gained a cooperative after the earthquake, compared to about one-fifth of the control group. German employment, by creating a surplus in capital, again made itself felt in this area.

In the damaged group of villages, before the earthquake, there were 33 coffee houses located in 19 separate villages. In this same group coffee houses have now increased to a total of 51, and 25 of the damaged villages now have at least one coffee house. This is an increase of 18 coffee houses, some of which are located in the seven villages that had no coffee house prior to the earthquake. Although three villages did have a net loss of coffee houses as a result of the disaster, only one village (Ören) had its coffee house destroyed, and has so far failed to have it replaced.

There was little change in the control group. A net increase of two coffee houses gave villages in this group a total of 12 coffee houses, but they are not equally distributed and are concentrated in only seven of the 13 total villages. Unlike some of the villages that were damaged by the earthquake, villages in the control group previously without a coffee house did not gain one.

Overall, the damaged villages showed a higher rate of increase in this variable.

Wells or fountains are very important, both for domestic water supplies and for limited irrigation which is allowed by the drain off from their flow. Overall, the damaged group gained 19 new wells, for a total of 146. This compares with a net gain of only seven in the control group. However, these figures can be misleading. The volume of flow, rather than the total numbers of wells, is really more important. The volume of water flowing from many fountains in the earthquake damaged group was greatly reduced after the disaster. It is felt that many of the villages in the damaged group are now at more of a disadvantage, concerning water, than they were before the disaster, regardless of the net increase in numbers of fountains.

The last variable to be discussed is that of students. Data concerning the numbers of students before the disaster could not be obtained for either group. Most villages in both groups have schools, and students generally do attend them. The new schools are found only in earthquake damaged villages, and the new schools seem to be important status symbols to the village leaders, and to other villagers (Fig. 18). It is possible that more emphasis will now be placed on obtaining an education in these new schools, since the new facilities are somewhat more conducive to learning and are greatly admired. Unfortunately, a few of the new schools are awaiting teachers. However, the problem of teacher shortages is not new and existed before the disaster in both groups of villages.

Figure 18. New Intermediate School which Serves Several Villages.

The above analysis has presented evidence that changes are occurring at a greater rate in those villages damaged by the earthquake. However, rapid change from the traditional way of life to the more modern can cause problems in human adjustment. Turkish government decision makers and villagers recognize that adjusting to the new village housing was a major problem associated with the Gediz disaster. As mentioned earlier, the nature of this problem has been examined in a separate study.[36]

SUMMARY AND IMPLICATIONS

This study has examined the influence of an earthquake disaster in several Turkish villages. It reveals that the Gediz disaster served as a catalyst to accelerate various changes in rural Turkey (see the rate of change in Table 2). Further, the study also confirms that villages in Kütahya province which were not damaged by the earthquake are also undergoing change.[37]

While change was accelerated in many instances, there are examples of a deceleration in the numbers of village houses, in village guest rooms, in water supplies, and in numbers of animals.

---

[36] See footnote 6 above.

[37] This study covers a rather short span of time and although changes are occurring throughout Kütahya province and Turkey, altering and transforming traditional ways does not necessarily assure the continuing development of a viable modern society. See S. N. Eisenstadt, Tradition, Change and Modernity (New York: John Wiley and Sons, Ltd., 1973).

Perhaps the most negative aspect is the human misery and suffering which many villagers experienced.

The government of Turkey is very much concerned with minimizing the disruptions of society which are caused by earthquakes and allocates a relatively large sum of money for restoration after disasters. Thus, credit for some of the change belongs to the government officials who permitted thousands of villagers the opportunity to migrate to Germany immediately after the disaster. The impact of this government decision is reflected in significant increases of many variables which were directly attributable to the increased capital and innovative attitudes brought into the damaged villages by those who had experienced external employment. But what if the government had not intervened? Would changes have been accelerated?

It is widely recognized that rural to urban area migration is occurring in Turkey as in most developing countries. This migration (internal employment) was increasing faster in the damaged villages than in the control group. Although there are certain socially negative aspects of this trend toward internal migration, the opportunity for salaried employment, which may contribute to some additional capital and various forms of innovation returning to the village, is greater in the urban or near-urban areas. So even without government assistance in the form of external migration to Germany, the potential for change still increased with the number

of villagers employed outside of their settlements. Nevertheless, without government intervention in the form of granting permission for priority migration and assistance in reconstruction, this study suggests that one could expect only a minimal pace of change in damaged villages after an earthquake disaster.

In Kütahya province, in Turkey, in the Middle East, and in most developing societies, changes from the traditional, subsistence type villages are becoming more pronounced. For Turkey, this fact has been recognized in several studies. Among them are the works of Hinderink and Kiray, Kolars, Lerner, Pierce, Stirling and Yasa.[38] This research reveals that changes are occurring in villages damaged by the earthquake and at the same time supports the above studies with respect both to those villages damaged by the earthquake and to those that escaped damage.

---

[38]Jan Hinderink and Mubeccel B. Kiray, Social Stratification as an Obstacle to Development: A Study of Four Turkish Villages (New York: Praeger Publishers, 1970), p. 241; Daniel Lerner, The Passing of Traditional Society: Modernizing the Middle East (4th ed.; New York: The Free Press, 1968), pp. 111-135; John Kolars, Tradition, Season and Change in a Turkish Village, Department of Geography Research Paper No. 82 (Chicago: University of Chicago Press, 1963), p. 201; Joe E. Pierce, Life in a Turkish Village (New York: Holt, Rinehart and Winston, 1965), p. 69; Paul Stirling, Turkish Village (New York: Wiley and Sons, 1965), pp. 290-293; and İbrahim Yasa, Hasanoğlan: Socio-Economic Structure of a Turkish Village (Ankara: Public Administration Institute for Turkey and the Middle East, 1957), pp. 187-194.