THE IMPACT OF CULTURAL CHANGE ON THE LAND USE PATTERNS OF THE HOPI INDIANS

by

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INTRODUCTION

Geographers have long been concerned with the problem of how to deal with human societies and their interactions with their environment. Much geographic research has dealt with this relationship, which has been suggested by some as constituting the core of geography. This theme, of Man and his Environment, locked in some sort of inter-relationship, has been given many short-hand labels, including "Man and the Land," "Habit and Habitat," "Land and Life," and others. In each case, man and his behavior is set up as one complex of items for study, while man's physical surroundings are set up as the other great area for investigation. But such a division is arbitrary. As Jones points out, "Indeed we are forced to realize the truth that the components are often one, that it is the geographer who has separated them, and that perhaps he is creating an artifical world of his own to satisfy his speculations" (Jones 1966, p. 17).

To avoid the difficulties which must inevitably arise from such artificial divisions, several different approaches have been devised which allow the student to examine the totality of a system involving both men and their surroundings, or environment. One of the best known of these approaches is the concept of genre de vie, as originally developed by Paul Vidal de la Blache, and recently re-examined by Max. Sorre (1962). Among the concepts which he feels are central to the genre de vie approach, Sorre includes the "ensemble of organized and systematic habits...imposed

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by acquired force on succeeding generations," that is, the cultural background of the group involved, the reflection of both the animate and inanimate aspects of their environment, and high degree of stability to the pattern of human life (Sorre 1962, p. 412).

Another approach is that of examining the "sequent occupance" of an area. This concept, put forth by Whittlesey (1929) also endeavors to examine the entire man-environment system, but employs the device of studying the area at different time periods, as the relationship is modified by various kinds of change. These changes are often the result of the entry of new elements to the population. This approach enjoys the advantage of introducing a certain amount of time depth, so that the influence of historical development can be more easily examined.

In recent years the claim for "geography as human ecology" has been put forth (Eyre and Jones 1966). Although the term was introduced by Barrows as early as 1922, it has never enjoyed great popularity. As Barrows first defined the term, there was very strong anthropocentric focus to it, almost to the exclusion of physical studies (Barrows 1923, p. 7). Recently a somewhat broader definition has been used, permitting a wider range of physical or human-oriented studies, but emphasizing the relationships between the two elements. To quote from a recent discussion of the subject, "It is this great interaction between the natural and the psychological, between the blind forces of nature and the self-conscious activities of man, that is envisaged here when the term 'human ecology' is used" (Eyre and Jones 1966, p. 9). In a slightly different context, Julian H. Steward defines cultural ecology as "the adaptive processes by which the nature of society and an unpredictable number of features of

culture are effected by the basic adjustment through which man utilizes a given environment" (Steward 1953, p. 243).

This study of the Hopi Indians of northern Arizona and the modifications of their way of life over the past century is an attempt to examine a society and its environment, and to determine how that society changes its land use characteristics as the result of changes in its environment. "Environment" is used in this study in the sense defined recently by Gregor:

> The term "environment" is used here in the broadest sense, not just as it relates to nature but to man as well. It is interesting to note that, although most economic--and human--geography books commonly emphasize the visible works of man, they ignore many of the genuinely cultural reasons for those accomplishments (Gregor 1963, p. vii).

It is the contention of this study that the environment with which a given group interacts must also contain other groups of people. That is, the environment with which we are concerned is not confined to the physical landscape of the Hopi area, but very importantly includes the various groups (Navajos, missionaries, tourists, Bureau of Indian Affairs personnel, and others) with whom the Hopi come in contact.

The main theme of the study is that the ecosystem of the Hopi has been greatly modified during the last century because of changes in their environment. With minor exceptions, these changes have not been physical, but rather have been in the social and cultural milieu which surrounds the Hopi. The Hopi have adapted to these changes by borrowing cultural traits from the surrounding groups and integrating them into the Hopi culture.

At places there are resemblances between the approach taken and both the genre de vie and the sequent occupance concepts. Nevertheless, the

effort has been made to focus the study on the ecological aspects of the problem and the processes by which the changes take place. That is, to recognize that we are dealing with a group of people interacting with a specific (but changing) environment, and that this constitutes a functioning system. While it is possible to single out certain aspects for purposes of study, the complexity of the interlocking elements of the system can never be ignored. Thus, while the focus is primarily on such problems as agricultural land use and patterns of settlement, reference must frequently be made to social organization, economic activities, the ceremonial cycle, patterns of rainfall, and many other aspects of the system. A significant change in any part of the system has an effect on every other part, and therefore cannot be completely ignored.

For convenience of study, it is always desirable to keep to a minimum the number of variables involved. The Hopi provide a good example. Because of their relative isolation, the interaction of the Hopi with other groups has been, until recently, minimal. The system was very nearly self-contained, providing an easily defined, separate entity for study. The Hopi have been in the process of losing this isolation, which naturally makes analysis more complex, but this process is in itself one of the major foci of this study.

This study, then, concentrates on those visible features of the cultural landscape which most clearly reflect the interaction between the social and economic patterns of the Hopi, and the physical and cultural environment which acts upon those patterns. After a long period of relative stability, the patterns of land use and settlement among the Hopi Indians are now in the midst of a substantial transformation as the result

of increasing contact between the Hopi and the surrounding Anglo-American culture realm.

This transformation is an example of a process that is taking place in many parts of the world as Western economic and social patterns come into contact with subsistence groups. The nature of the impact naturally varies widely, depending on the character of the societies involved, and the manner in which Western culture is introduced. In many cases the net result seems to be the complete destruction of the indigenous social and economic patterns, which results in severe dislocations of the people involved. In other cases, the nature of the contact is such that the society can gradually adapt itself to the demands of a modern commercial economy without the disintegration of its basic structure.

Through a series of fortunate circumstances, the Hopi are in this latter group. Almost alone among American Indian societies, the Hopi have been able to maintain their cultural integrity, and adapt gradually to their changing conditions. Most American Indian tribes were not so fortunate. In many cases they were forcibly moved into unfamiliar environments, their economic base was destroyed, and their populations greatly reduced. The reservation environment in which most groups found themselves was not conducive to the maintenance of a functioning society. The result of these influences is clear. The American Indian today is, in most cases, among the poorest, least educated, most disease-ridden, and most culturally deprived segments of the American population. Because of the uninviting character of the northern Arizona plateau country occupied by the Hopi, they were not greatly affected by many of the conditions which caused the disintegration of other tribes.

By examining the processes by which the Hopi have adapted, and the ways in which the impact of cultural and technological change have affected the Hopi, it may be possible to gain some insight into the problems of the under-developed nations of the world. Such an approach is not new. Similar studies have been carried out in various parts of the world, indicating the importance of such things as social organization, religious structure, and technological level in determining the land use and settlement patterns of a group, and the way in which they react to cultural and technological change. See, for example, Allen (1965), Yudelman (1964), or Geertz (1962) for excellent studies of this kind. It is hoped that this study will provide data on this process as it occurs under somewhat different conditions.

In order to arrive at some conclusions about the processes by which the Hopi have adapted to the changing conditions of the last century, it is necessary to examine many facets of the Hopi way of life. Since it is the intent of this study to examine the situation ecologically, it is the inter-relationship between these various facets which is of primary interest, but in order to discuss these inter-relationships a certain amount of background material must necessarily be included.

This study, as a result, has three major aspects: first, the aboriginal Hopi: his world view, his social organization, and his economy; second, the gradual modification of the cultural environment of the Hopi during the last few centuries, as contacts with other cultural groups became increasingly important to the Hopi; and third, the processes by which the Hopi have adapted to the present conditions, and the manner in which these adaptations are reflected in the cultural landscape.

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It is clear that the present situation is a transitional one. The Hopi have not yet completely adapted to the increasing interaction of their culture with the surrounding Anglo culture, as well as the Navajo, and other groups with which they come in contact. Nevertheless, they seem to be making the required adjustments relatively smoothly. The processes by which these adjustments are made may prove instructive for other groups endeavoring to make the transition from subsistence agriculture to modern, diversified economies.

Chapter 5

MODERN HOPI ECONOMY

The aboriginal economy of the Hopi was focused primarily on agriculture, with only minor emphases on other aspects, such as gathering of wild materials and hunting. It is not possible to examine the present Hopi economy in such a simplistic fashion, for it is no longer dominated by agricultural activities. Other factors, particularly wage work, have come to play a far more important role in the economy than agriculture. However, agriculture is still of considerable importance for many segments of the population, and still constitutes one of the most visible aspects of Hopi land use. Therefore, it will be examined in some detail, but it must be remembered that many of the changes which have taken place in agriculture are the result of the increasing importance of other economic factors. Some of these other factors are also discussed as they relate to the economy as a whole.

Agriculture

For several centuries the goal of every Hopi young man was to be a good farmer. Talayesva speaks several times of his doubts about his ability as a farmer, and how it affected his attitudes toward other aspects of his life (Simmons 1942). But within the period examined here, this view has changed. Titiev notes that during the 1930's one often heard,

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"I want my boy to grow up to be a good sheep herder" (Titiev 1944, p. 193ftn.). But this period lasted for only a short time. Now, neither farming nor herding are considered the best way to make a living. To this extent, the Hopi have been drawn into the surrounding Anglo culture. The Hopi now think in terms of a wide variety of alternate economic possibilities, of which farming or stock raising are only two. At present, neither is particularly attractive.

A century ago, the Hopi were dependent upon agriculture for most of their well-being, but today it is of little importance. I was told by one Hopi (not a farmer) that "farming is not an economic factor. It is mostly a tradition. If everyone who farms were to quit, no one would starve." This, I think, overstates the case somewhat, but it is indicative of the low level of importance currently attached to farming.

What is of particular interest here with regard to agriculture is the kind of changes which have affected this aspect of Hopi life during the last seven or eight decades. Although the Hopi agricultural system was well adapted to the conditions of the local environment, it has been possible to make some changes in the methods employed without upsetting the ecological balance of the system. These changes have taken a variety of forms, from the simple substitution of a pipe for a wooden stick in the construction of digging sticks, to the use of tractors and discs for the preparation of fields.

In recent years there has been a definite increase in the size of Hopi fields, and this is undoubtedly related to the increasing availability of tractors. Fields located in small, irregularly shaped sites in arroyos

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or on steep dune areas are still cultivated by hand, but most fields located in the valley bottoms are now partially cultivated with the aid of tractors.

There is still a great deal of hand labor involved. Hopi maize, for example, must be planted much deeper and at greater intervals than mechanical planters are designed for. In addition, much of the weeding, and nearly all of the harvesting must be done by hand. At this stage the only major use of modern conveniences is the use of pick-up trucks to carry the harvest back to the village.

The fact that much cultivation is done with tractors does not mean that tractors are commonly found on the reservation. It is unlikely that there are more than twenty to twenty-five tractors available, but nearly every farmer has access to a tractor through ceremonial or kinship ties. Since each farmer's fields total only a few hectares, the use of a tractor for a few hours is usually sufficient.

At Moencopi an interesting development has been the use of hand cultivators. Many of the garden crops at Moencopi are grown on terraces in lower Reservoir Canyon. These plots are quite large in comparison to most Hopi gardens, but are still too small and too irregular to permit the use of tractors.

Aside from the use of tractors for cultivation, and pick-up trucks and automobiles for transportation of the crops, there has been little major change in the Hopi agricultural technology. The tools devised for other systems cannot be readily applied to the peculiar conditions of Hopi crops and environment.

As has been discussed in Chapter 4, the Hopi have frequently experimented with new crops, and over the last several centuries have adopted many crops from their neighbors, such as peaches and many vegetables from the Spanish, squashes and beans from other Indian tribes and Anglo groups such as the Mormons. This experimentation with crops seems to be an important part of the agricultural system. In spite of this, there has been no substantial change in the types of crops grown by the Hopi during the recent past. Wheat, which was initially introduced by the Spanish, was grown for some time, although not particularly successfully, and was finally abandoned. Some Hopi at Moencopi grew wheat under irrigation for a time, where it was considered a commercial crop. Sorghum is a more recent introduction, brought in by Mormons. It too has been grown commercially in small quantities at Moencopi. Aside from these crops, the Hopi agricultural complex seems to have been remarkably stable during the last eighty years. Whiting noted this in 1939, and it is equally true at the present time. The only significant modification of the crop inventory during this century seems to be the elimination of the native cotton (Gossypium hopi) which was once an important crop. It was quickly replaced in the economy by commercially available cotton fibers and fabrics, and seems not to have been grown since about the time of World War I.

Other changes have been confined to varieties of well-established crops, with some varieties being added, while others were dropped. Flint corn, once prized for its storage characteristics, has been largely dropped as the danger of famine has declined. Some varieties of watermelon have been replaced by others which do not store as well, but have better flavor.

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Many of these changes can be traced directly to a decreasing dependence upon agricultural production. Under such conditions, crops which store best have been replaced by other varieties which are thought to taste better.

Distribution of Farming Activity

There are two changes in Hopi agriculture which have greatly affected land use patterns on the reservation. One is the recent decline in the total area devoted to farming, and the other is the modification of the location of fields.

Because of the nature of Hopi farming, with many very small fields scattered widely in the area around the villages, it is virtually impossible to get an accurate estimate of the total area in crops at any one time. This was particularly difficult before aerial photography became available for the area. Such photographs are of great utility, but even so, accurate estimates of crop acreage are difficult. Most air photos of the area have been taken for purposes other than agricultural assessment, and were therefore taken in late autumn, when conditions for photography are best. Unfortunately, this is after the crops have been harvested, so that fields in use and those which have been abandoned for several years look virtually identical. Re-growth of natural vegetation does not obscure an area which has been cleared for many years. Since ground surveys of the entire reservation are usually impractical, acreage figures are for the most part informed estimates at best. A glance at Table 14 will convince the reader that many of these estimates must be no

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Table 14

Area of Cultivated Land
on the Hopi Reservation (in hectares)

Year	Source	First Mesa	Second Mesa	Third Mesa	(Oraibi Valley)	Total
1890	(1)	--	--	--	--	2,430
1900	(2)	--	--	--	1,000	--
1901	(3)	--	--	--	--	780***
1925	(2)	--	--	--	650	--
1936	(4)	--	--	--	--	2,460
1943	(5)	756	625	1,505	--	2,886*
1950	(6)	466**	--	--	--	--
1950	(7)	--	--	--	--	3,180
1964?	(8)	--	--	--	--	4,900***
1966	(2)	--	--	--	370	--
1967	(9)	340	520	1,015	390	1,875

All data (except 1967) have been converted from acres to hectares.

(1) Donaldson 1893, p. 64.
(2) R.M. Bradfield, personal communication.
(3) U.S. Department of the Interior, 1901, p. 708.
(4) Page 1940, p. 58.
(5) Thompson 1950, p. 46.
(6) Dozier 1954, p. 358.
(7) Investigation of Bureau of Indian Affairs 1953, p. 1205.
(8) Hopi Indian Agency 1964?, p. 6.
(9) Field work, summer 1967.

*At another point Thompson (1950, p. 46) states that the 2,886 hectares represents the area which may be used for crops, so it does not represent the area actually under cultivation. Extrapolation of other data in Thompson indicates that the cultivated area in 1943 was probably about 2,250 hectares.

**This does not include area in orchards.

***This figure is so clearly grossly inaccurate that it casts suspicion on other Bureau data as well.

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more than guesses. It is very unlikely that the area under cultivation could fluctuate so widely within the period covered.

Disregarding the obvious disparities in the data for the moment, it seems to be the consensus of those who have worked in the area for extended periods that the cultivated area remained fairly stable during the early part of this century, and then began to decline, a trend which has continued up to the present. Bradfield (personal communication) dates the beginning of the decline in the Oraibi valley to about 1925. Page (1940, p. 20) felt that acreage for the reservation as a whole had declined little if any by 1940. There can be little doubt, however, that total acreage in crops have declined greatly since then, particularly in the last decade. There are large areas of abandoned fields in all parts of the reservation.

Calculations based on data collected in the field during 1966 and 1967 indicate that the area devoted to field crops (maize, beans, and squash, primarily) totaled approximately 1,900 hectares. The area devoted to orchard crops (mostly peaches, but also including some apricots and apples) is much more difficult to determine. A large percentage of the Hopi fruit trees are scattered in groups of two or three trees within some of the villages, or occur individually or in small groups along the margins of fields devoted to maize or beans. Others are found in the irrigated garden plots below the springs. Probably little more than half the fruit trees are in what might be called orchards.

In addition, some of the orchards consist almost entirely of dead or dying trees, which are no longer productive. Therefore, a simple acreage figure which includes such orchards is quite misleading as to the importance of orchard crops.

With the decline in the importance of agriculture, it is probable that some aspects have declined more sharply than others. If this is so, we could assume that the area devoted to the different types of crops would change in their relative proportions. As shown in Table 14, figures for total crop acreage are quite undependable, so comparable figures for various types of crops are probably equally unreliable. It is unfortunate that there is so little information on this subject, since it is impossible to make any definite statements about the change in relative importance of different crops. The information available is summarized in Table 15.

It is clear that maize continues to dominate the agricultural system, while there has perhaps been a slight decline in the importance of orchard crops, and various vegetable crops may have increased in relative importance.

Nagata (1967, pp. 230-232) has noted that at Moencopi maize has remained very stable, not only in the amount grown, but also in the locations of the maize fields. Several varieties, including blue, white, yellow, and sweet corn are being grown, and only rarely does the crop in a given field change from year to year. Vegetable crops, on the other hand, are frequently changed, and tend to displace beans when the changes occur.

The relative importance of vegetable cultivation has increased in recent years as the use of wild vegetable plants has declined. Unlike maize, nearly all of the seeds for the vegetable crop are obtained from commercial sources. Most of the maize seeds are saved from the previous crop, although sweet corn seeds are often purchased commercially. Nagata notes that this is also true for the other Hopi villages (1967, p. 233).

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Table 15

Hopi Farmland

(Percentage by Crops)

Year	Source	Maize	Orchards	Beans, Squash, Vegetables
1890	(1)	50-60	15-20	20-35
1940	(2)	72	13.2	11.4
1943	(3)	75	13	13
1950	(4)	67	11	22
1950*	(5)	76		24

(1) Donaldson 1893, p. 64.
(2) Hack 1942, p. 19
(3) Thompson 1950, p. 42.
(4) Investigation of Bureau of Indian Affairs 1953, p. 1205.
(5) Dozier 1954, p. 358.

*For First Mesa only, and does not include acreage in orchards.

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Since virtually none of the Hopi crops are sold commercially, there are very few records of yields or acreage for individual crops other than maize. Hack (1942, p. 17) estimated that no more than one per cent of Hopi agricultural production was marketed, and nearly all of this was sold to local traders who sold it back to other Hopi. There seems to have been no significant change in the situation since then.

Another aspect of Hopi agriculture which should be discussed is the location of the fields, and how this has changed during the period of rapid economic and social change. It is clear from the discussion in Chapter 4 that fields cannot be distributed randomly about the reservation, but are constrained by the distribution of those physical features which are favorable to the agricultural system.

In spite of these severe environmental limitations on the location of fields, there have been some changes over the last few decades in the distributional pattern. Some of these changes are related to changing physical conditions, primarily the entrenching of most of the arroyos in the Hopi area. Prior to 1900 the washes flowed in very shallow channels, and could be diverted for agricultural purposes, or fields could be located within the channel itself. But beginning early in this century most of the arroyos incised their channels to a depth of ten meters or more, making the diversion of water, or the use of the channel itself impossible. This was particularly critical on Third Mesa, where many of the fields were located in the valley bottom near Oraibi Wash. With channel cutting, many of these fields had to be abandoned, and this was probably a factor in the breakup of Oraibi in 1906.

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Similar incision of the stream channels occurred on Wepo Wash, and Polacca Wash, but apparently First and Second Mesa villages were not as dependent on valley bottom field sites as was Third Mesa. Other environmental changes would include the local movement of sand dunes, which results in a change in field location, but these are very localized moves, and do not result in major changes.

During the early nineteenth century it is probable that Hopi fields were located as near to the village site as possible, since the danger of raids by surrounding tribes was constant, and workers in the fields were in particularly exposed positions. However, during the late nineteenth century, when the Navajo, Apache, and Ute had been subdued by the U.S. Army, there seems to have been a great expansion on the part of the Hopi. It was during this period that Hopi farmers re-occupied the farms at Moencopi on a permanent basis, grazing activities--discussed below--expanded into a wide area, and farming seems to have spread out considerably along the washes south of the mesas. The extent of this expansion is unknown, since there are no maps of the period showing Hopi field locations, but some traditions and tales include stories of farms at considerable distance from the villages.

This period was relatively short-lived, however, for the Navajo began to move into the Hopi area in greatly increasing numbers after about 1875. While raiding was no longer employed, the presence of large numbers of Navajo, with their flocks of sheep, could quickly force the Hopi farmer to vacate exposed locations far from assistance. Waters (1963, p. 297) cites the case of fields located near Gray Springs, about fifty kilometers

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southwest of Oraibi in the early 1890's. Constant harrassment by Navajos caused their abandonment within a short time. Other stories are very similar.

Thus, the potential for expansion of the area farmed by the Hopi in the late nineteenth century was blocked by the increasing presence of Navajo herders in the areas around the villages. Therefore, the Hopi were confined to approximately the same areas they were utilizing at that time. In spite of tales of the marvelous ability of the Hopi to run great distances to get to their fields (which have a basis in fact), most fields were always located within a few kilometers of the villages. Most were within six or seven kilometers, and very few were more than fifteen kilometers distant.

This kind of distribution is common in many parts of the world where the economy is based on subsistence agriculture and holdings are fragmented. In Europe holdings about a nucleated settlement are often highly fragmented because of the inheritance pattern. Among the Hopi, it is a response to the environmental conditions of the area. A farmer must have fields in several locations to ensure a sufficient return. Because of environmental limitations on field location, Hopi fields seem to be somewhat more distant than is usual in other parts of the world. Chisholm (1962, pp. 50-53) summarizes data for various parts of the world, and while there is a large range, average distance from the village to the farm plots is most commonly from one to two kilometers. The Hopi fields seem to average between two and four kilometers distant, although there is considerable variation. At Hotevilla, for example, most fields are within one or two

kilometers, while at First Mesa fields are frequently three to five kilometers distant.

Such distances are measured as air-line distances, but for the farmer, access routes may be considerably longer. Probably more important than simple distance is the time required to reach the field (Chisholm 1962, p. 53). Müller-Wille prepared a map for a village in Germany showing zones of equal time of travel about the village (this map is reproduced in Lösch 1967, p. 382). The isochrones on this map correlate very well with the intensity of cultivation around the village, much better than simple air-line distance.

While data are not available for the construction of similar isochronic maps for the Hopi villages, this concept does raise another point which is of some relevance. The creation of District 6, set aside for the exclusive use of the Hopi, effectively ended the incursion of Navajo herders in a considerable area around the Hopi villages, much of it only lightly utilized. At the same time (the 1940's), many of the Hopi obtained the use of automobiles and pick-up trucks. Since the use of automobiles should vastly reduce the time needed to reach the fields, it should have been possible for the Hopi, with automobiles and the threat of Navajo incursions curbed, to cultivate fields in much more distant locations, with no greater effort or time than formerly expended in reaching nearby fields by foot. Theoretically, then, we should expect to find a dispersal of fields to more distant sites in the recent past.

This has not occurred, however, for several reasons. First, access to automobiles does not mean their ready availability for every farmer at

all times. Often it is necessary to go to the fields when no car is around. This factor works against distant field sites. Also, the rapid decline in the importance of farming during the post-World War II period means that there is no real interest in expanding agricultural production. Rather, fields are continually being taken out of production, even in nearby sites.

A few distant areas, particularly Tallahogan Valley on Antelope Mesa, have been utilized more intensively, but this seems to be because of especially favorable conditions there. The Tallahogan garden area, for example, was being used in the 1930's at least as intensively as at present.

The decline in agricultural acreage, and its increasing localization near the villages must be attributed to the smaller role in the Hopi economy played by agriculture in recent years. If it had maintained its importance, other factors indicate that field sites would have become more dispersed, rather than more localized, as is the case. An indication of the degree to which this is occurring can be found in a comparison of Figures 18 and 19. Figure 18, for 1940(?) is taken from a Soil Conservation Service agronomy map, and it is not known whether all fields were shown, or if it was confined to those in cultivation during the year. A study of the area involved indicates that it was probably the latter. However, several inaccuracies in the location of topographic features makes exact comparison with present field locations difficult.

Figure 19 is based on field work carried out during 1966 and 1967, and includes only those fields in actual cultivation in 1967. Because of the limitations of the photography used, the size of fields indicated is an approximation. But despite such difficulties, several things are clear.

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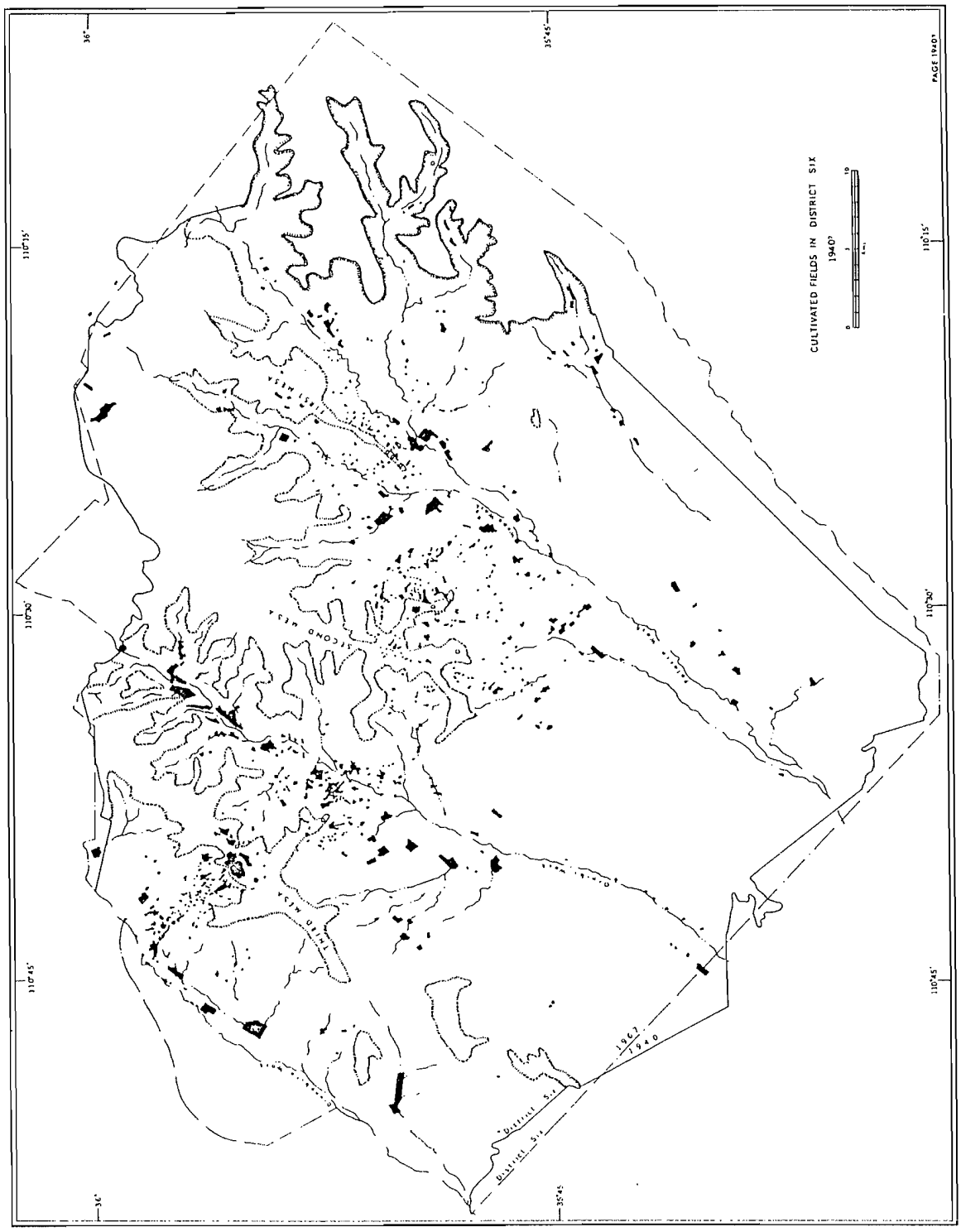
CULTIVATED FIELDS IN DISTRICT SIX
1940'
PAGE 19401
1967
1940
District Six
District Six

Figure 18

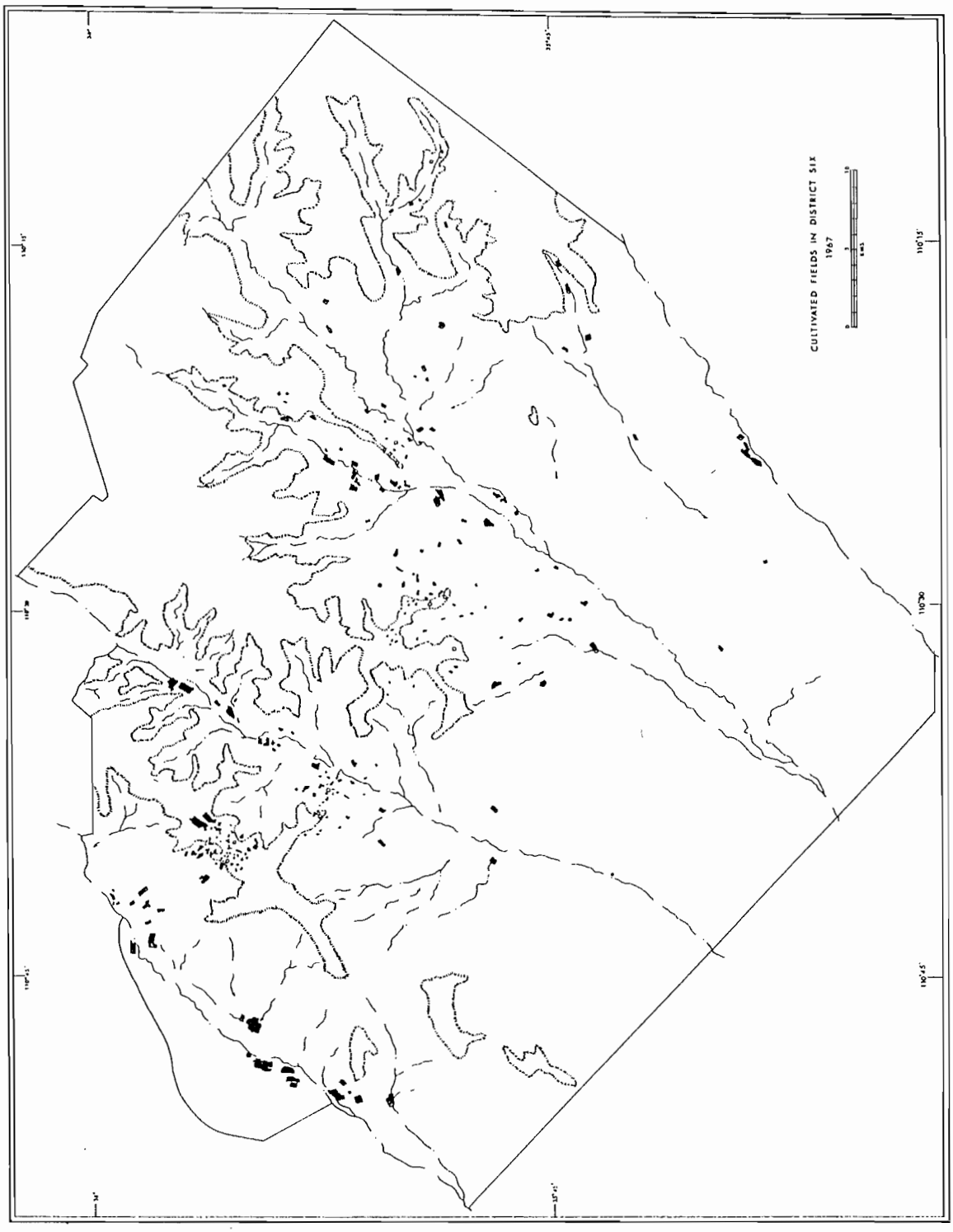

Figure 19

There has been a marked concentration of fields near the villages, due primarily to the abandonment of distant locations, and there has been a considerable increase in the size of fields. There are far fewer fields, but the total area has decreased only about twenty-five per cent. The figures are somewhat distorted, however, by the fields on the west side of Dinnebito Wash, which total nearly two hundred hectares, and were not included in the 1940(?) map.

Before leaving the subject of agriculture entirely, mention should be made of the agriculture practiced by the Hopi at Moencopi, west of the other villages. Moencopi is the only Hopi village which has an assured water supply year around. As a result, agriculture at Moencopi is based on irrigation of crops rather than a dependence on flood water or rainfall, and is therefore at variance with the other villages.

Nagata's recent study of the assimilation of non-Hopi traits at Moencopi (Nagata 1967) contains a good deal of information on the growth and development of the present agricultural system there, so I will mention only a few points here. One thing which is illustrated by the situation at Moencopi is the willingness of the Hopi to adapt to differing conditions quite readily, indicating that the lack of change in the agriculture of other villages may be due more to its close adaptation to the difficult environment, rather than any reluctance to change on the part of the Hopi.

Moencopi differs from the other villages in its accessibility to other cultures, so that assimilation of traits from other groups has been somewhat more pronounced there than in the other villages. During the early years of occupancy, a Mormon agricultural settlement was located immediately

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adjacent to the Hopi village. This was later taken over by the Bureau of Indian Affairs, which brought Moencopi into close contact with agents of the U.S. government. In addition, large numbers of Navajos have settled in the Tuba City area, within two or three kilometers of Moencopi. As a result, Moencopi has been exposed to a variety of cultural contacts for decades which has been approached in the other villages only within the last few years as circulation has improved.

Another difference has been the importance of commercial agriculture at Moencopi. While the crops grown are essentially the same as those grown at the other villages, many of them are produced primarily for sale, either to other Hopi who work for wages and do not farm, or to the Navajo and Anglo residents of Tuba City.

But in spite of the commerical aspect of at least a part of the Moencopi agricultural system, there has been a decline in its importance to the community during the last thirty years, similar to that which has affected the other Hopi villages. The peak acreage cultivated by the Hopi at Moencopi was reached at about 1940, when about 344 hectares (860 acres) were being farmed. This is the equivalent of about 0.8 (2 acres) per person (Nagata 1967, p. 171). Since 1940 there has been a decline in the area cultivated as the result of the abandonment of certain outlying areas, such as Coal Mine Canyon and around Red Lake (Tonalea). In 1962-63, only about 223 hectares (550 acres) were cultivated, or approximately 0.4 hectares (0.9 acres) per person (Nagata 1967, p. 175). Changes in the area cultivated by Moencopi residents are shown in Figure 20, which, however, does not include certain distant sites, such as those in Coal Mine Canyon, or some fields in Dinnebito Wash.

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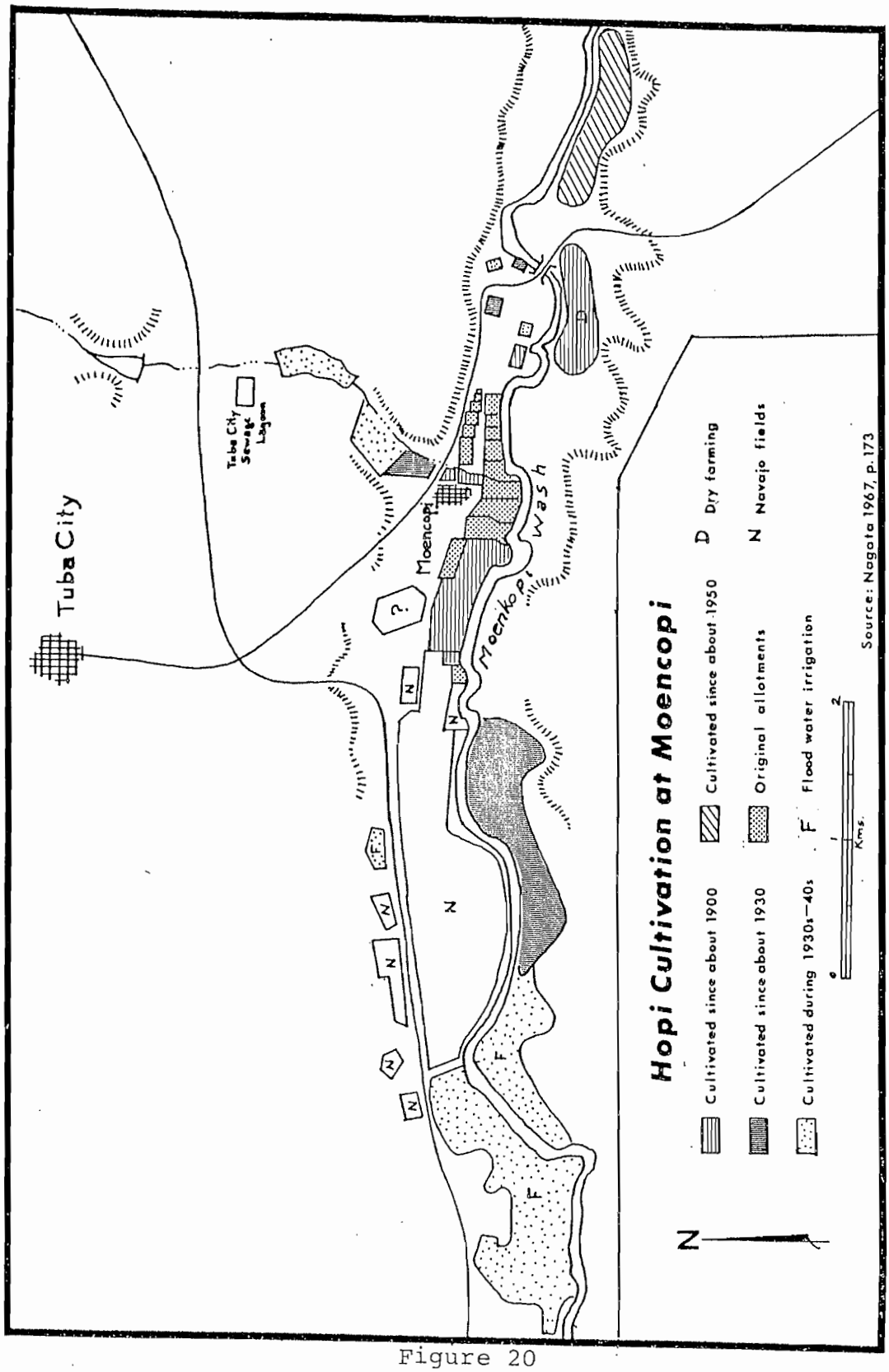
Tuba City
Tuba City Sewage Lagoon
Moencopi
Moenkopi Wash
Hopi Cultivation at Moencopi
Cultivated since about 1900
Cultivated since about 1930
Cultivated during 1930s–40s
Cultivated since about 1950
Original allotments
Flood water irrigation
D Dry farming
N Navajo fields
F Flood water irrigation
Source: Nagata 1967, p. 173
Kms.
N

Figure 20

By 1963, many plots had been abandoned, even fields very near the village. Nagata (1967, p. 175) feels that the decline in agriculture can be attributed to the change from an economy which was essentially subsistence agriculture (in spite of its commercial aspects) to an economy based primarily on wage labor. This change is reflected not only in the general decline of agriculture, but also in the relative proportions of the crops grown. Maize seems to be relatively stable, probably because of its ritual significance, but melons and vegetables, which can be readily sold, are replacing beans in many fields (Nagata 1967, p. 232).

Cotton and wheat, once grown in considerable quantities at Moencopi, were abandoned many years ago, since they could not compete effectively with commercial varieties from outside the area. Cotton has not been grown at Moencopi since about 1912 (except for one man who grew some during 1948-51), and wheat has not been grown since about World War II (Nagata 1967, p. 228).

Grazing

The Hopi have grazed some livestock since cattle, sheep and horses were first obtained from the Spanish in the seventeenth century, but it did not become an important part of the economic structure until late in the nineteenth century. Earlier, the threat of hostile raiders kept herds close to the villages, which restricted the grazing area, and therefore the size of the herds. Writing in 1872, W.C. Powell noted that "...at night, the sheep are driven up to stone corrals under the walls of the cities" (Powell 1948-49, p. 485). As the threat of raids was removed due to the subjugation of the Navajo, Ute, and Apache by the U.S. Army, Hopi herding activities expanded, and the size of herds increased rapidly.

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Hopi livestock ranged for a short period over an area reaching from Ganado on the east, and Cow Springs on the north, to the Little Colorado on the west and south. Large herds were grazed in Blue Canyon near Moencopi (Abbott Sekaquaptewa, personal communication) and as far away as Flagstaff. However, the rapid expansion of the Navajo into the Western Navajo Reservation in the late nineteenth century forced a curtailment of Hopi grazing activities, and the grazing area was reduced to within several kilometers of the villages.

Until the early part of the twentieth century, Hopi herding activities were one aspect of their subsistence economy. Cattle and sheep were raised primarily for meat and wool, while horses and burros provided transportation. From about 1880 to 1940 mules were also used for transportation and as draft animals. Apparently large numbers of goats were also kept, providing a certain amount of meat and hair.

In the twentieth century there has been a great shift in the relative proportions of the different kinds of livestock, reflecting two main factors. The first of these is the increasingly commercial character of Hopi grazing activities, and the second is the increasing use of automobiles, trucks and tractors. The latter has led to a precipitous decline in the importance of horses, mules and burros, although horses maintain some importance as a prestige item (see Table 16).

Stock Reduction

For many years it was the policy of the Bureau to encourage the expansion of herds, but this stand was reversed during the late 1930's, and in

Livestock on the Hopi Reservation

Year	Cattle	Sheep	Goats	Horses	Mules, Burros	Total Sheep Units
1901	1,325	55,500				60,800*
1929	4,500	14,200	7,500	3,600		57,700*
1937	7,695	11,202	317	5,085		67,727**
1943	1,000	12,627	1,000	1,200		23,627
1950	2,366	6,974	18	710	293	21,471
1964	2,000+	6,000+	90	430	90	16,690+***

Sources: 1901--U.S. Department of the Interior (1901, p. 709).
1929--Hoover (1930, p. 439).
1937--Hack (1942, p. 17).
1943--Thompson (1950, p. 38).
1950--Investigation of Bureau of Indian Affairs (1953, p. 1205).
1964--Hopi Indian Agency (1964?, p. 6).

*These figures pre-date the formation of District 6, and therefore presumably include livestock over the entire 1882 Executive Order Reservation, much of which would belong to Navajo herders, rather than Hopi.

**Thompson (1950, p. 38) states that the carrying capacity of District 6 was set at 23,627 sheep units, which necessitated a twenty-four per cent reduction in Hopi livestock. This would indicate that pre-reduction levels totalled about 31,500 sheep units. Hack states that his figures are taken from a U.S. Soil Conservation Service study of District 6, but his figures seem excessively high by about a factor of two.

***The cattle and sheep figures for 1964 are estimates, but indicate that livestock levels have been maintained at approximately the same level for the last twenty years, just below the level set as the carrying capacity of the range.

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the early 1940's a program of stock reduction was carried out. The change in policy came about as a result of the realization that the continued expansion of stock, particularly on the Navajo Reservation, but on the Hopi Reservation as well, was causing severe overgrazing, with a consequent destruction of the plant cover and serious erosion of the soil.

In order to reduce overgrazing and erosion, the Bureau of Indian Affairs divided the Navajo and Hopi Reservations into range management districts, and the carrying capacity of each was surveyed. District 6, which included the Hopi villages, was assigned a carrying capacity of 31,189 sheep units in 1942. The next year this was revised downward to 23,627 sheep units.[1] As a result, the Bureau of Indian Affairs required a reduction in the size of Hopi herds and flocks by about twenty-four per cent. The reduction did not effect each mesa equally. Since the stock were distributed unequally on the range in relation to carrying capacity, the program required a reduction of about twenty per cent on First Mesa, twenty-two per cent on Second Mesa, and forty-four per cent on Third Mesa (Thompson 1950, p. 38).

While there may have been excellent reasons for the stock reduction program, and indications are that there has been an improvement of range conditions under the improved management, there is no doubt that the program brought considerable economic hardship to many individual Hopi, especially on Third Mesa. Unlike land and agricultural products which are

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[1]Sheep units are the basic unit used by the Bureau in computing the number of animals a given area can support. It is defined as forage sufficient to feed one sheep for one year. Sheep and goats each equal one S.U.; a cow equals four S.U.; and a horse equals five S.U.

held by the clan, therefore distributing shortage or plenty among a fairly large group, livestock are owned by individuals, so that the loss of a large proportion of their herds was particularly costly to many.

Since the stock reduction program was carried out in the early 1940's, there have been several minor re-adjustments of the total sheep units allowed for the area, but it has remained at approximately the same level throughout this period.

Commercialization

The influence of increasing commercialization of Hopi livestock raising has brought about a considerable change in the proportions of sheep and cattle. During the last twenty years, prices for cattle have been somewhat more favorable than those for sheep, which has encouraged Hopi livestock owners to shift from the former strong emphasis on sheep to an emphasis on cattle.

Although stock raising has become increasingly commercial, and now constitutes an important source of income, its growth has been severely limited. The control over total numbers, and the issuance of grazing permits by the Bureau of Indian Affairs has worked against the expansion of individual herds, and therefore limited the possible income to be derived from stock raising. Additionally, beef and sheep prices have been relatively low in recent years, so that it is not as attractive economically as it might otherwise be.

As a result, stock raising, like agriculture, has failed to expand in recent years, and in fact has perhaps declined. Kennard notes that

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of 128 grazing permits issued to Second Mesa residents, twenty-five were unused in 1960, and only a handful were for units large enough to be economical (Kennard 1965, p. 32).

Although many individuals own a few sheep or cattle, stock raising is of economic importance to only a few individuals on each mesa. Many of those who have permits for only a few head of stock have formed organizations for the cooperative herding of sheep, although cattle are allowed to roam freely. Other organizations covering the whole reservation or large parts of it have been formed to facilitate marketing.

The discussion of grazing so far has been concerned only with the Hopi Reservation proper. Stock raising is also a factor at Moencopi, but because of the peculiar conditions there it has taken a somewhat different turn than in the other villages.

Additional problems face Moencopi stockmen because of their location. They must compete directly, and in the same areas, with the more numerous Navajo, who surround them completely. Due to the pressure of the Navajo, Moencopi herds have never been large. At the time of the stock reduction program of the 1940's, Moencopi's herds were well below the maximum number assigned to them. Since that time there has been some fluctuation, but the general trend has been toward smaller numbers of livestock (see Table 17).

Many of the trends in stock raising activities noted for the villages within District 6 are also present at Moencopi as well, often in an even more developed state. This is particularly true of ownership of horses, which have little commercial worth, and as a result have declined sharply

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in numbers over the last thirty years. As grazing has shifted from an activity which contributed primarily to a subsistence economy to an almost entirely commercial venture, it has become concentrated in the hands of fewer individuals, who have herds larger than was true in the past.

Table 17

Numbers of Hopi Livestock: Moencopi

Year	Horses	Sheep	Goats	Cattle	Sheep Units
1937	126	667	77	414	2,400
1943	--	1,080	70	518	3,222*
1947	--	517	12	414	2,185
1951	--	468	7	323	1,797
1955	103	375	10	372	1,873
1958	--	381	28	245	1,389
1961	--	338	18	250	1,356
1962	46	376	16	274	1,488

Source: Nagata (1967, p. 257).

*Since 1943, Moencopi has been allotted a maximum of 3,497 Sheep Units.

In one respect, stock raising at Moencopi has evolved in a different direction than among the other Hopi villages. At Moencopi, several relatively stable groups have developed for cooperative herding of cattle, while sheep owners tend their flocks on an individual basis. In the other villages the situation is reversed: cattle are allowed to graze freely, but sheep are herded cooperatively in flocks made up of several individuals' holdings. Reasons for this difference are not clear, but may be related to the presence of Navajo cattle herds at Moencopi and the danger of the loss of the Hopi stock. It is also related to the size of the holdings. The average holding of sheep at Moencopi is well over 100 head,

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while the average holding of cattle is just under ten head. Therefore, it is much more reasonable for sheep owners to do their own herding, but cattle owners are almost forced into some sort of cooperation.

Moencopi stock is herded in areas to the south and east of the village. Moencopi is located within District 3, and while the entire district is theoretically open range, there are "customary use areas" which are recognized by the herders, the Navajo Tribe, and the Bureau of Indian Affairs. In District 6, there has been some subdivision of the unit, so that it is not all equally open to grazing. For one thing, there are recognized boundaries between the territories of each mesa, and while these are not always followed, there is some feeling that herders should keep their stock within their own mesa's territory.

> We had a meeting at the Second Mesa day school, about land... The old Chief Sikyaletstiwa of Supalowi wants to have the First Mesa cattle and horses and sheep removed from Second Mesa lands, likewise the Oraibi cattle. Second Mesa people haven't got much stock, so we have been using their land....(Parsons 1925, p. 79).

In addition to the sub-division of the reservation on the basis of the territorial claims of the different mesas, there has been a division on the basis of land use. This was done largely at the instigation of the Bureau of Indian Affairs. In the central part of the reservation, near the villages, grazing is permitted, but the animals must be kept under control at all times. Farmers are not required to fence their fields, and the stock owners are liable for any damage. Outside this area, to the north and south of the villages, stock may graze freely, and farmers must fence their plots. In this area, stock owners are not liable for damages to the crops. Near the eastern and western margins of the reser-

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vation are areas where grazing is allowed from 15 November to 1 April, but no grazing is permitted in these areas during the growing season.

A sire pasture has been set aside and fenced, southeast of First Mesa, for the use of the improved breeding stock, both cattle and sheep, which has been brought into the reservation. The fences are often in poor repair, and there are often disputes over stock getting into the sire pasture.

Present Economy

The Hopi economy is in a state of transition, which makes generalizations about it difficult. Less than a half-century ago, commercial enterprises and wage labor constituted only an extremely minor part of the total economy. Much of this was derived from employment by the Bureau of Indian Affairs, which affected only a few Hopi directly, and the sale of craft items, such as pottery, rugs, and baskets. Handicrafts have never been of any real importance to the economy, except as a minor supplement to other sources.

At the beginning of the period under discussion, subsistence agriculture formed the basis of the Hopi economy. A certain amount of herding provided a supplement to the diet, and also provided wool, hides and bone, which were utilized in the manufacture of many household goods. Almost no livestock products were sold. Some wool did provide some income for the purchase of goods from the trading posts, such as sugar, coffee, cloth and tools.

During the last fifty years or so there has been a substantial change in the emphasis of economic activities. More and more Hopi are taking

part in various commercial activities, and wage labor, particularly in off-reservation locations, has become increasingly important (see Chapter 7).

Because of the nature of the economic changes, it is impossible to make definite statements about the relative importance of the different elements at the present time, but some general comments are in order. The available data are summarized in Table 18. These figures are not strictly comparable, since the bases for the data are somewhat different. Nevertheless, they do give some indication of the structure of the economy.

Recently there has been an increasing dependence on wage labor, but since much of this is in off-reservation locations, complete figures are not available. Livestock is an important factor for many individuals, but for the group as a whole it is of declining importance, in spite of its almost entirely commercial character at present. One of the most difficult factors to assess is the importance of subsistence agriculture. Nearly all Hopi engage in at least some farming. Even those who live more or less permanently off the reservation will often maintain a field or two, depending on a relative to care for it.

Since agriculture is still almost totally non-commercial, its importance must be assessed indirectly. The most common method of computing the worth of subsistence crops is to estimate the return which would be obtained if the crops were to be sold on a commercial basis. This gives a very distorted picture of the actual value of these crops to the society, however. A better method would be to try and determine what it would cost the individual to purchase equivalent amounts of foodstuffs for his own

Table 18

Relative Importance
of Various Economic Activities
(percentage)*

	1937	1942	1950**	1967 (est.)
Agriculture	54	25	15	20
Wages	32	33	58	55
Livestock	10	33	22	20
Handicrafts, etc.	4	9	5	5

Sources:
1937: Hack (1942, p. 16).
1942: Thompson (1950, p. 39).
1950: Dozier (1954, p. 88).
1967: Estimate based on field work.

*Sources vary in emphasis, but figures are intended to reflect total income, including use of subsistence crops.

**Hano only.

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use. These retail prices would be considerably higher than the sale price of his products.

Additionally, such computations deal only with the monetary importance of the crops. For a group such as the Hopi, much of the value of the agriculture is associated with its ceremonial importance. For example, blue corn, which is not available commerically, plays an important role in many ceremonies. Its worth to the tribe, then, is often not measured in monetary units at all. Many other crops have a similar ceremonial importance.

As wages and commercial activities contribute more and more to total income figures, agriculture will undoubtedly continue to decline in importance. Some agriculture will be continued, however, as long as Hopi culture continues to function, even though its economic significance may be negligible. It may ultimately become a gardening activity only, but Hopi culture and religion are closely tied to agriculture, so it is unlikely that it will be abandoned completely.

Future Development

At several points the transitional nature of the present Hopi social and economic structure has been alluded to. It is obvious that many trends and developments presently in evidence will continue to modify the Hopi culture.

First, we can consider the land itself. During the last century and a half, the area available to the Hopi for utilization has been steadily diminished both by the encroachment of the Navajo, and by the policies of

the U.S. government. The most recent reduction was in 1943 with the designation of three-quarters of the 1882 Executive Order Reservation as a joint use area, to be shared equally by the Hopi and the Navajo. Although much of the area involved was used only sporadically by the Hopi, its loss has had an important effect on the way they view their world. Their land, once fundamental to their way of life, no longer seems secure. It seems unlikely that any further reductions in area will occur, particularly in light of 1962 and 1963 court decisions upholding the 1943 division of the reservation.

Recently there have been some indications that the trend to reduce the Hopi's land area has been stopped, and perhaps even reversed. As a result of the controversy growing out of Navajo developments near Moencopi, the Bureau of Indian Affairs has now stated that "...an undetermined Hopi interest in the area shall be recognized by placing in a special deposit account all moneys derived from the use and management of the surface and subsurface resources therein" (letter from Bureau of Indian Affairs Commissioner Robert L. Bennett to Graham E. Holmes, area director for the Navajo Reservation, dated 8 July 1966; quoted in Hopi Action News, October 13, 1967). This statement recognized officially for the first time a Hopi claim to the portion of the Navajo Reservation lying west of the Hopi villages. What the result of this recognition will be is as yet unknown, but it represents an important step in re-asserting Hopi claims.

The shrinking of the Hopi land base, along with the steady growth of population and increasing involvement with Anglo culture, has placed an increasing strain on the traditional pattern of Hopi land use, which was

well-adapted to previous conditions, but less well-adapted to the conditions of the last few decades.

Most studies concerned with development or change in the area have assumed that since the Hopi have always been agriculturalists, they will continue to be so. The study described by Thompson (1950) is of this kind. One attempted solution to the problems caused by changing conditions was the colonization scheme on the Colorado River Indian Reservation (see Chapter 7). Again, the assumption was that agricultural development was the proper solution--in spite of the fact that the scheme disrupted virtually every other aspect of the Hopi culture pattern, in addition to placing them in an entirely different agricultural environment.

The Hopi, unlike outside students of the area, determined very quickly that the best method of restructuring their economy to meet the new conditions was to reduce the dependence on subsistence agriculture while developing alternate sources of income. The increasing importance of wage labor, whether on or off the reservation, has been a major factor in shaping many of the changes in settlement and land use. The changing agricultural pattern is, of course, directly related to this economic shift. The changes in housing are to a great extent determined by the availability of non-agricultural income which permits the purchase of commercial materials of various kinds. More indirectly, the dispersal of housing on the reservation is connected with the wage economy through its impact on social structure and the lessening of extended family ties.

Agriculture, as an integral part of the Hopi way of life seems destined to continue to decline in importance. Subsistence agriculture is no longer a feasible method of providing for societal needs, particularly as

the Hopi are increasingly drawn into the surrounding Anglo culture. Because of the extremely difficult physical environment, there has been no opportunity to change from a subsistence agricultural pattern to one of commercial agriculture, as has happened in many parts of the world in similar cultural situations. Commercial crops simply cannot be produced on a competitive scale in the Hopi area because of the shortage of water and the short growing season.

For a time it was felt that cattle and sheep grazing might provide an alternative economic base. It soon became clear, however, that the limited carrying capacity of the Hopi range would not support enough stock to make this a feasible alternative except for a few individuals.

The Hopi are a people who are dependent upon many differing income sources, each of which is inadequate individually to support the society, and which fluctuate from year to year in the return they yield. These sources include farming, grazing, handicrafts, local employment, off-reservation employment, welfare payments, and military service. Since it requires contributions from all these sources to support the present population, the Hopi cannot afford to give up any of them at present. For this reason, if for no other, subsistence agriculture and grazing will persist for some time on the reservation.

But on a long range basis there seems to be little doubt that wage labor will become increasingly important to the Hopi economy, and that this change will be reflected in the continuous modification of present land use patterns and forms and locations of settlement. The other income sources available to the Hopi are all limited in their potential, and in

some cases, such as herding, are already approaching their maximal development. Therefore, future increases must come almost entirely through an increase in employment.

The development of jobs open to the Hopi has therefore become a major concern of the Tribal Council in recent years. At present, the most important result of this activity is the construction of a garment factory for the Western Superior Company (BVD) which is being constructed near Winslow, Arizona, some one hundred kilometers south of the Hopi villages. This plant is being built by the Hopi tribe, which will then lease the facilities to BVD, who will employ several dozen Indians, thus creating jobs for both Navajo and Hopi in the area. Plans call for addition of other factories in the Hopi Industrial Park in future years, creating many more jobs.

The plant is located in Winslow rather than on the reservation itself, because of access to the railroad and the need for large amounts of water, which are not available on the Hopi Reservation. The plant is scheduled for completion in September, 1968, so its full impact on the reservation cannot be measured, but it will probably influence the Hopi in several ways. The already sizeable Hopi colony in Winslow will probably increase in size as people move from the reservation to take advantage of the employment opportunity. Other Hopi will probably commute from the villages over the recently completed paved highway between Second Mesa and Winslow.

The Hopi living in Winslow continue to function as part of the reservation community, even though they no longer live on the reservation. The Winslow colony acts as an extension of the reservation community, dependent

on the general economy, and constituting a source of subsistence for the people remaining on the reservation. Its proximity to the reservation permits the maintenance of close kinship and social ties, and the frequent participation in reservation events. The Hopi community in Flagstaff functions in a similar manner, although it is not quite as accessible to the reservation.

The Western Superior Company plant is an effort to generate jobs for Hopi on or near the reservation. Many Hopi go much farther away to seek employment, and eventually lose contact with the reservation to a great extent. There have been other efforts at developing sources of employment on the reservation to partially counter this trend. One possibility which has been explored is the expansion of tourist activities on the reservation. A recent study of the possibility of increasing the number of jobs through increasing tourism estimated that the construction of visitor centers, the construction of a motel, expansion of camping facilities, and several other possible activities would create a total of just over thirty jobs on the reservation (U.S. Department of Commerce 1964, p. 11). Obviously tourism offers no major solution to Hopi economic problems. Nevertheless, some efforts at encouraging tourism in the area might well have beneficial results, and as the new paved roads through the reservation become better known, the volume of tourist traffic will undoubtedly increase.

The Hopi are already well known for their handicrafts (pottery, baskets, kachina dolls in particular) and the public portions of ceremonials are often well attended by outsiders. The most notable example is the Snake Dance, held in August. This event usually draws several thousand

visitors to the reservation. However, the ceremonials are religious functions, and are therefore not subject to direct commercial exploitation.

Craft work, while it sometimes provides a supplement to other income, cannot be expanded to provide incomes for any number of people. For example, a kachina doll which sells for around twenty dollars may require forty to sixty hours of work. Basket making is even more time-consuming. The only craftsmen who can be supported on anything like a full-time basis are the silversmiths. At present there are about fifteen Hopi men engaged in this activity, but the possibility for expansion is limited.

The possibility of generating jobs on the reservation, then, seem rather limited. Lack of transportation facilities and adequate water supplies limit industrial development, and tourism cannot be depended upon to provide a significant number of job opportunities. Most Hopi will have to seek employment off the reservation, often in distant locations.

In the future, many Hopi will leave the reservation on a more or less permanent basis. Many will maintain some of the ties of the extended family, and will return periodically to participate in the social and religious functions of the community. Others will sever these ties, while continuing to provide partial support for relatives on the reservation, while still others will break with the reservation completely. Representatives of all three types are already in evidence.

For those who remain on the reservation, the problem will be to maintain their identity as Hopi, while adapting their culture to deal with the problems generated by contact with Anglo America. That this can be done has been demonstrated by a recent experimental school program on the

Navajo Reservation at Rough Rock (Fuchs 1967). This program has instilled a pride in the past and achievements of the Navajo people, while at the same time preparing its students for the variety of opportunities offered by the present culture of the Anglo world. Although such a program has not been instituted on the Hopi Reservation, the recent efforts to obtain a local high school could well take this direction if the school becomes a reality.

In terms of the land use and settlement patterns of the Hopi, we can expect that present trends will continue for some time. The area devoted to agriculture will continue to diminish, and fields will be located closer to the villages. It is likely that garden vegetables will increase in relative importance, while maize will continue to be important for ritual purposes, although its use as a food may well decline.

Chapter 7

RESETTLEMENT

Colonization

A rapidly growing Hopi population on a very limited area of cultivabl land was viewed as a serious problem in the early 1940's. Large, unused areas of potentially cultivable land were available near Parker, Arizona, on the Colorado River Indian Reservation, and it was felt by Bureau of Indian Affairs officials that colonization was a partial solution to the Hopi's problems. During the late 1940's, this was attempted, but met with only limited success. To understand why it was not as successful as had been hoped requires an examination of several aspects of the situation.

The Colorado River Indian Reservation (Figure 42) was established in 1865 "for the Indians of said river and its tributaries" (Young 1961, p. 198). In effect, it became a reservation for Mohave Indians, who had traditionally lived in the area along the river. By 1940, the Bureau of Indian Affairs was becoming increasingly concerned with the growing population pressures on other reservations, and began to explore the possibilities of opening up the Colorado River Indian Reservation to settlement by members of other tribes.[1]

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[1]Most of the information regarding the establishment of the resettlement scheme is summarized from Young 1961, pp. 198ff.

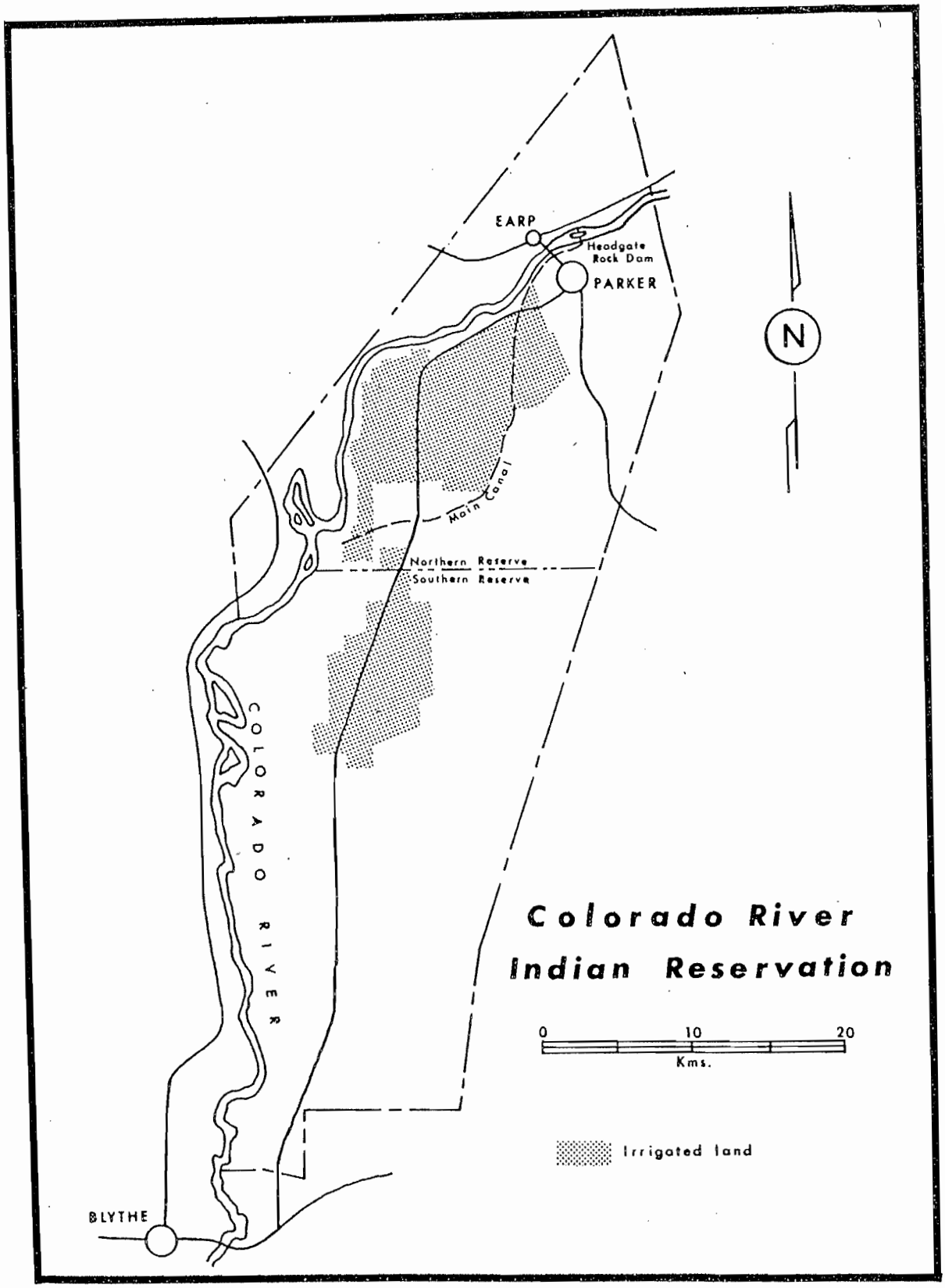
EARP
Headgate Rock Dam
PARKER
N
Main Canal
Northern Reserve
Southern Reserve
COLORADO RIVER
Colorado River
Indian Reservation
0
10
20
Kms.
Irrigated land
BLYTHE

Figure 42

In 1940, the population of the reservation was 1,187 (875 Mohaves and 312 closely related Chemehuevis). It was estimated that this population could be easily supported by 10,000 hectares of irrigated land, so plans were developed for the settlement of other tribes on the remainder of the land. The wording of the original legislation creating the reservation could be interpreted to include all Indians of the entire drainage area of the Colorado River, although it is doubtful that this was the intent of Congress in 1865.

Whatever the intent, plans were drawn for the settlement of groups from the Navajo, Hopi, Papago, and Yuma reservations, and certain other Pueblo groups. With the advent of World War II all such plans were suspended, and the unused southern portion of the reservation was turned over for use as a Japanese relocation camp.

At the end of the war the plans were revived, although many of the tribes previously listed were excluded. In 1945, the Colorado River Tribal Council and the Bureau of Indian Affairs entered into an agreement (known as Ordinance No. 5 on the reservation) which provided for the division of the reservation into two parts: the Northern Reserve, containing about 10,000 hectares of irrigable land for the use of the Mohave and Chemehuevi residents of the reservation, and the Southern Reserve, containing about 30,000 hectares of irrigable land, which would be opened for colonization. The Bureau agreed to subjugate some 6,073 hectares (15,000 acres) in each reserve. The new land, together with some 4,000 hectares already irrigated was thought to be sufficient to adequately support the resident population.

In order to provide a legal basis for the land holdings of the colonists (in the form of perpetual assignments, with title remaining with the tribe) it was agreed that the colonists would be required to become members of the Colorado River Indian Tribes (the legal tribal entity on the reservation).

This provision discouraged many potential colonists, since to do so they would have to give up all the rights and privileges as members of their original tribe. Few were willing to do so, particularly after the Indian Claims Commission Act of 1946 raised the possibility of large payments to tribal members for lands seized by the government in the past.

In spite of these difficulties, the first colonists arrived in June of 1945, and by the end of the year, sixteen Hopi families and one Navajo family were living on the Southern Reserve, housed initially in the buildings left from the internment camp. During the next few years more colonists arrived, although the total was far below that which had been expected. By the end of the program, 116 Navajo families, thirty-two[2] Hopi families, and three Supai families had moved onto the Southern Reserve. Some of the reasons for the relative ineffectiveness of the program are tied to a series of disagreements between the Colorado River Indian Tribal Council and the Bureau of Indian Affairs, outlined below.

By 1949, the Tribal Council, made up of Mohaves and Chemehuevis, had decided that Ordinance No. 5 had been a mistake on their part, and in 1951

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[2]Table 19, taken from Young (1961, p. 205) lists the total number of Hopi families as twenty-nine. The above figure is taken from data provided by the personnel of the Colorado River Indian Reservation Agency at Parker, Arizona. The reason for the discrepancy is unknown.

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Table 19

Number of Family Groups Involved in Colonization
on the Colorado River Indian Reservation
(adapted from Young 1961, p. 205).

Year	Arrivals**		Withdrawals**	
	Navajo	Hopi	Navajo	Hopi
1945	1	16	-	-
1946	-	2	-	-
1947	6	3	-	-
1948	2	2	-	3
1949	15	1	-	-
1950	60	3	-	2
1951	32	2	7	1
1952	-	-	8	-
1953	-	-	20	1
1954	-	-	5	2
1955	-	-	16	1
1956	-	-	6	-
1957	-	-	5	1
1958	-	-	1	-
1959	-	-	2	-
1960	-	-	1	-
Totals	116	29*	72	11*
Number remaining:	44	18		
Per cent remaining:	37.9	62.1		

*Figures exclude one Hopi colonist for whom neither arrival nor departure dates are available, and one Hopi colonist who died at Colorado River is omitted from the column headed "withdrawals."

**Does not include three Supai families who arrived in 1951. Two of the Supai families withdrew in 1955.

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acted to rescind the ordinance. This was contested by the Bureau of Indian Affairs, and the courts ultimately held that the reservation was for all tribes of the Colorado River and its tributaries, and the referendum was therefore invalid. In the confusion over the status of the colonists, the program came to an end in 1951.

Not all of those who came stayed. Table 19 shows the number of families arriving in each year during the program, and also the number of families who left, between 1945, at the start of the program, and 1960, by which time the colonist population had stabilized.

In 1964, Congressional action changed the status of the reservation, in order to avoid some of the problems of definition which had plagued the colonization effort. The phrase pertaining to the tribes of the entire Colorado drainage was eliminated, and the new legislation required that all residents of the reservation be enrolled on the tribal rolls of the Colorado River Indian Tribe, thus renouncing any other tribal affiliation. Most of the Hopi colonists had already been adopted into the tribe, so only a few individuals were affected by the new law (see Table 20). All of the Hopi who were there decided to remain, although two or three Navajo colonists returned to the Navajo Reservation at that time. At present no distinction is made on the agency records of any past tribal affiliations; all are members of the Colorado River Indian Tribe. The distinction between the Northern and Southern Reserves was also abolished, although in fact the northern portion of the reservation is still Mohave and Chemehuevi while the southern portion is Hopi and Navajo.

Out of a total Hopi population of around 4,000, only about 115 persons elected to make the move to the Colorado River, about three per cent of

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Table 20

Number of Hopi Adopted into the Colorado River Indian Tribe

1947	21
1948	27
1949	18
1950	4
1956	1
1965	5
Total	76

Data provided by the staff of the Colorado River Indian Reservation Agency, Parker, Arizona.

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the population. Of these, about forty eventually returned to the Hopi Reservation. In light of the rapid growth of the Hopi population, this scheme was of almost no importance in solving the problems faced by the Hopi.

But the program can be looked at in another way. What kind of Hopi were involved in the colonization, and what effect did their leaving have on the population which remained behind? Most Hopi in the late 1940's were not prepared to make the kind of change in their way of life required by the move to the Colorado River. Aside from the prospect of renouncing their membership in the Hopi tribe, the move meant that the colonists were effectively cut off from the remainder of their extended families, and the entire complex of social and religious activities which are of such great importance to the Hopi. Therefore, only those Hopi who were already at least partially divorced from these activities would be likely candidates for colonization. There are no figures available on the origins of the colonists or on their religious affiliations, but there can be no doubt that a majority of the colonists were Christian, and there is evidence that a large proportion of them came from First Mesa. Many of the names found on the Colorado River Indian Reservation are those of families at First Mesa.[3]

If these assumptions are correct, it means that a large proportion of the colonists came from the part of the reservation which had been most exposed to Western culture, and because of the presence of the Tewa popu-

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[3]In 1950 nineteen of the approximately eighty-eight Hopi colonists on the Colorado River were Tewa from First Mesa (Dozier 1954, p. 288).

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lation, had been most receptive to this influence. Those who were Christian would have suffered the least from the move, for they could continue to follow their religion anywhere, whereas the traditional Hopi religion depends to a very great extent on its followers' physical presence on the mesas, and their participation in the many ceremonials.

Even though the number of colonists was relatively small, the program probably removed many possible sources of dissension from the reservation, for the people most likely to be at odds with the traditional leaders were also the most likely to become colonists. Cox (1967, p. 153) cites one case in which a family was forced to leave Polacca because a member had sold clan land, which could not be done within the traditional system. This family became colonists on the Colorado River, and is now well-established there. It seems probable that a major side effect of the colonization scheme was to lessen tensions between factions on the Hopi Reservation far out of proportion to the numbers of people involved.

This colonization plan must be considered as a failure, in terms of providing a remedy for the problem of increasing Hopi population with a limited area to exploit. It was conceived as a farming colony, and since the Hopi have traditionally been farmers, it was felt that this would be a relatively easy change to make. But the farming practiced on the Colorado River Indian Reservation is a completely different type of agriculture from the traditional type practiced by the Hopi. Therefore the move required a great change not only in location, but also in the type of activity engaged in, and the whole cycle of yearly tasks.

In addition, most of the Hopi who felt strongly about continuing to farm preferred to remain within the traditional system, on the reservation.

Those who, for whatever reason, were inclined to move off the reservation were usually interested in non-agricultural employment. Many had worked at the Navajo Ordnance Depot west of Flagstaff during World War II, and the prospect of wage labor seemed more attractive to many than farming, particularly in the unfamiliar environment of the Colorado River Valley.

The experience gained through the colonization program has been applied to later programs of the Bureau of Indian Affairs, and others working with economic development on Indian reservations. As a result of observing the problems experienced by the Navajo colonists, the Navajo Tribal Council established the Navajo Farm Training Enterprise near Shiprock in 1957, to prepare the settlers chosen for the Navajo Irrigation Project on the San Juan River (Young 1961, p. 208).

More recent development projects aimed at assisting the Hopi have centered around training them for jobs in secondary or tertiary industries, usually off the reservation, or the development of industrial employment on or near the reservation.

Non-Agricultural Resettlement

Since the efforts at colonization of farming areas by Hopi proved to be of very limited utility in resolving the difficulties created by increasing expectations on the part of the Hopi, the increase in the total population, and the very limited possibilities for agricultural expansion on the reservation, it was obvious to all concerned that other solutions were necessary. In recent years, this has usually taken the form of resettlement of either individuals or nuclear families in off-reservation locations.

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Two distinct aspects of this resettlement can be noted: first, the move by individuals and families into nearby towns such as Flagstaff or Winslow made on an individual basis, with no particular training or assistance from outside agencies; second is the move, often to much more distant locations, connected with specific training programs which often include assistance in the location of housing and/or employment.

For the sake of clarity, the term "individual resettlement" will be used to refer to moves to off-reservation locations as the result of individual initiative, while "assisted relocation" will refer to such moves as are connected with the efforts of various training programs or government agencies.

Individual resettlement has been occurring in small numbers for many years. Off-reservation schooling gave many young Hopi an increased familiarity with various parts of the Southwest, and sometimes led to full-time employment after their schooling was completed. Far more important has been the resettlement of nuclear families in towns relatively close to the reservation, such as Flagstaff or Winslow, to secure employment with the Atcheson, Topeka, and Santa Fe Railroad. The Hopi gained a reputaion during the steam era of railroading of being skilled mechanics and machinists (Kelly and Cramer 1966, p. 33). The switch to diesel has eliminated many of these jobs, but the pattern of off-reservation employment was already well-established.

During World War II many Hopi were employed at the Navajo Ordnance Depot just west of Flagstaff. Many returned to the reservation following the end of the war and the consequent reduction of employment at the depot,

but the experience pre-disposed many of these individuals to look for other jobs off the reservation.

Flagstaff and Winslow offer several advantages for the Hopi seeking employment. Their nearby location makes possible frequent visits to the reservation, and the maintenance of social and religious obligations within Hopi society. Locations at greater distance usually prevent any active participation in reservation affairs. Historically, many Hopi families moved out of the village into summer homes during part of the agricultural cycle, returning to the village for ceremonials and other functions. Hopi residents of Flagstaff and Winslow were able to adapt this pattern to the changing conditions of the modern economy, but continuous residence off the reservation seems to have resulted in a weakening of ties to traditional activities, in spite of frequent contact between these families and their relatives on the reservation.

A rather detailed picture of the Hopi communities of Flagstaff and Winslow is available, as a result of a recent survey of Indian families in these towns (Kelly and Cramer 1966). Flagstaff has an Indian population of approximately 700 (1965), of which about thirty per cent are Hopi. That is, the Hopi population of Flagstaff is approximately 200. The balance is primarily Navajo, with a few members of other tribes also represented. The Indian population of Winslow is somewhat larger, about 850 (1965), with a similar tribal division, except that Winslow has a colony of Laguna Indians from New Mexico, which totals approximately 100. The Hopi population of Winslow,then, is probably about 225.

The survey indicated that home ownership is very high among the Hopi residents of these two cities, indicating that these groups are relatively stable, permanent communities. Home ownership among the Hopi was twenty-eight per cent in Flagstaff, and fifty-two per cent in Winslow, contrasted with thirteen per cent among the Navajo populations in both cities (Kelly and Cramer 1966, p. 29).

Employment figures for various industries are not given by tribal affiliation, but the Santa Fe Railroad is by far the largest source of employment in Winslow, while the biggest single employer of Indians in Flagstaff is still the Navajo Ordnance Depot. Other employers in the area include the U.S. Forest Service, which hires Indians as fire fighters (on a seasonal basis), the Museum of Northern Arizona, Northern Arizona University, garages, gas stations, and motels. Other Indians are employed by a wide variety of other businesses and industries.

In general, the Hopi employees remain with a single employer longer than do the Navajo, and seem to be somewhat better adjusted to the conditions of urban life. Kelly and Cramer suggest that this may be due to the nucleated character of settlement on the reservation, in contrast to the dispersed pattern of Navajo settlement. "Some informants believe Pueblo living, better English, better work habits, and 'settled way of life' contribute to Hopi success" (Kelly and Cramer 1966, p. 51).

According to the survey, prospects of employment were nearly always the reason for the move into the Anglo community from the reservation. Limited employment on the reservation, and a desire for an improved living standard seem to have combined to induce families to make the move.

In general, the attitudes of the Hopi interviewed by Kelly and Cramer indicated that Flagstaff and Winslow are considered as relatively attractive locations for individual resettlement. While not determined by the survey, it seems likely that proximity to the reservation is an important factor in shaping these attitudes. Presumably, more distant cities are less attractive for settlement because of their inaccessibility to the reservation. Another city which has a sizeable Hopi population is Phoenix, which is still within an easy day's drive of the reservation, but considerably more distant than Flagstaff or Winslow, and therefore probably less attractive to those wishing to maintain close ties to the reservation.

Assisted relocation (other than the Colorado River colonization scheme) is relatively recent in origin. There are several different programs which affect the Hopi, but the most important is the Adult Vocational Training program of the Bureau of Indian Affairs. This program had its origins in 1956, under Public Law 959 (Hart 1964, p. 8). This measure authorizes a program of vocational counselling, institutional training, apprenticeship, or on-the-job training for up to twenty-four months.

The program provides for transportation costs, living allowances, tuition, and incidentals for the trainee and his family in any of several training locations available. This program is open to any Indian, married or single, between the ages of eighteen and thirty-five. At the completion of the training program, the Bureau of Indian Affairs in collaboration with state employment offices and other agencies try to find jobs for the trainees. This may be either in the community where the training took place, on the reservation, or in some other locality.

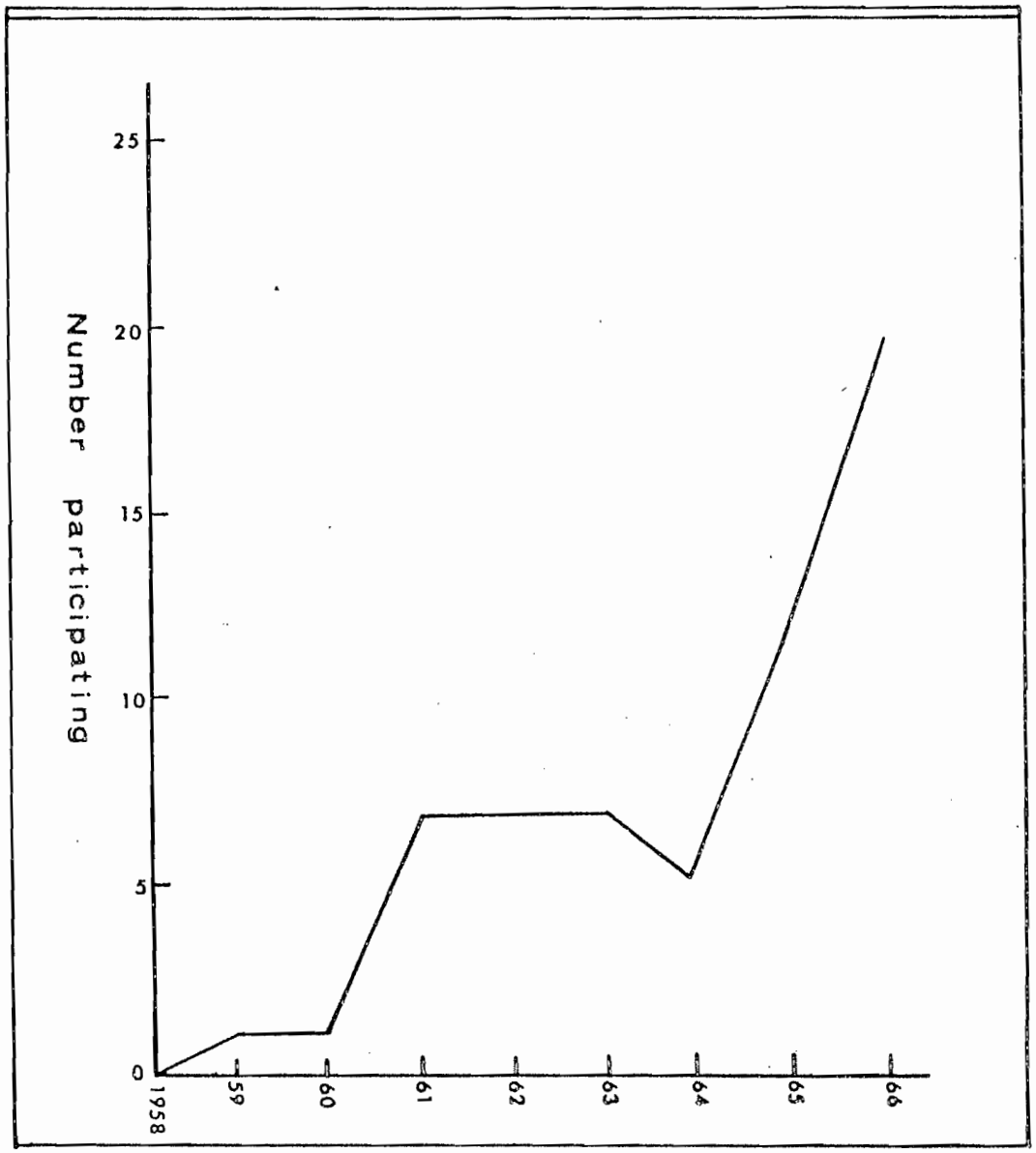
Hopi participation in this program was initially somewhat limited, but in recent years increasing numbers have taken advantage of it (Figure 43). Most of those who completed the training program took employment in locations other than the Hopi Reservation or its immediate surroundings, some as far away as Dallas or Cleveland.

By far the greatest number of those who had completed their training, and for whom employment locations were known, were found in the Phoenix area. This is the nearest large city to the reservation, and many of the trainees had attended high school at the Phoenix Indian School, so they were familiar with the area.

The type of training includes a wide variety of occupations, such as television repairman, stenographer, beautician, barber, welder, clerk-typist, practical nurse, and mechanic. Once the training is completed, other programs are available for finding employment.

While exact figures are not known, some generalizations about the location of off-reservation Hopi can be made. Estimates of their total number vary, but it is probably about 1000-1200. Of the total off-reservation population, nearly one-half [approximately 450] are located in the towns of Winslow and Flagstaff. There are probably an additional 200 in the Phoenix area [excluding students at the Phoenix Indian School who are included with the reservation population]. The remainder of the off-reservation population is scattered through much of the Southwest, with groups in Los Angeles, San Francisco, Tucson, Holbrook, Arizona, Gallup, New Mexico, and many other cities. Small numbers are found in Chicago, Cleveland, Dallas, and other more distant sites. Others are temporarily off the reservation while serving with the armed forces.

Hopi Participation in the Adult Vocational Training Program of the Bureau of Indian Affairs 1958-1966



(Data from Field Relocation Office, Bureau of Indian Affairs, Phoenix Area Office)

Figure 43

This situation, in which nearly a quarter of the Hopi population is living permanently off the reservation, is a recent development. In 1935, the total population for the tribe was 2,634. Of this total, 2,532 were living on the reservation, and 102 Hopi lived elsewhere. Fifteen of these Hopi were identified as living at some other agency, presumably as employees, or as spouses of members of another tribe. Therefore, only eighty-seven individuals, or 3.3 per cent of the population was living outside of the reservation environment (U.S. Department of the Interior 1936, p. 159).

In the three decades since, the percentage of off-reservation Hopi rapidly increased to about twenty per cent of the entire tribal membership at the present time. Since the population has been growing rapidly during this period, the number of individuals living off the reservation has increased even more sharply than the percentages indicate. Tribal population has increased about 100 per cent during the period, while off-reservation residence has increased by about 1200 per cent.

Many of these people return to the reservation periodically for extended intervals, and it is this feature which makes it so very difficult to determine either total tribal membership or the population of the reservation. Kennard's (1965, p. 30) data for Second Mesa indicate that for some villages between one-third and one-half of the population reside elsewhere. Most of these are probably in off-reservation locations.

Summary

The initial concern of government officials with regard to the Hopi and their utilization of their environment was with the growth of population in an area already virtually completely utilized. The solutions

proposed mostly took the form of some sort of resettlement. Initially this was of an agricultural character, utilizing the land available on the Colorado River Indian Reservation. When it became clear that this offered no significant improvement, the emphasis shifted to re-locating individual Hopi in industrial jobs away from the reservation. It is clear from the discussion above that this program has succeeded in re-locating hundreds of Hopi in off-reservation locations, but it has not brought any improvement to the reservation, since the population has been growing rapidly as well.

The basic problem in the past has been the limited nature of the agricultural resources of the reservation in relation to the number of people. As other economic factors increase in importance, agriculture becomes much less critical, so that the original problem has been greatly modified. Even at present it is much more meaningful to speak of the lack of employment on the reservation than to discuss the lack of farmland or the limited amount of range available.

In spite of the increase in reservation population during this century, the area under cultivation has actually decreased markedly. This decrease is the result of the decreased dependence of the Hopi on subsistence agriculture. The optimum population of the area is no longer a function of agricultural potential, but a function of many factors, such as the amount of income available from tourists, the amount of industrial employment available nearby, remittances from off-reservation relatives, and other aspects of a dollar economy. If other sources of income could be found, then population growth might cease to be an important factor influencing the well-being of the reservation Hopi.