PLAN B PAPER

OF

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FORWARD

The simple facts are that while it is not imperative for industry and subdivisions to occupy the best farmland, it is imperative that these lands be reserved for agriculture. There is little or no point in attempting to farm second-rate soil. 1

AGRICULTURAL LANDS AND THE PRESSURES FOR CONVERSION: THE CASE FOR PRESERVATION

I. INTRODUCTION

The importance of the subject matter treated in this paper cannot be underestimated. For it is a self evident fact that the American people, as most peoples of the world, are highly dependent upon their national heritage of land for the production of foodstuffs which in turn provide the necessary nutriments to sustain life. In light of the above, it would seem quite reasonable to expect that Americans would strive ~~strive~~ to preserve their most fertile lands for agricultural use and would allow, only with great reluctance and on account of compelling reasons, significant reductions in this valuable landed resource. However, the experience of the current century and the continuing trends indicate that such a judicious concern has not manifested itself to any great degree. Important losses in America's bounty of good agricultural lands have occured and are continuing to occur. These depletions have been due to various factors. Among the most prominent factors are ecologically unsound farming methods which have left lands in a wasted state and the outright withdrawal of fertile lands from agricultural use for purposes of development principally of an urban nature.

It is the task of this paper to examine the issues relating to the latter mentioned factor responsible for the depletion of the nation's agricultural resources. Although both factors merit serious attention, it is not possible to deal with each of them in the confines of this

particular paper. Consideration of the first aspect involves the matter of the deterioration of the fertility of farmable land due to such things as inadequate erosion control, extensive removal of soil minerals through excessive cropping without provision for minerals replacement and chemicalized farming practices with their heavy reliance on artificial fertilizers, herbicides, and pesticides.[2]

Discussion of the second aspect, the topic of this paper, focuses in upon the competing demands for land space between the urban development sector and the agricultural production sector, and the consequent wasteful loss of fertile lands from the agricultural resource base. Since there is not much use in resolving the problems owing to detrimental farming practices if the land itself is no longer available for farming by virtue of being converted to alternate use in behalf of urbanization, then maybe there is some justification for opting to discuss the second factor here and leaving the first for another opportune time.

The issues relating to the preservation of fertile lands for agricultural use will be taken up on two basic levels of geographic scale, ie. the national and the regional. Most of the analysis will be done at the regional scale since current problems are most pressing at this level and also since this level lends itself to more detailed analysis. The trends in agricultural land conversion will be assessed as well as the needs and desirability for preservation. The concluding section of this paper will cover the various measures which have been used and are being proposed for effectuation of agricultural land preservation policies developed at the various levels of government.

II. THE NATIONAL DIMENSION

Supply Situation

In attempting to arrive at some assessment of the need for agricultural land use preservation at an aggregate national scale it would be most helpful to review some relevant data regarding the land resources which presently exist within the boundaries of the United States. The best data which are currently available are the result of the National Inventory of Soil and Water Conservation Needs conducted by the U.S. Department of Agriculture [3] during 1957-58. Regarding this survey, our particular interests lie in the data which describe statistically the nation's agricultural land according to land capability classes and actual land use as of 1958. (Tables offering a detailed presentation of this data are included in the Appendices of this paper.)

Relying on the data source just cited, a summarization of certain pertinent information has been made by this writer and supplied in the table on the following page. The land classification categories labeled with Roman numerals which are used in the table are the familiar Soil Conservation Service's method of classifying lands based upon field studies of such aspects as soil depth, soil materials, slopes and other relevant features. Using the field survey data, the lands, or more specifically soils groupings, are mapped according to various soils capability classes which are assumed to be sufficiently uniform so as to (a) produce similar kinds of cultivated crops and pasture plants with similar management practices; (b) require similar conservation treatment and management under the same type and condition of vegetation; (c) and have comparable potential productivity.[4]

TABLE 1

Classification of U.S. Land Area
(48 Contiguous States)

Land Class	Acreage (millions of acres)	Cumulative Acreage Total	Class Acreage as % of Total U.S. Land Area	Cumulative % Total	Acreage Used as Cropland (millions of acres)	% of Class Land Used as Cropland
I	36.2		2%		27.4	75%
II	290.1	326.3	15%	17%	192.8	66%
III	310.8	637.1	16%	33%	152.9	50%
IV	168.7	805.8	9%	42%	48.9	4%
V	43.0	848.8	2%	44%	1.8	4%
VI	276.8	1,125.6	15%	59%	17.9	6%
VII	294.2	1,419.8	16%	75%	5.6	2%
VIII	26.7	1,446.5	1%	76%	.1	-
Federal Land (VI-VII)	396.0	1,842.5	21%	97%		
Urban, Built Up	51.0	1,893.5	3%			
Water Bodies	7.0	1,900.5	-			
Other	1.4	1,901.9	-	100%		
(Totals)	1,901.9		100%		447.4	24%

Source: Compiled from the Tables in the Appendices of this Report.

In so far as limitations for crop production are concerned, the lands in the various classes are rated as follows:

Class I- have few limitations that restrict their use.

Class II- have some limitations that reduce the choice of plants or require moderate conservation practices.

Class III- have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV- have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V- are impractical for cultivation.

Class VI- are unsuitable for cultivation.

Class VII- are unsuitable for cultivation.

Class VII- preclude cultivation.[5]

(For a more complete interpretation of the classification categories consult the Appendices of this paper.)

Generally speaking the lands in Classes I-IV are considered to be the arable classes. The different regions of the U.S. vary considerably in terms of their respective endowments of farmable land. (A general visual presentation of the distribution of lands in Classes I-IV throughout the U.S. is supplied in the Appendices of this paper.) This is one reason why it is essential to consider agricultural land use preservation from the regional as well as the national dimension.

From the data included in the table on the previous page, it can be seen that the Class I lands are in very meager supply, comprising only 2% of the continental U.S. (excluding Alaska, Hawaii, and the territories.)

Class II lands are also not abundant, accounting for only about 15% of the total land area. Class III and IV lands comprise 16% and 9%, respectively, of the total land area. Although the importance of the lands in the above four classes is relative depending upon the demand situation and regional distributions, the lands in Classes I and II are normally thought of as the "best" or "prime" agricultural lands. This is understandable in view of their excellent suitability for agricultural use. However, together they amount to only 326.3 million acres or 17% of the total land area.

Additional information from the table shows that about 75% of the Class I lands were actually being used as of 1958 for cropland, 66% of the Class II lands, and 50% of the Class III lands. Since the total land acreage in cropland as of 1958 amounted to 447.4 millions and the total acreage of the three most suitable land classes for cultivation (Classes I-III) was 637.1 millions, there evidently was not a pressing shortage of agricultural land at that time in terms of gross national acreage needs.

Preliminary deductions which can be construed form the above analysis are these: lands in Classes I-II are in minimal supply at the national aggregate level and though their ultimate worth depends heavily on the extent of national demand for foodstuffs, it could be expected that they will be required for food production uses in the future; the U.S. does possess a bounty of good agricultural land which proved sufficient for national foodstuff needs as of 1958. However, in order to gain a more realistic appraisal of the worth and need for agricultural lands in the U.S. it is neceassary to consider the demand side of agricultural production especially regarding future trends and projections.

Demand Situation

It is obvious that any attempt to project future land use requirements for agricultural production (as well as other land uses) far into the future would be beset by a multitude of complexities and imponderables. However,[6] the authors of the voluminous work, Resources In America's Future, have played the role of visionaries up to the year 2000, and have derived the most comprehensive set of projections for future land use requirements that are currently available for the U.S. on a national basis.

Tables 2 and 3 appearing on the following page contain the results of these researchers' prognostications for the target years of 1980 and 2000. Table 2 represents a meshing of varying demand levels with assumptions regarding crop yields which in turn enables some rough approximation as to cropland requirements. Table 3 is an attempt to bring together all the basic land use requirements for the U.S. in an effort to arrive at a composite mosaic of land use needs. It should be understood that these projections only represent broad guidelines as to what would be required in terms of land uses if certain assumptions are taken as givens. No direct attempt is made to state specifically what will be the actual situation in the target years of 1980 and 2000.

Regarding Table 3, the base cropland (and pasture) figure which is being used as the reference point is 470 million acres. This acreage amount is the rounded halfway choice between the recorded cropland acreage of the two census years 1950 (478 million acres) and 1954 (465 million acres). It has no physical connotations such as suitability for growing crops, but merely represents the actual land area used for crops and pasture at that

TABLE 2

Cropland Requirements for Crops and Pasture under Various Assumptions, 1960 and Projections for 1980, 2000

(Million acres)

Demand model	Yield assumption	Cropland required for pasture			Cropland excess over crop needs[1]			Cropland excess over combined crop & pasture needs		
		1960	1980	2000	1960	1980	2000	1960	1980	2000
1. Extreme Low	H	–	–	–	–	200	216	–	200	216
2. Extreme Low	M	–	–	–	–	176	187	–	176	187
3. Extreme Low	L	–	15	–	–	137	134	–	122	134
4. Modified Low	L	–	103	107	–	106	102	–	3	—5
5. Medium	M	79	75	58	102	102	52	23	27	—6
6. Modified High	H	–	35	6	–	102	14	–	67	8
7. Extreme High	H	–	173	258	–	70	—34	–	—103	—292
8. Extreme High	M	–	192	285	–	30	—102	–	—162	—387
9. Extreme High	L	–	210	312	–	—20	—215	–	—230	—527

Source: Appendix Tables A18-11 and 12.

1. Cropland required for crops (as calculated) subtracted from 470 million acres estimated as total suitable for crop production.

Source: Resources in America's Future, p. 351

TABLE 3

Land Requirements (excl. Alaska and Hawaii), 1950, 1960, and Medium Projections for 1980, 2000

(Million acres)

Category	1950	1960	1980	2000
Cropland, including pasture[1]	478	447	443	476
Grazing land[1]	700	700	700	700
Farmland, non-producing	45	45	45	45
Commercial forest land[2]	484	484	484	484
Recreation (excl. reservoir areas and city parks)[3]	42	44	76	134
Urban land (including city parks)	17	21	32	45
Transportation	25	26	28	30
Wildlife refuges	14	15	18	20
Reservoirs	10	12	15	20
Total specified[3]	1,815	1,794	1,841	1,954
Other land (residual)	89	110	63	—50
Total land area	1,904	1,904	1,904	1,904

1. All adjustments for feeding requirements are made in cropland, with grazing land held constant.

2. Does not provide for increased acreage to meet projected commercial forest demand. Requirements to close the projected gap in 2000 might run as high as 300 million acres (see p. 364 above), to be put into forest use at this time.

3. Totaled from unrounded figures in Chapter 11.

Source: Resources in America's Future, p. 373

selected point in time.[7] Thus, a positive number for cropland estimated for 1980 or 2000 would indicate that less land would be needed for crops and pasture than was required in the base year and consequently the number would represent the excess amount of cropland. Conversely, a negative number would indicate that more land would be required in the target year than was needed in the base year.

There are nine different models provided in the table. At the low extreme it can be seen that the model combining extreme low demand with the high yield assumption would result in an excess of 216 million acres needed for crops and pasture by the year 2000. In other words, only 254 million acres would be needed for this use (470 minus 216 equals 254). At the other end of the spectrum, the model combining the extreme high demand with the low yield assumption would mean that an additional 527 million acres (over and above the base year amount of 470 million acres) would be needed for crops and pasture by the year 2000.

It is obvious that the low extreme model would provide the least problems in so far as reconciling the competing demands for land for the various land uses of which agriculture is only one, albeit an important one. Should the high extreme model prove to be the reality for the year 2000, then it is just as evident that some serious problems would present themselves since a total of 997 million acres would be needed for crops and pasture and there are only 805.8 million acres categorized as arable (Classes I-IV) which lie within the U.S. (48 contiguous states only). Also, there would be created an impossible situation in so far as reconciling agricultural land use needs with the other land use requirements for the year 2000,

as projected for that horizon year. (To accomodate such an increase in land use for agriculture would necessitate very substantial reductions in the allotments to the other land use categories.)

As is the case with most of these efforts at offering a wide range of hypothetical models for future possible conditions, the model incorporating the medium assumptions is usually considered to be the one providing the most realistic portrayal of the probable futures. Thus, the researchers in this particular study opted for the medium model in their planning exercise of trying to integrate the various land use demands in the U.S. with one another. (This is apparant in Table 3.) The medium model,as its appellation implies, assumes a medium demand and medium crop yields. The result with this model by the year 1980 is a small excess of 27 million acres of cropland. However, by the year 2000 the excess is turned into a deficit of 6 million acres- meaning that by the year 2000, 476 million acres for cropland and pasture would be required. It is worth bearing in mind that the long range trend in the instance of the medium model calls for an increase in land for agriculture rather than a decrease. This should serve to create some concern for any existing trends which evidence substantial conversions of important lands out of agriculture. Although such trends may not seem detrimental in the short term, over the long run they could prove to be quite wasteful and costly.

Several comments could be made in regards the assumptions which form the bases of the various models. The researchers, in opting for the medium demand model as the most realistic for planning purposes, have probably overestimated somewhat the population increases which can be expected in

the next several decades. Recent population trends in the U.S. have shown a significant decline in the fertility rate. The 1970 census revealed that the number of children 5 years of age declined 15.5% between the years 1960-70. This is the greatest drop for the entire 120 years of census recording.[8] Should this trend continue, the U.S. population could possibly be stabilized within a few decades. Relating this development with the model, it would appear that domestic demand for foodstuffs might be at a lower level in the year 2000 than would be the anticipated level of demand called for in the medium demand model.

However, the researchers may have also overestimated in their medium model the capacity for increased crop yields per acre. They have assumed that technology as applied to crop production would invariably result in higher quantity yields per acre than are currently being achieved. This assumption has been built into the model. This writer would tend to think that this may be a faulty assumption in view of the mounting evidence that prevelant chemicalized farming methods which have artificially forced high quantity yields from farmlands are in the long run quite detrimental to the continued fertility of the soils.[9] Rather, it seems that the more probable prospect for the future would be a trend toward organic farming methods and away from chemicalized farming practices with their abnormal yields. Such a conversion process in methods would most likely, at least in the initial stages, result in a decrease in crop yields rather than an increase. Thus, maybe a low yield assumption for the year 2000 is a more reasonable estimate.

Overall, this writer would tend to think that the most realistic model of the nine listed by the reasearchers would be the model incorporating

modified low demand (to account for the growing evidence of a significant population growth rate decline in the U.S.) and the low yield assumption (to account for the changeover to organic farming methods). Actually, the resulting land use requirements of this model just described and the medium model are almost identical- the former requiring an additional 5 million acres for cropland and pasture by the year 2000 while the latter requiring an additional 6 million acres. However, in the modified low demand- low yield model the need for agricultural land is evidenced sooner than in the medium model. (For the former, the 1980 excess is only 3 million, while for the latter it is 27 million.)

The viewpoint of this writer offered above regarding the most probable model for the future is proposed with one important qualification. This is that the model is assumed to be orientated toward satisfying primarily the domestic U.S. demand for foodstuffs without any great increases in production assumed to supply (at a much higher level than is currently undertaken) foreign food consumption needs. Should the U.S. be called upon to assume a much greater role than presently in terms of providing foodstuffs to other nations, agricultural land use requirements could escalate dramatically due to the incresed demand for food. That such an eventuality is not merely idle speculation, is seen from the statement of a noted food expert such as Dr. George Borgstrom of Michigan State University who remarked recently that:

> More than half of the world's population is now on the other side of the hunger gap, and this at a time when we are in the unprecedented situation of adding almost a billion people in the 1970's. There is already a serious food shortage of a dimension the world has never seen before. 10

Although no attempt will be made here to assess the dimensions of such a foreign consumption demand which might possibly be partially satisfied through U.S. agricultural resources, it is just another important reason for the judicious preservation of fertile agricultural lands in the U.S. in the coming decades.

There are some additional observations regarding agricultural land use needs in the next several decades and their relationship to land use needs projected for other categories of land utilization that bear mentioning. From Table 3 it can be seen that the greatest increases in land needs during the period 1960-2000 have been projected for the categories of recreation and urban land. (It should also be noticed that the researchers held forest land needs constant over this period even though they could forsee a possible need for 300 million additional acres devoted to this use. However, they felt that it would not be feasible to expect that such increases in forest land could be accomodated and that alternate products would have to be devised to relace the need for wood products.) Recreation land needs are projected to increase 90 million acres between 1960-2000 and urban land needs are expected to increase by 24 million acres for that same period. Since the pressures for agricultural land conversion can be expected to be exerted by primarily urban land expansion needs, it is this aspect which will be pursued at greater length.

For purposes of speculation, considered in gross national terms, it might not seem overly deleterious if urban expansion did remove about 24 million acres from agricultural use in those several decades since the total acreage for the U.S. in Classes I and II, for instance, is roughly

326 million acres. However, the simplicity of treating agricultural lands from such a gross aggregate perspective can tend toward the glossing over of some important considerations. Should the removal of 24 million acres from agricultural use be at the expense of all Class I lands it would be a serious loss indeed since the total U.S. acreage for that Class amounts to only 36.2 million acres. Moreover, as the quote in the Forward of this paper so aptly put it, it is not necessary for industry and urban residences to occupy the best farmland; nor is it sensible to farm second-rate soil. The conclusion to be drawn is that urban development should be channeled so as to cause the least depletions in the bounty of the better agricultural lands. Finally, the importance of agricultural lands cannot be considered only from the national standpoint of gross U.S. (and foreign) food consumption needs. There are significant regional aspects to agricultural land use which should receive appropriate consideration in terms of the needs and desirability of preserving agricultural lands in the decades ahead. These will be discussed in the succeeding section of this paper..

III. THE REGIONAL DIMENSION

As was implied in the Introduction of this paper and should be evident as a consequence of the discussion in the preceeding section, the more pressing demands currently for agricultural land use preservation are are not yet a concern of national scope but are rather localized to certain regions and metropolitan areas of the U.S.. In this section an attempt will be made to delineate trends in agricultural land conversion for selected regions of the U.S.; to describe the nature of the pressures which are being exerted for conversion of agricultural lands to other uses mainly of an urban nature; and finally to outline the need and desirability of agricultural land use preservation as it relates to regional and local areas.

Trends in Agricultural Land Conversion

The regions in the U.S. which are presently faced with problems of agricultural land use preservation are generally characterized by a burgeoning urban sprawl, a high population growth rate due primarily to in-migration, a proximity of important agricultural lands to existing urban centers, and certain limitations in the supply of good agricultural lands within the regional area. The State of California is perhaps the best current illustration of an area possessing such characteristics and beset by problems of agricultural land use preservation. Most of the analysis which ensues will be devoted to the situation in California since it offers a good exemplification of the scope of the relevant issues to be encountered in agricultural land use preservation. In addition, good data sources are available for some of the regions in California, whereas this is not so true of other geographic areas in the U.S. .

The State of California comprises approximately 103,000,000 acres of land. The acreages assigned to Classes I-IV as of 1958 are as shown below.[11]

Class I	- 2.3	million acres
Class II	- 5.0	"
Class III	- 6.4	"
Class IV	- 5.8	"
	19.5	"

Comparing distribution of land class types in California with the nation as a whole (48 contiguous States), it can be seen that about 8.3% of land in California is in Classes I-II, whereas the national percentage is 17; the land in Classes I-IV in California amounts to only 20% of the State land, whereas the comparable percentage for the nation is 42%. Thus, it is apparent that California's supply of arable land is more limited than in other parts of the U.S. , and it could be expected that this would be a pertinent factor in behalf of agricultural land use preservation.

The following is a general picture of the shifting of crop land to urban uses in California expected for the 1958-75 period. A total of 1,672,800 acres are expected to be developed for urban uses, of which 1,217,100 acres (about 73% of the total) are in Classes I-IV. Of the 1,217,100 acres, 758,900 acres were in cropland as of 1958.[12]

In order to depict the trends of land conversion in finer detail for California, it would be helpful to consider the situation in the San Francisco Bay Bay Area Region. Much of the material relevant to this regional area is contained in the publication, Agricultural Resources Study,[13] which was commissioned by the Association of Bay Area Governments. The series of tables and maps included in this paper relating to the Bay Area Region

are taken from this publication.

Table 4 on the following page provides a statistical description of the land capability classes distribution for the Bay Area Region. In the nine Bay Area counties, only 17.5% of the land is in Classes I and II which are the best or prime agricultural lands. Figure 1 on the page after Table 4 indicates visually the situation with regard to soil capabilities for agriculture and urban development. What is evident is that the lands with no limitations for urban development are generally speaking also the lands most suitable for agriculture. The land portions suitable only for urban development are quite limited. Obviously, an inevitable competition for land between urban and agricultural uses would be precipitated by these circumstances. In order to retain prime lands in agricultural use, it would be necessary to forego short term economic benefits of lower urban development costs by selecting alternate urban development sites not in conflict with important agricultural uses but which at the same time incur higher initial development costs. (In effect this would mean generally that urban development would be channeled to the higher ground areas, leaving the valley floors for agricultural use.)

However, the trends to date have shown that agricultural uses have been steadily losing ground to urban uses in the competition for land. Tables 5,6,7 and Figure 2 appearing after Figure 1 amply document these trends. Data from Table 5 reveal that urban uses as of 1965 already occupied 21.5% of the land suitable for agriculture. Moreover, one-third of the prime agricultural land was in urban uses as of 1965. Figure 2 clearly demonstrates the extent to which urban development has already

TABLE 4

ACRES OF LAND BY SOIL CLASS GROUPS IN THE BAY REGION

County		Total	I-II	III-IV	VI-VII	VIII
Alameda	%	100	21.5	10.6	58.5	9.4
	Acres	469,120	100,860	49,720	274,440	44,100
Contra Costa	%	100	30.5	28.2	34.3	7.0
	Acres	469,760	143,280	132,470	161,130	32,880
Marin	%	100	10.0	6.8	75.2	8.0
	Acres	332,800	33,280	22,630	250,270	26,620
Napa	%	100	10.0	10.0	71.0	9.0
	Acres	505,800	50,580	50,580	359,120	45,520
San Fr.	%	100	–	67.0	33.0	–
	Acres	28,800	–	19,300	9,500	–
San Mateo	%	100	6.2	10.4	73.1	10.3
	Acres	290,560	18,010	30,220	212,400	29,930
Santa Clara	%	100	19.0	8.5	43.5	29.0
	Acres	833,280	158,320	70,830	362,480	241,650
Solano	%	100	29.0	33.0	35.0	3.0
	Acres	529,160	153,460	174,620	185,200	15,880
Sonoma	%	100	12.2	15.0	70.4	2.4
	Acres	1,010,560	123,290	151,590	711,430	24,250
Bay Area	%	100	17.5	15.7	56.5	10.3
Total	Acres	4,469,840	781,080	701,960	2,525,970	460,830

[1]Leonard R. Wholetz and Edward F. Dolder, *Know California's Land*, Sacramento, 1952.

Source: U. S. Department of Agriculture, Soil Conservation Service, Association of Bay Area Governments, *op. cit., Report and General Soil Map,* Nine Bay Area Counties, Berkeley, 1966.

Source: Agricultural Resources Study, p. 1.5

FIGURE 1

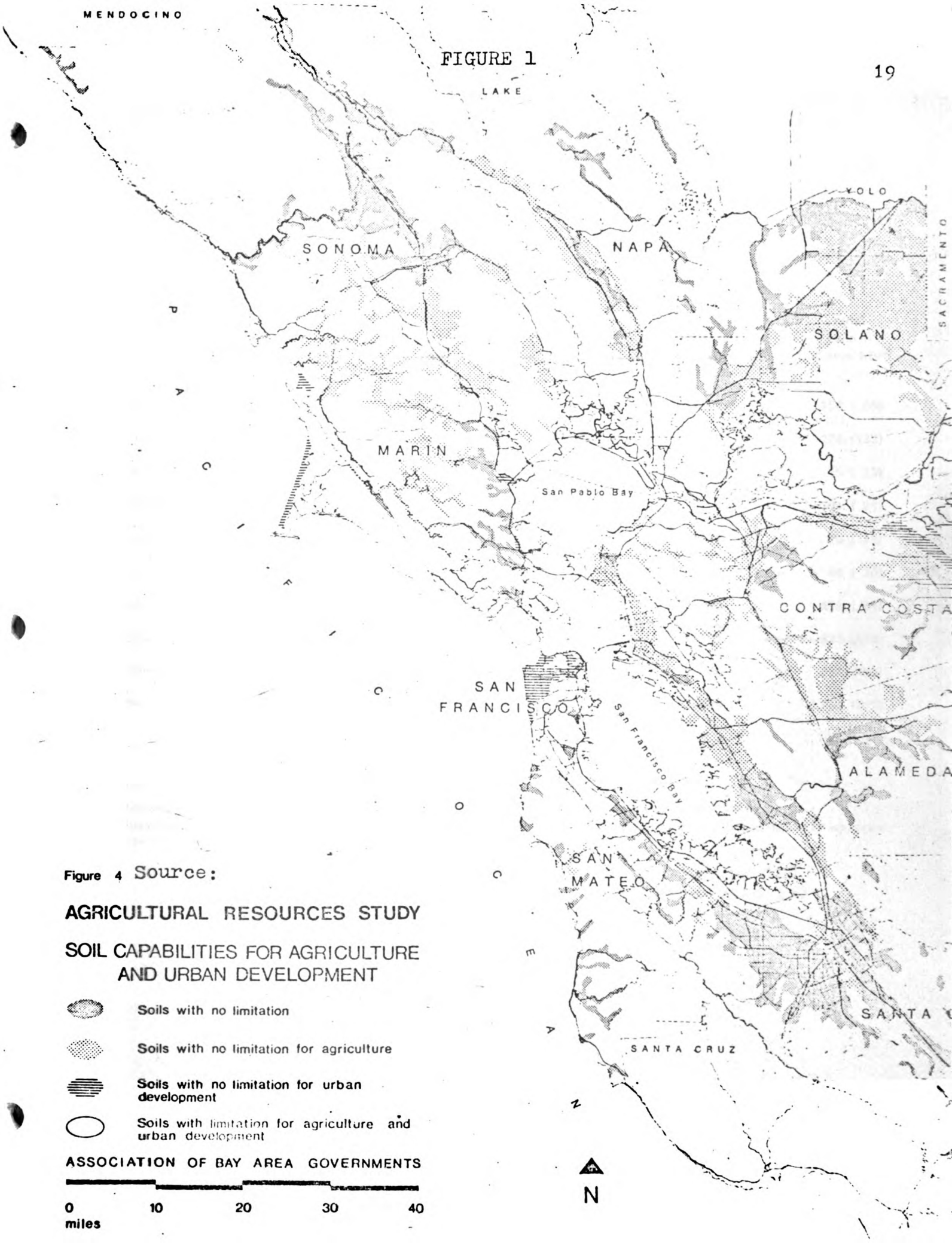


Figure 4 Source:

TABLE 5

1965-66 USES OF LAND SUITABLE FOR CULTIVATION BY COUNTY (in 000 Acres)

	Fruit Trees & Vineyards[1]	Other Cultivated Agriculture[1]	Non Cultivated Agriculture[2]	All Urban Uses[2]	Total Land in Classes I-IV[3]
ALAMEDA	5	34	41	70	150 (50)
CONTRA COSTA	21	50	135	70	276 (132)
MARIN	–	4	40	12	56 (23)
NAPA	19	6	72	4	101 (51)
SAN FRANCISCO	–	–	–	19	19 (19)
SAN MATEO	–	13	14	21	48 (30)
SANTA CLARA	51	34	54	90	229 (71)
SOLANO	16	131	174	7	328 (174)
SONOMA	40	37	173	25	275 (151)
BAY REGION	152	309	703	318	1,482 (701)
%	10.3	20.8	47.4	21.5	100 (47.3)

[1]California Department of Agriculture. County Commissioners' Reports, 1966.

[2]Association of Bay Area Governments 1965 Land Use Survey, *Preliminary Regional Plan,* November 1966.

[3]See Table 1 (figures rounded to the nearest 1,000 acres) given in parenthesis are the acreages in Soil Classes III and IV which are less desirable for cultivation than Soil Classes I and II.

Note: Non-Cultivated Agriculture refers to pasture and range which occur essentially in Soil Classes III and IV.

Source: Agricultural Resources Study, p. 1.12

FIGURE 2

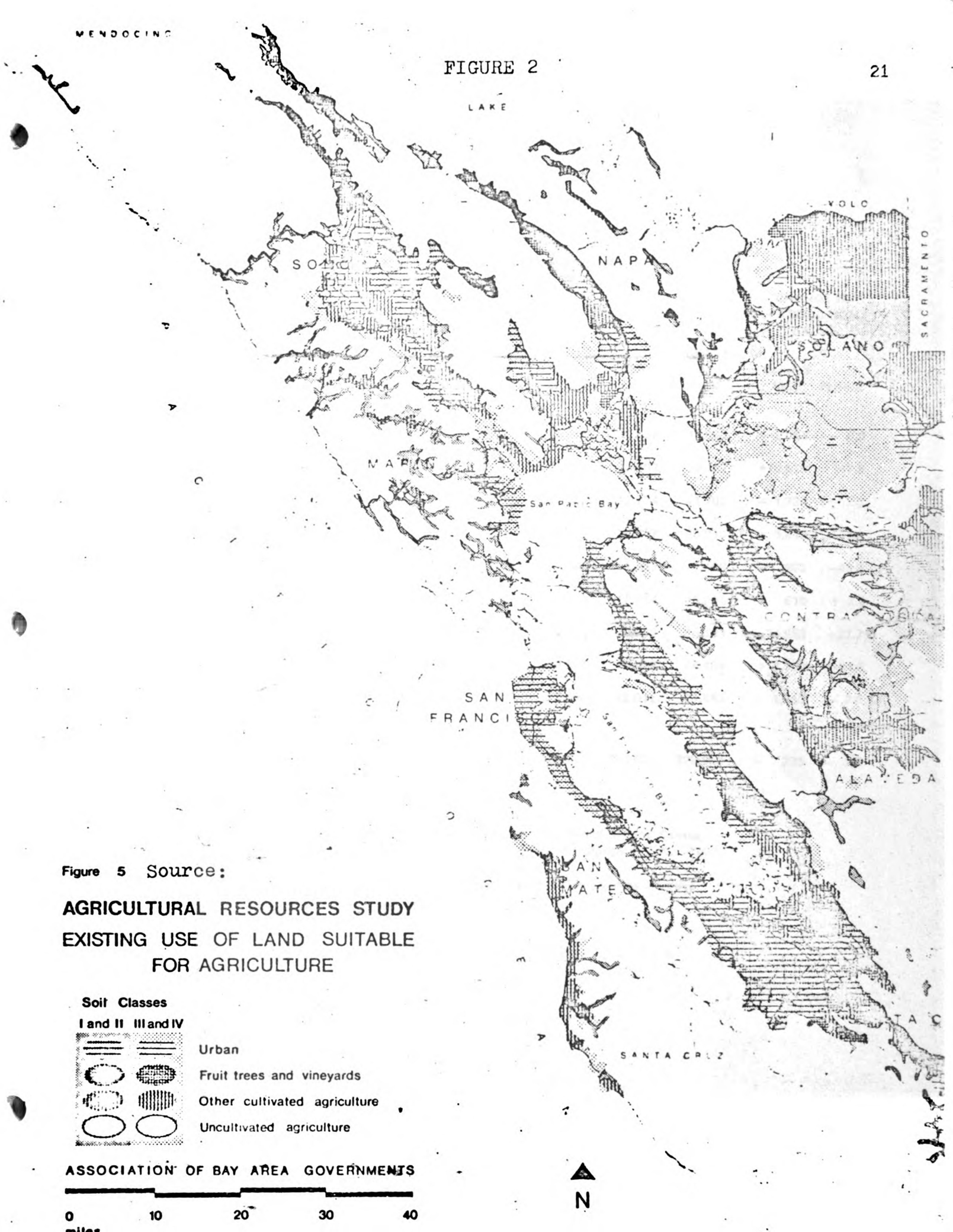


Figure 5 Source:

AGRICULTURAL RESOURCES STUDY
EXISTING USE OF LAND SUITABLE FOR AGRICULTURE

TABLE 6

BAY AREA AGRICULTURAL PRODUCTION BY COUNTIES 1960 - 66
ACREAGE HARVESTED - PRODUCTION VALUE

	CULTIVATED ACRES[1]		CHANGE IN CULTIVATED ACRES		PRODUCTION VALUE $000[2]			CHANGE IN PRODUCTION VALUE	
	1960	1966	Acres	Percent	1960	1966	1966 in Const. $ 1960	Const. $ 1960	Percent
ALAMEDA	61,603	39,382	−22,221	−36.1	35,159	36,035	33,066	− 2,093	− 6.0
CONTRA COSTA	82,984	71,019	−11,965	−14.4	22,324	35,892	32,934	+10,610	+47.5
MARIN	6,113	3,641	− 2,472	−40.4	13,427	12,754	11,703	− 1,724	−12.8
NAPA	29,889	25,098	− 4,791	−16.0	16,194	21,807	20,010	+ 3,816	+23.6
SAN FRANCISCO	36	29	− 7	−19.4	2,000	1,229	1,128	− 872	−43.6
SAN MATEO	23,956	12,571	−11,385	−47.5	17,397	19,624	18,007	+ 610	+ 3.5
SANTA CLARA	99,225	84,625	−14,600	−14.7	90,091	70,982	65,133	−24,958	−27.7
SOLANO	150,900	147,058	− 3,842	− 2.5	35,689	48,483	44,488	+ 8,799	+24.6
SONOMA	83,017	77,020	− 5,997	− 7.2	73,496	78,012	71,583	− 1,913	− 2.6
TOTAL BAY REGION	537,723	460,443	−77,280	−14.4	305,777	324,818	298,052	− 7,725	− 2.5

[1]Excludes pasture, and range land

[2]Using the wholesale price index by commodities (farm products) U.S. Bureau of the Census, *Statistical Abstract of the United States, 1967* (88th ed.), Table 499, Washington, D.C., 1967.

Source: Agricultural Commissioners *Annual Agricultural Crop Report*, Nine Bay Area Counties

Source: Agricultural Resources Study, p. 2.1

TABLE 7.

LAND WITHDRAWN FROM CULTIVATION AND NEW SUBDIVISIONS
NINE BAY AREA COUNTIES

Counties	Acreage Withdrawn From Cultivation[1] 1960-66		New Real Estate Subdivisions[2] 1960-66	
	Acres	% of Region	Acres	% of Region
ALAMEDA	22,221	28.3	7,490	16.0
CONTRA COSTA	11,965	15.5	7,306	15.7
MARIN	2,472	3.2	4,006	8.6
NAPA	4,791	6.2	1,845	4.0
SAN FRANCISCO	7	-	326	0.7
SAN MATEO	11,385	14.7	4,932	10.6
SANTA CLARA	14,600	18.9	14,433	30.9
SOLANO	3,842	5.0	1,183	2.5
SONOMA	5,997	7.7	5,126	11.0
BAY REGION	77,280	100.0	46,627	100.0

[1]Agricultural Commissioners Report, op. cit. Figures obtain by subtracting cultivated acres in 1966 from cultivated acres in 1960. Does not include pasture and range land.

[2]Northern California Real Estate Research Committee. *Northern California Real Estate Report* - Third quarter 1967, Table I, p. 37. (World Trade Center, San Francisco 11, California.)

Source: Agricultural Resources Study, p. 2.2

taken over much of the best farmland, especially on the valley floors. Table 6 offers an accounting of the land withdrawn from cultivation during the period 1960-66 in the Nine Bay Area Counties. Very substantial losses in agricultural land use have occured, especially in Alameda County (-36.1%), Marin County (-40.4%), and San Mateo County (-47.5%). Table 7 draws a correlation between the land removed from cultivation and the land used for residential development during the years 1960-66. The correlation is close and strongly suggests that most of the new urban development is taking place on land previously in cultivation rather than on range land or other less intensively used land.

The San Francisco Bay Area Region is not unique with respect to the loss of its fine agricultural lands for the Southern California Region is also experiencing a similar fate. Table 8 on the next page confirms this. Expectations regarding the shifts from agricultural to urban use for Los Angelos and Orange County during the years 1960-1980 indicate that possibly the lands in agricultural use will decline from 249,000 acres to 109,000 acres, almost a 60% reduction.

Regional indicators for the Northeastern Seaboard Urban Complex of the U.S. also show that significant depletions of lands from the agricultural resource base have transpired. Although data scurces are not available in fine as detail for California, general data covering the period 1940-59 as shown in Table 9 of the following page, document a 28% reduction in land in farms and a 24% reduction in cropland harvested.

The above examples should be sufficient to demonstrate that significant depletions have occured and are continuing to occur in the agricultural

TABLE 8

Expected Land Conversions From Agricultural to Urban Use By 1980 (Southern California)

		1960	1980
Citrus acreage:	Los Angeles	15,000	1,000
	Orange	34,600	10,000
Avocado acreage:	Los Angeles	2,500	500
	Orange	3,000	1,000
Other fruits, nuts, berries acreage:	Los Angeles	7,000	1,500
	Orange	2,000	1,000
Vegetable acreage:	Los Angeles	16,500	5,000
	Orange	21,000	12,000
Field crop acreage:	Los Angeles	102,500	50,000
	Orange	42,000	25,000
Nursery and cut flowers acreage:	Los Angeles	3,000	2,000
	TOTAL	249,000	109,000

Source: Open Space: The Choices Before California, p. 135

TABLE 9

AGRICULTURAL CHANGE, NORTHEASTERN URBAN COMPLEX, COMPARED WITH U.S. TOTAL, 1940, 1950, AND 1959

Item	Area	Unit	1940	1950	Percent change 1940–50	1959	Percent change 1950–59	Percent change 1940–59
1. Farms	NE	1,000	146.2	123.1	−16	74.9	−39	−49
	US	1,000	6,096.8	5,382.2	−12	3,703.9	−31	−39
	NE/US	percent	2.4	2.3	•	2.0	•	•
2. All land in farms	NE	mil. a.	10.2	9.4	−8	7.3	−22	−28
	US	mil. a.	1,060.9	1,158.6	+9	1,120.2	−3	+6
	NE/US	percent	0.96	0.81	•	0.72	•	•
3. Cropland harvested	NE	mil. a.	4.2	3.9	−7	3.2	−18	−24
	US	mil. a.	321.2	344.4	+7	311.3	−10	−3
	NE/US	percent	1.3	1.1	•	1.0	•	•
4. Milk cows	NE	1,000	668	647	−3	573	−11	−14
	US	1,000	24,926	23,853	−4	19,527	−18	−22
	NE/US	percent	2.7	2.7	•	2.9	•	•
5. Value of all farm products sold	NE	mil. $	336	803	+139	880	+10	+159
	US	mil. $	8,343	28,461	+241	33,511	+18	+302
	NE/US	percent	4.0	2.8	•	2.6	•	•

Source: Censuses of Agriculture.
• = not applicable.

Source: Suburban Land Conversion in the United States, p. 203

resource base of various regional areas of the U.S. In certain cases, such as California, the degree of depletion has become extensive enough to cause some alarm among those concerned with agricultural or general environmental issues. Discussion in the next section will be focused upon the various factors which have served to precipitate and sustain the trends for agricultural land conversion which have just been documented.

Nature of the Pressures for Agricultural Land Conversion

It was suggested earlier that the main pressures for conversion of lands out of agriculture were being exerted by the forces inherent to the expansionistic needs of urban development especially at the suburban fringes of existing urban areas. These pressures consist in the operations of the real estate market as well as the prevalent taxing systems at the local, state and national level. The combined weight of these pressures has been in part responsible for the unnecessary loss of good farmland due to the largely undirected path of urban expansion at the fringe areas. A brief and simplified capitulation as to the manner in which this happens is provided in the paragraph below.

As the population in an existing urban area increases, land development spreads outward, and as a consequence, the farmer's property tax rate and assessed valuation of his land are raised. The farmer is then quite often either forced into selling his land because of the increases in property taxes or he is strongly induced to sell to land speculators due to the lure of very substantial amounts of money to be gained by doing so. The speculators, after purchasing the farmland, often simply hold the land idle until value-enhancing public improvements are constructed in the vicinity.

Developers in turn are forced by the holding tactics of the speculators to "leapfrog out", as it were, in order to secure cheaper farmland for development. Thus, a wasteful sprawl pattern of urban development ensues.

An apt illustration of the detrimental effects of such a sprawl development pattern as just described above can be seen in the instance of Santa Clara County, California. It has been calculated that if all of Santa Clara County's subdivisions were contiguous, they would occupy less than forty square miles (including ten square miles allocated for open space and parks). However, as a result of sprawl development, not a single square mile of the 200 square mile Santa Clara Valley is without at least one subdivision.[14]

One important adverse effect of such scattered development is that large tracts of land are withdrawn from agricultural use without being needed for immediate urban development due to speculation pressures and certain incompatibilities between residential living and farming operations uses. Such lands can remain in an idle state for lengthy periods of time or for all practical purposes, indefinitely. Marion Clawson has estimated that for the nation as of 1950, land actually used for urban uses was 11 million acres but land withdrawn for urban uses was 17 million acres.[15] The difference between the two figures represents land not then, nor in all likelihood in the future, available for any other use than urban. Some of the land could remain forever idle but none would probably ever revert back to agriculture. Clawson also comments that "within the Standard Metropolitan Statistical Areas, far more land is vacant than is used for urban purposes."[16]

It is obvious to most observers that the operation of the various real estate markets in the different locales of the U.S. does not always work out to the benefit of the general public good. This is particularly the case in respect to the conversion of lands at the urban fringes. Quite often important agricultural lands are removed from the regional resource base for transfer to urban uses without regard to the ultimate environmental harm being done and without appropriate consideration of alternative land development schemes which achieve a better overall complement of benefits to the public good. To a great degree, it is the excessive, "unearned" profits accruing to such land transactions at the urban fringes, which involve shifts of land from rural to urban uses, that accounts for the prevalence of this regrettable state of affairs.

Allan Schmid[17] in his work, Converting Land From Rural to Urban Uses, provides some informative statistical data relating to land transactions involving shifts from rural to urban uses. Table 10 and Figure 3 on the following page summarize some of this data. Taking $300 as the average farm land value per acre in the U.S. (this value is weighted to the high side), Schmid estimates that for the average transaction, the farmer would be selling his land (usually to a speculator) for about $1,332 per acre. This would constitute a handsome profit of more than $1,000 per acre or more than three times the agricultural land use value of the land. The speculator comes out even further ahead since he buys for $1,332 and sells for $,3,030. This would net the speculator a gain of nearly $1,700 per acre. In specific instances even greater profits are to be made but the averages alone are convincing enough to demonstrate that voluntary preservation of agricultural lands would be difficult to sustain as long as such

TABLE 10

Land Prices at Various Stages in the Conversion Process: A Composite

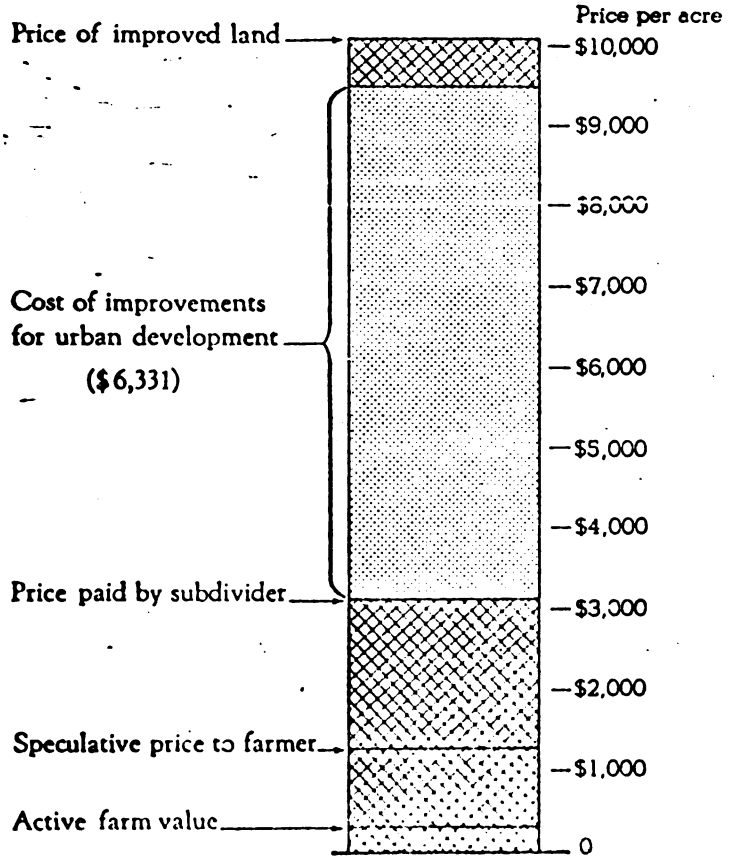
		(*Dollars per acre*)
Farm land value (1964)[a]		300
Price farmers received for subdivision use (1961)[b]		1,332
Price paid by developers for raw land (1964)[c]		3,030
Improvement cost ($2,435 x 2.6 lots/acre)[d]		6,331
Selling price of improved lots (1964) ($3,874 x 2.6 lots/acre)[e]		10,072
Total appreciation above farm land value (less improvement costs)		3,441
Percentage appreciation above farm land value[f]	1,147%	

[a] A purposely high judgment of average U.S. farm-land value weighted to those states with the most populous cities. The 1964 average value of farm land in the 48 states was $137.
[b] USDA data from Table 11. Simple average of regional averages without weighting.
[c] NAHB data from Appendix Table A-8.
[d] Data from Table 5.
[e] NAHB data from Appendix Table A-3.
[f] This composite produces a lower estimate of appreciation than the average shown in Appendix Table A-3 because of the higher farm land values used here.

Source: Converting Land From Rural to Urban Uses, p. 26

FIGURE 3

Graph of Land Prices at Various Stages In the Conversion Process



Source: Converting Land From Rural to Urban Uses, p. 25

enormous profits are capable of being made- and largely at public expense since it is the publicly provided improvements in terms of roads, sewer and water lines, and schools which enhance the value of these rural lands, and make these individual profits possible.

Real property taxes when assessed on agricultural lands in view of these lands potential for urban development rather than on their existing agricultural use, also tends to force the conversion of lands out of agriculture. This type of situation often prevails at the fringes of large metropolitan areas. Counties within Standard Metropolitan Statistical Areas (SMSA's) had property taxes averaging more than three times those in counties adjacent to SMSA's during 1964-68. Taxes in SMSA counties averaged more than seven times those on farms beyond both the SMSA's and their surrounding counties.[18] The effect of such tax burdens on farmers near urban areas has been investigated in numerous studies.[19] One study of the rapidly growing fringe area around Kansas City, Missouri, showed that for the period 1949 through 1964, the taxes on the farmland of the county closest to Kansas City appreciated from $189 per acre to $265 per acre. As a consequence, the real property tax absorbed almost 20% of the farmers' gross income per acre by 1965. The owners of the sample farms in that county were relegated to reporting income losses on their federal tax returns due to the high taxes.[20] Ultimately, farmers placed in such a situation as the above are forced to sell their farms to speculators or developers to prevent further financial losses although they may have wished to remain in farming.

Somewhat similar to the effect of increased property taxes is the functioning of the inheritance taxes in relation to farmland estates.

The Internal Revenue Service assesses agricultural land in view of its market value which includes its potential for urban development rather than its sole worth in agriculture. The inheritors are often called upon to pay inheritance taxes which can amount to 25% of the agricultural value of the land. This in turn forces some of them to sell the farms for urban development because they cannot afford to pay such high taxes from the income which the land would produce if retained in agriculture.[21]

Additionally, federal income tax rates and capital gains tax rates have not been high enough in relation to profits made in real estate transactions to discourage wasteful land conversions and speculative practices.[22] Finally, idle land kept for speculation has not been taxed at sufficiently high rates, in view of its intended purposes for urban use, to effectively free it up for immediate development and thus eliminate conditions of an artificial shortage of land for development which causes unnecessary and premature conversions of agricultural lands.[23]

By way of summary, it is clear that a complement of factors have served to create an unfavorable situation with regard to the conversion of agricultural lands to primarily urban uses. The harm being done is not always readily apparent nor is the need for preservation of certain agricultural lands within the various regions of the U.S. clearly perceived. The succeeding discussion is an attempt to set forth some of the needs and benefits which are associated with the judicious retention of important lands in agricultural use.

Need and Desirability of the Preservation of Agricultural Lands

It was already pointed out in the consideration of agricultural

lands preservation at the national level that gross national food demands by the year 2000 indicated a need for retaining, with some supplementation, the existing (mid-1950's) acreages in agricultural use. Additionally, it was pointed out that it makes no sense to farm second-rate soils if better lands are available - and thus, by implication should continue to be made available for farming. These two above factors do have their application to the regional dimension but the discussion which follows will highlight some further considerations which relate more directly to the benefits of agricultural lands preservation within regional areas. The elaboration of points will proceed in outline fashion.

1. It is highly beneficial for the urban dwellers of America's cities to live in a reasonably close proximity to the food production areas which accomodate their foodstuff needs. This proximal relation is particularly important in the case of such foodstuffs as natural, unprocessed fruits and vegetables which should constitute the mainstays of a nutritionally healthy diet. The closer the consumer is to the production source of these food commodities, the better chance he has of obtaining them in their most nutritious state and at the least cost. (It is also proposed here that consumers in increasing numbers will come to realize that present methods of food distribution which involve transporting foodstuffs over great distances have given rise to adulterative processing methods in behalf of extending the marketing life of the foodstuffs.) The import of all this is that metropolitan urban areas sould not be allowed to grow in indiscriminate sprawl patterns which either eliminate most farming operations in the region or which tend to unnecessarily place an inhibiting distance factor between the food producers and food consumers.

In regions of the U.S. where natural topgraphic features limit the available places for farming, rapidly expanding urban areas could end up having no nearby food production sources. The State of Hawaii has recognized this as a possible future problem and has already taken land use control measures to deal with the situation.[24]

2. Certain agricultural lands may be deserving of important consideration for preservation due to unique soil and climate combinations which permit the growing of special crops which cannot be feasibly grown elsewhere in the region or in the nation as a whole. An example of this is the case of San Mateo County, California. This County has lands which are especially suited to the growing of artichokes and Brussels sprouts. In 1962, 45% of the national production of Brussels sprouts originated from San Mateo County alone.[25]

3. Significant economic benefits are derived from agriculturally producing lands. These benefits would be lost if the agricultural lands were to be converted to other uses. By way of illustration, Tables 11 and 12 on the following page indicate the economic importance of agriculture for two selected areas. Table 11 provides data on agricultural production in the San Francisco Bay Area. The data indicate that there was a direct loss in production value (1960 dollars) of $7,725,000 between the years 1960-66 due to the reduction in cultivated acreage caused by land conversions. Table 12 shows that agricultural production comprises a very substantial share of the State of Hawaii's economy, and that by inference, any great reduction in agricultural production precipitated by extensive agricultural land conversions would seriously weaken Hawaii's economy.

TABLE 11

TOTAL BAY AREA AGRICULTURAL PRODUCTION BY CROPS
1960 - 66
ACREAGE HARVESTED -- PRODUCTION VALUE

	CULTIVATED ACRES		CHANGE IN CULTIVATED ACRES		PRODUCTION VALUE $000			CHANGE IN PRODUCTION VALUE		PERCENT DISTRIBUTION OF PRODUCTION VALUE	
	1960	1966	Acres	%	1960	1966	1966 in* Const. $ 1960	In Const. $ 1960	%	1960	1966
FIELD CROPS	290,313	249,735	- 40,578	-14.0	22,872	26,342	24,171	+ 1,299	+ 5.7	7.5	8.0
VEGETABLES	65,888	55,341	- 10,547	-16.0	36,887	47,422	43,514	+ 6,627	+18.0	12.1	14.6
FRUITS & NUTS	149,823	122,244	- 27,579	-18.4	83,975	63,020	57,827	-26,148	-31.1	27.5	19.4
VINEYARDS	28,838	29,975	+ 1,137	+ 3.9	5,949	9,969	9,148	+ 3,199	+53.8	1.9	3.1
HORTICULTURAL	2,861	3,148	+ 287	+10.0	35,428	46,143	42,341	+ 6,913	+19.5	11.6	14.2
LIVESTOCK & (ip)	52,102	53,050	+ 948	+ 1.8	83,106	94,742	86,935	+ 3,829	+ 4.6	27.1	29.1
LIVESTOCK PRODUCTION (np)	1,558,647	1,443,456	-115,191	- 7.3							
POULTRY	--	--	--	--	37,388	36,965	33,919	- 3,469	- 9.2	12.2	11.4
APIARY	--	--	--	--	172	215	197	+ 25	+14.5	0.1	0.1
TOTALS:											
w/o. Pastures	537,723	460,443	- 77,280	-14.4	305,777	324,818	298,052	- 7,725	- 2.5	100.0	100.0
w. Irrigated Pastures	589,825	513,493	- 76,332	-12.9							
w. Non-Irrig. Pastures & Range Land	2,148,472	1,956,949	-191,523	- 8.9							

ip = irrigated pasture
np = non-irrigated pastures
*Wholesale Price Index by Commodities 1950-1966 (Farm Products, U.S.) U.S. Bureau of the Census, *op. cit.* Table 498

Source: Agricultural Commissioners; *Annual Agricultural Crop Report*, nine Bay Area counties.

Source: Agricultural Resources Study, p. 2.3

TABLE 12

VALUE OF SELECTED AREAS OF THE ECONOMY: 1958 TO 1967
(STATE OF HAWAII)

Subject	In millions of dollars										Percent increase	
	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1958 to 1967	Annu aver.
al agricultural output[a]	276.4	301.4	290.1	307.5	317.2	355.8	338.9	349.5	368.2	374.4	35.5	3.
ense expend	327.4	338.0	373.1	401.9	375.8	368.6	415.9	460.0	517.0	600.0	+ 83.3	7.
tor expend	82.7	109.0	131.0	137.0	154.0	186.0	225.0	265.0	302.0	400.0	+383.7	19.
ue of construction[b]	174.4	206.8	268.5	267.3	257.0	265.2	302.9	338.6	392.4	346.8	+ 98.9	7.
ue of mineral produced[c]	6.3	7.6	9.3	14.6	14.8	15.3	19.6	20.8	20.8	—	+230.2[d]	16.

tal value of sugar and pineapple products. Total value of diversified crops and livestock.
tal value of construction put in place in Hawaii.
ludes the value of cement, gem stones, lime pumice, sand and stone and clays.
1966.
ce: *The State of Hawaii Data Book*, Department of Planning and Economic Development, 1968.

Source: State Of Hawaii Land Use Districts and Regulations Review, p. 79

4. The retention of existing lands in agricultural use also serves to preserve the viability of the present rural communities and farming as a way of life. Although the trends of the past century have shown a decline in such respects,[26] there appears to be a renewed appreciation, particularly on the part of the present younger generation, for the simple virtues of rural farming life. The independence and individualism attributed to farming as an occupation and the opportunity to live in natural surroundings seem to be the appealing elements in this appreciation.

5. Agricultural lands, as part of the web of the natural ecosystem, are important to the environment as a complement to the built upon urban areas. This is in addition to their food producing role. Agricultural lands can function as water and oxygen recharge areas of a particular region. Unlike urban lands with extensive paving and building structures, agricultural lands offer a permeable surface for the penetration of rain water down into underground water acquifers. Moreover, the plants grown on farms are producers of oxygen and can thus help to support the oxygen supply needs of nearby urban populations. Also, agricultural lands can make a contribution in terms of temperature control by moderating extremes of temperature, especially summer heat waves which are intensified in areas where the land is heavily built upon.[27]

6. Finally, agricultural lands definitely have an amenity value as open space. This open space feature of agricultural lands could be valued mainly for its functioning as demarcation boundary areas to preserve separate identities for cities within a region along the lines of the greenbelt concept popularized in England. Or, it could also be desired for purposes of scenic

beauty of nature- something so lacking in most American cities. A study critical of the more recent urbanizing transformation of San Jose, California had this poignant comment to make:

> ... the local orchard lands provided a very real benefit to the city's residents. One need only imagine seeing them in bloom, smelling the freshness of the air, and hearing the peaceful sounds of the country to know the benefit was real. Now they have been largely replaced by endless stretches of tract homes, jumbles of commercial signs, and the noises and oders of freeway traffic. 28

This concludes the discussion of the benefits to be derived from the preservation of agricultural lands from the regional context. It should be evident at this point that many factors can enter into a specific set of policy formulations emanating from the national, state, regional, or local level in behalf of agricultural land use preservation. That there are sufficient grounds for pursuing such policies of preservation at this time should also be obvious if the import of the discussions contained in the foregoing pages of this paper can be relied upon. No effort will be made in this paper to delineate what particular policies should be adopted since the content of the policies must be arrived at after a thorough analysis of the needs of a specific areal unit from the national down to the local level. However, the concluding section of this paper will review some of the measures currently available for effecting agricultural land use preservation once a policy commitment to that end has been made.

III. MEASURES FOR PRESERVATION OF AGRICULTURAL LANDS

Numerous measures are presently being used to attain the objectives inherent to agricultural land preservation policies which have been adopted by various units of government throughout the U.S.. Some of these measures, such as zoning have been in use for quite some time, while others are comparatively new. The review which follows is not intended to be exhaustive or especially detailed. It should merely serve to show generally what has been and perhaps should be done.

Zoning

Zoning ordinances are perhaps the most widely used method of regulating land use in the United States. They have been used to preserve lands in agricultural use through the setting up of agricultural use districts. However, their effectiveness over the long term in preventing the undesired (from the public interest standpoint) conversion of certain agricultural lands has been less than encouraging.

Marion Clawson, in his study of suburban land conversion in the U.S., concluded that zoning was a weak instrument for preventing the wasteful conversion of agricultural lands at the urban fringes. He feels that the local county officials responsible for administering the zoning provisions are unable or unwilling to stand firm in the face of political pressure and sometimes financial inducements brought about by speculators, developers, and other private interests. Invariably the districts set up within the zoning ordinance are modified to suit private parties interested in development of the agricultural lands. In support of his contention, Clawson

cites the situation in New Castle, Delaware in which three attorneys who together presented 26% of the petitions for rezoning (mainly of agricultural lands) received favorable decisions 80% of the time.[29]

The authors of the San Francisco Bay Area study, referred to earlier in this paper, came to the same conclusion as Clawson after analyzing the results of zoning in the Bay Area. They commented that "To date zoning has proven to be a rather ineffective tool for controlling development in the urban fringe. Since zoning laws are regulatory and do not provide for any compensation, they are not too popular and are subject to change."[30] Perhaps zoning could be an effective tool in behalf of agricultural land use preservation if it were utilized properly but practical realities seem to mitigate the possibilities of that happening. Thus, most units of government have experimented with some other, more specific controls.

Contractual Agreements

California could probably be considered the pacesetter among the state governments in devising contractual type of arrangements to preserve lands in agricultural use. The California Land Conservation Act of 1965 authorizes county and city governments to enter into bilateral legal arrangements with property owners to conserve prime agricultural lands. There are two types of arrangements allowed under this Act- contracts and agreements. Lands placed under contract must retain agricultural uses of the land for a minimum of ten years, renewable for ten years at the end of each year unless notice of non-renewal is given. The property owner receives compensatory payments as well as tax assessment rates based only upon the agricultural uses of the land (and not its potential for urban development.) Local

governments are also compensated by the State government for the consequent loss in local tax revenues because of the lower assessments. Agreements differ from contracts in that there is flexibility regarding the time period and land qualification aspects. Also the landowner does not receive compensatory payments as under the contract arrangement but he does benefit from lower tax rate assessments.[31]

Although the California Land Conservation Act of 1965 offered some promise as an alternative to the inadequacies of zoning, its implementation to date in California has not been heartening. A survey of 55 of California's 58 assessors revealed the following regarding the implementation of the Act:

1. The recipients of compensatory payments under the Act are generally not small farmers subject to pressures from speculators and wasteful sprawl, but large conglomerates also receiving a lucrative price support and other federal subsidies.
2. Seventy percent of the land under contract is not prime cropland and less than one-fifth of the State's prime cropland is covered by contract arrangements.
3. Only one and one-third percent of the agricultural land covered is within one mile of any city and less than five percent is within three miles.[32]

Overall, the provisions of the Act have failed to attract substantial numbers of landowners to place their lands under such arrangements. This has been due most probably to the fact that the farmers want to make a good deal on their land and wish to control the timing themselves.[33] The latter fact points out one of the inadequacies of the Act's approach- the lack of

eminent domain powers whereby contracts could be imposed in agricultural preserve areas in order to protect the public interest in safeguarding such lands from inopportune conversion.[34]

Purchase and Lease Arrangements

In order to ensure greater control and permanence over the fate of agricultural lands, especially at the peripheries of urban areas, some have advocated programs of public and quasi-public purchase of these lands with subsequent leasing under specifically stated conditions.[35] Although such proposals seem somewhat radical there are past precedents for such action. The federal level legislation entitled "Advanced Land Acquisition of Land Program" authorized in 1965 the disbursement of federal loans to local governments for the purpose of purchasing lands for the construction of public facilities.[36] There are also vast amounts of acreage in forest lands held by the federal government. At the state level, New Jersey as early as 1961 expended $60 million for land acquisition under its Greenacres program; New York State spent $75 million in 1961 for acquisition of lands for open space;[37] recently Suffolk County, L.I. announced plans to make an initial purchase of 3,000 acres of prime farmland at speculative prices and then lease it back for agricultural uses.[38] However, it is still too early to evaluate whether purchase measures will increase in prominence.

Critics of the purchase and lease method point out that its feasibility for widespread usage is limited due to some distinct disadvantages: great sums of money would have to be expended; the losses to the local property tax rolls would be substantial; it would be difficult to secure public approval for such large-scale purchasing programs.[39]

Easements

The legal device of easements has been proposed as a method to achieve the objectives of purchase and lease of agricultural lands by public agencies without the disadvantages of that path of approach. Again, California has been one of the initial experimenters. The Open Space Easements Act of 1969 empowers cities and counties to accept grants of open space easements within their jurisdictions. The landowner relinquishes all development rights for a fixed period of time except those reserved in the easement grant provisions. In return, the landowner receives (in some cases) a sum of money for the development rights which have been surrendered as well as a preferential tax assessment on his land.[40]

The easement method overcomes some of the disadvantages of the outright purchase of a fee simple in that it is less costly, does not remove land from the tax rolls, and the maintenance of the land still remains the responsibility of the original owner. However, the response to date (1971) in regards the Act has been minimal with only six counties acquiring a total of 22 easements under the Act.[41] Perhaps if the easement method were combined with eminent domain powers, it would constitute a most effective way of preserving agricultural lands.

Tax Laws

In earlier discussions it was shown how various federal, state, and local tax laws were partly responsible for wasteful conversions of agricultural lands, especially at the urban periphery. Thus, it stands to reason that certain modifications could be made in order to overcome such

undesirable effects. Preferential tax assessment valuations for agricultural lands combined with developmental tax deferral provisions would be one useful improvement over the current practice in most states. Under this system agricultural lands would be assessed only in view of their farming value and not their potential urban development value. However, should the farmer decide to sell his land for non-farming uses, he would be obligated to pay taxes (for a specified back period of time) on the difference between the agricultural value of the land and the valuation, resulting from the sale conversion of his land, that would have otherwise become due and payable earlier. Oregon, Hawaii and New Jersey have such tax arrangements as the above.[42] This tax method would certainly benefit the farmer who wished to remain in farming by relieving him of an onerous tax burden but it still would not do much for agricultural preservation in the cases where the farmer wished to sell out to speculators in hopes of windfall monetary gain.

In order to remove the possibility of excessive personal profits accruing from speculative transfers of agricultural lands to alternative uses, usually of an urban type, increased tax rates on profits derived from such land transactions have been proposed. The justification advanced is that these personal profits are largely "unearned" since they have been made due to the construction of publicly provided improvements and thus the public is entitled to a major portion of the monies redounding to any increase in land values resulting from such improvements.[43]

Modification of tax evaluations on idle lands would also assist agricultural preservation policies. If idle lands, held for eventual urban

development, were to be assessed with that potential purpose as the basis, the higher taxes might encourage earlier availability of such lands for development and thus decrease the pressures for further conversions of agricultural lands.[44]

Finally, preferential assessment of agricultural lands for inheritance tax purposes would also help to eliminate some of the forced sale conversions which are currently taking place.[45]

Public Improvements

Since the provision of public improvements has a great deal of influence in creating pressures for conversion of agricultural lands at the urban peripheries, the careful planning and staging of these improvements could assist in channeling urban development in a manner least harmful to agricultural land resources.[46]

In summary, though a great many different types of measures for preserving lands in agricultural use are currently available, perhaps no one single method is suitable for every circumstance. Thus, it could reasonably be expected that a combination of measures would be the most appropriate approach.

IV. CONCLUDING COMMENT

To recapitulate all the discussion of the preceeding pages would border on the redundant since summary evaluations have already been made and interspersed throughout the main body of the text of this paper. The mandate for agricultural lands preservation at the national and regional dimension should be evident enough. However, it still remains to be seen whether enlightened land use policies, formulated at all appropriate levels of government and planning, will be developed and implemented in a determined effort to correct past abuses and to achieve future benefits in this aspect of land use. The fate of a people is invariably linked with the fate of its soil. To overlook or neglect this fact could prove tragic indeed for the American people of this generation and the future generations.

APPENDICES

TABLE 6. Summary of characteristics of land in eight Soil Conservation Service land-capability classes

Item	Class I	Class II	Class III	Class IV	Class V	Class VI	Class VII	Class VIII
Limitations on use for crop production	Few	Some	Severe	Very severe	Impractical	Unsuited	Unsuited	Preclude
Conservation practices required	[a]	Moderate	Special	Very careful	[b]	[b]	[b]	[b]
Practicability of range or pasture improvements	[b]	[b]	[b]	[b]	[b]	Practical	Impractical	Impractical
Permissible limitations singly or in combination:[c]								
Slope[d]	Nearly level	Gentle	Moderate	Moderately steep	Nearly level	Steep	Very steep	Very steep
Susceptibility to erosion	Low	Moderate	High	Severe	Limited	Severe	Severe	Severe
Adverse effects of past erosion	None or slight	Moderate	Severe	Severe	Often slight	Severe	Severe	Severe
Hazard of overflow	Not susceptible	Occasional	Frequent	Frequent	Frequent	Excessive	[b]	[b]
Soil depth	Deep	Less than ideal	Shallow	Shallow	Variable	Shallow	Shallow	Shallow
Soil structure and workability	Good; easy	Unfavorable	Moderate salinity	Severe salinity or sodium	Usually poor	Salinity or sodium	Salts or sodium	Salinity or sodium
Drainage	Good	Correctable	Wetness	Excessive wetness	Poor	Poor	Wet soils	Wet soils
Climatic limitations	None	Slight	Moderate	Moderately adverse	Short growing season	Severe	Unfavorable	Severe
Moisture-holding capacity	Good	Fair	Low	Low	[b]	Low	Low	Low
Stones	None	Few	Few	Few	May be present	Present	Severe limitation	Severe limitation

[a] No conservation practices as such; ordinary management to maintain productivity.

[b] Not relevant.

[c] These are maximum permissible limitations for each class; a particular tract may have no limitation for one factor if other limitations result in its classification in a particular class.

[d] In this context "nearly level" means slopes usually of less than 3 per cent; "gentle" usually means slopes of 1 per cent to 8 per cent; "moderate," slopes of 5 per cent to 16 per cent; "moderately steep," 10 per cent to 30 per cent; "steep," 20 per cent to 65 per cent; and "very steep," over 45 per cent. Classes overlap to include variations within fields or areas and also to allow to some degree for effect of other factors.

SOURCE: Adapted from A. A. Klingebiel and P. H. Montgomery, *Land-Capability Classification*, Agriculture Handbook 210, Soil Conservation Service, U.S. Department of Agriculture, 1961.

Source: Soil Conservation in Perspective. (The other tables and Figures in this appendices are taken from the same source.)

TABLE 8. Area of land in Conservation Needs Inventory according to land-capability classification

(Millions of acres in 48 contiguous states)

Land classification[a]	Total inventoried area	Area in subclasses, according to dominant limitation[a]			
		Subclass e (erosion)	Subclass w (excess water)	Subclass s (unfavorable soil)	Subclass c (climate)
Class I[b]	36.2				
Class II	290.1	149.8	86.4	33.1	20.8
Class III	310.8	178.0	73.7	48.2	10.9
Subtotal, best arable classes	637.1	327.8	160.1	81.3	31.7
Class IV	168.7	95.9	27.5	41.1	4.2
Subtotal, arable classes[c]	805.8	423.7	187.6	122.4	35.9
Class V	43.0	.5	38.7	2.0	1.8
Class VI	276.8	146.3	7.1	97.9	25.0
Class VII	294.2	162.0	6.8	114.2	11.2
Class VIII	26.7	4.8	5.2	15.8	.9
Subtotal, poor classes	640.7	314.1	57.8	229.9	38.9
Total classified area[d]	1,446.5	737.8	245.4	352.3	75.8

[a] See Table 6 and discussion in text for meaning of these land classes and subclasses.

[b] Land in Class I has no significant limitations.

[c] Some land in poorer classes than these can be used for production of special crops, such as orchards with complete grass sod cover, cranberry bogs, and so on.

[d] Totals exclude 1.4 million acres inventoried but not classified, and excludes federally owned land not in crops (39.5 million acres), most of which would fall in Classes VI and VII, and excludes also nearly 51 million acres of urban and built-up land and nearly 7 million acres of water area in small streams and lakes which are often included in land area—or a total of 455.4 million acres. The totals for the subclasses do not equal the total given for inventoried area in the first column because Class I acreage is not broken into subclasses.

SOURCE: From *Basic Statistics of the National Inventory of Soil and Water Conservation Needs*, Statistical Bulletin 317, U.S. Department of Agriculture, August 1962, p. 101.

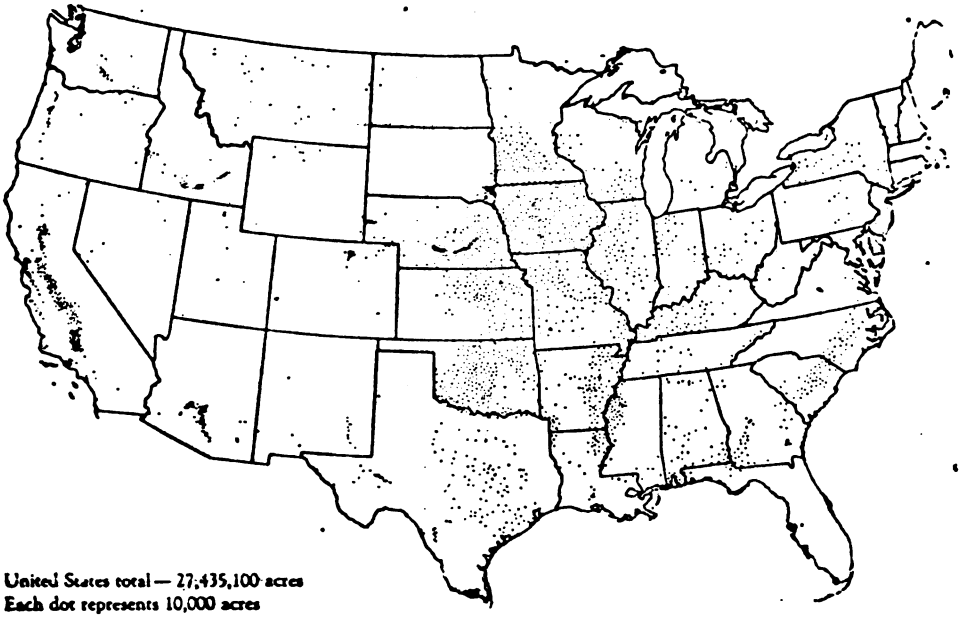
TABLE 9. Area of land in Conservation Needs Inventory according to use in 1958 and land-capability classification

(Millions of acres in 48 contiguous states)

Land classification and subclasses[a]		Land use in 1958				
		Cropland	Pasture and range	Forest and woodland	Other	Total
Class I:	All	27.4	3.9	3.6	1.2	36.2
Class II:	e	99.3	22.8	21.2	6.4	149.8
	w	58.0	9.2	15.6	3.5	86.4
	s	20.9	5.0	6.1	1.1	33.1
	c	14.6	5.8	.2	.3	20.8
Subtotal		192.8	42.8	43.2	11.3	290.1
Class III:	e	95.4	44.9	31.4	6.3	178.0
	w	27.4	10.6	30.4	5.3	73.7
	s	22.3	8.1	15.7	2.1	48.2
	c	7.8	3.0	.1	.1	10.9
Subtotal		152.9	66.5	77.6	13.8	310.8
Class IV:	e	31.9	33.5	26.4	4.0	95.9
	w	5.0	4.9	15.5	2.1	27.5
	s	10.1	13.3	16.1	1.7	41.1
	c	1.9	2.1	.1	—	4.2
Subtotal		48.9	53.9	58.1	7.8	168.7
Class V:	All	1.8	10.5	28.9	1.8	43.0
Class VI:	e	13.6	85.3	45.0	2.9	146.8
	w	.6	3.2	2.7	.7	7.1
	s	3.6	55.8	37.3	1.3	97.9
	c	.1	21.8	3.0	—	25.0
Subtotal		17.9	166.1	87.9	4.9	276.8
Class VII:	e	3.6	71.9	82.9	3.5	162.0
	w	.1	.4	5.3	.9	6.8
	s	1.8	57.3	53.1	1.9	114.2
	c	—	8.9	1.3	1.1	11.2
Subtotal		5.6	138.4	142.7	7.5	294.2
Class VIII:	All	.1	2.5	6.4	17.7	26.7
Total classified area		447.4	484.7	448.4	66.1	1,446.6

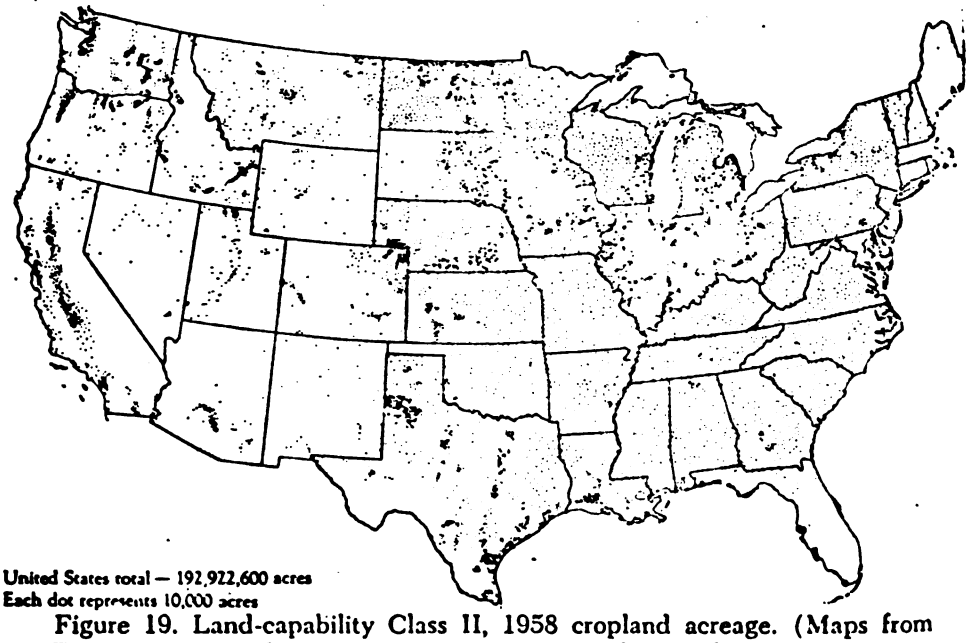
[a] The dominant hazards in the subclasses are as follows: e, erosion; w, excess water; s, unfavorable soil conditions in the root zone; and c, climate.

SOURCE: From *Basic Statistics of the National Inventory of Soil and Water Conservation Needs*, Statistical Bulletin 317, U.S. Department of Agriculture, August 1962, p. 101.



United States total — 27,435,100 acres
Each dot represents 10,000 acres

Figure 18. Land-capability Class I, 1958 cropland acreage.



United States total — 192,922,600 acres
Each dot represents 10,000 acres

Figure 19. Land-capability Class II, 1958 cropland acreage. (Maps from Economic Research Service, U.S. Department of Agriculture.)

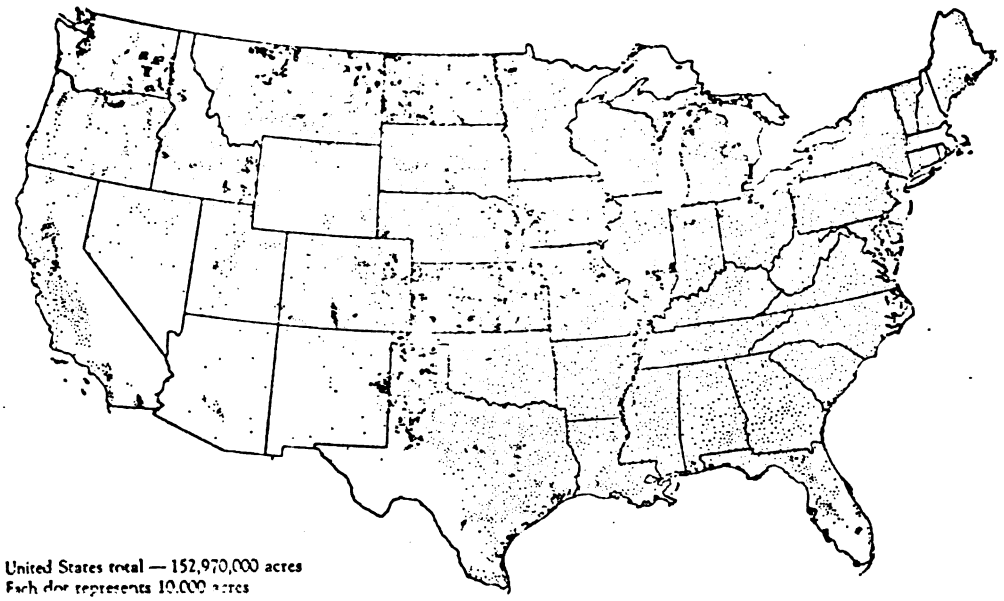


Figure 20. Land-capability Class III, 1958 cropland acreage.

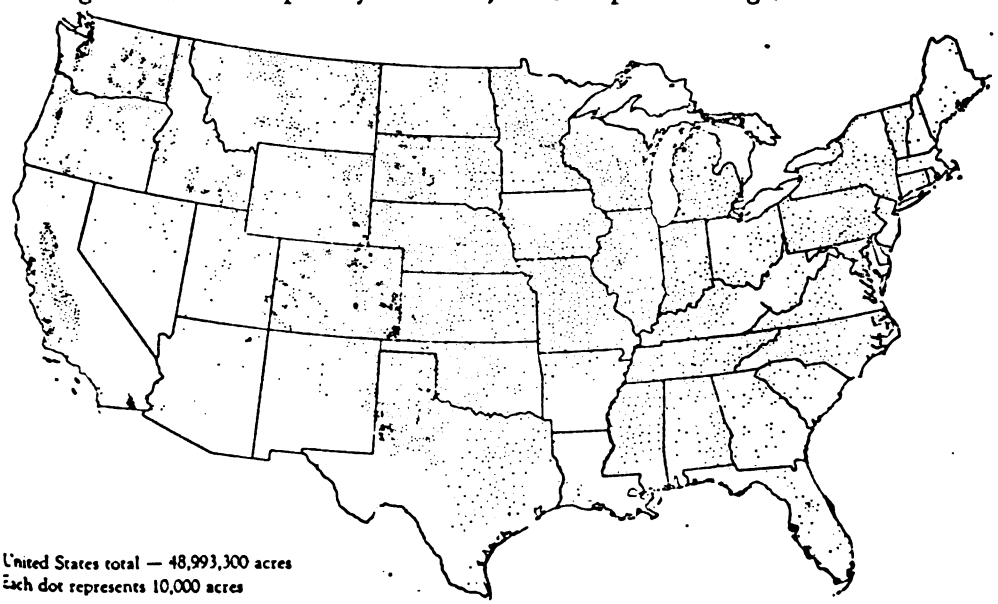


Figure 21. Land-capability Class IV, 1958 cropland acreage. (Maps from Economic Research Service, U.S. Department of Agriculture.)

FOOTNOTES

1. Open Space: The Choices Before California, p. 134.

2. See R. Held and M. Clawson, Soil Conservation in Perspective; and A. Voisin, Fertilizer Application; Acres, U.S.A., March 1972; and also S.A. Howard, The Soil and Health.

3. R. Held, Ibid., p. 132.

4. Ibid.

5. Ibid., pp. 122-32.

6. H. Landsberg and others, Resources in America's Future.

7. Ibid., p. 969.

8. The State Journal,(Michigan), Tuesday, Sept. 14, 1971, p. C-7.

9. S.A. Howard, op.cit..

10. G. Leach, "Starvation... Then Strife," The Detroit News, Sunday ed., April 30, 1972, E-1.

11. Open Space: The Choices Before California, p. 134.

12. Ibid.

13. Agricultural Resources Study,(See bibliography for full information)

14. Power and Land in California, pp. 9-10.

15. H. Landsberg and others, op. cit., p. 371.

16. M. Clawson, Suburban Land Conversion in the United States, p. 318.

17. Consult bibliography for full information.

18. U.S. Department of Agriculture, Economic Research Service, Farm Real Estate Taxes, RET-9, p. 4.

19. Useful information can be found in M. Plase and W. Staub, "Real Property Taxes in the Rural-Urban Fringe," Land Economics, Vol. XLVI, No. 2, May 1971, pp. 168-74; and H. Clonts Jr., "Influence of Urbanization on Land Values at the Urban Periphery," Land Economics, Vol. XLVI, No. 4, Nov. 1970, pp. 489-97; and also M. Rancich, "Land Value Changes in an Area Undergoing Urbanization," Land Economics, Vol. XLVI, No. 1, Feb. 1970, pp. 32-40.

20. M. Blase and W. Staub, Ibid.

21. D. Andelman, "Estate Taxes Drive Farmers Off Land," The New York Times, Sunday ed., May 14, 1972, pp. 1,53.

22. M. Clawson, Suburban Land Conversion in the United States, p. 350.

23. Ibid., p. 351.

24. State of Hawaii Land Use Districts and Regulations Review, pp. 78-80.

25. Agricultural Resources Study, p. 2.15.

26. M. Clawson, Policy Directions for U.S. Agriculture, p. 273.

27. I. McHarg, Design With Nature, p. 98.

28. San Jose; Sprawling City, pp. 8-9.

29. M. Clawson, Suburban Land Conversion in the United States, pp. 252-53.

30. Agricultural Resources Study, p. 3.5.

31. Ibid., p. 3.2.

32. Power and Land in California, p. 11.

33. Agricultural Resources Study, p. 3.3.

34. J. Hunter, "Preserving Rural Land Resources: The California Westside," Ecology Law Quarterly, School of Law, University of California, Berkeley, Vol. 1, No. 4, Fall 1971, p. 330-73.

35. Ibid,, and also see Clynn Smith III, "Easements to Preserve Open Space Land," Ecology Law Quarterly, School of Law, University of California, Berkeley, Vol. 1, No. 4, Fall 1971, pp. 728-48; and M. Clawson, Suburban Land Conversion in the United States, pp 355-63.

36. G. Edwards, Land, People and Policy, pp. 125-26.

37. Ibid.

38. D. Andelman, op. cit.

39. M. Clawson, Suburban Land Conversion in the United States, pp. 355-63.

40. Clynn Smith III, op. cit.

41. Ibid., p. 735.

42. F. Stocker, "Property Tax Exemptions for Farmers and the Aged," The Property Tax: Problems and Potentials,

43. Power and Land in California, p. 17 and also M. Clawson, op. cit. pp. 355-63.

44. M. Clawson, op. cit., p. 351.

45. D. Andelman, op. cit.

46. M. Clawson, op. cit,, p. 347.

BIBLIOGRAPHY

Acres, U.S.A., A Voice for Eco-Agriculture, March issue, 1972.

Agricultural Resources Study, Supplemental Report 15-6. Association of Bay Area Governments. Claremont Hotel, Berkeley, California. August, 1969.

Andelman, David A. "Estate Taxes Drive Farmers Off Land," The New York Times. Sunday, May 14, 1972. (pp. 1, 53)

Blase, Melvin G. and W.J. Staub. "Real Property Taxes in the Rural-Urban Fringe," Land Economics, vol. XLVII, No. 2, May 1971. pp. 168-74.

Clawson, Marion. Policy Directions For U.S. Agriculture. (Baltimore: Johns Hopkins Press for Resources for the Future, Inc. , 1968)

_____, Suburban Land Conversion in the United States. (Baltimore: Johns Hopkins Press for the Resources for the Future, Inc., 1971)

Clonts, Howard A. Jr. "Influence of Urbanization on Land Values at the Urban Periphery," Land Economics, Vol. XLVI, No. 4, November, 1970. pp. 489-97.

Edwards, Gordon. Land, People and Policy. (West Trenton, New Jersey: Chandler-Davis Publishing Co., 1969)

Held, R. Burnell and Marion Clawson. Soil Conservation in Perspective. (Baltimore; Johns Hopkins Press for Resources for the Future, Inc., 1965)

Howard, Sir Albert. The Soil and Health. (New York: Devin-Adair Co., 1956)

Hunter, Jerald W. "Preserving Rural Land Resources: The California Westside," Ecology Law Quarterly, School of Law, University of California, Berkeley, Vol. 1, No. 4, Fall 1971. pp. 330-73.

Landsberg, Hans H. and L. Fischman, J. Fisher. Resources In America's Future, Patterns of Requirements and Availabilities 1960-2000. (Baltimore: Johns Hopkins Press for Resources for the Future, Inc., 1963)

Leach, Gerald. "Starvation... Then Strife", The Detroit News, Sunday, April 30, 1972. pp. E-1,2.

Mc Harg, Ian L. Design With Nature. (Garden City, New York: Double Day, Natural History Press for the American Museum of Natural History, paperback ed., 1971)

Open Space: The Choices Before California. The Urban Metropolitan Open Space Study, directed by Edward A. Williams for Eckbo,Dean,Austin, and Williams. (San Francisco, Diablo Press, 1969)

Power and Land in California. The Ralph Nader Task Force Report on Land Use in the State of California, Robert C. Fellmeth, Project Director and Editor, Center for the Study of Responsive Law, Washington, D.C., 1971.

Price, Weston A. Nutrition and Physical Degeneration. (Redlands, California: Published by the Author, 1972)

Ranciek, Michael T. "Land Value Changes in an Area Undergoing Urbanization," Land Economics, Vol. XLVI, No. 1, February, 1970. pp. 32-40.

San Jose: Sprawling City, A Study of the Causes and Effects of Urban Sprawl in San Jose, California. Conducted by the Stanford Environmental Law Society, Stanford University Law School, Stanford, California, 1971.

Schmid, A. Allan. Converting Land From Rural to Urban Uses. (Baltimore: Johns Hopkins Press for the Resources for the Future, Inc., 1968)

Smith, Clyn III, "Easements to Preserve Open Space Land," Ecology Law Quarterly, School of Law, University of California, Berkeley, Vol. 1, No. 4, Fall 1971. pp. 728-48.

The State Journal, "Fertility Decline in U.S.," Tuesday, September 14, 1971, p. C-7.

State of Hawaii Land Use Districts and Regulations Review. Prepared for the State of Hawaii Land Use Commission by Eckbo, Dean, Austin, and Williams, August 15, 1969.

Stocker, Frederick D. "Property Tax Exemptions for Farmers and the Aged,"

The Property Tax: Problems and Potentials, Symposium conducted by the Tax Institute of America, November 2-4, 1966. (Princeton: Tax Institute of America, 1967)

U.S. Department of Agriculture, Economic Research Service, Farm Real Estate Taxes, RET-9 (Washington, D.C.: Government Printing Office, December, 1969)

Voisin, Andre, Fertilizer Application, trans. Catherine T.M. Herriott. (Springfield, Illinois: Charles C. Thomas, 1965)