Issues Affecting the Availability and Price of Land for Agriculture

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ISSUES AFFECTING THE AVAILABILITY AND PRICE OF LAND FOR AGRICULTURE

B. Delworth Gardner**

This paper first reviews some data relating to agricultural land use nationally and then discusses the huge increases in land prices that have occurred in recent years and some of the implications for agriculture. The final section evaluates the need for public policy to preserve prime lands for agricultural use.


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**Land Availability for Agricultural Purposes**

The cropland base in the United States is approximately 385,000,000 acres.\(^1\) An average of 1.3 million new acres enters this base annually via land clearing, irrigation and drainage development, and cropping land previously held out of production. On the other hand, an average of 2.7 million acres of cropland is lost to non-agricultural uses each year. Thus, there is a net loss of 1.4 million acres, or about one-third of one percent, of the national base.

Even this very small figure, however, may exaggerate the seriousness of this loss of cropland from a national perspective. The soil conservation service has estimated\(^2\) that there are 266 million acres (69% of the present base of potentially tillable land) in pasture, forest and other uses which could be added to the cropland base if it were economically feasible or socially desirable to do so. One view, therefore, is that the land base is quite adequate to provide for the agricultural needs in the United States for the rest of the twentieth century at least.\(^3\)

Other historical figures tend to support this optimistic view. The total land area devoted to crops in the United States has been reasonably constant since World War II. The 1949 cropland acreage was 387,000,000 --- a fifty year high. By 1969 this figure had dropped to 333,000,000 acres but rose again to an estimated 367,000,000 acres in 1976.

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2/ Ibid page 3.

3/ This is essentially the view taken by O. Krause and D. Hair, "Trends in Land Use and Competition for Land to Produce Food and Fiber" Perspectives on Prime Lands, USDA (July 1975) pp. 1-26.
Throughout the 1950's and 1960's, prices of most basic farm commodities in the United States were supported above world market levels. Various land set aside policies were invoked to help limit the supply of farm products in order to support prices at pegged levels. From 37 million to 65 million acres were kept out of production during the years 1961-1972. This acreage is fourteen to twenty-four times the annual loss of cropland to other uses. By 1976, however, most of this set aside acreage had been returned to crop production under the impetus of favorable farm prices, particularly from 1972 to 1975.

By 1975, however, that old nemesis in our agricultural history called excess supply, had returned putting downward pressure on farm prices. The Carter administration and the congress have decided that, to keep price support costs at politically acceptable levels under the target prices announced in the 1977 farm act, supply must be curtailed by new land set aside programs: a 20 percent set aside for wheat and 10 percent for the feed grains.

The evidence is abundantly clear that this nation has never had a serious shortage of land available for agricultural use. To the contrary, given our programs to support incomes in the agricultural sector and to stabilize prices by establishing price support floors, incentives have been required to induce farmers to keep land out of production. If conditions were somehow reversed and agricultural production became highly profitable, and if the government had no set aside policy, there seems to be an adequate reserve of land waiting to be brought into production.
Further technical advance is bound to increase land productivity and greater doses of capital, labor and management could also increase yields substantially and stretch the effective supply of land. I simply cannot find compelling evidence to support the view that our nation faces a critical problem in the foreseeable future in shortages of agricultural land.

The Price of Agricultural Land

A more interesting question, to the economist at least, is the price of agricultural land. After all, it is the price that represents the per acre wealth that land owners have tied up in land and that farmers must pay if they are to acquire it for productive purposes.

Columns 6 and 7 of Table 1 report the real per acre values for agricultural land in 1970 dollars and for that land plus improvements respectively for the post World War II years. Both series have approximately tripled over the period.

The tremendous profitability of holding agricultural land for capital gains through this period is shown in Table 2. The numbers in columns 3 and 4 indicate the average real rates of return from holding land through the period specified in Column 1. For example, if a typical parcel of agricultural land was purchased in 1946, held until 1975 and then sold, the average real rate of return on the original land price would have been 3.25 percent per year. Unfortunately, no data are available on the variances on these returns, either cross-sectionally or over time, except for some state data to which I will later refer.
It needs to be emphasized that these are real returns corrected for inflation. As such they are very high compared with real returns from holding other capital assets in the American economy. Average real returns to capital in the economy as a whole have averaged just under two percent over this century.\(^4\) Another significant point is that these yields represent real capital gains just from holding land. The annual rents obtainable from using land in productive pursuits have not been included in these returns except as they have been capitalized into the value of land. Thus, there is no double counting.

Besides the size of these real rates of return, two other points are worthy of mention. The first is that the real rates of return to land only are consistently higher than those to land plus improvements regardless of the period considered. This corroborates the point made earlier that the real returns to land are higher than the real returns to capital prevailing in the economy as a whole. The other significant point is the tremendous increase in the real rates of return in the last five year period (1971-75) compared with the rest of the total period. Had 1976 data been added to this period, the results would probably have been even more startling. I will have more to say about this period later.

The steady post-World War II rise in the real value of agricultural land is one of the most puzzling phenomena of our times. Numerous explanations have been offered and some of them are indeed plausible.

a priori. The most obvious reason for increasing real land prices was the expected increases in net income accruing to landowners in agriculture. Net income, however, is a function of both the returns and costs of agricultural production and both might be related to land price increases.

Let us see what has been occurring to prices received and prices paid by farmers. Is it reasonable to infer that increases in real land values are attributable to increasing real farm output prices? The composite index of real prices of all farm products at the farm gate is shown in column 2 of Table 1 and the corresponding index for real crop prices only may be found in column 3. Since World War II, the year of the highest relative farm product prices and crop prices was 1947 when the indices stood at 184 and 216 respectively. By 1955, the crop index had fallen to 155, by 1960 to 132, and by 1965 to 128. The low came in 1970, the base year, with a value of 100. The 1972 figure rose to 105 and by 1973 had jumped to 151, about the same as in 1956. By 1974 the index was up even further to 176 but fell off sharply by 1976 to 136. All farm prices show similar patterns of movement but with less amplitude. Thus, although relative farm product prices rose from 1970-74, they are now declining once again and are far below what they were in the early post-World War II period. Only some catastrophic events on a worldwide scale that sharply reduced food production could increase real farm product prices to levels of the 1940's and 1950's in the near future.

5/ Perhaps the best study in this direction is by Reynolds, John E. and John F. Timmons, FACTORS AFFECTING FARMLAND VALUES IN THE UNITED STATES, Iowa State Agriculture and Home Economist Experiment Station Research Bulletin 566 (Ames 1969). Independent variables regress on a time series of agricultural land values and signs of the regression coefficients were: 1. Expected net farm income (positive), 2. Government farm program payments (positive), 3. Expected capital gains (positive), 4. Technological advance (positive), 5. Farm enlargement (positive), 6. The number of voluntary transfers of farmland (negative), and 7. An increasing demand for land from a growing population (positive). It appears, however, that the high R²'s and some significant regression coefficients might have resulted from a failure to deflate the various monetary series by a price level index. The steady inflationary trends over the period may have caused an upward movement in all the nominal values of the various series and thus distorted their real causal significance.
Comparing the indices of real farmland prices and prices received by farmers reveals a strong negative correlation, with the exception of the short period 1972-74. It is not plausible, therefore, to impute rising land values to favorable agricultural prices alone. Of course, farm revenues are the product of prices and output. Changes in output per unit of input will be related to land prices shortly.

The other component in net income is cost, the product of input prices and input quantities. Could it be that net incomes have risen in the face of declining output prices because either productivity has increased or input prices have declined more than output prices? In either case, per unit costs probably would have declined.

Consider the question of input prices first. A composite of prices paid by farmers for nonland production inputs in real terms is found in column 4 of Table 1. This series is much steadier than the two output price series discussed above, although similar in direction. The high value occurred in 1951 and the low in 1970 and 1971. There was a declining trend through the 1950's and the 1960's and a sharp rise after 1972. The figures for 1974-75-76 were 121-121-124 respectively. One must go back so far as 1954 to find the numbers so high as 124.

A comparison of prices received and prices paid reveals that the relative prices received by farmers dropped much faster before 1970 than prices paid. During the early 1970's, prices received rose faster but by 1975 prices paid had caught up. This evidence suggests that increasing land values may not be attributed simply to farm output prices rising relative to farm input prices. Indeed, the terms of trade have been steadily worsening for agriculture throughout most of the post-World War II period except for a couple of years after 1972.
If the explanation for rising land values cannot be found in prices of outputs and inputs, perhaps it can be found in the productivity of the inputs. The USDA average index of crop production per acre of cropland, one measure of productivity change, appears in column 5 of Table 1. There is little change in the index from the mid-1940's to the mid-1950's. From the mid-1950's onward, however, there is an upward trend until 1972, when an apparent leveling off occurred. It is too early to tell whether the series will continue its historical two-decade upward climb. Much depends on the quantity of private and public investment in agricultural research and extension, the weather, pest control, and the availability and prices of critical inputs such as energy to agriculture. Also, regulations imposed on agriculture in the form of labor, health and safety, and environmental policies are important determinants of input productivity. In any case, the index series of productivity and the series of real land values tend to move together through time.

Let us now consider net farm income directly. The relationship between land prices and net farm income was studied by Schofield in 1964. He calculated the secular trend in net farm income and the ratio of per acre values of farm real estate to per acre net farm income. Net farm income was defined as per acre revenues minus per acre nonland cost, where land included the value of capital improvements. The ratio was approximately six for the late 1930's, primarily because net farm income was very low. The ratio dropped to approximately four for 1943-47, a period when farm income rose but land prices did not respond proportionately. From 1948 to the early 1960's there was a steady rise in the ratio from about four to nearly ten. I made an analogous calculation for 1975 and the ratio was 14.5. I am predicting that the 1976 ratio will be even

higher when the data are finally in, since net farm income was down somewhat from 1975 but land prices continued upward.

The sharp rise in this ratio implies that either farmers are expecting continuing increases in net income that will be capitalized into higher land values or alternatively, other variables are explaining the rise in the ratio. The latter explanation is implied mildly by other Schofield results. He estimates a cross-sectional equation that regresses the log of per acre net farm income for each state, the independent variable, on the log of per acre farm real estate value for each state, the dependent variable. Schofield’s estimates are for three periods: the average for 1936-1940, 1951-53, and for 1961-63 (see Table 3). I made the same estimates for the period 1972-75. Each of the slope coefficients (the b's) is statistically significant at the one percent probability level, suggesting that changes in land values are associated with changes in net farm income for all periods. Also, the data show some tendency for the explanatory power of net farm income as reflected in the R^2's to fall after 1951-53. Apparently other variables not specified in the two variable model are increasingly important. The same conclusion is implied by the falling b's (the elasticity indicating the percent change in land values associated with the one percent change in net farm income) after 1951-53. The significant conclusion that emerges from these data is that net farm income accounts for nearly 80 percent of the cross-sectional variation among states in per acre land value and is therefore probably the critical factor in accounting for the secular rise in real land values. It is obvious that the profitability of agriculture will continue to play a crucial role in agriculture's ability to compete for land.
It is highly instructive to see where the large increases in land values from November 1975 to November 1976 were occurring. The map (Chart 1) tells much of the story. It is the grain states where the largest increases occurred over this period: Illinois, Iowa, Ohio, Indiana, Nebraska, Minnesota, Wisconsin and Missouri. The grains are our most important export crops. This ties the increase in land values to our role in the world market, to which I will return later.

Two implications are suggested by these data:

1) Land conversion demand may not be so important in raising land prices as is alleged. The highly urbanized states are not those where high land-price increases occurred. There is one significant caveat that should be stated, however. One block of the low-increase group -- Hawaii, California, New York, New Jersey, New England, etc.-- are those states where there has been much discussion about restrictions on free market transfers of agricultural land to other uses. If land cannot be freely transferred, its value as a speculative asset will be diminished. These restrictions take the form of agricultural zoning and various other devices to be discussed later.

2) There was an abrupt shift in expectations for higher net incomes in agriculture in the early 1970's that soon became translated into higher land prices. It is not difficult to see why a new era for agriculture was expected. Each of the following factors could be elaborated at great length:

a) The dollar devaluations in December 1971 and February 1972 made American exports more attractive and in particular made our grains more competitive in world markets. There have been seven successive years now of increases in agricultural
exports. For the past four years agricultural exports have
gone over 20 billion dollars per year, which is over half
of what we normally spend for imported oil. It has been
estimated by the Department of Agriculture that fully one-
third of our present agricultural acreage is being devoted
to crops which are later exported.

b) Rising per capita incomes in countries around the world and
high income elasticities for food caused the demand curve
for our products to shift to the right.

c) Bad monsoon weather in South and East Asia during the period
1972 and 1973 increased our exports to those areas.

d) The celebrated crop failures in the USSR had an impact on
grain prices that got worldwide attention.

e) The anchovies off the coast of Peru shifted their location
and this had an effect on world supplies and prices of
fertilizer.

f) The great wave of pessimistic forecasts of world hunger by
demographers, biologists, and agriculturalists, persuaded
many, including America's farmers, that the world was entering
a new era of increasing relative food prices and increased
profitability of agricultural production.

g) In response to higher world prices and low reserve stocks
of grain, there was a loosening of production controls on
U.S. farmers.
h) Governmental policies in many countries, such as those in the European Economic Community and all the East Bloc countries, prevented their internal food prices from rising. This meant that consumers did not curtail their demands and producers did not increase their supply as would have occurred had prices been permitted to rise. The effect was to shift the main burden of supply and price instability to the international grain markets and the exporters of grain.

i) Finally, the income tax and general inflation policies that were pursued in this country over these years provided incentives for investment in agriculture and speculation in land.

How important each of these factors is in explaining the recent increase in land prices has yet to be determined. We have just initiated a research project to assess quantitatively the effect of these factors and, in a year or two, we hope to be able to say something more definitive than we can today. We already know, however, that the predictions which were made in the early 1970's have not been valid.

In their world hunger study, my California colleagues suggest why the expectations established in 1973 and 1974 giving rise to large increases in land values may have been too optimistic as follows:

1) There is general but not complete consensus that the world's population food balance is not undergoing a fundamental transformation toward chronic food shortages. Market surpluses will recur in the major producing countries in the world, and particularly in North America.

2) Rapidly expanding world fertilizer plant capacity has significantly lessened the fertilizer price and supply problems that peaked about two years ago (1972).

3) The agricultural productive capacity of the United States is basically strong and there is potential for expansion in the resource base and for continued productivity growth.

4) The real price of grain will remain roughly constant for a few years and then likely will begin to decline again.

In the case of point 4) my colleagues were too pessimistic. The high grain price did not last as long as anticipated. Except for soybeans, those grain prices are down very substantially from their peaks in the early 70's and surpluses of wheat, feed grains, rice, and cotton are building up.

The California analysis assumed a constant real world price for oil and no sustained changes in weather patterns. As everyone knows, the price of oil has risen precipitously. The effects on agricultural production have not been perceptible, however, as the production of food in the world has been at record levels in 1975, 1976 and it appears 1977. Also, the California study assumed that investment in agricultural research and development in the United States would accelerate. This is beginning to occur and the impact on national food production will be positive in the years to come.

What do I conclude about the real significance of rising land prices? I do not believe that they necessarily reflect a real shortage of agricultural land in any productivity sense. Rather, they are attributable to the rising expectations for profitable food production that were established in the early 1970's. These expectations are not likely to be borne out as we move on through the 1970's and the 1980's. If I am correct, the rate of increase of land
prices will surely fall, and prices might well fall in absolute terms as well. Already there are reports of declining land prices coming from the Midwest where recent increases have been greatest.

Other asset markets run in cycles. These cycles have more amplitude than the basic economic forces underneath. The stock market is a good example. Speculative fervor causes stock prices to go beyond those warranted by levels of profit flows and vice versa on the downside. It is quite significant that the upward trends in land prices discussed above have lasted since the 1930's, a very long time as cycles go. This may have suggested to speculators that there were few risks in land speculation. This is the stuff of which speculative "bubbles" are made. The effect would be to increase the size of the bubble and to greatly intensify the seriousness of the situation if and when it bursts. To make matters worse, the process feeds on itself in a spiraling way. Higher priced land increases net worth, which increases borrowing capability. This stimulates the demand for land and raises land prices. The cycle is then repeated as farm enlargement occurs. Some unpublished data out of the USDA suggest that one-third of American farmers that have loans with the government and with the commercial banks are in financial stress in terms of repaying those loans. Much of this condition must be attributable to the very high land prices which farmers have been paying for the last few years.

One wonders if there are historical parallels of this phenomenon. A striking example occurred in the early 1900's (see Table 4). There was a very rapid escalation in farm product prices during the World War I years, 1915-1919, followed by a decrease after 1920. The index of per acre land and building prices indicates that they lagged behind product price increases.
There was a very rapid increase in land prices in 1919-1920, and then the bubble burst. By 1933, the index had fallen to 55.3, less than half the level in 1920.

Clearly the 1970's are not the 1920's. The federal government is immensely more powerful, richer, and more Big Brotherly than it was then. Private financial institutions are much stronger and better protected by federal insurance. Still, the current cash flow situation in agriculture could be serious and may be more so if speculation gets further out of hand.

Prime Land Preservation

Another complex issue of current interest is prime land preservation. Several state legislatures, including California's, are considering enactment of tight zoning laws to preserve high productivity land for agricultural use. The tax preferential policies and other planning devices designed to protect agricultural lands from conversion to other uses have not been very effective.\(^8\)

Some of our best agricultural land continues to be converted to expanding urbanization, transport, utility easements, and for a variety of public purposes. So it is argued by those who advocate zoning for agricultural land that more drastic measures are now needed to stop this avalanche before serious agricultural land shortages occur.

Of course, if social action is needed to retain prime land and agricultural use, the implication is that the land market cannot efficiently allocate land resources among competing uses. Under the tax preference schemes use changes could still occur through the market if value differentials were great enough to offset the production cost advantage created by the tax preference. The crux of the proposed prime land preservation legislation is quite different; it removes

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the land allocation decisions from the market entirely by using productivity criteria to qualify land for preservation and by granting the power for exemptions and use changes to designated boards.

What society appears to get in the action of preserving agricultural land are at least four joint products (benefits):

1) "Sufficient" food and fiber to meet the nutritional requirements of a growing national and world population
2) Local economic benefits that derive from a viable agricultural industry
3) Open space and other environmental amenities that accrue chiefly to urban residents, and
4) More efficient orderly and fiscally sound urban development.

Given that these are the joint benefits that will hopefully be achieved by retaining high productivity land in agriculture, what is the rationale for extra market social action?

Market Failure and Prime Land Retention

So long as product and factor markets are perfectly competitive, goods are private as contrasted with collective, and no externalities exist, it is generally conceded by economists that the free market will allocate the socially optimal quantity of land to various competing uses. Thus, if the market is removed from the allocation task and is replaced by essentially non-market allocation criteria as is proposed by the prime land preservation legislation, some rationale should be offered. In addition, the consequences in terms of economic efficiency and equity should be carefully evaluated.9/

Space limitations will not provide a full development of classes of

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market failure that may justify public intervention with the land market. Rather the approach utilized here will be to discuss the four joint benefits alleged to be significant in prime land retention and see if there are elements of market failure that justify the removal of the land market from allocation decisions.

It is difficult to see why the market will not allocate sufficient land to food and fiber production. The food and fiber sector of the economy is as competitive as any other, and food and fiber prices adjust rapidly to changing conditions in supply and demand. The enormous increases in agricultural land prices in the last five years have been due principally to expectations for higher food and fiber prices at the farm gate as discussed above. If further increases are expected there is nothing inherent in the land market that would prevent these expectations from yielding even higher land prices. The more productive the land, the higher the agricultural land price can be expected to be and the more competitive agriculture will be for land vis a vis other land uses. The greater the comparative advantage of American agriculture and the fewer the impediments to free world trade in agricultural commodities, the greater will be the demand facing our producers, the higher the profitability of producing food, and the stronger the competitive position of agricultural producers who compete for prime land.

The collective good and externality arguments do not seem very relevant when applied to food and fiber. These products meet all of the requirements of private goods and significant external effects are not obvious in consumption. There may external diseconomies in production of food and fiber (such as the use of chemicals) but this would suggest too much effort in production -- not too little.
Decision makers across the spectrum of agriculture — such as farm operators, processors, farm suppliers, transporters, financial firms, university professors in agricultural fields, and government agency personnel — have obvious stakes in a viable and stable industry. Land owners are directly affected in a unique way by the prime land retention issue. If land is immobilized in agricultural use, they forfeit the direct wealth gains in price appreciation that would have occurred with the possibility of changing use in a free market. The others listed above are affected more indirectly. The wealth impacts, however, could be substantial for them also — positive or negative. Conceptually, these indirect impacts are identical to secondary benefits and costs in traditional benefit cost analysis. In addition, these effects are primarily pecuniary as contrasted with technological and thus they are fully reflected in the market prices of the services rendered. As such, they qualify neither as collective goods nor relevant externalities in justifying interference with the land market.

Some might argue that income and wealth differences among regions may justify prime land retention in order to prop up the dominant local industry — agriculture. The argument is thin, however, as related to the secondary beneficiaries listed above because they tend not to be low income people. It may apply to some immobile farm workers who may benefit if local land is left in agriculture.

Many of these same issues are applicable to producing a more efficient, orderly, and fiscally sound urban development by agricultural zoning. If prime land cannot be developed for urban purposes, demand will shift to parcels which are not so zoned thus conferring wealth gains on the elders of these parcels. Whether the result is a more or less efficient urban development is far from clear, however. It depends on where these parcels are, how efficient they are at producing urban amenities, what the costs are of bringing public utilities
and transport to these parcels, etc. It is not obvious in principle that urban "leapfrogging" will be reduced over what the free market would have produced. Much would depend on the criteria utilized to zone agricultural land the number of zoning variances granted and the availability of soil types and other land classification data.

Finally, there is the case where market failure is most apparent -- the creation of open space and environmental amenities. These benefits obviously meet the criteria for collective goods and since there are no market signals there is little evidence available as to how much these amenities are worth. In any case, in principle at least the market will not provide the optimal quantity of these amenities and there may be some justification for social action to remedy this market failure.

Efficiency and Equity Implications

It is significant that both the land capability classification system of the Soil Conservation Service and the Storie index, which in most states are to be utilized to designate prime land parcels, are strictly oriented toward physical productivity. Location plays no role whatever. Because of the point made earlier that agricultural productivity may not be the only purpose for land retention in agriculture or even the major one, criteria that do not include location factors may be quite inefficient in producing desired results. Enhancing environmental amenities, removing competition for urban land parcels, and preventing urban sprawl are all tied up in the location of the land parcels affected. Urban people who want these joint products of land retention may well be frustrated and disappointed in the results of the land preservation scheme that retains land in agricultural use based only on agricultural productivity criteria.
It must always be remembered that there is no good substitute for the market in providing signals in the form of prices that reflect relative scarcity of resources and relative values of these resources in alternative uses. A set of firm property rights is the institution that permits the market to serve this function efficiently. When property rights are altered -- such as would be the case if land disposition is restricted -- the signals are distorted, and the market does not work efficiently. If society really has a scarcity of agricultural land and food and fiber prices are not artificially controlled at lower than equilibrium levels, the land market will serve perfectly well to reveal its scarcity. If this effective instrument for revealing scarcity is replaced by the prime land retention schemes proposed where inadequate economic or political criteria will dictate resource allocation, there will be no reliable way of knowing whether agricultural land is becoming scarcer or more plentiful.

Another common allegation is that in investment decisions the market is short-sighted compared with political processes. In fact, do the actors operating in the market have a bias toward the present that is socially inefficient. The land "speculator" is that bad guy who makes his living predicting the future more accurately than the rest of us. He has an incentive to do his job well and market prices reflect his anticipations of future scarcity. What reasons can be advanced for believing that a part time agricultural board member or even a career planner, to say nothing of a legislator elected for two years, can do a better job of predicting the future.

Because the market is an institution where preferences can be freely expressed, although these preferences are constrained by limits on purchasing power, there is always some uncertainty associated with market allocation. There may be even more uncertainty connected with government allocation, however, as politicians and
even agency bureaucrats are notorious for changing their minds. Although the uncertainty question is far from clear there will almost surely be more freedom of choice in the market and better information of foregone alternatives.

It is true as suggested above that the market may not provide the optimal quantity of the collective good -- open space -- but neither will the prime land retention schemes. They preserve land on the basis of agricultural productivity and there may or may not be a good match between high productivity agricultural lands and open space for urban recreationalists. Given that open space is partially a joint product with agricultural use, it is an empirical question whether the land market or zoning based on agricultural productivity criteria will provide more socially optimal quantities of open space. If there are critical shortages of open space then a sensible and efficient solution would seem to call for open space selection criteria and either zoning on that basis or public acquisition of the requisite lands in the market.

If it is granted, contrary to my belief, that there are public interests to be served in supplying open spaces and feeding the world's people by prime land retention, then the equity issue boils down to creating these benefits by imposing a wealth loss on the owners of prime agricultural land by immobilizing the land in that use and thus preventing land use shifts at higher prices. Thus, unless compensation is given, these land owners absorb losses in order to provide the collective goods enjoyed by society as a whole.

Another equity issue that is often overlooked is that the purchasers of land for non-agricultural uses will be required to pay higher prices for those land parcels than they would be required to pay in the absence of a land preservation policy. If part of the land supply is removed by governmental action from the market the inevitable consequence is a price rise for those parcels which remain available to the market. It is a bit odd, therefore, that we do not see
urban consumers lobbying against prime agricultural land retention.

Even though there do seem to be devices such as zoning by eminent domain and transfer of development rights that can mitigate the equity problem there has been no attempt to incorporate them in the proposed legislation and there is even a conspicuous absence of any discussion of them. What is perhaps even more significant, there is not even any explicit recognition that an equity problem exists at all.

**Summary and Conclusions**

In the way of summary:

1) It is clear that physical/biological possibilities for increasing food production around the world are enormous, especially in our own country.

2) If food were to become increasingly scarce food prices would rise if they are free to do so. Investment in producing food would rise and food output would increase.

3) Society can be expected to increase resources for research and extension if food becomes relatively scarcer and this would have a substantial long run output increasing effect.

Given the above I am very optimistic except for three worries which I will now summarize. The explosion of land prices has some ominous possibilities. What we might do about them is far from clear to me, however. Secondly, a serious problem in my opinion is the unwillingness of the government to let the free market set prices to serve as signals for resource allocation. The most obvious example is the threat of further government tinkering with the land market. In addition,
the United States government has set target prices for basic agricultural commodities that almost guarantees surplus production in the grains and cotton. In a very short period of time we could be back in the situation of the 1950's and 1960's with expensive surplus disposal programs. Thirdly, exogenous restrictions on agricultural production are becoming evermore numerous and onerous. These restrictions are ostensibly invoked to protect the environment and to maintain health and safety of farm operators and workers.\(^\text{10}\) Of course, there are compelling reasons for government policy to protect the environment and the safety of farm workers but it is not often realized that these policies are costing agriculture a good deal in terms of efficiency without at the same time mitigating our real environmental problems. It is time for a tough minded benefit-cost assessment to determine if these restrictions on agricultural producers are justified.

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CHART I

FARMLAND VALUES SHOW STRONGEST RISE IN MIDWEST

PERCENT INCREASE
NOV. 1875 - NOV. 1976

0-7
8-14
15-41

48 STATES INCREASED 17 PERCENT

BASED ON INDEX NUMBERS OF AVERAGE VALUE PER ACRE. * AVERAGE INCREASE FOR MAINE, NEW HAMPSHIRE, VERMONT, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT. † AVERAGE OF THE PERCENTAGE CHANGE IN GEORGIA AND ALABAMA INDEX VALUES.
<table>
<thead>
<tr>
<th>Year</th>
<th>Prices Received</th>
<th>Prices paid</th>
<th>Real dollars per acre</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>All farm products</td>
<td>Crops</td>
<td>Nonfarm production inputs</td>
</tr>
<tr>
<td>1946</td>
<td>178</td>
<td>213</td>
<td>130</td>
</tr>
<tr>
<td>1947</td>
<td>184</td>
<td>216</td>
<td>133</td>
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<tr>
<td>1948</td>
<td>180</td>
<td>195</td>
<td>139</td>
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<tr>
<td>1976</td>
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<td>136</td>
<td>124</td>
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</table>

a/ The indices of prices received and prices paid were put in real terms using the Gross National Product implicit price deflator (1972=100). Then, in order to see more clearly the trend since 1970, figures were adjusted to 1970=100.

b/ The index was adjusted to the 1970=100 basis.

c/ 1946-49: The total value of land was calculated by deducting the value of buildings and improvements from the total real estate value. The land value was then divided by the number of acres in production and adjusted by the GNP deflator on a 1970=100 basis to give the real average value per acre in 1970 dollars.

1950-1967: The average value per acre of land was adjusted by the GNP deflator, 1970=100.

1968-1976: The total value of land net of buildings and improvements was divided by the number of acres in production and then adjusted by the GNP deflator, 1970=100.

d/ The average real estate value per acre was put in real terms using the GNP deflator, 1970=100.


Col. 2-4: Ibid., Table B-92, p. 293.
### TABLE 2

**Average Real Rates of Return Yielded by Holding Agricultural Land, 1946-1975**

<table>
<thead>
<tr>
<th>Period</th>
<th>Years</th>
<th>Land only</th>
<th>Land and improvements</th>
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<tbody>
<tr>
<td>1946-1975</td>
<td>30</td>
<td>3.25</td>
<td>2.84</td>
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<td>1951-1975</td>
<td>25</td>
<td>3.73</td>
<td>3.09</td>
</tr>
<tr>
<td>1956-1975</td>
<td>20</td>
<td>4.03</td>
<td>3.42</td>
</tr>
<tr>
<td>1961-1975</td>
<td>15</td>
<td>3.84</td>
<td>3.37</td>
</tr>
<tr>
<td>1966-1975</td>
<td>10</td>
<td>3.52</td>
<td>3.13</td>
</tr>
<tr>
<td>1971-1975</td>
<td>5</td>
<td>6.13</td>
<td>6.00</td>
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</table>
TABLE 3


<table>
<thead>
<tr>
<th>Years</th>
<th>$R^2$</th>
<th>a</th>
<th>b</th>
<th>Standard error of b</th>
</tr>
</thead>
<tbody>
<tr>
<td>1936-1940</td>
<td>.833</td>
<td>.899</td>
<td>.838</td>
<td>(.059)</td>
</tr>
<tr>
<td>1951-1953</td>
<td>.890</td>
<td>.952</td>
<td>.952</td>
<td>(.045)</td>
</tr>
<tr>
<td>1961-1963</td>
<td>.865</td>
<td>.262</td>
<td>.750</td>
<td>(.046)</td>
</tr>
<tr>
<td>1972-1975*</td>
<td>.790</td>
<td>1.283</td>
<td>.730</td>
<td>(.058)</td>
</tr>
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*Note: The logs of 1975 farm real estate values per acre were regressed on the logs of the 1972-1975 average net farm income per acre.
TABLE 4

Farm Prices and Land Value Indexes, 1911-1922

<table>
<thead>
<tr>
<th>Year</th>
<th>Farm product price index (1924=100)</th>
<th>Index of average value per acre of land and buildings (1924=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1911</td>
<td>66.8</td>
<td>74.9</td>
</tr>
<tr>
<td>1912</td>
<td>72.6</td>
<td>76.9</td>
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<tr>
<td>1913</td>
<td>71.5</td>
<td>78.6</td>
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<tr>
<td>1914</td>
<td>71.2</td>
<td>80.2</td>
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<tr>
<td>1915</td>
<td>71.5</td>
<td>79.6</td>
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<tr>
<td>1916</td>
<td>84.4</td>
<td>84.2</td>
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<tr>
<td>1917</td>
<td>129.0</td>
<td>89.9</td>
</tr>
<tr>
<td>1918</td>
<td>148.0</td>
<td>97.9</td>
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<tr>
<td>1919</td>
<td>157.6</td>
<td>106.0</td>
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<td>1920</td>
<td>150.7</td>
<td>127.8</td>
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<td>88.4</td>
<td>119.4</td>
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<td>1922</td>
<td>93.8</td>
<td>105.6</td>
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