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FARM CONSERVATION IN THE UNITED STATES

Investment and Capital Values, 1935-80

by

George A. Pavelis

Washington, D.C.
February 1983

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ABSTRACT

From 1935 through 1980, cumulative conservation investments in the agricultural sector of the U.S. economy were $19.1 billion, in historical dollars. When 'deflated' to a 1977 base the 'real' total investment from 1935 through 1980 came to $43.0 billion. The corresponding real 'gross capital stock' in 1980 was $20.7 billion. It measures the real full cost of conservation improvements still in service. The net or partially depreciated value of conservation capital was $13.2 billion in 1980. Compared with other farm business assets, the $13.2 billion net capital value of conservation improvements in 1980 amounted to about 3.7 percent of the net value of all land in farms. The net value of conservation improvements in 1980 was about 22 percent as large as the net capital value of all nonresidential structures on farms, and 17 percent as large as the net capital value of farm machinery and other producers' durable equipment.

Key Words: Investment, capital growth, conservation capital, conservation improvements, farm conservation, watershed projects.

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FARM CONSERVATION IN THE UNITED STATES

Investment and Capital Values, 1935-1980

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Introduction

The purpose of this staff report is to summarize and discuss the implications of research on conservation capital accumulation in U.S. agriculture. In addition to greatly improving earlier time-series information covering the period 1935 to 1975, the information is updated to the year 1980.

Equal importance is given to cumulative historical and real annual investments, and also to 'gross capital stocks' as approximating the original real cost of the improvements still in use. Finally, real 'net capital values' are derived as measures of national wealth and commitments to conservation on farms and in agriculturally oriented watershed projects.

Rational public conservation policies as well as intelligent farm production planning and farm policies in general require such information. It provides at least an approximate qualitative indicator of the economic 'condition' of land as the basic component of our agricultural productive 'plant.'

As Timmons (12) and others have observed, in the decade of the 1970's and yet today, four factors have converged to cause considerable alarm over the condition of agricultural land: (A) increased reliance on farm exports for improving the U.S. balance of payments and trade; (B) cash grains and oilseed crops are prime exports and also happen to be considered soil-depleting crops;

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(C) conversion of so-called fragile cropland and grasslands to cash crop production; and (D) a reduced flow of new capital into conservation, with a possible serious decline in long-term productivity, and thus in our capacity for maintaining farm exports at high levels. Timmons has discussed factors A and B (12), and statistics supporting factor C are in recent reports of of Frey (7) and Daugherty (17). My discussion concentrates on factor D.

Historical Background

Natural resource conservation in the United States did not evolve gradually or in phase with the intensity of resource use. Rather, it came about in response to genuine and successful 'movements'. The pioneers in forest and parklands conservation were President Theodore Roosevelt, Ferdinand Hayden, Gifford Pinchot and John Muir. Forest reserves were established in 1891 and reorganized in 1907 into the present system of National Forests managed by the U.S. Department of Agriculture. Yellowstone, our first National Park, was officially created in 1872 by President Grant.

The leading crusader for conservation on the Nation's farms was Hugh Hammond Bennett, though as Rasmussen says, the adverse effects of soil erosion were recognized early on by Thomas Jefferson, Edmund Ruffin and other influential leaders (2). Bennett's success in the 1930's was doubly significant because it involved costly and drastic government intervention in the midst of the Great Depression and a time of social distress and minimal farm income. The initial emphasis on cost-sharing subsidies and income incentives in Federal conservation programs was a natural and understandable consequence of depressed economic conditions prevailing when the programs were started. An analysis of how these and other incentives and techniques have achieved their goals or might achieve new public conservation goals was published in 1982 by Easter and Cotner (8).

Discussion Plan

The rest of this overview of conservation capital in U.S. agriculture first specifies just what conservation 'capital' includes. The method for determining gross and net 'stocks' of capital is then outlined. Investment rates and capital stocks from 1935 to 1980 are then discussed for on-farm conservation measures, and also for conservation projects. To conclude the review a planned redirection of the U.S. Department of Agriculture's conservation programs is described, not only with respect to its findings on the effectiveness of historical conservation efforts, but also with respect to its probable effects on future investment and the value of conservation improvements.

Composition of Conservation Capital

For this discussion conservation capital is considered to include: (a) depreciable on-farm land treatment and management measures designed to reduce soil loss from water and wind erosion, including permanent vegetative cover establishment, strip-cropping, terracing, diversions, shelterbelts, and so forth; (b) sod waterways and various detention structures for sediment reduction and water quality control; and (c) water impoundment structures for flood prevention, erosion and water quality control. Some of these may jointly provide fire protection, livestock water, and water to irrigate permanent vegetative cover.

All conservation investments on farms are included, whether made with or without Federal cost-sharing assistance. Those measures and structures for which Federal cost sharing assistance was given under the Agricultural Conservation Program (ACP) and the Great Plains Conservation Program must be permanent and maintained at least five years. They may have either an on-site soil conservation or general environmental improvement orientation.

They are addressed to specific local problems by State and County Committees (2). Official ACP and other U.S. Department of Agriculture agency reports were the main source of Federal cost-sharing and similar progress information (5, 13, 15).

Federal investments for watershed protection under the Watershed Protection and Flood Prevention Act (P.L. 83-566), and also in the so-called Flood Prevention Watersheds, are represented by the Federal obligations of appropriated funds (11). Nonfederal and local inputs for planning, easements, and other construction contributions were figured at 17 percent of the Federal investments. This percentage is based on 1,120 individual P.L. 566 watershed work plans inventoried for costs and benefits by the Economic Research Service through 1975 (9). These inventory studies were then terminated.

While irrigation and drainage investments connected with ACP, the Great Plains Program, or various watershed projects are usually considered as resource development, they are not counted as conservation capital in this study.

Measuring Gross Capital Stocks and Net Values

In determining conservation capital values, current-dollar private and Federal cost-sharing and other annual investments were first deflated to constant 1977 dollars (1). The deflated investments were then summed to cumulative expenditures to date, then reduced by cumulative retirements to obtain gross capital stocks. The last step was to depreciate gross stocks to obtain net capital values. These concepts and corresponding aggregate results for all U.S. conservation activities for the period from 1935 to 1980 are illustrated in figure 1.

In these determinations ordinary maintenance was regarded as an operating cost and not included as part of gross investment. But major or non-ordinary

maintenance frequently occurs as substantial re-establishment and supplementary improvements, which may qualify for Federal cost-sharing. Such 're-application' expenditures are included in gross annual investments.

Service lives for straight-line depreciation purposes varied primarily according to the type of conservation measure or structural improvement involved, guided partly by the legislation authorizing joint Federal and private participation and financing. Conservation practices regarded as 'temporary' were excluded altogether.

Permanent conservation measures installed on farms were assumed, if maintained, to have a total useful life of 25 years. However, no depreciation was charged for the first 5 years; thereafter, the original cost was depreciated on a straight-line basis over 20 years.

Structural measures for flood prevention or land protection installed under the P.L. 566 watershed program, or in special Flood Prevention Watersheds (since 1944), were considered to have an average service life of 35 years. This recognizes that water supply structures have useful lives of 50 years or more and other permanent improvements a life of 30 years or more.

Highlights of Study

From 1935 on through 1980, cumulative conservation investments in the agricultural sector of the U.S. economy were $19.1 billion, in actual historical dollars. When 'deflated' to a 1977 base, to remove inflationary changes in the value of the dollar, the total investment from 1935 through 1980 in 'real' terms came to $43.0 billion. The corresponding 'gross capital stock' in 1980 was $20.7 billion. It measures the real full cost value of

conservation improvements still in service. This reasoning suggests that, from an 'accounting' point of view, slightly under half (48 percent) of all conservation measures and improvements installed since 1935 should still be in place. Their net or partially depreciated capital value was $13.2 billion (figure 1).

In comparison with other farm business assets, the $13.2 billion net capital value of conservation improvements in 1980 amounted to 3.7 percent of the net value of all land in farms of $356.7 billion. Net land value means farm real estate value less all farm buildings. The value of conservation improvements in 1980 was about 22 percent as large as the capital value of all nonresidential structures on farms, and 17 percent as large as the capital value of farm machinery and durable equipment.

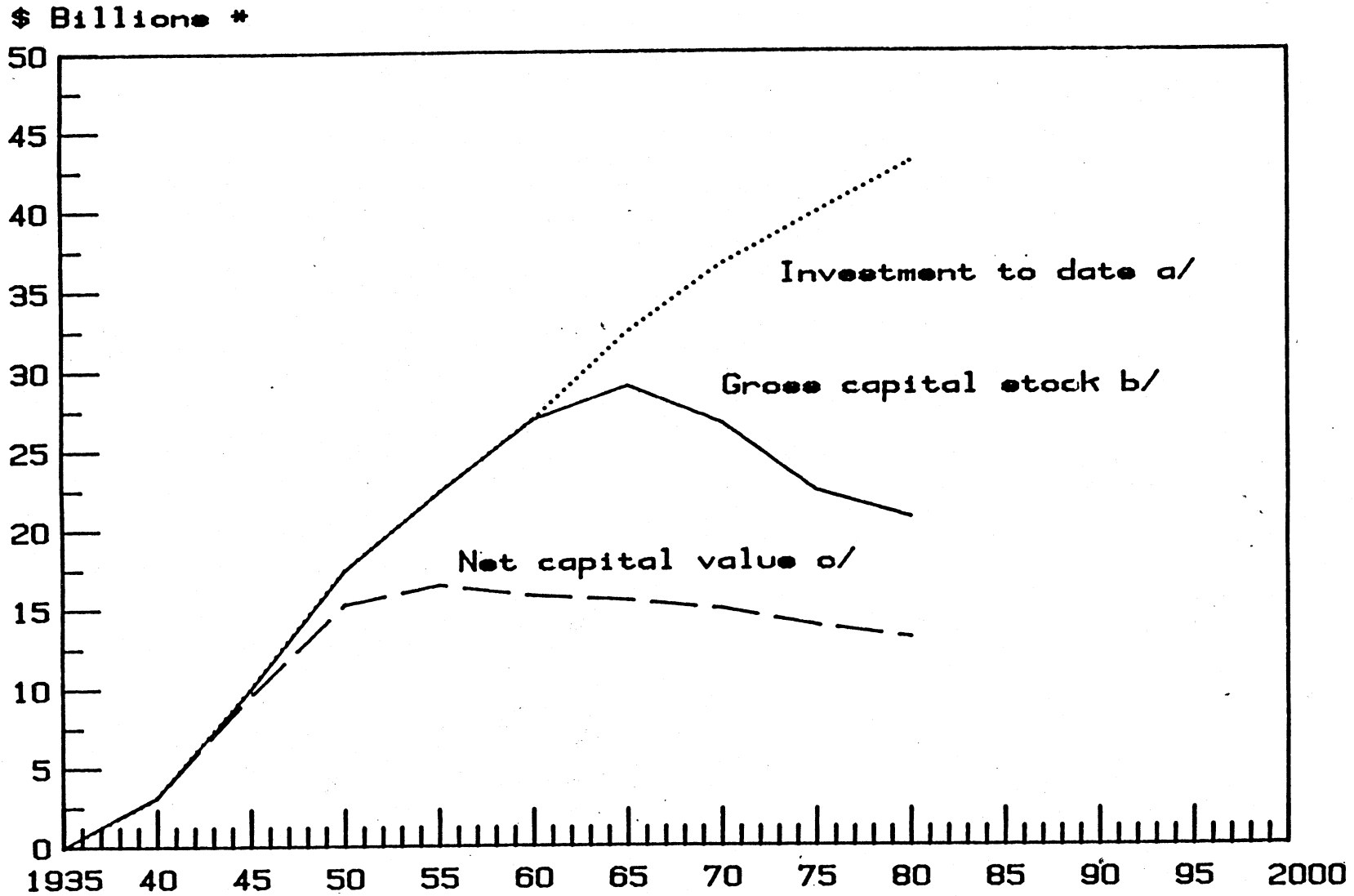
In the peak year, 1955, conservation improvements came to 4.8 percent of net land value, were nearly 60 percent as great as the value of nonresidential structures, and almost 38 percent as great as the value of machinery and durable equipment on farms.

The following subsections discuss historical variations in investment rates and conservation capital for conservation measures on individual farms, and also for watershed conservation projects jointly sponsored and financed by local organizations, States and the U.S. Department of Agriculture. Data underlying the discussion are summarized in tables 1 and 2.

On-Farm Conservation Measures

Investment rates: Average annual investments in on-farm conservation, by the nine 5-year periods since 1935, are shown in table 1 and figure 2. From the beginning of a national conservation program in the mid 1930's on through 1965, gross investments in on-farm conservation measures in the U.S. were very substantial. They rivaled combined real investments for farm

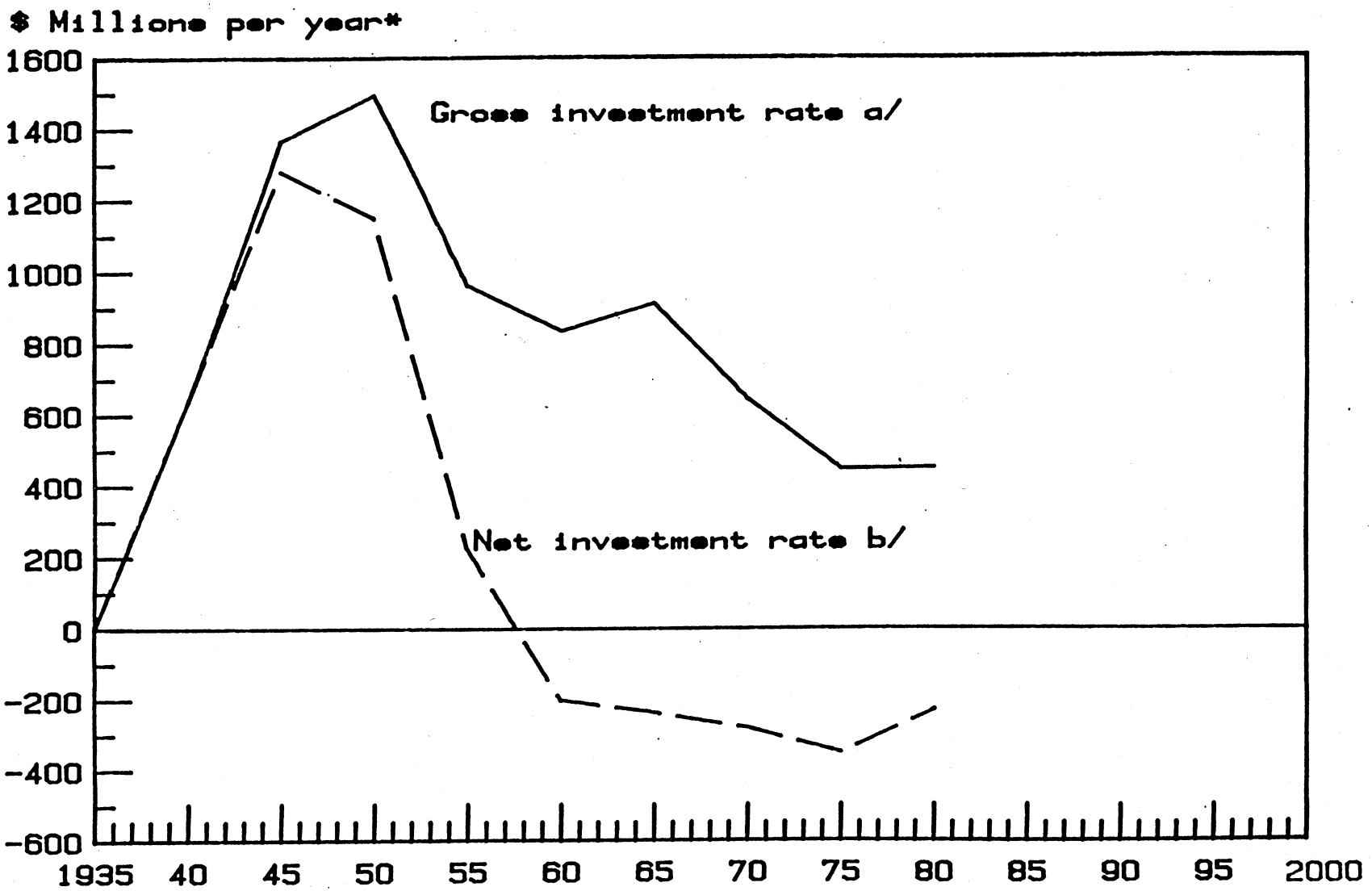
Farm and Project Conservation Capital in U.S. Agriculture, 1935-1980



* In constant 1977 dollars. a/ Cumulative gross investment in 1977 dollars. b/ Full cost value of facilities still in use. c/ Depreciated value of facilities still in use.

FIGURE 1

Annual Investment in Conservation Measures on U.S. Farms, 1935-1980



* In constant 1977 dollars; annual averages for prior 5 years.
a/ Total capital expenditures for new facilities. b/ Gross investment less depreciation allowance on existing facilities.

FIGURE 2

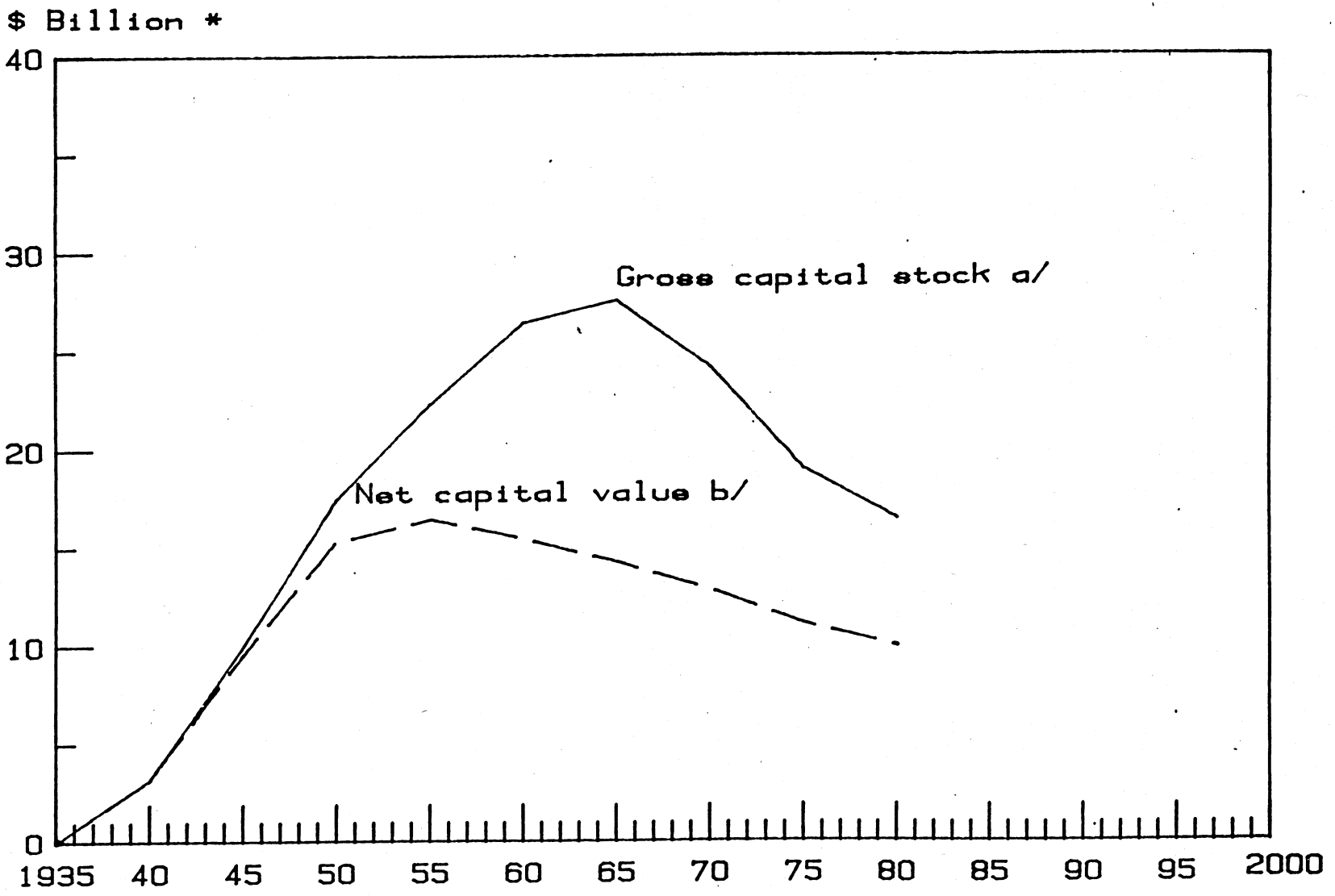
irrigation and drainage. In constant 1977 dollars, gross investments were $634 million per year from 1936 to 1940. They ran nearly $1.5 billion per year from 1941 on through 1950. Between 1951 and 1965 they dropped back to an average of about $900 million per year.

The other side of this coin is that the rapid buildup of conservation capital meant growing depreciation allowances too and so 'disinvestment', that is to say, negative net investment and a reduction in net capital values, began about 1957 (figures 2 and 3). The disinvestment rate came to $-351 million per year from 1971 to 1975. Disinvestment continued through 1980 though at a somewhat reduced rate. It averaged -$230 million per year between 1976 and 1980.

In examining figure 2 note the significant increase in the gross investment rate for on-farm conservation measures during the period 1961-65, but a continued fall in the net investment rate. This apparent anomaly is due to the fact that gross capital stocks, as the summation of all past investment less 'retirements', continued to increase until 1965 (see figure 3). As depreciation is proportional to gross stocks, it thus was increasing too, and was great enough to more than offset the higher gross rate of investment for the 1961-65 period. The inevitable result was a greater average rate of disinvestment for 1961-65 than for the prior five years 1956-60.

This interesting example illustrates very well how gross investment is the essential independent variable in capital and investment studies, being determined by such factors as expectations of conservation benefits, budget allocations to cost-sharing programs, etc. On the other hand, net investment is a function of both current gross investment and past investment, since the latter determines the size of the capital stock against which depreciation is estimated within any given year or period.

Capital Value of Conservation Measures on U.S. Farms, 1935-1980



* In constant 1977 dollars. a/ Full cost value of facilities still in use. b/ Depreciated value of facilities still in use.

FIGURE 3

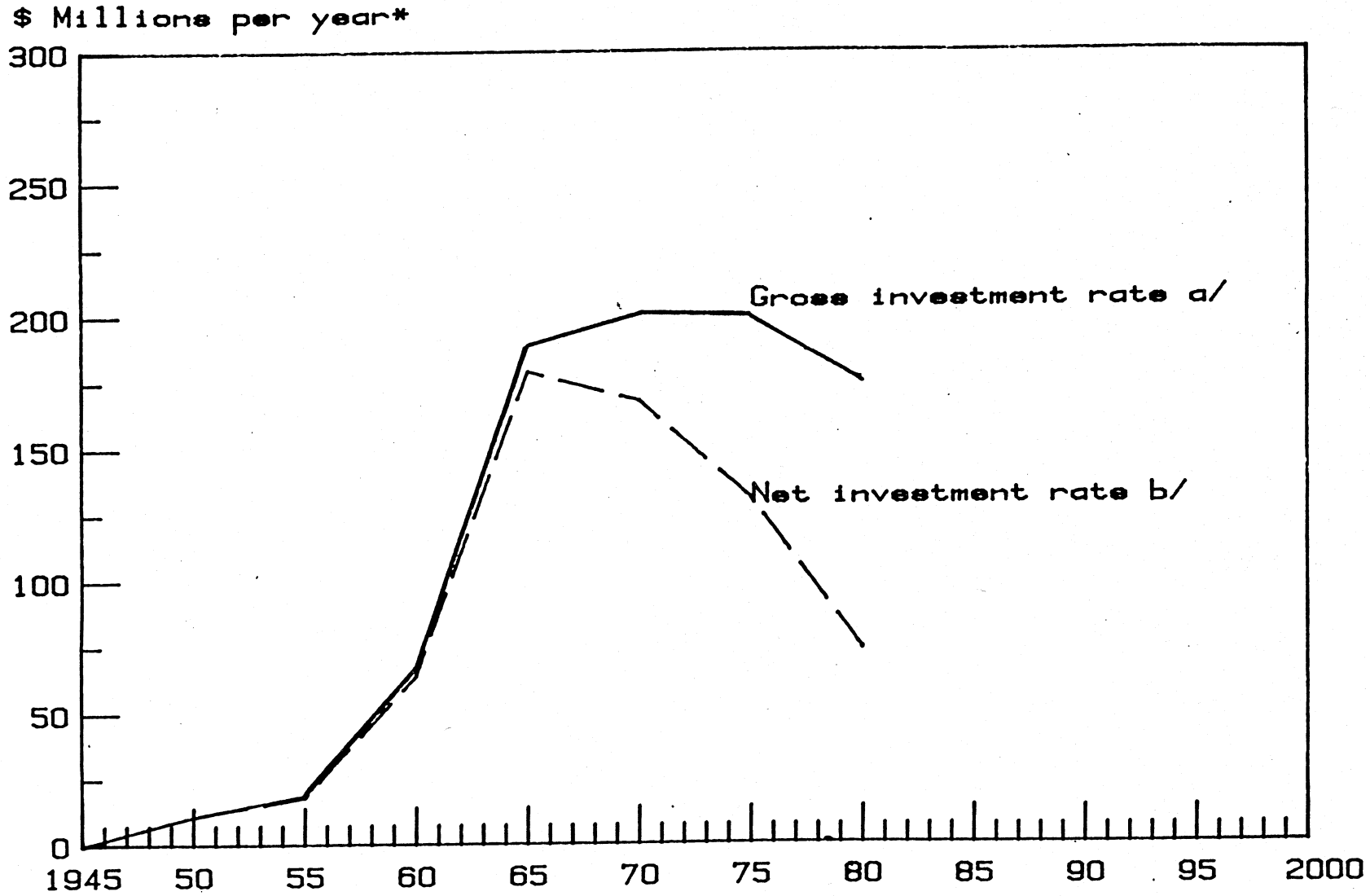
Returning to our main theme, substantial on-farm investments in soil conservation and rural environmental protection do continue, but are outweighed by depreciation allowances alone, without reference to the actual early removal or abandonment of measures installed in past years. Daugherty and Young report, for example, that about 5,000 landowners in the U.S. removed terraces, grass waterways, windbreaks and strip-cropping systems in the period 1975-77 (16).

As already noted, the net capital value of conservation measures on U.S. farms fell by about $230 million per year from 1976 to 1980. However, project conservation improvements gained in net value, by about $74 million per year (compare figures 2 and 4).

The reason for such differences is not that gross project investments have exceeded those for on-farm measures, because actually, gross new project investments from 1976 to 1980 were only 40 percent as large as new on-farm investments. Rather, major structural improvements like those installed under the Flood Prevention Watershed program beginning in 1944 and Watershed Protection and Flood Prevention Act of 1954 have longer service lives. Depreciation allowances to be deducted from gross new investment have been correspondingly less for project improvements and so net project investment tends to be closer to gross project investment.

From 1976 to 1980, for example, annual depreciation for existing conservation projects came to $102 million per year. This was 60 percent of the gross investment rate of $176 million. On the other hand, depreciation for on-farm conservation measures came to $677 million per year. This was about 1.5 times the gross investment rate of $447 million. Similar comparisons for earlier periods and, if desired, also for Federal conservation outlays, can be made from the investment rates in table 1.

Annual Investment in Conservation Projects for U.S. Agriculture, 1945-1980



* In constant 1977 dollars; annual averages for prior 5 years a/ Total capital expenditures for new facilities. b/ Gross investment less depreciation allowance on existing facilities.

FIGURE 4

Capital stocks and net values: In real (1977) dollars, gross capital stocks and net capital values for on-farm conservation measures at first rose rapidly and then fell off (figure 3). In the early years the emphasis was on encouraging farmers to quickly adopt better tillage practices and conservation farming systems as a direct means of coping with severe soil erosion conditions then existing, mostly in the Southern and Plains States, but in other areas too. In essence the Federal effort before World War II can be regarded as an effort by society to provide income incentives to farmers in exchange for more careful and limited crop production. The latter purpose was, of course, selectively reversed during the War. It then revived somewhat during the supply-management era that followed the Korean War. Cotner (6) made one of the first analyses of the policy connections between the Federal conservation and supply-management programs.

As of 1980 about 52 percent of the gross stock and 46 percent of the net stock of conservation capital had been created via Federal cost-sharing and watershed programs (3). Despite considerable fluctuation in Federal investment from year to year, the overall Federal share of conservation capital has not changed much since cooperative conservation programs were initiated in the 1930's (tables 1 and 2).

It seems clear that the rapid growth phase for farm conservation in the U.S. ended about 1955. By then depreciation began to outweigh new investments, with a consequent decline in the net capital value of such improvements. In 1980 this value was $9.9 billion. The gross value of conservation improvements on farms peaked in 1965 at $27.6 billion. In 1980 it stood at $16.4 billion (figure 3 and table 2).

Conservation in Watershed Projects

Investment rates: Average annual real investments in project conservation by 5-year intervals between 1945 and 1980 are graphed in figure 4. Watershed project investment encompasses the investments made since 1944 in the so-called 11 authorized Flood Prevention Watersheds, some of which are actually large river basins (4). Included also are the investments made in locally sponsored 'small' watershed projects (under 250,000 acres) organized since 1954 under the Watershed Protection and Flood Prevention Act.

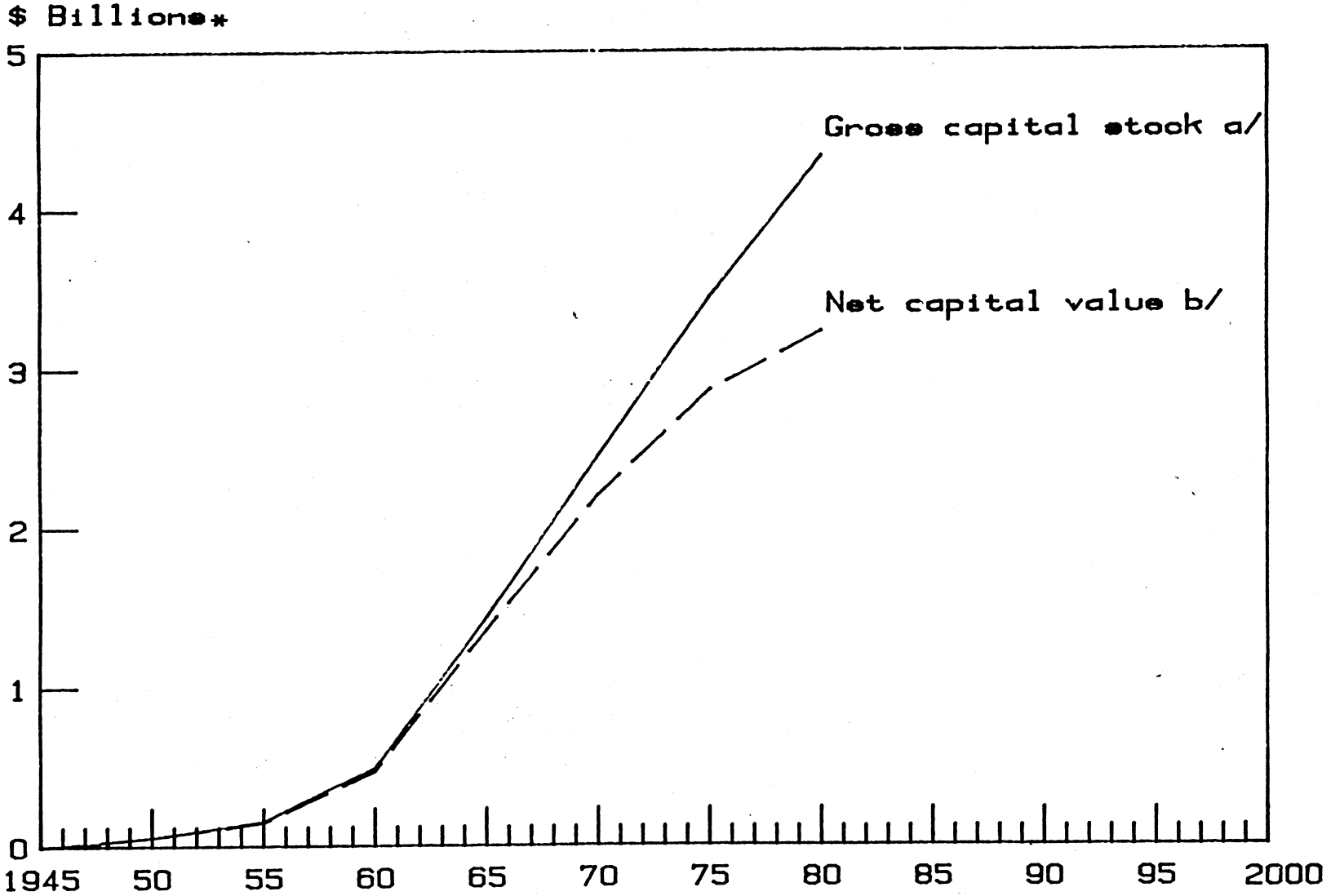
While work in several of the Flood Prevention Watersheds and about 550 small watershed projects is now complete, cooperative watershed programs continue, though at a diminishing rate, especially when inflation is considered (11). Gross real investments for project conservation programs held fairly steady at about $200 million per year between 1960 and 1975. They fell to an average of about $176 million per year from 1976 to 1980. After allowing for depreciation, net investment in watershed project conservation averaged $74 million per year in the period 1976-1980 (figure 4 and table 1).

Capital stocks and net values: As of 1980 project conservation facilities were valued at about $4.3 billion on a gross-stock basis and about $3.2 billion on a net value basis (figure 5 and table 2). Their net value was nearly 25 percent of the net capital value of all conservation improvements in agriculture. Most of the substantial gain for project conservation has occurred since 1960. Only 3 percent of the Nation's stock of conservation capital was then in project improvements (table 2).

Productivity Implications

Information on the changing aggregate value of conservation improvements can be used to roughly gauge resulting changes in the overall productive condition of agricultural land. The year 1955 is a logical benchmark for this

Capital Value of Conservation Projects for U.S. Agriculture, 1945-1980



* In constant 1977 dollars. a/ Full cost value of facilities still in use. b/ Depreciated value of facilities still in use.

FIGURE 5

purpose, because the real net value of all conservation improvements in agriculture had then been a maximum--of $16.6 billion (1977 dollars). This maximum capital commitment to conservation had fallen by 4 percent by 1960, 9 percent by 1970, and 21 percent by 1980. Were it not for project conservation activities, the drop in capital committed to conservation in the U.S. would be more severe. Net capital values confined to on-farm conservation measures in 1960 were down 6 percent from 1955 levels. By 1970 they were down 22 percent and by 1980 were down almost 40 percent.

An alternative and more realistic way of assessing possible productivity changes is to recognize that the aggregate acreage of land utilized for agricultural purposes has declined along with conservation capital, even while land used for crops has generally increased. In 1980 between 733 and 743 million acres of land in the U.S. were used or were usable for crop production and grazing. This figure omits approximately 325 million acres (10) of Federal land used for crops and grazing.

A comparable total for agricultural land use back in 1955 was 773 million acres. Divided by the 1955 acreage, the conservation capital commitment in 1955 averaged about $21 per acre, in constant 1977 dollars.

Owing to the concurrent decline in conservation capital and losses of land from agriculture, the 1955 per-acre average did not change very much until about 1970. But between 1970 and 1980 it suddenly appeared to have fallen by at least by 20 percent. Were it not for watershed conservation programs, which began to come on-line in the 1950's, the drop would have been close to 40 percent.

Declines in conservation capital values and agricultural land use, as considered together, clearly mean that per-acre conservation capital commitments in agriculture have decreased significantly over the past decade. They

have serious implications for maintaining long-term agricultural productivity and explain why conservation has again become a public problem. The increasing use of land for cash crops in erosion-prone areas will aggravate the problem even more.

Near-Term Outlook for Conservation

In December 1976 the Senate Committee on Agriculture and Forestry asked the Secretary of Agriculture to evaluate all land and water conservation programs of the U.S. Department of Agriculture. While eight different USDA agencies are somehow officially involved in such programs, agencies which work directly with farmers and ranchers in action programs include the Agricultural Stabilization and Conservation Service, Farmers Home Administration, Forest Service, and Soil Conservation Service. In the main the evaluations were to assess: (1) the extent to which program and legislative objectives are being met; (2) program impacts in the context of national conservation policies; efficiencies in administration, and (3) whether program purposes and mechanisms remain valid considering present and projected conservation needs.

This evaluation effort was later made formal in Public Law 95-192, the Soil and Water Resources Conservation Act of 1977 (RCA). It required the Secretary of Agriculture to develop a national soil and water conservation program for the Nation's private and other nonfederal lands.

A major interim report on the RCA was released in November 1981 and a final report in 1982 (14). The policies and program features approved by the Secretary address and rank three major concerns: The reduction of soil erosion on all agricultural and forest land is assigned top national priority. The second national priority is to conserve water used in agriculture and reduce upstream flood damages. Such State and local priorities as water

supply management, water-quality improvement, fish-wildlife habitat improvement, and organic waste management can also qualify for assistance.

How the redirected program will affect actual conservation investment as discussed in this paper is not yet clear. There will be more emphasis on matching funds, technical assistance and research, and less on direct Federal financial assistance to farm operators for installing conservation measures. Combining this with pressures to reduce Federal spending in virtually all budget areas, it is reasonable to expect that the Nation's aggregate real stock of conservation capital, at least in the near term, will continue to decline. It will also become less diffused among States and regions. There are clear intentions to concentrate assistance programs geographically in critical erosion areas and to have conservation programs administered more directly by State and local governments.

Closing Comments

It was not possible in the study reported here to systematically relate conservation investments with corresponding reductions in soil loss rates and other visible indicators of conservation problems. How past conservation investment and resulting capital improvements are perceived to be connected with the present condition of our productive lands is, however, strongly implied in some observations from the above-mentioned interim RCA report of 1981 (14, p. 5-2).

"There appears to be a broad consensus that soil conservation programs and practices have reduced and continue to reduce erosion from agricultural lands. National surveys indicate, however, that progress in controlling erosion has been slow. There is evidence that total soil erosion actually increased during the 1970's, because the acreage of row crops increased

substantially in response to growing world demands and favorable prices for agricultural commodities."

"The extent of serious erosion and other resource problems is evidence that present programs with their historical funding and personnel levels have not been fully successful. For example, the annual erosion rate exceeds 5 tons per acre on nearly one-fourth of the Nation's cropland. In the Southeast, over 40 percent of the cropland is eroding at excessive rates. Despite such statistics, millions of acres of land have received conservation treatment as a result of past and present USDA programs. Much of the erosion of the 1930's has been healed, but new problems have arisen due to several factors. These include changes in farming enterprises and production practices brought about by changes in crop prices, farm machinery, and new technologies; changes in farm ownership, and conversion of grasslands and forest lands to cropland."

* * *

Table 1. Average annual gross and net real capital investment in project and on-farm conservation measures and improvements, and with Federal investment, United States, by 5-year periods, 1936-1980

Period	Gross annual conservation investment 1/				Net annual conservation investment 2/			
	All conservation	Conservation projects 3/	On-farm measures 4/	Federal investment 5/	All investment	Conservation projects 3/	On-farm measures 4/	Federal investment 5/
	-Millions of 1977 dollars per year-							
1936-40	634	—	634	296	634	—	634	296
1941-45	1,366	—	1,366	639	1,280	—	1,280	598
1946-50	1,506	12	1,494	710	1,160	12	1,148	547
1951-55	981	20	961	469	241	18	223	120
1956-60	902	67	835	450	-138	64	-202	-39
1961-65	1,101	190	911	572	-57	170	-227	31
1966-70	842	202	640	503	-111	168	-279	-45
1971-75	645	200	445	348	-219	132	-351	-141
1976-80	623	176	447	290	-156	74	-230	-145

1/ Gross real investment in conservation is 1/5th the sum for the period of annual conservation investments in current dollars, after each yearly amount was indexed (deflated) to 1977 price levels.

2/ Net real investment is gross real investment less depreciation allowances on existing gross capital stocks. Average depreciation for each component and period can be determined by subtracting (algebraically) net investment rates from corresponding gross rates. For example:
All depreciation, 1951-55: 981 - 241 = $740 million/year (in 1977 dollars).
All depreciation, 1976-80: 623-(-156) = 623 + 156 = $779 million/year (in 1977 dollars).

3/ Includes capital investment for project-type works of improvement within formally organized watershed projects or by sponsoring organizations. Such investment includes any construction outlays plus the value of easements and rights-of-way, etc., considered part of local contributions. Also covers direct Federal or other governmental construction expenditures for project improvements, whether made before or after formal watershed organizations were established.

4/ Includes all on-farm conservation improvements other than those structures and measures installed and cooperatively financed as project-type improvements. Temporary measures and recurring normal practices are not included, even though some capital investment may have been required.

5/ Rates of investment by farmers or local watershed organizations are the difference between rates for all conservation and Federal investment rates. Until 1943 the Federal investment includes only cost-sharing for on-farm conservation measures installed under the U.S. Department of Agriculture's Agricultural Conservation Program. Since 1944 also covers Federal investments for works of improvements installed in the 11 Flood Prevention Watersheds projects administered by USDA. Since 1955 also includes Federal conservation investments made under the Watershed Protection and Flood Prevention Act of 1954, as amended. Since 1956 also accounts for cost-sharing assistance provided under the USDA's Great Plains Conservation Program.

PRIMARY SOURCES: See table 2.

Table 2. Real gross capital stocks and net capital values for project and on-farm conservation measures and improvements, with Federally-financed shares, United States, 1940-1980

Year	Gross capital stock, conservation 1/				Net capital value, conservation 2/			
	All conservation	Conservation projects 3/	On-farm measures 4/	Federal share 5/	All conservation	Conservation projects	On-farm measures	Federal share
	$Billions (1977 dol.)	Pct. of gross capital stock 6/			$Billions (1977 dol.)	Pct. of net capital value 6/		
1940	3.172	—	100.0	46.8	3.172	—	100.0	46.8
1945	10.001	—	100.0	46.8	9.574	—	100.0	46.8
1950	17.533	0.3	99.6	46.9	15.375	0.4	99.6	46.9
1955	22.437	0.7	99.3	47.1	16.581	0.9	99.1	47.9
1960	26.945	1.8	98.2	47.5	15.890	3.0	97.0	48.0
1965	29.034	5.0	95.0	48.8	15.603	8.7	91.3	49.6
1970	26.659	9.2	90.8	50.6	15.046	14.7	85.3	49.9
1975	22.411	15.4	84.6	52.4	13.952	20.5	79.5	48.8
1980	20.722	20.9	79.1	52.8	13.170	24.6	75.4	46.2

1/ Gross capital stocks for conservation are the sum of conservation investments since 1936 indexed to 1977 dollars, less all those measures considered to be fully depreciated. Measures only partly depreciated are included in the gross stock at their full cost in 1977 dollars.

2/ Net capital values are the sum of investments since 1936 less all accrued depreciation. Net capital values are less than gross capital stocks by the amount by which just those measures still in use had depreciated as of the year indicated.

3/, 4, 5/ See table 1.

6/ Percentages for conservation projects and on-farm measures add to 100. The Federal share is a separate percentage and after 1944 involves participation in conservation projects as well as on-farm cost-sharing assistance.

PRIMARY SOURCES: U.S. Department of Agriculture agencies:

Agricultural Stabilization and Conservation Service: Participation and cost-sharing information since 1936 on the Agricultural Conservation Program for permanent on-farm conservation measures, as reported in "Agricultural Statistics" (annual) or in other agency reports and statistical summaries.

Soil Conservation Service: Participation and cost-sharing information since 1957 on the Great Plains Conservation Program for permanent on-farm conservation measures as reported in "Agricultural Statistics" (annual) or otherwise supplied. Also Federal and non-Federal expenditures for project measures installed since 1946 in authorized Flood Prevention Watersheds and since 1957 in watersheds improved under the Watershed Protection and Flood Prevention Act (Public Law 83-566).

Notes and References

1. Unless indicated otherwise, all capital values and investment data in this paper are in constant dollars, based on the year 1977. This permits investments made throughout the 45 + years of conservation covered (1935-1980) to be expressed on a common basis, and easily merged into other studies of capital growth and national wealth.

2. The political and legislative evolution of agricultural conservation programs in the United States is discussed in Wayne D. Rasmussen's "History of Conservation, Institutions and Incentives." Ch. 1 in Soil Conservation Policies, Institutions, and Incentives (H. G. Halcrow, E. O. Heady and M. L. Cotner, Editors). Soil Cons. Soc. Am., Ankeny, Iowa, 1982. Sandra Batie's ch. 2 reviews how conservation in the U.S. has become institutionalized at a predominantly local level. Other complete references are W. Robert Parks' text Soil Conservation Districts in Action, (Iowa State University Press, 1952) and Soil Conservation in Perspective by R. Burnell Held and Marion Clawson (John Hopkins Press, 1965).

3. Because conservation farming systems and practices are so diverse and linked, no acreages corresponding to capital values are given. One overall acreage indicator is the area in farms for which 'active' conservation plans have been drawn up with Soil Conservation Service technical assistance. As of September 1980 the planned area was around 622 million acres and involved about 2.3 million cooperating farms. The 'active' plans covered about 60 percent of all land in farms.

4. The 11 Flood Prevention Watersheds with planned completion dates include: Buffalo Creek, New York (1964); Coosa River, Georgia and Tennessee (1972 est.); Little Sioux River, Iowa (1986 est.), Little Tallahatchie, Mississippi (1974); Los Angeles River, California (1986 est.); Middle Colorado, Texas (1986 est.); Potomac River, Virginia-West Virginia-Maryland-Pennsylvania

(1976); Santa Ynez, California (1980 est.); Trinity River, Texas (1981 est.); Washita River, River, Oklahoma and Texas (1974 est.); and the Yazoo River, Mississippi (1976 est.). Details in Eleven Authorized Flood Prevention Watersheds, 1970. U.S. Dept. Agr., Bul. SCS-CI-15, 13 pp.

5. Agricultural Stabilization and Conservation Service, USDA. 1981. (a) Agricultural Conservation Program: 45-year Statistical Summary, 1936-1980, 221 pp; (b) Agricultural Conservation Program: 1980 Fiscal Year Statistical Summary, 133 pp; (c) Practice Cost-Shares by States: 30-Year Summary 1944-74, 135 pp., (d) National Practices and Guidelines, 1980. 57 pp.

6. Cotner, Melvin L. 1964. The Impact of the Agricultural Conservation Program in Selected Farm Policy Program Areas. Mich. State Univ., Agr. Econ. Mimeo 943. 23 pp.

7. Frey, H. Thomas. 1982. Major Uses of Land in the United States: 1978. U.S. Dept. Agr. Econ. Rpt. No. 487. 22 pp. Frey's estimate of total cropland (471 mil. ac.) is slightly higher than that reported in the 1978 Census (461 mil. ac.) to adjust for Census underenumeration and conform with totals used by the Statistical Reporting Service in USDA.

8. Easter, K. William and Melvin L. Cotner. 1982. "Evaluation of Current Soil Conservation Strategies." Ch. 13 in Soil Conservation (H. G. Halcrow, E. O. Heady and M. L. Cotner, Editors). Policies, Institutions and Incentives. Soil Cons. Soc. Am., Ankeny, Iowa. 329 pp.

9. Gadsby, Dwight M. 1977. "Inventory of Benefits, Costs and other Data for P.L. 566 Watershed Work Plans Approved through 1975." Staff Report completed by the Economic Research Service for Soil Conservation Service, USDA. Text for 1974 released December 1976 and tables for 1975 prepared July 1977.

10. McGill, Ernest, Allen Hidlebaugh and Joseph Yovino. 1981. "Federal Data on Agricultural Land Use." Res. paper No. 7 in Agricultural Land Availability: Papers on the Supply and Demand for Agricultural Lands in the United States. Com. Print. 97th Cong., 1st sess.

11. Soil Conservation Service, USDA. 1981. Annual construction obligations for watershed protection projects (1957-80); and annual obligations for flood prevention watersheds (1946-80). Records supplied July 1981 by O. P. Lee, SCS.

12. Timmons, John F. 1979. "Agriculture's Natural Resource Base: Demand and Supply Interactions, Problems and Remedies." Presented Nat. Conf. on Soil Conservation Policies, Washington, D.C. November 15, 1979. 44 pp.

13. U.S. Department of Agriculture. 1981. Agricultural Statistics 601 pp. Annual issues for years ending in 2 or 7 usually contain back data for at least the previous decade.

14. U. S. Department of Agriculture. 1981. Soil and Water Resources Conservation Act: 1981 Program Report and Environmental Impact Statement. 120 pp. The 1982 final report, A National Program for Soil and Water Conservation, is available at all local offices of SCS and ASCS, or at State offices of the Extension Service and Farmers Home Administration.

15. Young, C. Edwin and Arthur B. Daugherty. 1981. Investment in Conservation Structures: 1975-1977. U.S. Dept. Agr., ERS Staff Report No. AGESS810709. 43 pp.

16. Daugherty, Arthur B. and C. Edwin Young. 1981. "Removal or Abandonment of Selected Conservation Practices, 1975-1977." U.S. Dept. Agr., ERS Staff Report No. AGES 811208. 31 pp.

17. Daugherty, Arthur B. 1981. "Additions to Cropland, 1975-77" and "Land Removed from Crop Production, 1975-77." U.S. Dept. Agr., ERS Staff Reports AGES 810501 and 810211. 23 and 31 pp.