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Land Use Issues in Delaware Agriculture

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Department of Food and Resource Economics • College of Agriculture and Natural Resources • University of Delaware

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SUMMARY

Can Delaware's agriculture coexist (and prosper) in the face of competing land uses over the next twenty years? We believe that maintaining Delaware's agriculture as a viable land-use alternative depends on the success in addressing three critical challenges. First, will residential, commercial, and industrial land uses be forced to bear the full costs that their land-use decisions visit on Delaware agriculture? Alternatively, will agriculture be fully compensated for its contribution to Delaware's economy and quality of life? An associated, second challenge, is whether state, county, and local governments will institute incentive-based policies to achieve socially desirable land-use outcomes? It is particularly important that there exist policies to protect and to promote diverse land uses within all three counties. Finally, will spatial land-use patterns evolve, which ensure that agriculture maintains the critical masses necessary for the industry's economic viability and which insulate producers from the complaints and threats of nonagricultural neighbors? This paper expands on these three challenges and then reviews data on trends in agricultural land use to draw conclusions.

INTRODUCTION

We see three central land-use challenges facing agriculture in Delaware. The first—and perhaps most conspicuous challenge in the public's eye—is the loss or conversion of prime farmland to competing uses, threatening agricultural viability in the State. For decades the agricultural sector has been underpaid for the environmental services it provides society. These services include the prevention of sprawl, the provision of open space, and the making of (relatively) few demands on public services. Many farmers persevere, however, because of their genuine love of their way of life and because they know that they will be able to draw on the equity tied up in their land when they retire. Because conversion often offers a higher price than selling to other farmers, farmers quite correctly view conversion as an individually rational decision. Unfortunately, these individually rational decisions coalesce into collective irrationality as the State's stock of farmland decreases and the social burdens of sprawl are absorbed.

Beyond this disconnect between individual and collective rationality, conversion is especially troubling because it may be an irreversible decision. Farmland frequently converts to residential uses, but we do not observe the opposite phenomenon. Like other nonrenewable resources, the finite stock of existing farmland is being depleted, and it cannot be restocked. The data analyzed in the second section show that, for decades, Delaware was able to mask the extent of conversion by drawing in other land uses (typically forestland) to agriculture. Over the next twenty years, however, Delaware's limited reserves of forestland will no longer be able to hide conversions of agricultural land.

Conversion threatens the viability of remaining farms because it jeopardizes the "critical mass" of farming necessary to support size-appropriate and competitive input, processing, and marketing firms. Indeed, economies of scale in the agricultural processing and marketing sector mean that a given number of farms in a concentrated area signal a healthier agricultural economy than those same farms scattered across the state.

Conversion also drives up the remaining farmers' opportunity costs of staying in agriculture. Although existing State programs mitigate the property tax consequences of sprawl,

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developed farmland creates a demand in the area for grocery stores, gas stations, restaurants, drug stores, schools, wider roads, and other nonagricultural uses of land. An entire community now must absorb the additional costs of infrastructure. Land-use decisions in this transition period become less coordinated, which magnifies the inefficiencies of sprawl. As conversions continue, agricultural activities—which were considered state-of-the-art when adjacent to other farms—suddenly become harmful to the new, residential neighbors. Less profitable, but more residential-friendly management practices must be adopted to avoid legal quagmires. Although the convenience of living closer to suburban retail options in important, the only other benefit of conversion seems to be that the remaining farmers land value for development increases, thereby making it even more profitable to convert. It also makes it more costly *not* to convert. The cycle continues until the price of residential land (discounted by the capitalized subsidies of sprawl) equals the price of farmland or until all farms are gone. Beyond the economics of cost incidence, however, conversion leaves many with the feeling that a less important industry has just crowded out a more important industry.

To counteract problems such as conversion, a second major challenge will be for state, county, and local governments to adopt new programs and to revise existing programs for the retention of agriculture. At present, most of the major programs for farmland retention are regulatory. Zoning allows municipalities and counties to establish allowable uses of land and control for the changes. Some areas zoned for agricultural use also are protected by State agricultural districting designations. In an effort to compensate for shortcomings in the regulatory programs, the state has operated an incentive-based purchase of development rights (PDR) program for the past nine years. This program has spent over $70 million and has secured the development rights to over 30,000 acres of farmland. Nevertheless, the current pace of conversion in Delaware and the experience of other States indicate clearly that regulatory programs for farmland retention are not sufficient and must be combined with or replaced by assorted incentive-based programs. The second section describes these policies in depth.

Although this third challenge does not capture the general public's imagination, as do the first two, we speculate that further conversion and inadequacies in governmental programs will combine to exacerbate private conflicts between residential and agricultural neighbors. Those in farm communities accommodate the by-products of agriculture, including smells, dust, noise, and other effects of farming. When nonagricultural land uses arise in farm communities, however, conflicts arise as to which use will prevail. Often, such conflicts are settled informally; typically, farmers alter their operating hours. Sometimes, however, residents bring private lawsuits (called nuisance suits) seeking to force farmers to alter their production choices (injunctions) and/or to pay damages for what the residents claim is a diminution in their property values. These suits are becoming more common as more residential development are built in agricultural areas and, importantly, as statutory protection against such suits (right-to-farm laws) are increasingly attacked as being unconstitutional. Although such suits are not common in Delaware, such cases are becoming more common in Iowa, New York, and other states. Most cases arise when farmers change their operation—corn to hogs, say—after residents have already settled nearby. There is also a risk that increased complaints from residents will lead to increased regulatory oversight by the government, which will reduce farmers' ability to react to changing market circumstances.

These three land-use challenges to the future of Delaware agriculture encapsulate many of the issues that have arisen in the other chapters of this volume. The next section of this chapter reflects upon these three challenges by reviewing the data on agricultural land-use change over the last twenty years and looking to the governmental efforts of Delaware and neighboring states to get a sense of what policies have been successful and what policies have struggled. In the last section, we offer a perspective on the future by considering critical factors (particularly institutional constraints) that will affect the current trends in agricultural land use. The objective is not to predict what the agricultural landscape will look like in twenty years. That question is a

dynamic one, which would raise too many complex issues and which could not account for the ways in which people alter their response to a landscape they dislike. Rather, the intent is to speculate about the "trajectories" land-use patterns may follow and to identify which types of people will benefit from certain patterns of land-use.

PAST AND PRESENT SITUATION

This section describes the past trends in and current state of Delaware's agricultural land use and land-use controls. The trends in the aggregate data are sobering. When interpreting the data, two qualifying themes emerge. First, all land is not created equally. Fragmented agricultural land is not as good as contiguous agricultural land. An acre of high quality soil is not interchangeable with an acre of marginal land recently removed from forest use. Second, the increasing scarcity of agricultural land ought to lead to increasing land prices—assuming that Delaware agriculture is profitable, on the margin. For the last two decades, the price of agricultural land has not fully increased to reflect the reduced stock of land due to conversion because there have always been stock of forestland from which to replace agricultural acres. Now, however, the stocks of forestland have decreased to the point at which agricultural land prices will likely rise.

1. Past Trends and Current State of Agricultural Land Use in Delaware

The data on agricultural land use are presented in tabular form. Table 1 presents previously published land-use change data for each county and the State based on four years: 1974, 1984, 1992, and 1997. Land use is separated into urban residential, urban nonresidential, agricultural, forest, wetland, and other.[2] The other category includes surface water, wasteland, utilities, and roads. The upshot is alarming; from 1974 to 1997, Delaware acres in residential land use almost doubled, while acres in agriculture decreased by 10 percent. It is instructive, however, to paint a fuller picture by looking at each county, separately.

Land use in Delaware has changed dramatically since 1974. Land in residential use nearly tripled, from 57,630 acres in 1974 (4.5 percent of State land) to 167,750 acres in 1997 (13 percent of State land). Over the same time period, agricultural land use has fallen only 10 percent from 596,602 acres (46.5 percent of State land) to 538,803 acres (42 percent of State land). The main reason that agriculture has not seen a larger drop is that acres for residential development have also come from forestland and agriculture has replaced some of its lost acres by drawing on forest. Forestland dropped by 47 percent from 1974 to 1997, from 392,456 acres (30.5 percent of State land) to 207,620 acres (16 percent of State land).

From 1974 to 1997, residential land use in New Castle County increased by 130 percent. These increases primarily came at the expense of acres in agriculture (decreased by 25 percent), forestland (decreased by 19 percent), and the "other" category (decreased by 37 percent). Most of these changes occurred from 1984 to 1992, during which residential development consumed an average of 4000 acres per year. Because New Castle County was the most urban county by 1974, the percentage increase in residential development there was smaller than the other two counties. Indeed, New Castle County had 27 percent more residential land than the Kent and Sussex *combined*. By 1997, Kent and Sussex Counties, combined, had 20 percent *more* residential development than New Castle County. In short, residential land use is increasing in New Castle County, but it is increasing at a much faster rate in Kent and Sussex County. From 1974 to 1997, residential land use in Kent County increased by 284 percent. Forestland decreased by 62 percent

[2] Importantly, the classification scheme changed in 1992 so that acres in forested wetlands moved from the "forest" category to the "wetland" category. The dramatic changes in these categories therefore are merely due to the classification scheme.

over this period and agricultural land decreased by 10 percent. Residential development expanded at an average rate of 1500 acres per year between 1984 and 1992 and 1000 acres per year between 1992 and 1997. Sussex County saw almost the same substantive growth in residential land use as New Castle County. From 1974 to 1997, Sussex County residential development increased by 270 percent. Agricultural land decreased by only 3 percent, although forestland decreased by 47 percent.

2. Current Status of Agricultural Land Use Control in Delaware

The current state of agricultural land use was not produced by purely atomistic choices in a perfect market. Rather, it emerged from the combination of public and private choices under imperfect market conditions. Public choices include institutional controls on land use—chosen (semi-) purposefully—and the provision of infrastructure. Private choices consist of a myriad of choices by landowners in a market characterized by external costs and benefits, inelastic supply, rent seeking, and other market imperfections. Institutions, therefore, shape the choice sets available to private landowners, but institutions do not fully dictate outcomes. The government's problem is to select the best mix of policies to minimize the harmful effects of incompatible uses of land.

Decisions on local land use primarily emanate from city and county Planning Departments, Planning Boards, and Councils. Local Boards of Adjustment and State courts of first instance help interpret these pronouncements. In Delaware, there is also some regional control reserved to the Wilmington Area Planning Council. All these processes are subject to the input and advisement of the general public, neighborhood organizations, and other stakeholders. Yet, the State also affects the use of land. Mainly, State land-use controls emanate from the State Agencies, which are empowered by the State Legislature. Of primary importance for agricultural land use is the Department of Agriculture's Planning Section. But there are also important advisory organizations at the State level, including the Delaware Office of State Planning Coordination and the Governor's Cabinet Committee on State Planning Issues.

Institutional controls on land use may be distinguished as being regulatory or incentive-based.[3] Regulatory controls are mandatory institutions that tell landowners that they may do something, may not do something, or must get permission to do something. Zoning is the most prominent form of this control, affecting land use. At a basic level, local zoning separates land into different uses—such as agricultural, residential, and commercial—in an effort to minimize incompatibilities. Property owners must seek a rezoning or special permission (conditional use permit) if they want to change their use.

Many of the most stringent controls of agricultural land use come from the state and federal government. One example is the Clean Water Act, Section 404, which empowers the U.S. Army Corps of Engineers to control the use of wetlands. Before any wetland can be filled, a landowner must secure a permit. This regulation had a profound effect on agricultural land use because, prior to the 1970s, farmers could more freely draw on the stock of wetlands to replenish the stock of agricultural land as it was drawn into nonagricultural use. Another federal law, the Endangered Species Act, may prohibit most agricultural and nonagricultural land uses if an endangered species is found on the property

However, there is a growing sense among stakeholders and public decision makers that regulatory controls are inappropriate. Some object to the uniform nature of regulation. Indeed, landowners decry (and economists use theory to prove) the inefficiencies arising from regulations that mandate one-size-fits-all policies for landowners, who operate under diverse sets of

[3] We have in mind the direct actions by State and local governments, which affect agricultural land use. Of course, there are many indirect actions such as transportation decisions that greatly affect land use, but which are beyond the scope of this paper.

circumstances. The mandatory nature of regulation is also troublesome. Over the last three decades, incentive-based programs have become increasingly popular with policy makers. Incentive-based programs are characterized as being voluntary, competitive among landowners, and involving an exchange. These programs have also been criticized as condoning harmful activities as long as the perpetrator pays.

Incentive programs at the local level include impact fees on developers, which force the internalization of some of the costs of conversion. Farms may also voluntarily join agricultural districts. Agricultural districts allow farms to pay property taxes that reflect the capitalized value of farming rather than the capitalized value of development. Also, agricultural districts afford some statutory protection from nuisance suits brought by residential neighbors. Farms in agricultural districts may also apply to participate in the State purchase of development rights program (PDR). In this program, farmers offer to sell the State the development rights to their parcel. There is also the option to participate in the State Farmland Assessment Program, which gives them special tax treatment. The federal government has incentive programs that affect agricultural land use by reducing the cost of farming. The Conservation Reserve Program, which is a voluntary program that pays farmers to keep some of their land out of production.

3. Regional and National Comparisons

Although the most effective mix of land-use controls for Delaware's agriculture remains to be seen, it is instructive to see how agriculture in three neighboring states has been affected by their land-use policies. Pennsylvania, Maryland, and New Jersey have much in common with Delaware, especially in terms of agriculture.[4] But, unlike Delaware, the three states have employed several additional tools in the kit of farmland retention. The successes and failures of their land-use policies, therefore, ought to help Delaware make better decisions. Table 2 summarizes some of the data discussed in this subsection.

Pennsylvania lost 1,108,172 acres to urban development from 1982-1992, an area almost the size of the entire State of Delaware. This is despite the fact that Pennsylvania is losing population; between 1960 and 1990, the ten largest metropolitan areas in Pennsylvania grew in population by 13 percent and in area by 80 percent. Although it is a much larger State—geographically and in terms of population—Pennsylvania also has disproportionately more local government (2,572 units). There is little regulatory control of land use above the municipal level, except for the provisions of sewers and highways. Pennsylvania has developed a host of State and local policies to combat sprawl. Like Maryland, Pennsylvania has implemented agricultural districting, local agricultural protection zoning, differential tax assessment, local purchase of agricultural conservation easements (PACE), State PACE, right-to-farm laws, and transferable discharge permits.

New Jersey (8204 square miles) is similar Delaware in size (1982 square miles), but is much more densely populated. New Jersey has dedicated efforts recently to state-level, comprehensive land conservation planning, including the Pinelands National Reserve. The Pinelands National Reserve contains 1,100,000 acres and is 22 percent of New Jersey's land area. Of the acres, 33 percent are publicly owned.

Maryland may be the neighboring State most similar State to Delaware in that they both have limited local government. But in Maryland 42 percent of land is commercial forest. Maryland has 13,000 farms as of 1997. Like Pennsylvania, Maryland has a strong tradition of local control of land use. They have used transferable development rights and PDR. Despite

[4] Pennsylvania is the least densely populated state (268 per square mile), followed by Delaware (345 per square mile), Maryland (529 per square mile), and New Jersey (1042 per square mile).

these programs, Maryland has been predicted to lose 240,000 acres of farmland and 307,000 acres of forestland between the early 1990s and 2020 (Tierney 1994).

MAJOR FACTORS AND ISSUES

Land-use patterns and land-use controls will remain markedly stable over the next twenty years. On the whole, most land uses will stay the same and zoning will still be the primary policy approach to land-use control. On the margin, however, there will be great change. It is up to public policy makers to bound individual behavior in determining how big and of what type this marginal group will be. We already know that farms in the southern part of New Castle County will be converted to residential use. We know that the city of Dover will continue to spread into the rural areas on its fringe. Vacationers and retirees will construct homes on former farms in Sussex County. The policy challenge is to maintain agricultural viability in the face of these land-use changes. In other words, the central goal must not be to *eliminate* conversion but to *efficiently manage* conversion—or, perhaps better yet, to *concentrate* conversion. Indeed, the true measure of success in farmland retention will be how well the built and un-built environment reflects social preferences.

1. Dynamics of Change

Predictions depend on identifying what public policies will be used to define landowners' choice sets and what will be the sensitivity of individual land-use decisions to these constraints. The next subsection speculates on future trends in public policy. This subsection asks the prior question: What will the public demand from agricultural land use?

The articulation of public preference, in a market or in the political process, sees a clash of two behaviors. In the political sphere, Delawareans are likely to express preferences for land-use patterns that minimize incompatible uses, are sustainable, and protect agriculture. The 1995 report from the Cabinet Committee on State Planning Issues, "Shaping Delaware's Future: Summary Report," found Delawareans favor policies to curb sprawl and promote land-use planning that increases their quality of life. Along with tourism, the report identified agriculture as the "backbone of (Delaware's) identity," and singled out poorly planned development as "a major threat" to agriculture's future. In another recent report, "Landowners speak out!" Tom Ilvento, Angela Watson, and Theresa Thomas surveyed New Castle County landowners. Respondents identified the loss of farmland as being one of the most serious land use issues in New Castle County. In addition, nonfarming respondents were even more likely than farming respondents to favor strict measures to control land use. When it comes to voicing their preferences, Delawareans are generally supportive of agriculture's special place in the economy and policies to ensure its survival.

In the market, however, when costs of land use are not fully borne individually, Delawareans reveal less preference for agricultural land use. In markets, people tend to maximize the return for their dollar—residential "land-use dollars" go a lot farther on agricultural land at the suburban fringe than to infill the cities. Delawareans will continue to buy the least expensive housing they can afford. For example, it has been estimated that by 2020, southern New Castle County will absorb 9,000 additional dwellings and 21,000 more people (Taft). Even with existing impact fees, it remains comparatively inexpensive to build on converted land. In the end, the solution must come from selecting policies that do not run counter to public preferences.

2. Policy Issues and Conclusions

If, as we suspect, zoning remains the principal form of land-use control, then there will be a group of landowners, which will escape the bounds of zoning and which must be subjected to alternative means of control. In our opinion, the most promising means of control will be impact

fees. Economic theory demonstrates that impact fees are an efficient way to force individual to bear the social costs of their action.

We believe that zoning will not be a binding constraint for the marginal group. This is partially a function of the limitations of zoning itself—zoning is a rather blunt instrument in restraining land-use change. Zoning is much more effective in separating incompatible uses. Moreover, zoning is only as effective as those who apply it. Based on newspaper articles over recent years, there appear to be many idiosyncrasies in local land-use decision-making. Zoning is also limited constitutionally. There has been a rise in the last twenty years of successful claims for compensation resulting from regulatory takings. As the permissible level of stringency in zoning falls, another form of control must fill the void. Although binding control will continue to come from the federal government, these regulations typically apply to environmentally sensitive areas only.

A broad application of impact fees will force individuals to see all the costs of their actions. Because impact fees are incentive-based, they are immune from the one-size-fits-all criticism levied on regulation. Nevertheless, policy makers still must reconcile impact fees with other forms of land-use control. The public will only legitimize zoning, the PDR program, differential tax assessment, and impact fees if they are viewed as part of a broad plan to manage all land uses efficiently and fairly. A goal for policy makers and elected State leaders therefore should be to send a clear signal to Delawareans about the social value of agricultural land and the coherence of the policies used to protect it.

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New Castle County	***1974***	***1984***	***1992***	***1997***	***Change 1974-1984***	***Percent Increase or Decrease***	***Change 1984-1992***	***Percent Increase or Decrease***	***Change 1992-1997***	***Percent Increase or Decrease***	***Total Change 1974-1997***	***Percent Increase or Decrease***
Urban residential	33,259	38,332	70,485	76,378	5,073	15%	32,153	84%	5,893	8%	43,119	130%
Urban nonresidential	13,451	15,092	13,633	14,680	1,641	12%	(1,459)	-10%	1,047	8%	1,229	9%
Agricultural	106,281	100,792	84,904	79,642	(5,489)	-5%	(15,888)	-16%	(5,262)	-6%	(26,639)	-25%
Forest	53,915	27,684	46,572	43,889	(26,231)	-49%	18,888	68%	(2,683)	-6%	(10,026)	-19%
Wetland	22,178	20,676	32,036	31,908	(1,502)	-7%	11,360	55%	(128)	0%	9,730	44%
Other	47,266	73,774	28,720	29,853	26,508	56%	(45,054)	-61%	1,133	4%	(17,413)	-37%
Total	276,350	276,350	276,350	276,350	-	0%	-	0%	-	0%		
Kent County												
Urban residential	9,049	16,337	28,643	34,711	7,289	81%	12,305	75%	6,068	21%	25,662	284%
Urban nonresidential	6,259	7,817	4,279	4,662	1,558	25%	(3,538)	-45%	383	9%	(1,597)	-26%
Agricultural	208,753	202,489	193,519	187,152	(6,264)	-3%	(8,970)	-4%	(6,367)	-3%	(21,601)	-10%
Forest	104,326	102,286	39,625	39,386	(2,040)	-2%	(62,661)	-61%	(239)	-1%	(64,940)	-62%
Wetland	43,969	41,256	98,349	97,602	(2,713)	-6%	57,093	138%	(747)	-1%	53,633	122%
Other	10,573	12,744	18,514	19,416	2,170	21%	5,771	45%	902	5%	8,843	84%
Total	382,929	382,929	382,929	382,929	-	0%	-	0%	-	0%		

Sussex County												
Urban residential	15,332	21,946	46,254	56,661	6,624	43%	24,308	111%	10,407	22%	41,339	270%
Urban nonresidential	4,605	5,729	5,555	6,074	1,124	24%	(174)	-3%	519	9%	1,469	32%
Agricultural	281,568	286,377	278,664	272,009	4,809	2%	(7,713)	-3%	(6,655)	-2%	(9,559)	-3%
Forest	234,215	234,829	133,434	124,345	614	0%	(101,395)	-43%	(9,089)	-7%	(109,870)	-47%
Wetland	30,398	30,232	114,654	113,174	(166)	-1%	84,422	279%	(1,480)	-1%	82,776	272%
Other	58,419	45,424	45,976	52,274	(13,005)	-22%	552	1%	6,298	14%	(6,155)	-11%
Total	624,537	624,537	624,537	624,537	-	0%	0	0%	-	0%		
Delaware												
Urban residential	57,640	76,616	145,382	167,750	18,986	33%	68,766	90%	22,368	15%	110,120	191%
Urban nonresidential	24,315	28,638	23,467	25,416	4,323	18%	(5,171)	-18%	1,949	8%	1,101	5%
Agricultural	596,602	589,658	557,087	538,803	(6,944)	-1%	(32,571)	-6%	(18,284)	-3%	(57,799)	-10%
Forest	392,456	364,799	219,631	207,620	(27,657)	-7%	(145,168)	-40%	(12,011)	-5%	(184,836)	-47%
Wetland	96,545	92,164	245,039	242,684	(4,381)	-5%	152,875	166%	(2,355)	-1%	146,139	151%
Other	116,258	131,941	93,210	101,543	15,673	13%	(38,731)	-29%	8,333	9%	(14,725)	-13%
Total	1,283,816	1,283,816	1,283,816	1,283,816	(0)	0%	-	0%	-	0%		

*Source: Data on 1974 and 1984 come from Mackenzie (1989). Data on 1992 and 1997 come from State of Delaware, Office of State Planning Coordination (2000).

Table 2
Comparison of Land-Use Characteristics and Policies

Land Use Characteristics

State	*Total Acres (1997)* (000s)*	*Farm Acres (1997)* (000s)*	*Percent Acres in Farm**	*PACE Acres (1997)*	*Percent Protected*	*Prime Farmland Converted 1982-1992*
Delaware	1,284	580	46.3	36597	17	
Maryland	6,204	2,155	34.7	193956	43	
New Jersey	4,718	833	17.6			
Pennsylvania	28,685	7,168	25.0	147308	141	

Land Use Policies for Farmland Protection**

	Agricultural Districts	*Local Ag Prot Zon*	*Differential Tax Assessment*	*Local PACE*	*State PACE*	*Right-to-Farm Law*	*Transferable Development Rights*
Delaware	1	0	1	0	1	1	0
Maryland	1	1	1	1	1	1	1
New Jersey	1	0	1	1	1	1	1
Pennsylvania	1	1	1	1	1	1	1

*American Farmland Trust (2000)
** American Farmland Trust (1997)

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