

Article

Farmers' Perceptions of Agricultural Land Abandonment in Rural Western New York State

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Abstract: Over the last century, the U.S. economy has favored large-scale agribusiness over small-scale farming. In some regions, this trend has led to the abandonment of cultivated land, and there is little scholarly literature that discusses how farmers are affected. The goal of this study was to examine Allegany County (NY) farmers' perceptions of abandoned land and associated correlates. The data were collected through surveys mailed to farmers in Allegany County in 2012. We found that the majority of farmers felt personally affected by abandoned land and expressed the greatest amount of dissatisfaction with the state of the U.S. economy and local, state, and national regulations, especially if they considered themselves Republican. These findings address the sociopolitical significance of abandoned land and contribute to an understanding of how abandoned land affects residents of rural communities who are typically left out of discussions on policies affecting their livelihoods.

Keywords: agricultural economics; farmers perception; land abandonment; land use; rural community

1. Introduction

In the recent decades, the Southern Tier region of western New York State has experienced land use transitions atypical of the rest of the state, where suburban development was the dominating trend. Between 1973 and 2000, the two most common types of land use transition in the region were directly the result of agricultural land abandonment and subsequent ecological succession [1]. Typical of the region, Allegany County has experienced a decline in industrial activity, population level, and agricultural production. The research presented here aimed at examining abandoned farmland from the perspective of a key driver of land use change, the farmer.

The loss of agricultural land has been primarily observed in the peri-urban environment, where population density lead to land values favoring conversion to developed uses [2]. This pattern is of a global nature with urban land areas growing at an even faster rate than that of the urban population density [3]. Decisions made by the farmer to sell land can be in part explained by market forces, as net returns for suburban development often surpass those obtained by farming [4,5], or as off-farm wages exceed farm revenues [6]. However, non-economic factors have been shown to come into play in land conversion decisions, including place attachment [7] and social capital [8].

The decisions made on peri-urban farms have much in common with those located further away from urban centers: Most decisions are primarily economic ones [9]. Rural farmland is generally less susceptible to land use conversion through higher net returns from alternate uses; instead, the motivation behind abandonment is the decline in net returns. In Allegany County, these returns are kept low due to elevated transportation costs, high property taxes, and the nature of the fragmented fields of marginal quality, which are barriers to high productivity and scale efficiencies. This is also

a major cause for land abandonment worldwide, in areas with low productivity in relation to other land in the region, often due to topography or marginal soil [9]. Policy-driven economic incentives can also cause farmers to suspend operations in some fields. For example, a policy by the Conservation Reserve Program encouraged U.S. farmers to let economically marginal and environmentally sensitive land go fallow, with a peak enrollment of 36.7 million acres in 2007 [10].

However, as in the case of peri-urban locations, non-market factors can emerge as important causes in agricultural land abandonment. Profound changes in agriculture land use followed a change in institutional framework in 1990s Eastern Europe [11], catastrophic events in Chernobyl [12], and a combination of climatic factors and damaging agricultural practices during the 1930s “Dust Bowl” in the United States. These examples are broad scale pressures, but farmers are often direct agents of these changes through personal decisions that are not necessarily market driven—for example, local attachment and social networks can influence a farmer’s decision to sell or retain land [13].

Non-economic factors can be associated with an eco-centric perception of abandoned farmland. Abandoned land may be a welcomed sign that nature is reclaiming space once exploited by humans and becoming more hospitable to local wildlife, especially for those whose lives are not dependent on farming [14]. Unkempt shrubs and scraggly grasses may be viewed as a symbol of land healing from human disturbance and providing new and diverse habitats. One study found that non-farmers favored abandoned land over other types of land for its species diversity and variety of color and form; those preferences were interpreted to be driven by notions of cultural and national heritage rather than economic value [15]—although some have reported negative views of abandoned land by non-farmers [16]. Agricultural land abandonment has been linked to forest recovery and to a significant increase in atmospheric carbon sequestration [17,18]; an esthetic- or conservation-based attitude may influence a farmer’s decision to cease activities on a portion of their property.

Predicting land use changes, planning for conservation, and developing agricultural policy require an understanding of the drivers of land use changes. Even when drivers of agricultural land use change are well known, the land use change outcomes can be different than expected: farmers are moderators of land use change drivers through the individual decisions they make [19]. Land abandonment in European mountains appears to be broadly governed by external reasons (e.g., broad-scale economics, policy, migration) and “realized” under the control of internal factors having to do with local economies, the farmers themselves, and characteristics of their farm [20,21]. The central agent of agricultural land abandonment is the farmer, and we were interested in the perceptions this key stakeholder offers on both external and internal factors behind agricultural land abandonment.

There have been a few valuable studies that describe how socio-economic or institutional conditions can lead to the abandonment of agricultural lands [12,22,23]. Very few studies have reported on the opinions of farmers on abandoned land. In one, vacated fields suggested a loss of tradition and a loss of value (as potential farmland) and upset respondents who were reminded of the difficult work that their ancestors had spent cultivating the land [15]. When surveying owners of abandoned land, another study found that the parts of land that they no longer farmed were those which had the least value and were the least liked, especially among long-term owners [24]. The objective of our study was to survey farmers in Allegany County, New York where land abandonment is common, explore their perceptions of abandoned farmland, and identify the factors they perceive as drivers of this widespread transition in land use. As farming practices continue to evolve and to change land use, the need for understanding the social attitudes toward land abandonment is crucial. We feel that this understanding is key to predicting land use changes, planning for conservation, and developing agricultural policy.

2. Materials and Methods

This study took place in 2012 in Allegany County, located on the Alleghany Plateau in southwestern New York. Allegany County is predominantly rural, with a 2010 population of 48,946 over 1030 square miles [25].

Education attainment levels in Allegany County are on par with the US average when comparing the proportion of individuals holding at least a high school degree (89% for Allegany County, 85% nationwide). However, only 20% hold at least a bachelor's degree, compared to 28% nationwide [25]. Allegany County is politically conservative; 61% voted for John McCain in the 2008 presidential elections and 62% for Mitt Romney in 2012 [26].

The 2012 agricultural census identified 764 farms in Allegany County, with a median farm size of 45 hectares. Less than 0.1% of the farmed acreage is irrigated. Beef, dairy cattle, and hay farming operations dominated agricultural activities, being the main activities for 69% of the farms. The next most common agricultural activities were grain, vegetable, and sheep farming. Most farms (65%) reported annual sales total of less than 10,000 USD, and 40% reported less than 2500 USD in sales. Average income from farm-related sources was 9,494 USD. Twenty-nine farms were certified within the USDA National Organic Program. Principal operators were 86% male, on average 57 years old, and farming was the primary occupation for 52% of them. Farms were owned by individuals or families in 91% of the cases [27].

Historically Allegany County's main land use was dairy farming and in 1910 56% of the land in the county was used for agriculture. By 1992 that percentage dropped to 13% [28], resulting in widespread agricultural abandonment [1]. The 1992–2012 period accelerated the loss, with dairy farm numbers sliding from 234 to 112 [27], leaving behind scattered abandoned pastures and hay fields.

Survey

A list of addresses for 57 farms in Allegany County was created from the USDA's Farm Service Agency, the Northeast Organic Farming Association of New York, the Cornell Cooperative Extension, and the Allegany Tourism Bureau. In January 2012, we mailed a survey to these 57 farms, with a follow-up mailing sent two weeks later to increase the response rate.

The survey was made of a mix of 17 qualitative and quantitative questions. In the first section, the respondents were asked to answer questions about land ownership. The assumption was that amount of land owned, length of land ownership, and possession of abandoned land would affect perceptions towards abandoned land, especially since abandoned land may be financially burdensome for those who still pay taxes on land that they can no longer afford to farm.

Respondents were then asked to answer questions about abandoned land as it relates to opinions on environmental issues. The assumption was that the association between different economic, political, and environmental issues and abandoned land would differ depending on land ownership and socio-political background. Our prediction was that full-time farmers would feel more negatively towards abandoned land, more "personally affected" and would think that the best use of abandoned land would be for agriculture. Because multiple-choice questions ask respondents to simplify complicated issues, the respondents were also asked to answer two questions by providing short, individual responses in their own words.

Next, respondents were asked to answer questions about the community's responsibility towards abandoned land. This question was designed to explore how land ownership status and socio-political background affect perceptions of stewardship responsibility.

We also used a semantic differential format in which the respondent was asked to rate 10 sets of opposite terms (e.g., tidy vs. untidy) on a 7-point scale in order to capture their feelings toward abandoned land, both in an aesthetic and utilitarian sense (see [13]). This section was meant to situate our findings among other assessments of the perceptions of abandoned land, which were found to be largely aesthetic during a literature review.

Finally, questions about the respondent's background included length of residency in Allegany County, gender, occupation, highest level of education attained and political affiliation. The survey was conducted under Alfred University's Human Subjects Research Protocol No. 2011-25.

The data was analyzed using SPSS Statistics 17.0 and 24.0 (IBM Corp., Armonk, NY, USA) to determine relationships between variables. Cross-tabulations of frequency and compared means were assessed to establish multi-variable trends.

3. Results

3.1. Respondent Characteristics

Out of the 57 surveys dispatched, 45 replies were received, a 79% response rate. Most owned the land they farmed (Table 1). Owned property ranged from 0.4 to 549 hectares, with a median size of 65 hectares. Length of ownership, including intergenerational ownership, ranged from 2 to 106 years, with a median of 20 years. Full-time farmers consisted of 58% of respondents, and 42% listed farming as a secondary occupation or listed an occupation other than farming (hereto identified as part-time farmers). Full-time farmers owned more land than part-time farmers and also owned the land longer. The mean age of the full-time farmers was 55, while the mean age of part-time farmers was 59. Most (80%) full-time farmers were male, compared to 63% for part-time farmers. In terms of characteristics noted by both our survey and the USDA Census of Agriculture, the sample of respondents in this study is relatively similar to Allegany County farmers as a whole (Table 1).

Table 1. Characteristics of the Allegany County (NY) farmer respondents in this study ($n = 45$) and of Allegany County farmers as a whole [26,27].

Statistics		Sample	County
Mean Farmer Age		57 yrs	57 yrs
Gender	Male	73%	86%
	Female	27%	14%
Educational attainment	At least some college	73%	na
	Farming is the primary occupation	58%	52%
Political affiliation	Republican	51%	61%
	Democrat	31%	31%
	Independent/other	36%	9%
Farm ownership	Owned	93%	97%
	Rented	7%	3%
Median farm area		65 ha	45 ha

3.2. Attitudes Towards Abandoned Land

Of those who owned land, 28% considered some of their land “abandoned.” Full-time farmers were more likely than part-time farmers to feel affected by land abandonment (73% vs. 54%) but were less likely to own abandoned land (23% vs. 33%). When asked what is the best use of an abandoned field, 53% answered the land should be put into agricultural production, and 32% suggested an abandoned field should be kept wild as a place to observe nature. Only 5% selected commercial or industrial development.

When asked about the aesthetics of various landscapes, farmers found densely forested woodlands (80%) and cultivated fields (87%) beautiful. In contrast, only a third of respondents found wild, overgrown fields beautiful, but those who own abandoned farmland were more likely to do so than those who do not (Table 2).

Aesthetic perceptions of abandoned land were explored further through a semantic differential scale. Possible semantic differential scores ranged from 10 (most negative attitude toward abandoned farmland) to 70 (most positive attitude toward abandoned farmland). Full time farmers had more negative feelings about abandoned land than part-time farmers (mean scores: 33 vs. 40). Among full-time farmers, those who did not own abandoned land in Allegany County had more negative feelings (mean score: 30) than those who owned abandoned land (mean score: 37). Politic affiliation

or gender did not affect aesthetic perceptions by more than four points on the scale, but ownership of abandoned land shifted the average semantic differential score towards a more positive view of abandoned land (Table 2).

Table 2. Aesthetic perceptions of abandoned land by Allegany County (NY) farmers, contrasting the subgroup who owns abandoned lands with the subgroup that does not. A higher semantic differential score indicates a more positive aesthetic perception of abandoned land.

		Owns Abandoned Land?	
		No	Yes
Considered “a wild, overgrown field” beautiful	Yes	28.6%	45.5%
	No	71.4%	55.5%
	n	24	11
Semantic differential score	Mean	32.2	41.6
	St. dev	10.96	10.89
	n	24	10

3.3. Issues Affecting Farmers

When asked which of a series of suggested issues are problematic to Allegany County farmers, the most common answers were government regulations and the state of the economy (Figure 1). Industrial farming was seen as problematic by 56% of all respondents. When broken down by political affiliation, some divergence was apparent. Republicans associated government regulations as problematic 90% of the time ($n = 20$), while that proportion was 53% for those who qualified their political association with Democrat, Independent, or Other ($n = 19$). Only 40% of Republicans thought industrial farming was problematic compared to 68% of the rest of the respondents.

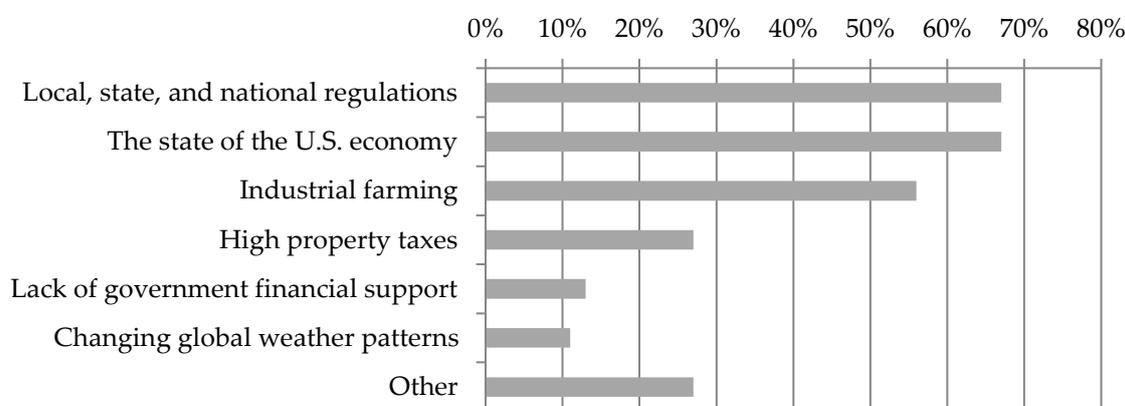


Figure 1. Distribution of issues identified as problematic to farmers in Allegany County, from a multiple-choice question. Respondents were farmers in Allegany County, New York ($n = 45$).

When asked to identify issues problematic to Allegany County farmers, respondents were offered “Other” as a choice, with space to write in an answer. Among all respondents 27% selected “Other” and all of those wrote in “property taxes”, “high taxes”, or a similar answer (Figure 1). That proportion reached 35% for farmers who identified as Republican.

3.4. Qualitative Responses

When asked, “Do you think that any of these problems contribute to land abandonment in Allegany County?” Thirty-four out of 45 (76%) of respondents answered the question. Below are some responses to this question.

About the economy:

“The small farm is unable to compete in today’s economic conditions because the cost of fuel, seed, feed, and farm equipment has skyrocketed. Our transportation and advertising costs to get goods to market are also costly.” (Full-time farmer, age 51)

“The small farms I’m aware of have at least one full time spouse working a full time job somewhere other than the farm to help support the household and farm. Our county has very little industry so many people cannot find any job in the area of their farm, which increases the number of abandoned farms.” (Full-time farmer, age 51)

“When income from farming isn’t enough to sustain a family’s living expenses, let alone the business, most of us have to work off the farm, decreasing quality of business and lifestyle of family.” (Part-time farmer, age 64)

About industrial farming:

“Industrial farming has practically obliterated small and medium sized farms, forcing them to move to obtain jobs and leave land abandoned.” (Part-time farmer, age 61)

“The efficiencies of industrial farming have kept food prices low compared to the rest of the economy making small farming and small fields unprofitable.” (Full-time farmer, age 65)

“As industrial farming grows so does the size of equipment they own making it impossible for them to cultivate small plots economically thus the land was abandoned.” (Full-time farmer, age 64)

About government regulations:

“The cheap food policy at the national level coupled with subsidies is the perfect environment for corporate food companies to obtain inexpensive corn, milk, meat and make money retailing low nutrition, long-shelf-life food that leads to health problems and abandoned land.” (Full-time farmer, age 57)

“National regulations favor industrial agriculture resulting in low price for farm commodities—forcing out small, local, farmers when a farmer can’t make a living on the land, which sometimes results in abandoning the land.” (Full-time farmer, age 57)

About taxes:

“With all the taxes, it is becoming increasingly harder to make a living off the land. Small farms on marginal land are having a real tough time.” (Full-time farmer, age 62)

“The costs of owning land from taxes is significant and restrictive for low income farms.” (Part-time farmer, age 45)

“Allegany County is one of the poorest counties in the state, yet has the highest property taxes in relation to property values.” (Full-time farmer, age 43)

How abandoned land is difficult to reclaim:

“Abandoned land grows up to brush. Birds carrying the seeds to our land and make it harder for us to keep our land clean. Also a great habitat for deer. They eat everything that we grow.” (Full-time farmer, age 62)

“Weeds and invasive species from abandoned land make it more expensive to control on adjacent land still in production.” (Full-time farmer, age 44)

How the increase in abandoned land is a result of a decline in farming:

“The abandoned land gives the impression that farms cannot be successful in this country. It is very difficult to make a living on farm income alone.” (Full-time farmer, age 51)

“It just gives me a sad feeling to see fields growing up in weeds and brush. I would like to see it cleaned off and being farmed.” (Full-time farmer, age 27)

“I grew up in Allegany County and remember when most of these smaller farms were productive and viable. It took years to “make” these farms—clean the land, etc. and what a waste to see beautiful hay fields and crop fields taken over by scrub brush. IT’S HORRIBLE.” (Part-time farmer, age 50)

“Some of my neighbors are in danger of losing land that has been in their family for 150 years because they can’t keep up with rising property tax rates.” (Full-time farmer, age 43)

“Farming is a 24/7/365 day job with little monetary compensation. We do it because it is a heritage and honorable way of life, but a dying breed.” (Part-time farmer, age 64)

4. Discussion

Surveyed farmers in Allegany County, New York, felt affected by the issue of abandoned farmland, tying it with the rise of industrial farming, the regulatory burden, and high taxes. A large number of the respondents dealt with the economic realities of farming by working outside the farm.

4.1. Frustrations

Some patterns were apparent in the explanations invoked for the economic situations farmers were in. Farmers and part-time farmers alike were concerned with competition from industrial farming, in agreement with previous studies [22,29]. Allegany County farmers are located far from markets and in a topography that allows only small, disconnected fields, leading to difficulty competing with the scale efficiencies of large farms.

Burdensome government regulations are often mentioned, especially by republican respondents. These regulations are perceived as favoring further industrial farm operations. Notably, non-farmers support a highly regulated agricultural industry: in a national study, the non-farming public favors more government action towards food quality, food safety, and farm subsidies, even for respondents claiming conservative political beliefs [30].

As a write-in option, high taxes were often reported as problematic. New York ranked as the eighth state with the highest property taxes as a percentage of gross farm income [31]. Tax incentives exist in some states to encourage the transfer of farmlands to new farmers [32] and could ease the tax burden decried by the respondents.

The short answer questions from the respondents provided more substance to that theme. They expressed frustration over the financial situation that forced them to abandon some land and seek work outside the home. They felt economically pressured by increasing equipment and materials costs, industry-gear government regulations, and high property taxes. They saw abandoned land as a symbol of the downfall of farming, and remembered a time when farming was more successful in the county.

4.2. Economic Challenges

Farmers in our sample generally connected abandoned lands, and sometimes their own experience farming, with economic disadvantage. When invoking industrial farming as problematic, farmers connected their difficult situation with broad-scale economic patterns, which they see as favoring consolidated, larger scale production of crops and livestock—a pattern observed in the United States [22]. Write-in answers identified the high costs of fuel, seed, feed, and equipment as sources of misfortune for small farmers. These factors are driven by global and national economic dynamics—the external reasons hypothesized as governing land abandonment [21]. With a nearly \$1 trillion USD contribution to the Gross Domestic Product, the levers of agriculture production in the United States have a global effect, and some of those were identified as disadvantageous to farmers in our sample, who blamed a national cheap food policy and regulations on food safety for further pressuring them economically.

While global dynamics strongly steer land use changes, it is a suite of local factors that lessen or augment them [20]. Broad-scale economics can affect agricultural activity indirectly through non-farm wages: A driver of cropland abandonment in China was an increase in off-farm wages in the manufacturing sector, disincentivizing farm work [6]. While wages are influenced by international and national dynamics, in the case of New York's Southern Tier's farmers wage discrepancies are realized at the local scale. Surveyed farmers are leaning on off-farm income to supplement farming revenues, a situation common to small farms nationally [23], but Allegany County does not offer enough jobs or high enough wages to support a farming venture. This situation has worsened in the last few decades, as manufacturing industries have largely left the Southern Tier region.

This evacuation of industry from the region has shifted almost the entire tax burden on the residential and agricultural owners left behind. Because of this thin tax base, along with a series of state level policies, Allegany County property taxes are some of the highest in the nation relative to property value. This situation was complained about by many farmers in our survey. Unprompted, 27% of our respondents wrote in property taxes as an issue for Allegany County farmers.

4.3. Local Factors

The remaining active farmers may consider consolidation of all stages of production, processing, and distribution, and increase their farm's size. However, these decisions, once made by individual farms, are now determined by the investment community which prioritizes efficiency and output, sometimes ignoring sustainability [22]. Large farms have competitive advantages over small farms as scale economics and production techniques favor larger operations [23]. This consolidation has not been common in the Southern Tier region. The post-glaciation dissected plateau topography leaves mostly unconnected, small pockets suitable for agriculture. When discussing industrial farming, the farmers surveyed in this study noted that fields in Allegany County are not easily consolidated, and large farm equipment is not suitable for these small, often sloping, fields.

The average age of our study's farmers was representative of the national farming population, at 55 years old. In the United States, most farm operators are 45 to 65 years old, and farm operators over 65 are the fastest growing group [22,25]. Fewer young people have the opportunity or desire to take over their family farms, and the capital investment needed to establish viable farms may discourage young farmers [22]. An aging farm population was a dominant factor behind land abandonment in the mountains of Western Europe [9].

4.4. Eco-Centric or Conservation-Based Decisions?

An aesthetic assessment of various landscape types confirmed the farmers' preference for cultivated fields over overgrown fields. These findings offer no direct support to the idea of an eco-centric or conservation-based view of old fields. Old fields do have a comparatively high level of biodiversity, their transitory nature providing habitat for shrub-adapted species. For example, in another Allegany County study area, species richness and density of Neotropical migratory birds were higher on former agricultural land undergoing succession than in an undisturbed forest [14]. Farmers may be aware of the diversity present in old fields, but they may not view wildlife access to natural habitats as limiting in a region where a dense forest cover already dominates the landscape. Some survey respondents did introduce ecosystem concepts, but, in an unexpected way, characterizing old fields as attracting invasive shrub species and white-tailed deer (*Odocoileus virginianus*), both of which can be damaging to nearby cultivated fields.

Perceptions from outside the farming community are also varied, and can certainly bear on public policy. Non-farming residents in a Latvian study expressed negative feelings towards abandoned land, selecting words like inefficient use, desolation, and apathy [16]. In contrast, preference for abandoned land was shown in rural Switzerland where some level of afforestation was seen as a desirable element of visual diversity—while the appeal of a more systematic comeback of the forest, with near complete coverage, was lower [24]. Attitudes may fit somewhere along a spectrum where residents of the post-Soviet country, perhaps like farmers in Allegany County, may base their appreciation of a landscape on its ability to produce goods, while residents of more affluent Switzerland may be in a post-productivist period where factors like aesthetics, biodiversity conservation, and heritage may have more influence [33]. Our respondents when expressing negative feelings about abandoned fields did mention heritage, but along with the terms “sign of decline” and “loss of a way of life”, perhaps expressing the loss of what they view as a traditional landscape—a feeling similarly expressed elsewhere [9,15].

4.5. Choice of Terms

In written and verbal comments, some farmers expressed their disagreement with the use of the term “agricultural land abandonment”. They reported that the word abandonment carried an emotional burden, unfairly carrying an accusatory tone that implies willful neglect or failure. The apparent shame associated with owning abandoned land may in addition stem from how old fields can exacerbate non-native plant invasions on nearby farmland [34,35]. Owners of shrubby fields may be blamed for facilitating the local spread of invasive shrubs, thus perhaps incurring a social capital cost [8]. Respondents also recounted how nearby old fields meant more work needed to keep their own cultivated fields clear of invasive species.

While the use of the term agricultural land abandonment seems appropriate for broad-scale landscapes to describe a process where individual decisions are highly aggregated, at finer spatial scales, it takes on a personal meaning that may be better avoided. Agricultural land succession might be a better term, focusing on the operating ecological process rather than on the consequences of individual decisions made in response to harsh economic conditions. When referring to the pattern instead of the process, abandoned land may be instead called land no longer farmed.

5. Conclusions

Beyond the survey’s results, the high response rate (79%) and the high number of written comments on the form suggest that abandoned land is an issue that is relevant to farmers and which they tie primarily to issues of economic hardships. The economic disenfranchisement of small farmers is transforming the landscape in New York’s Southern Tier, and possibly in other parts of the country where we observe afforestation following agricultural land succession. These land use changes have been forecasted to continue [5] and have significant consequences on the families involved, on local economies, but also on biodiversity and carbon sequestration.

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