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Yes, U.S. Farmer Suicide is Significantly Higher Than the National Average

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Introduction

It is common knowledge that data interpretation can serve specific narratives. As seen until now, the economy of agriculture, which is at the base of human survival, has not fit into the contemporary occupational categories of a system built on financial capital. Recent U.S. farmer suicide rates, as highlighted here, demonstrate how a non-scientific research base can distort awareness about a public health crisis through subtle data misuse, and how this possibly implies a bias against rurality.

The Standard Occupational Classification (SOC) subgroup of Farmers, Ranchers, and Other Agricultural Managers in the United States, based on the Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Report (MMWR) on *Suicide Rates by Major Occupational Group—17 States, 2012 and 2015* (Peterson et al. 2018), serves as the starting point for this research. Considering the CDC retraction of its earlier *Suicide Rates by Occupational Group—17 States, 2012* report (LiKamWa McIntosh et al. 2016), the following data reflect the corrected version of the CDC study published on November 16, 2018, with its corresponding erratum dated February 22, 2019 (Peterson et al. 2018; Erratum 2019).

1. Suicide rates by occupation

The CDC surveyed 17 out of 50 states: Alaska, Colorado, Georgia, Kentucky, Maryland, Massachusetts, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, Virginia, and Wisconsin (LiKamWa McIntosh et al. 2016; Peterson et al. 2018). In considering the Farmers, Ranchers, and Other Agricultural Managers occupational subgroup, the report, in both its original and corrected version, did not include several top agricultural producing states, such as California, Illinois, Indiana, Iowa, Kansas, Minnesota, Nebraska, and Texas.

Of the 17 states surveyed, the findings of the corrected version show that per 100,000 people, the major

occupational groups with the highest suicide rate were as follows: Construction and Extraction (43.6 [2012] and 53.2 [2015] among males) and Arts, Design, Entertainment, Sports, and Media (11.7 [2012] and 15.6 [2015] among females). These data are based on the 2012 and 2015 National Violent Death Reporting System (NVDRS) (Peterson et al. 2018).

In terms of federal SOC subgroups, the CDC reports the Farmers, Ranchers, and Other Agricultural Managers subgroup as follows:

> "The 2012 and 2015 male suicide rates among Farmers, Ranchers, and Other Agricultural Managers (SOC 11–9013, a subgroup of the SOC 11 Management major group) were 44.9 (CI = 34.2–57.9) and 32.2 (CI = 24.2–42.0) per 100,000, based on 59 and 54 suicides in 2012 and 2015, respectively. The 2012 and 2015 male suicide rates for Agricultural Workers (SOC 45–2000, a subgroup of the SOC 45 Farming, Fishing, and Forestry major group) were 20.4 (CI = 13.8–29.1) and 17.3 (CI = 12.1–23.9), based on 30 and 36 suicides in 2012 and 2015, respectively." (Ibid.)

1.1 Classifications in agriculture

Following the CDC's initial 2012 *Occupational Group* report (LiKamWa McIntosh et al. 2016) and prior to its 2012 and 2015 *Major Occupational Group* errata (Peterson et al. 2018; Erratum 2019), *The New Food Economy* (an online newsroom rebranded in 2020 as *The Counter*) published that the CDC had misclassified farmers as Triple-F (farming, fishing, and forestry) workers (Rosenberg & Wilson Stucki 2018b). In terms of classification, the authors stated that "under the federal occupational guidelines, farmers are classified as having a 'management occupation,' not a 'farming, fishing, and forestry occupation.' Yet it was the farming, fishing, and forestry, or 'Triple-F,' occupational group that had the highest suicide rate in the country: 84.5 per 100,000 people, over 4 times the overall average of 20.3 among people in the workforce. The suicide rate among managers, in contrast, was exactly average" (Rosenberg & Wilson Stucki 2018a).

From the SOC coding error, *The New Food Economy* assessed the Triple-F category as third among occupational groups (Ibid. 2018a, 2018b). The authors conjectured that if the CDC had grouped farmer suicides with Triple-F suicides, then the rate should have been "no higher than third in the study, and as low as sixth, rather than the highest" and if farmer suicides had not been grouped with Triple-F, then "the suicide rate for Triple-F workers should have been about 50 per 100,000 people—and ranked second or third highest" (Ibid. 2018a). What the authors derived from their hypothesis is that either, if correctly classified, "agricultural *workers*, not farmers, have the highest suicide rate in the country" or, if incorrectly classified, then the CDC data "provided no definitive findings" for neither farmworkers nor farmers (Ibid.).

The publication speculated that although the authors "cannot know how many of the suicides classified as Triple-F were agricultural workers, the fact that they comprise between 80 and 90 percent of the category is highly suggestive" (Ibid. 2018b). Further, the authors published an e-mail from the CDC that highlighted the misclassification of 90 farmers. Accordingly, farmers "would still fall below the rate for Triple-F workers" (Ibid.). Essentially, and reiterated here for clarity, the authors' hypothesis asserts that if the CDC's original Triple-F classification were correct, then the 2012 study "found that a group made up almost entirely of agricultural workers had the highest suicide rate in the country," and if the CDC had, in fact, misclassified farmer suicides with Triple-F suicides, then they "could not make conclusions about the respective suicide rates of Triple-F workers and farmers" (Ibid. 2018a).

1.2 Validity amid data misuse

Going even further, *The New Food Economy* stated that the CDC study "had nothing to do with farmers and everything to do with farm workers" (Ibid. 2018b) under the claim that the suicide crisis among farmers is "not true" and that either the CDC had made an error or the media mistook "a farmworker suicide crisis for a farmer one" (Ibid. 2018a). This message was transmitted to the media. Various publications reported the hypothetical, then CDC-confirmed, correct classification of Triple-F suicides while still projecting a lower farmer suicide rate that was still inconclusive (Clayton 2018; Norford 2018; Walrath 2018a & 2018b). The authors from the cited publications, that is, *Farm Bill Law Enterprise*, *Mother Jones*, *Progressive Farmer*, and *The New Food Economy/The Counter*, which all reported

the CDC retraction, have not revised the data following the errata nor updated their corresponding assessment of the 17-state 2012 and 2015 CDC data. Also, the National Farmers Union (Perdue 2018) and Farm Aid (Vanderpool 2018) acknowledged the CDC retraction, yet observed its inconsistency with their experience and previous studies. Farm Aid stated that "it will continue to prioritize farmer stress" based on a 30% increase in "calls to their farmer hotline and feedback from family farm partners around the country" (Ibid.).

Is *The New Food Economy*'s original hypothesis valid? Table 3 of the amended 2012 and 2015 CDC report (Peterson et al. 2018) shows that the SOC 45 Farming, Fishing, and Forestry major occupational group ranked 8th at 26.3 [2012] and 9th at 22.8 [2015]. SOC 11, the Management major occupational group, ranked 17th at 16.4 [2012] and 15th at 17.8 [2015]. According to the 2012 and 2015 report, the Farming, Fishing, and Forestry (SOC 45) major occupational group includes farm laborers and supervisors but does not include farm operators, such as self-employed farmers or farm owners. The 2012 and 2015 report placed farm operators into the Management major occupational group. Based on the report's data, a farm "manager," that is, Farmers, Ranchers, and Other Agricultural Managers subgroup (SOC 11–9013) and a farm "worker," that is, Agricultural Workers subgroup (SOC 45–2000) are, respectively, separated between the major occupational groups of SOC 11 Management and SOC 45 Farming, Fishing, and Forestry. The two groups do not overlap according to these data.

1.3 Significantly high farmer suicide

When looking at the CDC's national average:

> "during 2000–2016, the suicide rate among the U.S. working age population (persons aged 16–64 years) increased 34%, from 12.9 per 100,000 population to 17.3." (Ibid.)

Peterson et al. (2018) report that the Farmers, Ranchers, and Other Agricultural Managers subgroup (SOC 11–9013) male suicide rate was 44.9 [2012] and 32.2 [2015] per 100,000. These rates can be compared to the national average [(12.9 [2012] and 17.3 [2015]). Among the 17 states surveyed, suicide rates for Farmers, Ranchers, and Other Agricultural Managers were more than three times as high as the national average in 2012 and almost twice as high as the national average in 2015.

In terms of the Farmers, Ranchers, and Other Agricultural Managers subgroup (SOC 11–9013 of the Management major occupational group) in relation to the Agricultural Workers subgroup (SOC 45–2000 of the Farming, Fishing, and Forestry major occupational group), the Farmers, Ranchers, and Other Agricultural Managers subgroup (SOC 11–9013) has a suicide rate

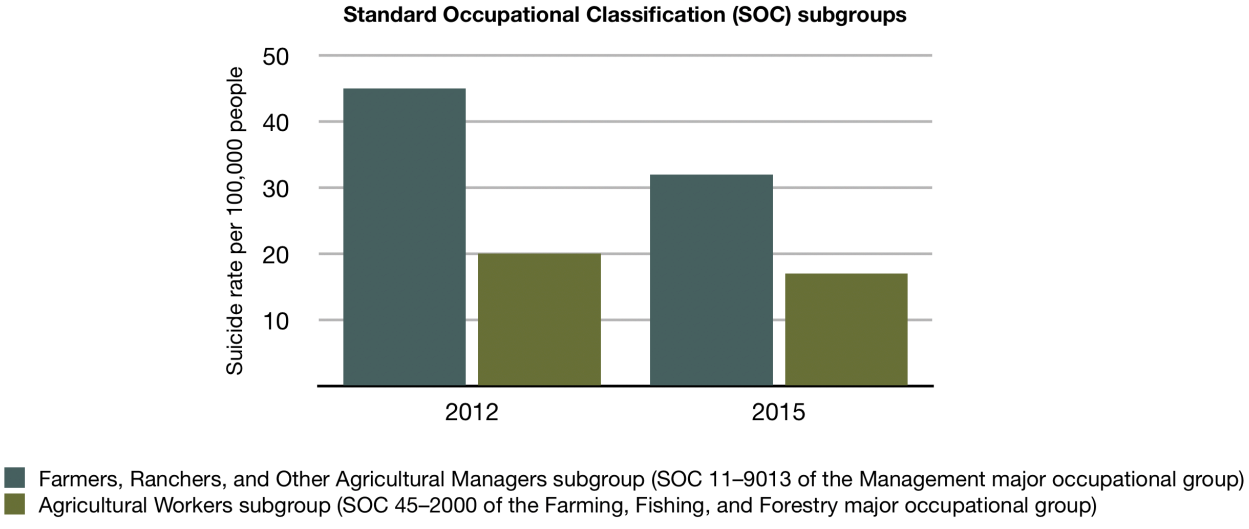

Figure 1: The Farmers, Ranchers, and Other Agricultural Managers subgroup (SOC 11–9013 of the Management major occupational group) compared to the Agricultural Workers subgroup (SOC 45–2000 of the Farming, Fishing, and Forestry major occupational group), based on the CDC errata, *Suicide Rates by Major Occupational Group—17 States, 2012 and 2015* (Peterson et al. 2018).

of 44.9 [2012] and 32.2 [2015] per 100,000 while the Agricultural Workers subgroup (SOC 45–2000) has a suicide rate of 20.4 [2012] and 17.3 [2015] per 100,000 (see Figure 1). Among the 17 states surveyed, Farmers, Ranchers, and Other Agricultural Managers have approximately double the rate of suicide than Agricultural Workers (Ibid.).

If comparing Farmers, Ranchers, and Other Agricultural Managers to the major occupational group with the highest suicide rate in Peterson et al. (2018), that is, Construction and Extraction (SOC 47), then in 2012, Farmers, Ranchers, and Other Agricultural Managers had a higher rate at 44.9 [2012] per 100,000 than Construction and Extraction at 43.6 [2012]. However, the proximity of these two figures lies within the statistical margin of error based on the Confidence Interval (CI). Despite Farmers, Ranchers, and Other Agricultural Managers had a rate of 44.9, this subgroup's CI was 34.2–57.9 and potentially higher or lower than that of Construction and Extraction in 2012. According to the highest estimate of 44.9, the Farmers, Ranchers, and Other Agricultural Managers subgroup (SOC 11–9013) ranks first, but it is most likely in a statistical tie with the Construction and Extraction (SOC 47) major occupational group for first.

In 2015, Farmers, Ranchers, and Other Agricultural Managers had a lower rate of 32.2 [2015] per 100,000 than Construction and Extraction at 53.2 [2015] (Ibid.). Considering the CI (24.2–42.0) was below that of Construction and Extraction, it is definite that the Farmers, Ranchers, and Other Agricultural Managers subgroup ranked lower than the 2015 Construction and Extraction major occupational group.

Comparing Farmers, Ranchers, and Other Agricultural Managers (SOC 11–9013) to Construction and Extraction (SOC 47) is problematic in that a major occupational group (SOC 47) is placed in relation to a subgroup (SOC 11–9013) of a major occupational group. However, a trend can be highlighted from this subgroup (SOC 11–9013): the farmer suicide rate was in a statistical tie with the highest suicide rate observed for any major occupational group in 2012. Farmer suicide ranked third when compared to major occupational group rates in 2015. The Peterson et al. (2018) CDC study based on 2012 and 2015 major occupational group statistics cannot provide enough detailed data to compare farmer suicide rates to every particular occupation.

2. Suicide rates by industry

The CDC recently published *Suicide Rates by Industry and Occupation—National Violent Death Reporting System, 32 States, 2016* (Peterson et al. 2020). This report outlines suicide among the U.S. working-age population of 16–64 years by major industry, major occupational, and detailed occupational groups. Calculated by the United States Census Bureau code for major industry groups and defined by the North American Industry Classification System (NAICS), the Agriculture, Forestry, Fishing, and Hunting group (Census code 0170–0290) had a significantly higher suicide rate among males at 36.1 (CI = 31.7–40.5). The Agriculture, Forestry, Fishing, and Hunting industry followed Mining, Quarrying, and Oil and Gas Extraction at 54.2 (CI = 44.0–64.3); Construction at 45.3 (CI = 43.4–47.2), and Other Services (e.g. automotive repair) at 39.1 (CI = 36.1–42.0) with high suicide rates among industry groups in comparison to the overall study population (see Figure 2).

In this recent, 32-state report on 2016 NVDRS data by Peterson et al. (2020), the CDC stated that "estimates for most major occupational groups are similar, although not directly comparable, to previous estimates that were based on 2015 NVDRS data from 17 states," that is, the previously outlined Peterson et al. (2018) study. According to major occupational groups, Farming, Fishing, and Forestry (Census code 6000–6130) had a male suicide rate of 31.4 (CI = 25.6–37.1) and Management (Census code 0010–0430) had a male suicide rate of 17.5 (CI = 16.4–18.6). Detailed occupational groups showed that Fishing and Hunting Workers (Census code 6100) of the Farming, Fishing, and Forestry major occupational group had an elevated suicide rate of 119.9 (CI = 60.9–215.6). Farmers, Ranchers, and Other Agricultural Managers (Census code 0205) from the Management major occupational group had a suicide rate of 43.2 (CI = 34.9–51.5). Both detailed occupational groups were "statistically higher than [the] population rate (all occupations) based on 95% CI of [the] occupational group rate not containing the total population rate point estimate" (Peterson et al. 2020).

It is also worth noting that many farmers continue working beyond 64 years of age, which is the limit of the cluster considered by the two years of 2012 and 2015,

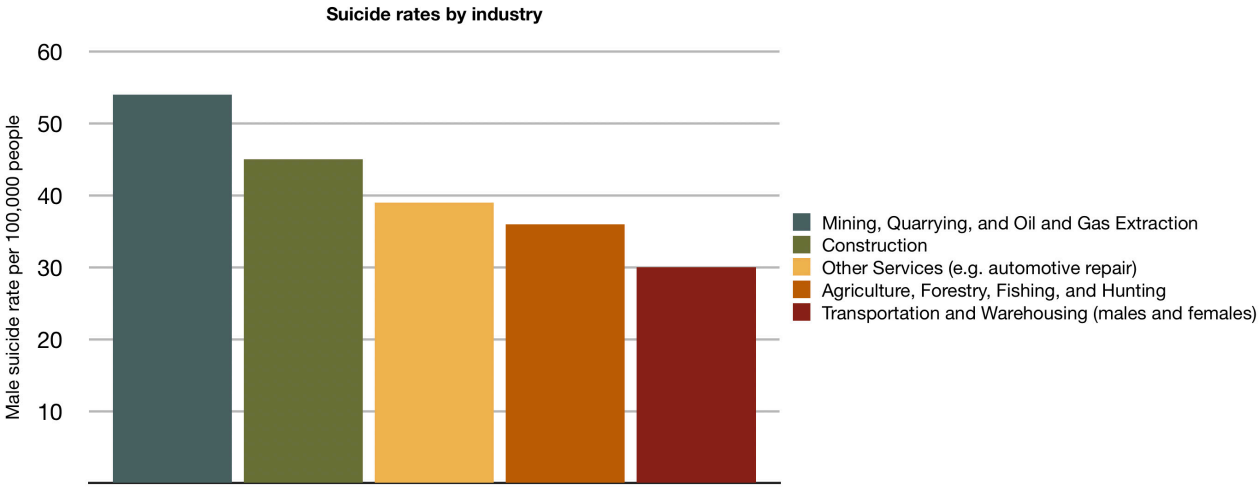

Figure 2: Suicide among U.S. working-age population males, 16–64 years, through major industry groups according to the CDC's *Suicide Rates by Industry and Occupation—National Violent Death Reporting System, 32 States, 2016* (Peterson et al. 2020).

as well as the 2016 CDC reports. Another study in *The Journal of Rural Health* (Ringgenberg et al. 2017, p. 6) examines the period from 1992 to 2010, indicating that 20.4% of male farmer and agriculture worker suicide occurs among those who are 65 years and older. This may signal that a relevant number of farmer suicide data have been unreported and, therefore, that actual farmer suicide figures behind the CDC study could even be underestimated. In fact, the United States Department of Agriculture's (USDA) *2017 Census of Agriculture* indicates that 1,000,534 farmers over the age of 65 are making day-to-day decisions (National Agricultural Statistics Service [NASS] 2019 p. 65). Further, 761,171 of all male producers and 392,871 of all female producers are 65 years and over (Ibid. p. 67; 69).

2.1 Agriculture-related work characteristics

Beyond these CDC studies, further and more comprehensive data on suicide in agriculture are outlined in *Trends and Characteristics of Occupational Suicide and Homicide in Farmers and Agriculture Workers, 1992–2010*, as published in *The Journal of Rural Health* (Ringgenberg et al. 2017). This 19-year study on all 50 states utilized data from the United States Department

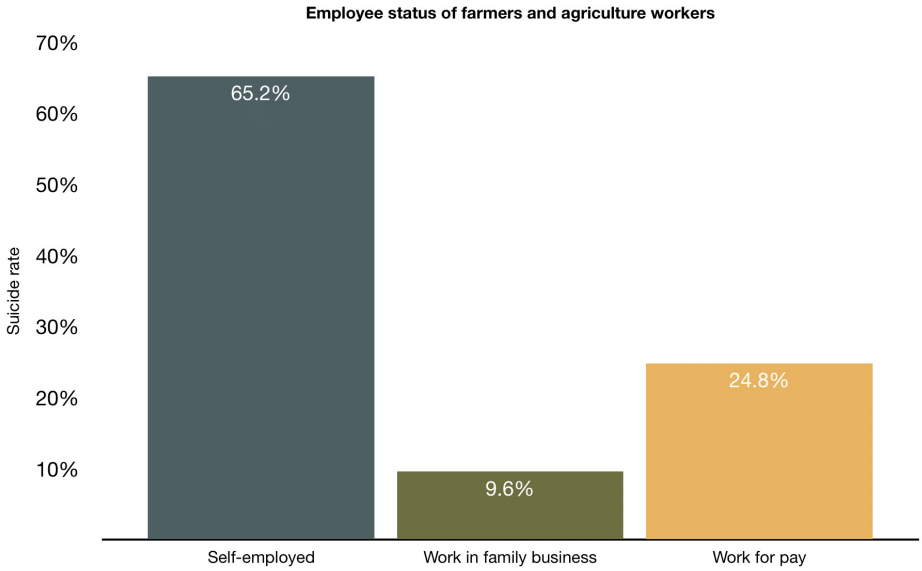

Figure 3: Data based on the 19-year Ringgenberg et al. (2017, p. 6) *Trends and Characteristics of Occupational Suicide and Homicide in Farmers and Agriculture Workers, 1992–2010* study.

of Labor's Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI). Ringgenberg et al. (2017) examine work-related suicide and homicide data on farm operators (farmers, farm owners, and farm managers) and farmworkers (agriculture workers and laborers) in comparison to the overall working population. Among these, 65.2% of suicides occur among the self-employed, 9.6% among those who work in a family business, and 24.8% among those who work for pay (Ibid. p. 6) (see Figure 3).

2.2 Regional relevance, national concern

Reported 2014 NASS figures (as cited in Ringgenberg et al. 2017, p. 5) show that the Midwest region (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin based on the United States Census Bureau-designated regions and divisions) holds 50% of U.S. farmland. Ringgenberg et al. (Ibid.) observed that among agriculture-related occupational fatal injury data, the proportion of farmer suicide in this region was remarkably high at 37.4%. Such a ratio was even worse in the West (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming) which, with 16% of U.S. farms, had a proportion of 43%. While the proportion of suicide was significantly lower in the South (13.5%) and the Northeast (6.1%), there was an alarmingly high proportion of homicide in the South (44.4%) and again in the West (39.8%). These regional differences highlight a particular occupational aspect. When comparing homicide and suicide, 65% of suicide victims were self-employed, whereas 61% of homicide victims worked for pay (Ibid.).

Data from this 19-year analysis thus indicate a suicidal concern of national relevance that affects farmers in particular. Ringgenberg et al. (2017, p. 4; 6) highlight that paid farmworkers are also affected by this common tragedy yet at a suicide rate of just under three times less than farmers. Moreover, this study stresses the need for further regional data and analysis regarding the reasons for elevated suicide among farm operators and elevated homicide among farmworkers. The USDA's most recent *2017 Census of Agriculture* indicates that out of 2,042,220 total U.S. farms, 1,529,083 have no reported farm labor (NASS 2019, p. 339). Indeed, given the structure and modality of agricultural work, a division among farmers and farmworkers on such a sensitive and urgent matter can be inconsequential when considering the occupational overlap between farmer and farmworker duties. Even more, the average U.S. farm was cited at 441 acres, that is, manageable and worked by a single farmer with or without family labor and without the need for hired labor (Ibid. p. 7).

3. The family farm economic unit

This situation reflects a diverse social and economic status of family farms which, given the due differences, is analogous to peasantry (Bissen 2014). The peasant with no hired labor represented a theoretical issue for Karl Marx, as outlined by Alexander Chayanov. This agrarian economist and rural sociologist illuminated Marx's challenge with a specific economic figure, the peasant. Marx (as cited in Thorner 1966, p. xviii) states of the peasant: "as owner of the means of production he is capitalist, as worker he is his own wage worker," and even more, "the separation between the two is the normal relation in this [i.e., capitalist] society." According to Chayanov, the absence of one of the four elements of capitalistic entrepreneurship envisioned by classical and neoclassical economic theories, that is, "wages (of labor), interest (on capital), rent (for land), and profits (of enterprise)" makes it impossible to determine the magnitude of the remaining three, thus destroying their theoretical structure (Ibid. pp. xiii-xiv). This does not exclude farming from capitalist agriculture. However, the duality of the worker as the owner of the means of production highlights the need for another economic theory in interpreting the specific world of family farms (Chayanov 1966 [1920s], p. 42). The USDA's *2017 Census of Agriculture* (NASS 2019) mirrors this characteristic by distinguishing farmers who hire labor from farmers who do not hire labor. The latter constitute a large majority.

3.1 Farming's social body

Following Chayanov, the authoritative scholar of rural sociology, Teodor Shanin, detailed how family farm life has remained incongruent with narrow capitalistic

formations (Chayanov 1966 [1920s]; Shanin 1990). Shanin advanced and deepened the discourse, from the past half-century to today, on the social, economic, and political factors of peasantry and rurality. Despite the mainstream denial of peasant existence alongside myths of progress, peasantry and the family farm as a socioeconomic unit go on, even within contemporary market relations. This particular existence—and its persistence, as articulated by Shanin—stems from a pre-industrial social body that bleeds into contemporary society. Specifically, Shanin observed a resistance to industrialization during the transformation of peasants into farmers and how the farming occupation, especially when livestock husbandry is involved, differs from mechanized forms of production (Shanin 1990, pp. 25-27).

In terms of agriculture-related suicide, further examination is needed to deepen the analysis on this social and economic body. Indeed, such work is progressing through a broader and more detailed data collection process. In the meantime, however, it is clear that discrediting interpretations of actual data is a rhetorical exercise in error.

3.2 Survival

Yet questions remain as to why suicide is high among farmers. For over 40 years, Dr. Michael R. Rosmann has studied the purposeful drive of family farmers, developing what he refers to as the *agrarian imperative* (Rosmann 2010). Beyond personality traits, Rosmann's research highlights motivated actions and risk taking among those engaged in agriculture. The agrarian imperative is an instinct that "instills farmers to work incredibly hard, to endure unusual pain and hardship, and to take uncommon risks" (Ibid. p. 72). This lens elucidates the phenomenon of suicide among farmers not only in the U.S. but also transnationally. The survival of the human *umwelt* is at the center of this tragedy. Rosmann has found that "when the objectives of farming are not met and the loss of the farm is threatened, the same traits that motivate agricultural producers to be successful also become associated with depression and suicide" (Ibid. p. 74). Survivability requires risk: it "depends on a broad diversity of species and people" against any harm (Bissen 2017, p. 137). Rosmann emphasizes that if we lose our agrarian imperative, then we lose our survival.

Reasons as to why farmers fail to meet their basic instinct of providing food, fiber, and energy deserves further examination and may encounter a sociological and anthropological response. Isolation, compounded with a lack of alternatives, means that a sole farmer has at once neither workers to rely on for support or to exploit nor bosses to turn to or to direct responsibility. Ringgenberg et al. (2017, p. 4) highlighted owner-operator stress, particularly financial, as a trigger among self-employed farmers who may not have an off-farm income. Self-employed farm operators "take on significant responsibilities for day-to-day operations of the farm, with high work load and financial responsibilities. This increased hands-on role in both work task and management creates greater personal investment in the farm and its operations" (Ibid.). Access to lethal means, exposure to depression-linked insecticide, and poor access to mental and health care services intensify farmer vulnerability (Ibid.). Risks associated with debt demand further consideration. It is commonly held that one must borrow money to make money. If overextended, in either pursuit of more ground, that is, cash rent, or unnecessary equipment, then farmer consumption accelerates. Debt is one aspect that affects how farmers make decisions. Going beyond good measure in terms of either stress on the body or excess consumption risks losing the agrarian imperative. If farms become sheer businesses (e.g. plant, spray, and harvest without livestock and sustainable practices), then they lose their fundamental qualities to the point of working against survival.

Family farms, even in capitalistic societies, express more than pure business operations, as clearly seen when not relying on hired labor. Farming is a way of being. Acculturation and the transformation of family farms into absolute businesses and farmers into hungry consumers forge this anthropological change amid an increasingly financed urban world. This process uproots an existence, and it is at odds with human survival. Suicide may be the only way out of this indiscriminate financial market that manufactures human nature—something a modern market society has, thus far, failed to do.

Acknowledgments

In memory of Teodor Shanin (1930–2020)

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Editorial comment

When reading this manuscript, I was a little perplexed in the beginning: 'What does this story have to do with *Organisms*?' I was tempted to dismiss the manuscript as 'not appropriate'. Reading further, I progressively changed my mind, and I decided how this story of 'tricking by numbers while being formally correct' is very instructive for the readers of *Organisms*. Here, the trick is purely nominalist: 'How to define a given person's job?' (biologists call this problem ontology when they must assign a function to a given gene in order to interpret omics results). The author clarifies how a simple 'shift of definition' can completely change the results and the conclusions. No ontology is perfect for the simple reason (known since the Plato era) that any categorization assumes a specific viewpoint and drastically diminishes the original semantic richness of the object it describes. This problem is clearly explained by the comment that assumes a bottom-up (Aristotelian) approach to categorization. It asks, no matter the code rigor—what about the significantly higher proportion of suicides in a category that almost entirely accounts for agricultural producers?

That is the right way to do it since considering farmers as 'managers', even if legally correct, is out of touch with reality.

The thoughts on the existence of an unsurmountable fault line between post-modern society and rural life are totally correct. They warn of the dangers we are exposed to as an entire civilization if the most central human work over the past ten thousand years has no place nor social consideration in our society.

A. Giuliani