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The Dust Bowl as a Failure of American Agriculture

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The Dust Bowl as a Failure of American Agriculture

by

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"The Dust Bowl as a Failure of American Agriculture"

Over 49 million acres of soil and earth were moved and blown away from the Southern Plains in 1935-1936.[1] The Dust Storms that raged were not only intense - but massive. Stretching over tens of miles wide and over a mile high, they engulfed towns, cities, people, cars, and anything that stood in front of them.[2] Already bare soil was met by more drought and more wind, but the farmer readied his plow once again and hoped for relief next week.[3] How might we imagine one of the largest environmental disasters of the 20th century? Who or what would we blame? These questions remain in the discussion about the Dust Bowl as a disastrous event in American history. The Dust Bowl covers a wide range of topics in academia, ranging from geology and climatology to economics and sociology. To truly understand the Dust Bowl as an event, all of these facets must be carefully considered and placed in context to one another.

From 1934 to 1940 there was a series of severe droughts that ravaged the agrarian landscape of the Southern Plains of the U.S and created massive and destructive dust storms that

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[1] Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 17

[2] Robertson, Flora. Interview with Flora Robertson about Dust Storms in Oklahoma, August 5, 1940. Other. *Iowa Department of Cultural Affairs*. Accessed December 5, 2020. https://iowaculture.gov/history/education/educator-resources/primary-source-sets/dust-bowl/interview-flora-robertson-about

[3] Glover, Imogene. A Child of the Dust Bowl. Other. *PBS - American Experience*. PBS. Accessed December 5, 2020. https://www.pbs.org/wgbh/americanexperience/features/surviving-the-dust-bowl-interview-child-dust-bowl/.

destroyed already struggling crops adjacent to the dust ridden houses of lungs of the Plains communities.[4] The previous 1920's had better than average crop prices, which fueled the expansion of agriculture into the region.[5] However, during the Depression of the 1930's, Plains farmers struggled not only with Depression era crop prices but with the crop failures and dust storms as well.[6] The Plains themselves fill the expanse between the Canadian Border and the Mexican border in Texas. However, the main area of interest for the Dust Bowl consists of a region where all the borders of Kansas, Oklahoma, Texas, New Mexico, and Colorado meet.[7] There are the Southern Plains of the U.S and will be discussed in more detail later.

Many of the primary sources used for this essay come from the 1920's-1940's time period which I think accurately represents the time period in regards to agricultural thought, biological knowledge, geological knowledge, and people's experiences. The sources range in variety from agricultural statistics of the crop production in 1936 to the native vegetation of the Plains. Using these various sources helps fully encompass the environmental history of the Dust Bowl and allows for a full explanation of what the Dust Bowl was, how agriculture shaped what would become the Dust Bowl, and how exactly the Dust Bowl was fundamentally caused by the profiteering of capitalist agriculture in the U.S.

There are numerous sources available about the historical examination of the Dust Bowl and its causes. However, there are three of primary importance in the examination of the historiography of the Dust Bowl. The first of these being Donald Worster's "Dust Bowl: the Southern Plains in the 1930s." Worster blames the Dust Bowl on the profit motive of capitalist

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[4] Donald Worster. *Dust Bowl: the Southern Plains in the 1930s*. New York: Oxford University Press, 1979. 4

[5] Lee, Jeffrey A, and Thomas E Gill. "*Multiple Causes of Wind Erosion in the Dust Bowl.*" Aeolian research 19 (2015): 21

[6] Worster, 11

[7] Schubert, S. D. "*On the Cause of the 1930s Dust Bowl.*" Science (American Association for the Advancement of Science) 303, no. 5665 (March 19, 2004): 1855

agriculture/market economics in conjunction with the environmental conditions of the droughts.[8] However, Worster believes the market economy is more to blame than the environmental conditions alone.[9] Another source is "Amplification of the North American "Dust Bowl" Drought through Human-Induced Land Degradation" by Benjamin Cook. Cook's ideas and evidence suggests that the Dust Bowl droughts were amplified by the plowing (land degradation) of the Southern Plains due to the introduction of agriculture.[10] These ideas support Worsters and back up the argument that the Dust Bowl was primarily human (and profit) caused. The last source in the historiography comes from Paul Bonnifield's "The Dust Bowl: Men, Dirt and Depression." Bonnifield essentially takes an "anti-Worster" perspective. He believes that the Dust Bowl as an event was nature at its worst, and the farmers did the best they could to get by while the government failed at providing relief for their suffering. For Bonnifield, the blame squarely falls on the shoulders of the government.[11]

All of these sources do an excellent job of examining the Dust Bowl as an event and the methodical process of their explanations and arguments is greatly appreciated in the contribution to this small portion of historical insight. However, Worster seems to have a better understanding of the drive that created the conditions of the Dust Bowl, while Bonnifield seems to accept the drive of what led to the agriculture in the Southern Plains and examines who or what should've been in place to restrain it or fix it. Due to this, Worster's perspective seems more apt to explaining the blame for the Dust Bowl and the cause and effects that led up to it. The driving

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[8] Donald Worster. *Dust Bowl: the Southern Plains in the 1930s*. New York: Oxford University Press, 1979. 7
[9] Worster, 7
[10] Cook, Miller. "*Amplification of the North American 'Dust Bowl' Drought through Human-Induced Land Degradation.*" Proceedings of the National Academy of Sciences - PNAS 106, no. 13 (March 16, 2009): 4997
[11] Bonnifield, Paul. *The Dust Bowl: Men, Dirt and Depression*. Albuquerque: University of New Mexico Press, 1980. 3

force of the profit motive behind the agriculture reaching into the Plains in the first place aligns with Worster's argument. This important aspect of Worster's argument makes it seem more favorable than Bonnifield's, and my argument will align with Worster's ideas as well.

By using Cook's examination of the human induced land degradation in the region, as well as other primary and secondary sources, it seems clear that Worster's argument is able to be supported and even expanded on. Cook's article would allow further insight into how the Dust Bowl was not only caused by the agricultural model of the 1930's, but how it made it worse throughout the drought period. By examining these sources it seems apparent that the Dust Bowl would not have been an issue without the primary drive of capitalist agriculture and the soil disruption that came along with it. This paper will demonstrate that the Dust Bowl as an event was primarily caused and worsened by the capitalistic agricultural model used by American farmers during the 1930's. The Dust Bowl is representative of a failure of American agriculture due to its failure to consistently produce food on the land it utilizes, but also due to its failure to protect the farmers and laborers that had to deal with the aftermath. While farmers themselves were not necessarily to blame for the conditions caused, the pursuit of profit encouraged the expansion of plowing and soil disruption in the Southern Plains.

First, American agriculture's failure of the land and the people will be brought to light through personal testimony of Dust Bowl survivors and the scientific knowledge and explanation for why the soil fell apart. Second, the causes of these issues will be carefully examined by retracing what farming techniques were used and why. Finally, the driving force - profit - will be placed in the center of this story, and blame placed on its shoulders for driving agriculture into the Plains in the first place.

Section One: Dusted People and Moving Land

"My daddy was an optimist. I think he just kept thinking, 'Next year will be better and we'll have a good crop and we'll raise some more cattle and we'll get rich.' We never did, but he thought we would. He was a good farmer and he was a good cattleman and he — he really believed that everything would work out for the best, that we'd have a good crop and — and everything would be better…" states Imogene Glover, a survivor of the Dust Bowl who was a child at the time.[12] The Dust Bowl not only took a toll on the environment but on the people in it. This is the second half of why the Dust Bowl was a failure of American agriculture during the time. Not only did it prioritize growth over the environment, but it also jeopardized the lives of many families and farmers during this time. In a sense, the agricultural systems' primary goal is to successfully utilize the soil and environment to grow food consistently while providing a better life for the people laboring to produce that food and those who utilize it. The farming that took place in the Southern Plains did neither. The first half of the issue begins with the environmental destruction that took place at the hands of plowing and killing the native grasses and soils. The second half of this story relates to the farmers and the people affected by the Dust Bowl itself. Both of these stories combine to describe the relationship between human and nature, and how this relationship is impacted by one's effect on the other.

First, the environment pre-Dust Bowl and pre-agriculture must be examined. This natural Southern Plains state is important to understand what exactly created the unravelling that led to the issues at hand. The Plains region, as previously mentioned, stretches from Canada through

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[12] Glover, Imogene. A Child of the Dust Bowl. Other. *PBS - American Experience*. PBS. Accessed December 5, 2020. https://www.pbs.org/wgbh/americanexperience/features/surviving-the-dust-bowl-interview-child-dust-bowl/.

Texas. However, the Southern Plains is the main region of focus for the study of the Dust Bowl event. As shown in Figure 1, the areas of wind erosion are concentrated around the neighboring state borders of Texas, Oklahoma, Kansas, Colorado, and New Mexico. Understanding this particular region of the Southern Plains is essential to understanding how exactly the introduction of agriculture changed the soil, air, and climate of the region.

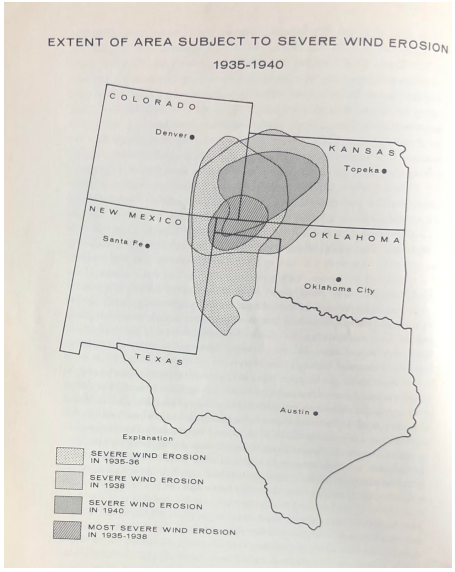

Figure 1 - Worster, Donald. *Dust Bowl: the Southern Plains in the 1930s*. New York: Oxford University Press, 1979.

To begin, the Southern Plains region represents a fairly fragile ecological system. Generally, when an environment does not have a large amount of biological diversity, it is more susceptible to disruptions, or even destruction. Some examples of these types of environments include the Arctic, the Desert, and the Southern Plains of the United States. Typically, vegetation is the primary instigator of life within the Southern Plains given that most (if not all) is covered in various species of grasses (Figure 2). As best stated by Donald Worster; "One effect of the grasses and other plants was to keep the dirt in place; another was to transform the sun's energy into food-stuffs on which other organisms could subsist."[13] Thus, the vegetation of the Southern Plains truly is the primary species that controls everything else. The grasses present here have also been perfectly adapted to the environmental and climatic

Figure 2 - Rothstein, Arthur, photographer. Dr. Tugwell and farmer of dust bowl area in Texas Panhandle. President's report. United States Texas. Texas, 1936. July-Aug. Photograph. https://www.loc.gov/item/2017761047/.

[13] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 72

conditions of the region.[14] The various species have adapted to the niche parts of the Plains so well, that the soil conditions can be assumed to some degree by accessing what grass species is present in a certain area.[15] Due to this adaptation, the native grasses are also incredibly drought resistant by nature. Most will not die if harsh drought conditions ensue, and will enter a state of dormancy until further moisture is provided.[16] This is due in part to the vast and extensive root systems of the various grass species that allow access to deep underground moisture (and allow for energy storage in case of dormancy).[17]

Soil structure (or the lack thereof) is the one of the key components to understanding the Dust Bowl. Soil itself is more than the sum of its parts. It is geological, biological, and climatological. It is shaped by outside factors such as the precipitation, climate, wind, temperature, organic matter, wildfires, and more.[18] The soil in the Southern Plains is no different. While the exact mineral composition and makeup of the soil is not terribly important to understand the causes of the Dust Bowl, understanding what holds the soil together is. The grasses on the Southern Plains have extensive root systems in order to access moisture and possibly go into dormancy.[19] These massive root systems hold the soil, and help create the general soil structure of the Plains.[20] So, from this it seems that the fragile soil ecosystem of the Plains is largely dependent on the grasses.

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[14] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 71
[15] Worster, 71
[16] Shantz, H. "*The Natural Vegetation of the Great Plains Region.*" Annals of the Association of American Geographers 13, no. 2 (June 1923): 91
[17] Shantz, 91
[18] Marbut, C. F. "*Soils of the Great Plains.*" Annals of the Association of American Geographers 13, no. 2 (1923): 42. http://www.jstor.org.elib.uah.edu/stable/2560702.
[19] Shantz, 91
[20] Shantz, 91

The climate conditions of the Southern Plains is also an essential part in understanding the ecological balances present in the region, especially when factors such as drought and wind patterns are taken into account. As previously mentioned, the natural vegetation of the Southern Plains is very well adapted to drought conditions.[21] Long term drought was more of an uncommon occurrence, however, this is compared to the already low 25-30 inches of annual rainfall that the region receives.[22] It was not uncommon to have some degree of wind erosion as well. Dust storms and wind erosion were documented throughout the 19th century before agriculture was ever fully introduced to the area.[23] However, it should be noted that these dust storms before agricultural disruption were not as common or severe when compared to the 1930's Dust Bowl storms.[24] They were also more commonly present after prairie fires, which would allow for dust and exposed soil to be more readily exposed to wind erosion than if regular prairie grasses were present.[25]

Both of these factors, biological and meteorological, can be used to establish that the Southern Plains region is a very unpredictable and harsh place for life to exist. "It is an unreliable, intractable place, wildly oscillating around an almost meaningless mean."[26] Thus, it is hard to imagine the development of agricultural systems in this region and climate. So, what exactly drove agriculture out to the Plains region? Why would farmers enter this unpredictable and arid landscape to pursue, of all things, growing plants? The answer is complex, however, the main pursuit of agriculture during the expansion into the Plains can be narrowed down to the

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[21] Shantz, H. "*The Natural Vegetation of the Great Plains Region.*" Annals of the Association of American Geographers 13, no. 2 (June 1923): 91
[22] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 70
[23] Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 17
[24] Lee and Gill, 18
[25] Lee and Gill, 17
[26] Worster, 70

main pursuit of profit in a market economy. Mechanized equipment that allowed for the large scale tillage and cultivation of land provided the opportunity to efficiently utilize this arid landscape for agriculture.[27] Another incentive that represents the driving force behind this agricultural expansion is increased crop prices in the 1920's.[28] In many ways, the Prairie landscape was the "last frontier" of agriculture in the continental U.S due to its harshness, but also its vastness.

This harshness of the land is also reflected by the farmers and laborers that worked the land themselves. As J.R. Davison tells, at least there was a living to be made; "I think the land was good to these people, because it provided 'em with a — I don't know whether I should say a 'good living.' It wasn't a good living as we would judge it now, but it was an existence."[29] Here is where the historical context is contained in conjunction to the scientific. This is the second half of American agriculture's failure in the Southern Plains. The people of the Plains plowed so they could plant, and they planted so they could live. No amount of scientific analysis about soil structure will change the fact that there were families that relied on making a crop that year.[30] So, the farmer is not to blame necessarily for the cause of the Dust Bowl. However, the farmers and laborers of the Southern Plains act as a tool for the agricultural industry, a cog in the ever expanding wheat producing machine. A primary lack of knowledge about the consequences of soil erosion created a lack of any barriers that may have stopped the Plains from being tilled. The mechanized and growing industry drove an agricultural machine that rolled over millions of

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[27] Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 21
[28] Lee and Gill, 21
[29] Davison, J.R. A Dust Bowl Survivor. Other. *PBS - American Experience*. PBS. Accessed December 5, 2020. https://www.pbs.org/wgbh/americanexperience/features/surviving-the-dust-bowl-interview-survivor/.
[30] Davison

acres of grassland, and thus prepped the stage for the worst environmental catastrophe ever caused by American agriculture.[31] As Mr. Davison states; "they kept breaking this country out and they plowed up a lot of country that should never have been plowed up. They got the whole country plowed up nearly and that's about the time it turned off terribly dry."[32]

Another important part of this process that needs further examination is the storms themselves. This is ultimately the most memorable aspect of the Dust Bowl in history, and what veterans of the Southern Plains remember most. They impacted the land just as much as they impacted the people on it. To begin, the dust storms during the Dust Bowl were a specific breed of storms. The hot air rolling across the loose soil came like a blanket over towns and cities, and even ended up on the decks of some ships off the East coast.[33] One of the biggest storms occurred in 1939, and spanned 100,000 square miles.[34] The major dust storms started roughly in 1934, and continued until 1939.[35] The "extremely high level winds" that sweep from the west to the east caught this dust and brought it into the upper level atmosphere.[36] Thus, the dust continued to travel all the way across the Midwest and Eastern

Figure 3 - Rothstein, Arthur, photographer. Heavy black clouds of dust rising over the Texas Panhandle, Texas. United States Texas Panhandle. Texas Panhandle Texas, 1936. Mar. Photograph. https://www.loc.gov/item/2017759842/.

[31] Porter, Jess. "*Lessons from the Dust Bowl: Human-Environment Education on the Great Plains.*" Journal of Geography 111, no. 4 (July 1, 2012): 128
[32] Davison, J.R. A Dust Bowl Survivor. Other. *PBS - American Experience*. PBS. Accessed December 5, 2020. https://www.pbs.org/wgbh/americanexperience/features/surviving-the-dust-bowl-interview-survivor/.
[33] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 14
[34] Worster, 34
[35] Worster, 12
[36] Worster, 13

United States. Often travelling at excessive speeds, up to 60 mph, these winds slammed sand and dust into windows, cars, and people.[37] Livestock, and sometimes people, would suffocate and perish into the clouds of dust.[3839] The dust would also settle in places and cause "dirt banks," which would cover crops, cars, railroad tracks, and a number of other things (Figure 4). The sight itself was horrifying and embodied agricultural doom over the areas it swept (Figure 3).

Figure 4 - Lange, Dorothea, photographer. Sand drift along fence. Dust Bowl, north of Dalhart, Texas. United States Dallam County Texas Dalhart. Dalhart, 1938. June. Photograph. https://www.loc.gov/item/2017770561/.

The dust storms are also important symbolically when examining the Dust Bowl. They represent the challenges that farmers faced throughout the 1930's. A massive wall of darkness and Earth, swallowing towns for a day, only for the remnants to be picked up for life to carry on. This is the life many Dust Bowl "veterans" will describe. Flora Robertson recalls once when their cattle smothered to death in a dust storm; "It killed them. They was out in that… We would cut their lungs open and it looked just like a mud pack of some kind. It just really showed it was the mud."[40] Desperate and powerless, the farmers of the Dust Bowl faced the brunt of what the tillage and storms had to offer. The farmers of the Southern Plains faced these troubles and continued the best they could. It made no difference what they tried to do to stop it, the dust came anyways. The allure of wheat had drawn thousands of farmers to reap the bounty of the

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[37] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 13
[38] Worster, 16
[39] Robertson, Flora. Interview with Flora Robertson about Dust Storms in Oklahoma, August 5, 1940. Other. *Iowa Department of Cultural Affairs*. Accessed December 5, 2020. https://iowaculture.gov/history/education/educator-resources/primary-source-sets/dust-bowl/interview-flora-robertson-about
[40] Robertson

Plains, but soon after its effects were realized, they were left to use self determination to get them through the worst environmental consequence ever caused by American agriculture.

Section 2: The Rain, the Plow, and Many Dead Cows

To first understand what agriculture did to cause the Dust Bowl, first the agricultural processes of the time must be understood. The primary crops grown in the Plains at the time were corn and wheat, but mostly wheat.[41] In fact, the production of cereal grains in the 20's increased by 300%, demonstrating the incredible abundance of crops that can be produced when mechanized agriculture meets profit motives.[42] However, as this agricultural market grew, and more started to take on the task of farming in this new era, many started to have trouble managing money and land.[43] So, before the Dust Bowl period began, farmers already had financial issues. It is also notable that more Northern Plains farmers had more capital available to them and longer settlements.[44] This represents yet another challenge to farmers before the drought and storms began, which is also notably another challenge driven by a system of financial profiteering.

The crops planted by these farmers represent a very large disruption and alteration to the native environment of the Plains. Wheat and corn are members of the grass family botanically, however, they are not adapted to the drought conditions of the Plains like native grasses are.[45] Thus, they are unable to adapt or persist in the arid climate and drought conditions of the Southern Plains. This is particularly important when placed alongside the process of plowing or tillage which loosens and breaks the soil. These processes not only kill the "weeds," or native

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[41] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 94
[42] Worster, 93
[43] Baker, O. "*The Agriculture of the Great Plains Region*." Annals of the Association of American Geographers 13, no. 3 (September 1923): 110
[44] Baker, 111
[45] Worster, 71

grasses, of the Plains environment but also expose this loose soil to the wind and rain (Figure 5).

Figure 5 - Lange, Dorothea, photographer. Dust bowl farmer driving tractor with young son near Cland, New Mexico. Cland. United States New Mexico Cland, 1938. June. Photograph. https://www.loc.gov/item/2017770648/.

Generally, loose soil is more susceptible to erosion, particularly with wind or fast downpours of rain.[46] There was a prevalent idea at the time of "the rain follows the plow" which is based on the premise that if the moisture in the soil is disturbed by tillage, then it will come back again as rain after evaporation.[47] However, this process is not only proven false, but it is shown to have the opposite effect. That is, as agriculture was brought to the Southern Plains it worsened the drought conditions.[48] After the crop failures due to the droughts, the bare and plowed land was susceptible to any and all forms of erosion. Cook also mentions that due to the lack of vegetation on the soil surface, this decreases the rate of "evapotranspiration." That is, the native grasses of the Plains "wick" moisture from the soil into the atmosphere, thus increasing the precipitation rate due to the increased moisture content. Since these native grasses have such extensive root systems, they can "pull" moisture from much deeper in the earth than wheat or corn could.[49] It should be noted that the Plains region, as unpredictable and rugged as it is, has had this specifically biology developing there for centuries.[50] So, the act of tillage was extremely destructive to the complexities that existed biologically.

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[46] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 71
[47] Worster, 82
[48] Cook, Miller. "*Amplification of the North American 'Dust Bowl' Drought through Human-Induced Land Degradation.*" Proceedings of the National Academy of Sciences - PNAS 106, no. 13 (March 16, 2009): 4997
[49] Cook, 4999
[50] Worster, 71

The methods used by farmers during the period need to be looked at more in depth as well as to understand why exactly they were used. Tillage and plowing were the primary methods of turning and prepping the soil. "Dry-farming" methods that were taught to farmers as they ventured out into the Plains to begin farming expeditions using mechanized equipment (as shown by this picture from Donald Worster's *Dust Bowl: the Southern Plains in the 1930s)*.[51] These particular dry farming methods in the Southern Plains remain at the heart of exactly what made erosion possible in the first place. "Dry Farming" represents a specific type of farming that is used in non-irrigated agricultural settings so that moisture is both "created" and conserved.[52] The main tenets of dry farming were to compact the lower levels of soil so that the moisture deeper in the earth rises up towards the surface through somewhat of a "capillary action" while simultaneously loosening the very top layer of soil so that it creates a "dry surface mulch" that retains moisture below.[53] Due to this loose surface mulch caused by tillage, wind was easily able to carry this fine layer of soil (Figure 6). However, initially this was to be expected somewhat, but moisture conservation was considered more important than soil erosion during this time.[54]

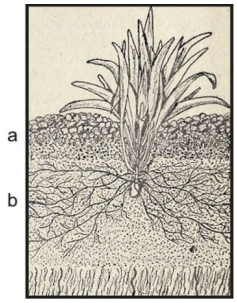

Figure 6 - Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 15–36.

As time went on, farmers moved away from this particular idea of dry farming, but still continued to till the soil regularly.[55] "Large-scale farming began in the Dust Bowl region in the late 1910s and 1920s. There was, therefore, insufficient time for farmers in the 1930's to have

[51] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 91
[52] Lee, Jeffrey A, and Thomas E Gill. "*Multiple Causes of Wind Erosion in the Dust Bowl.*" Aeolian research 19 (2015): 20
[53] Lee and Gill, 20
[54] Lee and Gill, 20
[55] Lee and Gill, 21

learned which tillage practices and equipment were best suited to the region for soil conservation."[56] The inapt farming practices at work in the Plains set the stage for large scale erosion, especially when presented with the droughts of the 1930's. However, the farmer is not necessarily to blame for this. Many were unfamiliar with how to exactly deal with this environment well, and many were looking to just get by with what they could. If tillage and dry farming methods were the normal methods of the day, then it seems that they wouldn't have risked attempting something new. "Perhaps of as great importance as the unsustainability of some of the systems of farming adopted by many in their ignorance of the geographic conditions, or because of their poverty."[57] Many farmers held onto the hope that if they just kept doing what they were doing, they would eventually get a break. And since there wasn't an alternative at the time for farming methods, this hope really was all that kept them going. "If we are poor today, we will be rich tomorrow. If there is drought, it will rain soon. In the dirty thirties that quality of hope was strained to the breaking point."[58]

The dust storms themselves had existed for essentially as long as the Southern Plains had. However, they were not near the severity as what came about due to the loose dirt and dust in the 1930's droughts. The top level of fertile and valuable soil was blown away in the destructive winds that came about due to the actions of mankind.[59] The wind itself had always been there, however, the tilled and loose soil had not. "By 1938, the peak year for wind erosion, 10 million acres had lost at least the upper five inches of top soil… Over all cultivated land in the region,

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[56] Lee, Jeffrey A, and Thomas E Gill. "*Multiple Causes of Wind Erosion in the Dust Bowl.*" Aeolian research 19 (2015): 21

[57] Baker, O. "*The Agriculture of the Great Plains Region*." Annals of the Association of American Geographers 13, no. 3 (September 1923): 111

[58] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 27

[59] Worster, 29

there were 408 tons of dirt blown away from the average acre."[60] When Worster's examination of the storms is placed alongside Cook's analysis of Dust Bowl amplification, it seems readily apparent that the only missing link for these disastrous conditions to take place was human ecological destruction.[61] Cook explains that due to vegetation not covering the surface of the soil due to cultivation, it made the surface of the soil hotter, thus drying it out faster and killing more crops.[62] The cultivation process also worsened the drought due to decreased net radiation.[63] Due to a complicated process of factors, the net radiation was reduced due to the severe amount of dust in the air, which in turn lessened the precipitation that fell on the region.[64] These factors are important to maintain the narrative that the Dust Bowl as an event was *human caused.* While it would not have been possible for the Dust Bowl to have happened without these meteorological factors, the missing link in this complex system of Dust Bowl causes was indeed human destruction of the surface vegetation through tillage.

Thus, when the natural state of the prairie and the agricultural state are examined side by side, it seems very apparent that the agricultural state was not structured to be effective at stopping the problems that led to soil erosion and crop failure. However, these agricultural practices do not exist within a vacuum. That is to say, the agricultural methods present in the Southern Plains would not have been present if there had not been a drive or push to expand the agricultural market. The profiteering of the wheat industry on behalf of increased crop prices came at the expense of the Plains ecology and soil erosion. Due to poor farming practices that

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[60] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 29
[61] Cook, Miller. "*Amplification of the North American 'Dust Bowl' Drought through Human-Induced Land Degradation.*" Proceedings of the National Academy of Sciences - PNAS 106, no. 13 (March 16, 2009): 4997
[62] Cook, 4999
[63] Cook, 4999
[64] Cook, 4999

were not suited well enough to deal with the arid and unpredictable conditions of the Southern Plains, the droughts of the 1930s created one of the worst environmental disasters of the 20th century.[65] A metaphor that can be considered when describing the relationship between the farming practices in the early 1900's and capitalistic agriculture is that poor and unequipped farming practices was the loaded gun, but the capitalist market pulled the trigger.

[65] Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 20

Section 3: Can't Squeeze Profit from a Turnip

As previously stated, the expansion of American agriculture into the Southern Plains was largely driven by the rising price of wheat during the 1910s and 1920's.[66] However, the mindset of the farmer and businessman should be examined in relation to nature itself. How did farmers view the world around them and how did they view their place in it? How did businessmen view capital and its relation to nature? These are important questions that need to be examined deeper in order to understand the Dust Bowl's relationship with capitalism.

Worster specifies three tenets of economic and agricultural development that took place during the early 1900's. They are as follows: "1. Nature must be seen as capital… 2. Man has a right, even an obligation, to use this capital for constant self advancement… 3.The social order should permit and encourage this continual increase of personal wealth…"[67] Using these tenets as the basis of examination, it seems easy to see how capital development led to mass ecological disruption on the plains. Given that farmers did not develop the proper techniques for farming on the unpredictable and arid landscape of the plains, but there was profit to be made, capitalist profit motives seem to represent the driving force behind the agriculture expansion.

The technological means behind the mass scale cultivation of the Plains is also notable to how maximum productivity played into the story of the Dust Bowl. As mechanized equipment became more easily available to the average farmer, it drastically increased the amount of land that could be plowed and profited off as well. J.R. Davison mentions the same when discussing his family's involvement farming in Oklahoma; " ...my uncle bought a tractor, you know, from

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[66] Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 21

[67] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 6

the John Deere Company on time. He made a few payments on it and then my dad ended up makin' the rest of 'em, but they could plow, you know, 30 acres a day. It wasn't like that old walkin' plow when you could get five or six acres a day."[68] Without this, none of the millions of acres of subsoil would have been able to blow away into the eastern US in the first place. Things such as the tractor and plow, the disc plow, and the combine all were part of a bigger structure that influenced technological growth in exchange for market growth. This relationship is important in a capitalist economy. While the market drives for more and more production and efficiency, the technological development increases to suit that demand. Thus, tractors and disc plows scraped millions of acres of the surface soil of the Southern Plains and chased the alluring profit of wheat. "The removal of native grasses to pursue the riches from the cultivation of wheat set the stage for the disaster."[69] However, it should be noted that while these factors may work hand in hand, once does drive the other. The capitalist market has a need to drive production and efficiency forward in order to maintain its own existence and expansion. Technology just adapts and advances to meet that need of the market.

There seem to be the perfect combination of technological and economic means and motives present to create the Dust Bowl. First, mechanized farming allowed for large, mass scale operations to take place on the Plains. Second, there was a very good economic motive to farm on the plains given that crop prices had been increasing and the large open area of the Southern Plains seemed enticing to agricultural production. Dry farming techniques had also been adopted

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[68] Davison, J.R. A Dust Bowl Survivor. Other. *PBS - American Experience*. PBS. Accessed December 5, 2020. https://www.pbs.org/wgbh/americanexperience/features/surviving-the-dust-bowl-interview-survivor/.

[69] Porter, Jess. "*Lessons from the Dust Bowl: Human-Environment Education on the Great Plains.*" Journal of Geography 111, no. 4 (July 1, 2012): 128.

and then dropped, but the practice of large scale tilling was still present.[70] Due to this tillage, it killed the native and hardy grasses that allowed for evapotranspiration and prevented soil erosion.[71] After the native grasses were mostly eliminated, the top surface of the soil was loose, friable, and easily blown away. However, if crops had been successfully planted and grown into this surface soil layer, erosion may have been prevented somewhat. When drought is entered into this equation however, crops fail to germinate and/or die all together (Figure 7*)*. Thus, the surface soil is loose with nothing to hold it down. Hence, the Dust Bowl began from this perfect storm of factors with profit motives as its driving force. "There have been many reasons why people misuse their land. But the American Dust Bowl of the thirties suggests that a capitalist-based society has a greater resource hunger than others, greater eagerness to take risks, and less capacity for restraint."[72]

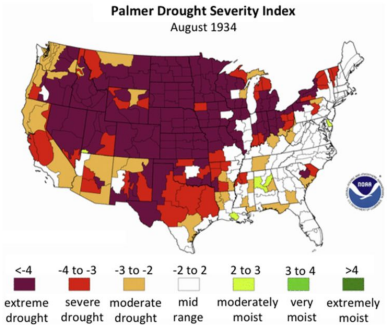

Figure 7 - Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 15–36.

This unregulated and unrestrained expansion of agriculture in the early 1900's left the gate open for mass tillage and destruction of grassland. The climate conditions present did not "make" the Dust Bowl happen, but it did make it possible. While the rest of the United States' agricultural methods were somewhat suitable for the environment in which they were based, they still exhibited a demanding and destructive toll on the soil. However, when this idea of man over nature, and a controlling and capitalistic ethos took hold in the Southern Plains, it resulted in a

[70] Lee, Jeffrey A, and Thomas E Gill. "Multiple Causes of Wind Erosion in the Dust Bowl." *Aeolian research* 19 (2015): 21
[71] Cook, Miller. "*Amplification of the North American 'Dust Bowl' Drought through Human-Induced Land Degradation.*" Proceedings of the National Academy of Sciences - PNAS 106, no. 13 (March 16, 2009): 4999
[72] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 7

wide scale environmental disaster. Usually, the more environmental conditions and biological subjects that can be controlled in a capitalist agricultural system, the better for standardization and efficiency. It demanded wrestling control over natural factors, increasing production at all possible costs, and sought to eliminate all that stood in the way of profit margins. These capitalist maxims were the driving force behind the Dust Bowl in the Southern Plains. "The attitude of capitalism - industrial and pre-industrial - toward the earth was imperial and commercial; none of its ruling values taught environmental humility, reverence, or restraint."[73] This culture and mindset of production at all costs set the stage for this disaster of American agriculture that chased the dollar before it used cautionary ecological examination.

In the prairies of the Dust Bowl, the environment was barely holding itself together already. It battled horrible conditions and wrestled with unpredictable temperature, wind, and precipitation.[74] When fragile ecosystems like the Plains get disrupted, and their most important vegetative form dying at a rapid pace, it is ultimately bound to fall apart. This is ultimately why agriculture failed during the 1930's on the Southern Plains. Given, if the conditions in the Southern Plains had not been the perfect mix of conditions for dust storms and drought, it doesn't seem apparent that the capitalist agricultural machine would've even slowed. Growth of wealth, land, and efficiency remain at the forefront of this driving force. It represents an unrelenting pursuit to squeeze every drop of profit margin out of the soil that is available to it through the use of machinery and manpower. As best summed up by Worster, " But as it turned out, the culture they had brought to the plains - the culture that had brought them there - was ecologically among the most unadaptive ever devised."[75]

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[73] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 97
[74] Shantz, H. "*The Natural Vegetation of the Great Plains Region.*" Annals of the Association of American Geographers 13, no. 2 (June 1923): 86
[75] Worster, 97

Looking back at the Dust Bowl with careful examination, it seems obvious that this track of land would not have been suitable for just any regular farming methodology. However, it does reflect the notion that the American agriculture of the time had its intentions set of profit margins. If more preparation and forethought had been used to examine the exact geology, biology, and climatology of the plains, then it seems that many processes could have been implemented to at least curb the erosion of the soil. Farmers, scientists, government officials, and others who experienced the Dust Bowl look back with many lessons learned about what exactly went wrong. J.R. Davison, whose father was a farmer, states, "But they [farmers] sure broke up a lot of this country that should never have been plowed up. It just wasn't farmland. It should have been grassland."[76] Government land planners and ecologists took the stage as well to examine, learn, and teach better methods of farming. However, the scientists had some difficulty with placing their ideas properly within the economic and societal framework in the Post-Dust Bowl era.[77] Despite this, scientists spurred a more disciplined agricultural system as time went on. By using shelterbelts, listing, cover crops, and overall a better understanding of our actions' impact on nature, a new agriculture swept throughout the Plains region.

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[76] Davison, J.R. A Dust Bowl Survivor. Other. *PBS - American Experience*. PBS. Accessed December 5, 2020. https://www.pbs.org/wgbh/americanexperience/features/surviving-the-dust-bowl-interview-survivor/.

[77] Donald Worster, *Dust Bowl: the Southern Plains in the 1930s*, New York: Oxford University Press, 1979. 198

Conclusion:

The Dust Bowl as an event was primarily caused and worsened by the capitalistic agricultural model used by American farmers during the 1930's. While farmers themselves were not necessarily to blame for the conditions caused, the pursuit of profit encouraged the expansion of plowing and soil disruption in the Southern Plains (which in turn created the Dust Bowl conditions that worsened so many lives during the Depression era). The Dust Bowl region in the Southern Plains before agriculture was a fragile and unpredictable environment that was foreboding to agricultural failure. However, the profitability of farming in the 1920's due to increased crop prices and mechanization drove agriculture to expand into the Southern Plains. Inadequate farming techniques not only provided the perfect conditions for dust storms and soil erosion, but also worsened the drought conditions throughout the 1930's. The capitalist model of this agricultural expansion and system resulted in the pursuit of profit in the Plains without proper forethought about agricultural methods that were suited for the region. Thus, severe dust storms resulted and droughts worsened due to soil disruption and drought.

Worster's arguments still hold true to the ultimate cause behind the Dust Bowl. However, based on the information at hand it seems Bonnifield's argument deserves some sympathy. The American agricultural system exists to feed people, but it also exists as a for profit business set up. To disconnect the government from this for profit system is irrational, given that the allure of wheat is what brought farmers and business to the Plains in the first place. However, that does not mean that the government is totally absolved from this equation. The American agricultural system exists both within the free market and within the government structure. Despite this, the for profit drive of wheat farming is ultimately what pushed into the Southern Plains to begin with, and that is where the blame should mostly remain.

The Dust Bowl as an event in history is important because it sheds light how economics, agriculture, politics, biology, and meteorology all interact with each other to create environmental history. The causes of the Dust Bowl is important because it represents economic drives as a force that incentivizes profit over long term planning. This is present in the expansion of agriculture in the Plains without a well developed method to prevent soil erosion and evaporation. Thus, when prioritizing the profit of a capitalistic model over the planning process of long term goals (such as agricultural expansion), major issues such as the Dust Bowl can be expected. This trend represents economy and efficiency over regulation and planning. If this pattern can be mitigated, and proper planning of agricultural systems can be managed, disasters such as the Dust Bowl can be stopped in the future.

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