

# Norman Borlaug: Actions Overweighing Words in Agricultural Communication

Junior Division  
Individual Exhibit  
Seonghui Ju



# Thesis / Historical Argument

American agronomist Norman Borlaug started and spread an agricultural movement in the 1950s and 1960s called the Green Revolution to increase world food production to help reduce hunger in the developing world. The Green Revolution had an immediate dramatic impact on incomes and food supplies and facilitated self-sustaining economic growth in Mexico and India. Borlaug's communication through agricultural methods and scientific breakthroughs of plant development helped raise awareness on hunger and make it an international priority.

“Norman Borlaug is the living embodiment of the human quest for a hunger free world. His life is his message.”

- Professor M. S. Swaminathan, Indian geneticist

“Norman Borlaug has already saved more lives than anyone who has ever lived.”

- Gregg Easterbrook, *The Atlantic Monthly*, 1997

# Picture & Text on Left Panel (1 of 4)

## A HUNGRY WORLD

During the 1900s, hunger had 942 million people across the globe on their knees. Poverty, Dust Bowl, Great Depression, and stem rust, a devastating fungus disease, was an obstacle to faster food production. At that time, people strongly believed the Malthusian theory that population growth would outpace food production, and due to undeveloped agricultural methods, it was becoming reality. Agronomists had to form a plan to save people quickly and efficiently.

Malthusian theory (Environmental History resources)

"He'd wonder why in some areas the grass would be so green, and then over here, it wouldn't be."  
- Charlotte Culbert, sister of Borlaug

"Stem rust, the most feared of all wheat diseases, can turn a healthy crop of wheat into a tangled mass of stems that produce little or no grain. The fungus spores travel in the wind, causing the infection to spread quickly. It has caused major famines since the beginning of history."  
- Borlaug

Dust Bowl, 1930, All That's Interesting

Great Depression, CHERESEARCHEERS (Library of Congress)

"[On the Dust Bowl of 1930] Of course I remember those days. And they certainly changed my whole way of thinking about what was needed to change agriculture. I saw the unhelpful—when all the banks went broke—rural banks especially—the unemployment—my first visit when I went to Minneapolis to try to get into the University of Minnesota. I encountered hundreds, yes, thousands of people on the street with their hands out asking for a nickel to buy bread."  
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# Picture & Text on Left Panel (2 of 4)

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# Picture & Text on Left Panel (3 of 4)

**STRAINING FOR THE RIGHT STRAIN**

After WWII, Borlaug went to Mexico to help farmers as a Rockefeller Foundation(RF) agriculturist, learning Spanish to better communicate. The instant he saw the situation, it shocked him: crops were infected by diseases and yields were so low farmers couldn't even feed themselves. Borlaug planned for a bigger benefit which RF was against, so Borlaug communicated his dedication by leaving and was called back. Borlaug spent hours hunched over the blazing sun, crossing different wheat strains.

"In 1944, when Borlaug arrived in Mexico, its farmers raised less than half of the wheat necessary to meet the demands of the population. Rust perennially ruined or diminished the harvest."  
- Professor R. Douglas Hurt, Purdue University

"Everything was alien to him, the crop (he was accustomed to growing maize in his farm), the geography, the people, and the language they spoke. To understand the difficulties faced by farmers and to better communicate his ideas and technologies to the locals, he learned Spanish. It was here that he exercised his industriousness to achieve his conviction that the farmer's plight is reversed at any cost. The technologies he helped popularize are still in use to improve crop traits."  
- Science India



Short and long wheat creations, Washington State Magazine



Crossing wheat strains, Digital Public Library of America

With Mexican farmers, University of Minnesota Archives

"His involvement in the 1960s-70s in the region led to improved conditions of the lives of people simply through increased crop production from the same lands that were not reaping profitable crops earlier. He transcended national boundaries, language barriers, political ideologies, and ethnicity of people because he desired to quell human misery arising out of hunger and poverty."  
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"These places I've seen have clubbed my mind. They are so poor and depressing. I don't know what we can do to help these people, but we've got to do something."

- Borlaug to his wife

# Picture & Text on Left Panel (4 of 4)

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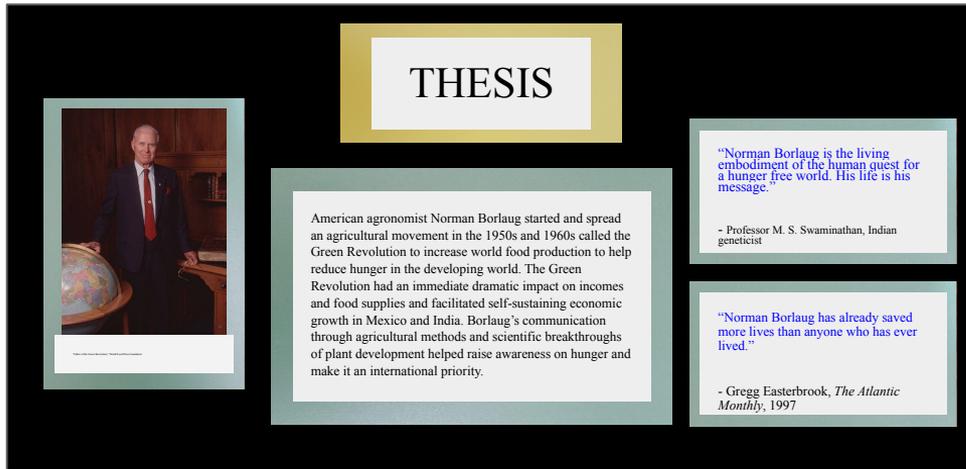
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# Picture & Text on Center Panel (1 of 3)



The collage features a central white box with the word "THESIS" in black. To the left is a photograph of Norman Borlaug standing next to a globe. Below the photo is a small caption: "Norman Borlaug, 1963, International Rice Research Institute". To the right of the photo is a large text box containing a paragraph about the Green Revolution. Further right are two smaller text boxes, each containing a quote about Borlaug and the name of the person who said it.

**THESIS**

American agronomist Norman Borlaug started and spread an agricultural movement in the 1950s and 1960s called the Green Revolution to increase world food production to help reduce hunger in the developing world. The Green Revolution had an immediate dramatic impact on incomes and food supplies and facilitated self-sustaining economic growth in Mexico and India. Borlaug's communication through agricultural methods and scientific breakthroughs of plant development helped raise awareness on hunger and make it an international priority.

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# Picture & Text on Center Panel (3 of 3)



“The results were as astonishing as they had been difficult to attain. ... His belief in scientific research and a hands-on connection to the farmers paid off in what was considered an agricultural miracle.”

- Ambassador Kenneth M. Quinn, President of the World Food Foundation

# Picture of Right Panel of Exhibit

**IMPACT OF THE GREEN REVOLUTION**

Borlaug met with world leaders, and using his actions to communicate, he sent his seed varieties to developing countries and taught farmers himself. Thus, hunger rates dropped 16% and yields and its profits increased. Mexico transformed from a wheat importer to exporter between 1943-1958. Borlaug trained young scientists globally as Director of the International Wheat Improvement Program, with communication. To honor all contributions, Borlaug received numerous awards, including the Nobel Peace Prize.

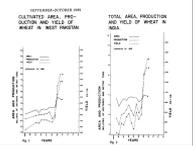
"The battle to feed all humanity is over."  
- Paul Ehrlich, biologist, in his 1968 bestseller *The Population Bomb*

"As U.S. Food for Peace Administrator in the 1960s, I shipped 4 million tons of food aid per year to India; now it can export food."  
- George McGovern, UN "Ambassador to the Hungry"

In South Asian countries, World Food Prize Foundation

"Thanks to the Green Revolution, the real price of food is half or less than it was in 1960 which means those who spend the highest portion of their income on food – the urban and non-farm rural poor – garner the most benefit from it."  
- Thomas R. DeGregori, University of Houston

"Just how significant an impact he had was brought home to me four decades later, while I was visiting with the Egyptian Minister of Agriculture in Cairo. When I mentioned Norman Borlaug's name, the Minister immediately stopped the meeting and sent several aides rushing from the room. They returned a few minutes later with displays of robust wheat plants which the Minister proudly showed me."  
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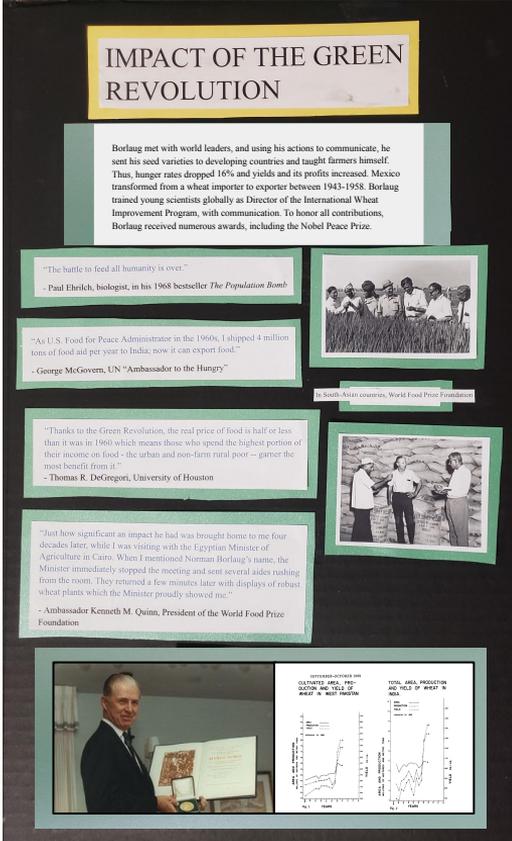
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| Year | Wheat Production (Million Metric Tons) |
|------|----------------------------------------|
| 1960 | ~100                                   |
| 1970 | ~150                                   |
| 1980 | ~200                                   |
| 1990 | ~250                                   |
| 2000 | ~300                                   |
| 2010 | ~350                                   |
| 2020 | ~400                                   |

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**HISTORICAL SIGNIFICANCE**

The revolution brought some negative consequences; choosing technology over “green” methods increased diseases, technology use, pesticide use, and environmental damages. In India, Borlaug’s research helped wealthy families but some fell deeper into poverty, resulting the government’s discontent. However, each action must have some effect, and Borlaug communicated with actions that saved millions, led to further developments connected to today’s agriculture, and showed advocacy changes the world.

**Food: A Battle Won, Not the War**  
The Green Revolution Hasn’t Ended Hunger  
Changing Farm Challenge  
World Hunger Organization  
Green Revolution Is Not Enough, Study Finds

“... indomitable man who fought rust and red tape ... [and] who more than any other single man of our age, has provided bread for the hungry world.”  
- Nobel community

**THE MAN WHO TRIED TO FEED THE WORLD**  
A TALE OF FOOD, DESIRE AND UNTHINKED CONSEQUENCES

“But Dr. Borlaug is proof that large-scale progress is possible. He is a genuine hero, and his story should make us optimistic about the future.”  
- Bill Gates

“But perhaps the most remarkable thing is that although most people Norm helped may never know his name, he would be very gratified that they no longer know hunger.”  
- Former President Jimmy Carter

With his “miracle” inventions, The Community

**#REMEMBERINGBORLAUG**  
On what would have been his 100th birthday

©RememberingBorlaug movement on Facebook, 2014, World Food Prize Foundation

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“The Green Revolution was criticised by social activists on the ground that the high-yield technology involving the use of mineral fertilizers and chemical pesticides is environmentally harmful. Similarly, some economists felt that the new technologies would bypass small and marginal farmers, for although the technologies are scale-neutral, they are not resource-neutral.”

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"As a result of [Borlaug's] work, a billion people now exist who otherwise would have starved to death, died of starvation-related diseases, or never have been born."  
- Gregory Pence and Joyce Hsu, Birmingham News

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## CONCLUSION

Norman Borlaug, father to the world, defines communication wordlessly, his life and purposes embodied inside the crops we grow and the food we eat, living inside us forevermore.

“Almost certainly, the first essential component of social justice is adequate food for all mankind. Food is the moral right of all who are born into this world. Yet today 50 percent of the world’s population goes hungry. Without food, man can live at most but a few weeks; without it, all other components of social justice are meaningless.”

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CIMMYT's drawing of Norman Borlaug

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**Norman Borlaug:**

**Actions Overweighing Words in Agricultural Communication**

Seonghui Ju

Junior Division

Individual Exhibit

Student composed words on exhibit- 500

Process paper- 500 words

Sometimes I just wonder about how the world feeds so many but also starves so many. I wonder why I have a table full of food when just down the street, others have hardly anything at all. History Day came around while those questions went unanswered, and I was fascinated to find that an agronomist named Norman Borlaug had pondered the same things. It was intriguing how one man could send the whole world a message with just his determination; how actions and thoughts, not words, could communicate that hunger should be a prime concern. The moment I learned about him, I knew he would be the ideal topic for me.

I began my research in multiple databases, like Gale in Context, and looked over websites, images, and academic journals provided to get all the basic information, and dug a little deeper with many articles after getting a firm background. I read several biographies and that helped me to get a real glimpse on how others viewed him and his methods at that time. Then I started focusing on primary sources, and I conducted my research more on information I needed than the general ones. This was where I got the most captivating details. I looked at interviews, speeches, documentaries, letters, newspapers, and quotes, and visited the University of Minnesota archive website where I found more valuable data. I searched for numerous interviews because they were direct sources on Borlaug's ideas where I could form a base in my arguments. All of these sources helped me get a clear idea of Borlaug's life and how he influenced the world.

Based on what I learned about Borlaug and the Green Revolution, I decided that it was best to show all the information on a board, because I prefer hands-on projects, and I'd be able to show sources like images freely that can lure the audience in. Looking at perspectives from both sides that are praising and criticizing Borlaug helped my board have balanced information. The color arrangements are from the cover picture for PBS's film about Borlaug, "The Man Who Tried to Feed the World." The yellow is the wheat, the green is the stem, and the black trifold represents dirt, and the dark side of the revolution often

covered by the success of it, but very much noticeable especially since it continues to effect our lives today.

Norman Borlaug connects to the theme of communication because with the movement, the creation of a new cereal grain, and determination, Borlaug communicated through his actions instead of his words that food is a moral right for everyone and anyone. He communicated that technology has a place in agriculture as he paved the way for today's agricultural advancements and achievements. He showed the world how to feed themselves and showed that hunger is a pressing matter. Without his contribution, the world would've lost a billion lives, and even though he passed away in 2009, the changes he brought still impact the world today.

## Annotated Bibliography

### Primary Sources

Borlaug, Norman E., and others, "A Green Revolution Yields a Golden Harvest", *Columbia Journal of World Business*  
<http://www.ask-force.org/web/Organic/Borlaug-GreenRevolution-1969.pdf>

This academic journal was written by Norman Borlaug and he shows his work directly. He talks about the implementation of transplant, spectacular spread, wheat and rice production, intensity of cropping, effect on business, new problems, export potential, population growth, and the magnitude of world hunger.

Borlaug, Norman Ernest. "Feeding a Hungry World." *Science*, AAAS, 19 Oct. 2007, [science.sciencemag.org/content/318/5849/359.full](http://science.sciencemag.org/content/318/5849/359.full). Accessed 8 Jan. 2021.

This article, written by Norman Borlaug, talks briefly about how the battle from escaping from famine is far from won. It explains the wheat breakthrough rates and the current world hunger situation, including how it's being helped.

Borlaug, Norman Ernest, and The New York Times. "Stem Rust Never Sleeps." *The New York Times* [Dallas], 26 Apr. 2008. *The New York Times*, [www.nytimes.com/2008/04/26/opinion/26borlaug.html](http://www.nytimes.com/2008/04/26/opinion/26borlaug.html). Accessed 4 Feb. 2021.

This website helped me have a firm understanding of stem rust and how serious and deadly it is that a whole new crop variety had to be created. With it being written by Borlaug himself, it gave me the "history" of stem rust and crops before and even after the Green Revolution.

*Dr. Norman E. Borlaug*. Produced by CIMMYT, CIMMYT, 2013.

This short clip briefly explains Norman Borlaug's achievements and work in Mexico and leads through the after-events in the world.

Ehrlich, Paul Ralph. 1. *The Population Bomb*, 1968, pp. 11-25, [faculty.washington.edu/jhannah/geog270aut07/readings/population/Ehrlich%20-%20Population%20Bomb%20Ch1.pdf](http://faculty.washington.edu/jhannah/geog270aut07/readings/population/Ehrlich%20-%20Population%20Bomb%20Ch1.pdf). Accessed 5 Feb. 2021.

Professor Paul R. Ehrlich's bestseller *The Population Bomb* is about the world's population growing immensely, similar to the Malthusian theory, like a bomb, exactly the title. Even though I could only get ahold of a PDF of the prologue, foreword, and chapter 1, it was still really interesting and brought up thought-provoking theories.

"Interview: Norman Borlaug discusses the Green Revolution and challenges to the use of inorganic fertilizers." *All Things Considered*, 26 Mar. 2004. *Gale In Context: U.S. History*,

link.gale.com/apps/doc/A161994276/UHIC?u=fairfaxcps&sid=UHIC&xid=e15619a2.  
Accessed 22 Jan. 2021.

This interview shows me Dr. Borlaug's personal thoughts on the use of inorganic fertilizer, 21st century's technology's impact on crops, genetically modified crops, and his experience through the tragic Dust Bowl of 1930. This interview helped me to understand what he was thinking about agriculture just a few years ago and agriculture today.

Lumpkin, Thomas, and Cosmos. "The Father of the Green Revolution." *Cosmos*, 17 Feb. 2014. *Cosmos*, cosmosmagazine.com/society/father-green-revolution/. Accessed 1 Mar. 2021.

his academic journal is like a short biography on Borlaug and leads me to the steps of his life until reaching the stages of the Green Revolution. It helps me really understand Borlaug's purposes and intentions on what he has done for the world. I learned that Borlaug's spirit will set in motion a new Green Revolution, the second wave of the fight for ending hunger, which once again shows that Borlaug's sheer will made all these accomplishments and changes.

*Norman Borlaug: A Lifetime Fighting Hunger*. Produced by World Food Prize Foundation, World Food Prize Foundation, 2009.

This video is about Borlaug's life with snippets of his opinions, showing me what words and actions influenced him, communicated to him, to do what he did.

Retrieved from the Digital Public Library of America  
<<http://umedia.lib.umn.edu/item/p16022coll175:21253>>.

This photo shows Norman Borlaug in St. Paul, Minnesota, performing seed research. This visually helps me understand how you produce and recreate the cereal grains.

World Food Prize Foundation, producer. *The Norman Borlaug Centennial*. World Food Prize Foundation, 2014.

This video released in the year of what would've been Borlaug's 100th birthday rewinds Borlaug's life. With small interviews included, this video adds to my general understanding of Borlaug and his work.

## Secondary Sources

AgBioWorld. "Quotes on Norman Borlaug." *AgBioWorld*,  
[www.agbioworld.org/biotech-info/topics/borlaug/quotes.html](http://www.agbioworld.org/biotech-info/topics/borlaug/quotes.html). Accessed 5 Feb. 2021.

This site has 19 impactful quotes regarding Borlaug and the Green Revolution, all showing how significant Borlaug and the movement came to be and how it has a definite spot in today's agriculture. One of the most awe-striking quotes was one

by Professor M. S. Swaminathan's, saying, "Norman Borlaug is the living embodiment of the human quest for a hunger free world. His life is his message." Though it's only of 2 sentences, its words still bring out much more.

Basu, Salikat Kumar, et al. "Is Genetically Modified Crop the Answer for the Next Green Revolution?" *PubMed.gov*, Saikat Kumar Basu, Madhuleema Dutta, Aakash Goyal, Pankaj Kumar Bhowmik, Jitendra Kumar, Sanjib Nandy, Sandra Mansun Scagliusi, Rajib Prasad, [pubmed.ncbi.nlm.nih.gov/21865874/#:~:text=Post%2Dgreen%20revolution%20advances%20made,cotton%20and%20several%20other%20crops](https://pubmed.ncbi.nlm.nih.gov/21865874/#:~:text=Post%2Dgreen%20revolution%20advances%20made,cotton%20and%20several%20other%20crops). Accessed 13 May 2021.

This site provided valuable information about genetically modified crops and the Green Revolution's impact on both the development and usage of them.

Burton, Tony. "Did You Know? The Green Revolution Began in Mexico." *Mex Connect*, 2009, [www.mexconnect.com/articles/3393-did-you-know-the-green-revolution-began-in-mexico/](http://www.mexconnect.com/articles/3393-did-you-know-the-green-revolution-began-in-mexico/). Accessed 7 May 2021.

This website focuses on the first stages of the Green Revolution in Mexico, explaining what changes were made there, what conflicts arose, and what impact it left on Mexico as it spread globally.

The Editorial Board, and The Wall Street Journal. "Battering Norman Borlaug." *Battering Norman Borlaug*, 24 April 2020. *The Wall Street Journal*, [www.wsj.com/articles/battering-norman-borlaug-11587769611?mod=article\\_inline](http://www.wsj.com/articles/battering-norman-borlaug-11587769611?mod=article_inline). Accessed 1 Mar. 2021.

This article reviews on the PBS documentary called "The Man Who Tried to Feed the World: A Tale of Good Deeds and Unintended Consequences." For my research, I've seen the documentary before, and while reading this article, I could compare my thoughts on the film to the Editorial Board's (authors). It highlights an iron law that fits exactly to the PBS film, on the authors' account. "Be successful at what you do, and sooner or later you will be labeled an enemy of the people." (from the article)

Environmental History Resources. "Malthus, Population and Environment, a Short Bibliography." *Environmental History Resources*, [www.eh-resources.org/malthus-bibliography/](http://www.eh-resources.org/malthus-bibliography/). Accessed 4 Feb. 2021.

This website was very detailed and gave information on Thomas Malthus and his theory, the Malthusian theory of population growth, that population can't equally pace with how much time it takes for food production. With visuals like images, a graph, and a video, this website filled several holes of what was happening before the Green Revolution.

Gillis, Justin, and New York Times. "Norman Borlaug, Plant Scientist Who Fought Famine, Dies at 95." *New York Times* [New York], 13 Sept. 2009. *New York Times*, [www.nytimes.com/2009/09/14/business/energy-environment/14borlaug.html#:~:text=In%201953%2C%20Dr.,a%20large%20amount%20of%20wheat](http://www.nytimes.com/2009/09/14/business/energy-environment/14borlaug.html#:~:text=In%201953%2C%20Dr.,a%20large%20amount%20of%20wheat). Accessed 27 Jan. 2021.

This news article provided me more than enough information and walked me clearly through the important stages and events in Borlaug's life. With various quotes and images that helped add to Borlaug's story, this article suggested new ideas and perspectives, and a bigger picture to the Green Revolution.

Hartford, Tim, and BBC News. "The Man Who Helped Feed the World." *BBC News*, 12 June 2019. *BBC News*, [www.bbc.com/news/business-47643456](http://www.bbc.com/news/business-47643456). Accessed 3 Mar. 2021.

This BBC reporting of Norman Borlaug and some stories of when he was working for the right wheat strain in Mexico. It also mentions the book "Population Bomb" by Paul Ehrlich and the Malthusian theory of population growth.

"The History of Farmers." *Gale U.S. History Online Collection*, Gale, 2019. *Gale In Context: U.S. History*, <https://link.gale.com/apps/doc/URSOCV178373290/UHIC?u=fairfaxcps&sid=UHIC&xid=f75fbf40>. Accessed 16 Dec. 2020.

This academic journal provides information on the history of farming, such as synopsis, the foundation of agriculture, industrialization and organization, artificial scarcity, the Green Revolution, and the rapidly expanding technology that has taken over the world, including agricultural innovation. This source is helpful because I can easily see what the agricultural systems were like before the Green Revolution was developed and why they needed a change.

<https://www.pbs.org/video/borlaug-starts-green-revolution-22790/>

This short clip on Norman Borlaug's time in Mexico in the 1940's and how it spread out to Pakistan and India was very informative and included many short interviews that helped me see the bigger picture. This video also showed how much dedication and persistence he had to his work; he volunteered to go to Mexico when nobody else would, he could've had a successful, rich life in America but he chose to risk it, and when people would usually just supervise the Mexican farmers working, Norman Borlaug got up before them and worked alongside them.

Kuroski, John, and All That's Interesting. "47 Dust Bowl Pictures That Are Still Haunting Today." *All That's Interesting*, 30 Nov. 2016, [allthatsinteresting.com/dust-bowl-pictures#31](http://allthatsinteresting.com/dust-bowl-pictures#31). Accessed 5 Feb. 2021.

This website gave me walked me through the experiences and damages relating to the Dust Bowl of 1930 through its many visuals. Even though this website has no

words but the descriptions for the photographs, with a gallery that contains 47 pictures, it shows me very undeniably the grave situation of the Dust Bowl.

Lobb, Richard L. "Green Revolution." *Encyclopedia of Food and Culture*, edited by Solomon H. Katz, vol. 2, Charles Scribner's Sons, 2003, pp. 155-157. *Gale In Context: U.S. History*, <https://link.gale.com/apps/doc/CX3403400302/UHIC?u=fairfaxcps&sid=UHIC&xid=15cd94fe>. Accessed 14 Dec. 2020.

This academic journal focusing on Norman Borlaug and the Green Revolution helped me understand the big project in general and the process of the Green Revolution. It also gave me information about the consequences of the Green Revolution's spread around the world. The article showed how important its success was, but also offered some criticisms.

Mann, Charles. *The Wizard and the Prophet: Two Remarkable Scientists and Their Dueling Visions to Shape Tomorrow's World*. Charles C. Mann, 2018.

This book is about two brilliant scientists whom we know very little about despite the huge environmental changes they brought to our world: William Vogt and Norman Borlaug. They had the exact opposite view on what to do with our future population continuing to grow immensely and how our environment can support that. This book explains the two different groups who have different perspectives of said topic in a rather fun way, and gives me context and more knowledge on Borlaug's thoughts and purposes.

*Norman E. Borlaug- Extended Biography*. World Food Prize Foundation, [www.worldfoodprize.org/en/dr\\_norman\\_e\\_borlaug/extended\\_biography/](http://www.worldfoodprize.org/en/dr_norman_e_borlaug/extended_biography/). Accessed 8 Jan. 2021.

This biography of Norman Borlaug leads me through the stages of his life and how many events impacted him, like living during the Great Depression and seeing all the starvation soon motivated him to dedicate himself on solving world hunger issues. Alongside his life, this biography gives details on his work in several organizations, countries, and events, by the perspective of the World Food Prize Foundation, who worked with Norman Borlaug for many years.

O'Neill, Natasha, and CHERESEARCHERS. "The Faces of Depression-Era Hunger." *Histories of Emotion*, 2 Mar. 2018, [historiesofemotion.com/2018/03/02/the-faces-of-depression-era-hunger/](http://historiesofemotion.com/2018/03/02/the-faces-of-depression-era-hunger/). Accessed 5 Feb. 2021.

This website goes deeper into famine during the Great Depression and the sacrifices that goes along with it. With the stories packed inside the words and images, this site helped add on to my knowledge of problematic events that lines up with hunger.

Peter Hedden, The genes of the Green Revolution, Trends in Genetics, Volume 19, Issue 1, 2003, Pages 5-9, ISSN 0168-9525, [https://doi.org/10.1016/S0168-9525\(02\)00009-4](https://doi.org/10.1016/S0168-9525(02)00009-4). (<https://www.sciencedirect.com/science/article/pii/S0168952502000094>)

This section of a collection introduces me to Borlaug's creation that I had trouble understanding from just texts that focuses on other things in the Green Revolution. This reading gave me a good understanding of the strains used for the movement.

Pritchard, Forrest, and The Wall Street Journal. "Amber Waves' Review: Cereal Drama." *The Wall Street Journal*, 10 no 2020. *The Wall Street Journal*, [www.wsj.com/articles/amber-waves-review-cereal-drama-11604266382?mod=searchresults\\_pos1&page=1](http://www.wsj.com/articles/amber-waves-review-cereal-drama-11604266382?mod=searchresults_pos1&page=1). Accessed 1 Mar. 2021.

This website is a review on the book "Amber Waves: The Extraordinary Biography of Wheat, From Wild Grass to World Megacrop" by Dr. Catherine Zabinski, a professor of plant and soil ecology. The article talks about our history with wheat, which has been, according to the article, It helps me realize the importance of wheat and goes over a foundational question. It goes through the book and through the history of wheat and how it's intertwined with humans, since, for example, daily staple of bread that people rely on is made from wheat.

Public Broadcasting Service, and American Experience, producers. *The Man Who Tried to Feed the World: A Tale of Good Deeds and Unintended Consequences*. Public Broadcasting Service, 2020.

"The Man Who Tried to Feed the World: A Tale of Good Deeds and Unintended Consequences" was a very informative film about Norman Borlaug and his life, how he tried to solve famine, and went on to lead the majestic Green Revolution. Lots of pictures and descriptive narrations helped me through the video. It gives some criticism on Borlaug and his technique, "going light on the lives saved and heavy on the "unintended consequences."" (from WSJ article: Battering Norman Borlaug), which helped me learn about a dark side lurking behind the revolution.

Santos, Joseph. "Wheat and Other Cereal Grains." *History of World Trade Since 1450*, edited by John J. McCusker, vol. 2, Macmillan Reference USA, 2006, pp. 809-813. *Gale In Context: U.S. History*, <https://link.gale.com/apps/doc/CX3447600435/UHIC?u=fairfaxcps&sid=UHIC&xid=966d7eba>. Accessed 17 Dec. 2020.

This academic journal tells a lot about cereal grains like what they are are how they're resourceful and how people used them back then. This adds to my background knowledge, with events that happened before the Green Revolution.

Selvaraj, Velu Mani, and Science India. "Norman Ernest Borlaug: Father of Green Revolution." *Science India*, [scienceindia.in/home/view\\_blog/17](http://scienceindia.in/home/view_blog/17). Accessed 1 Mar. 2021.

This blog is a biography on Borlaug and what hardships he faced that he had to overcome before the success of the Green Revolution. It helped me get a few new ideas on how Borlaug was a strong communicator. For example, in Mexico, he had to convince Mexican farmers to trust him to help them, considering it would be hard to believe in someone from a whole different country that they just met. Also, to better communicate with these Mexican farmers, he learned Spanish so they could easily discuss ideas on how to improve wheat techniques.

Shaikh-Lesko, Rina, and The ScientistW. "Wheat Whisperer, circa 1953." *The Scientist*, 1 June 2014. *The Scientist*, [www.the-scientist.com/foundations/wheat-whisperer-circa-1953-37409](http://www.the-scientist.com/foundations/wheat-whisperer-circa-1953-37409). Accessed 5 Feb. 2021.

This digital version of The Scientist's article is about the Green Revolution's crops and wheat cultivars. It tells me how "The Green Revolution of the 20th century began with Norman Borlaug's development of a short-statured, large-grained wheat." and how stepping further later led to the major movement.

University of Minnesota. "Taking the Mexican 'Miracle Wheat' to the World's Farmers: 1961-1969." *Taking the Mexican 'Miracle Wheat' to the World's Farmers: 1961-1969*. University of Minnesota, [borlaug.cfans.umn.edu/borlaug/1961-1969](http://borlaug.cfans.umn.edu/borlaug/1961-1969). Accessed 5 Feb. 2021.

This website gave me a quick run-through of Borlaug's life through the years and showed me partly how his creation of "miracle wheat" influence the world. Even though this article was brief, it showed me the difference Borlaug really brought to the world in various places.

World Food Prize Foundation. "How Norm Inspired Me." *World Food Prize Foundation*, 2019, [www.worldfoodprize.org/en/dr\\_norm\\_e\\_borlaug/how\\_norm\\_inspired\\_me/](http://www.worldfoodprize.org/en/dr_norm_e_borlaug/how_norm_inspired_me/). Accessed 4 Feb. 2021.

This website explains to me the "#RememberingBorlaug" movement that has been going on online for people to post their favorite photo of Borlaug on March 25th, 2019; what would've been Borlaug's 105th birthday. It gives me numerous videos and quotes of people sharing their stories on how Borlaug inspired and changed their lives.