

ARE ORGANIC FOODS BENEFICIAL TO SOCIETY?

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ABSTRACT OF THE DISSERTATION
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This study examines the overall net benefits of organic foods. Considering the extra costs to the consumer, the economic, social, and environmental impacts one might ask if the organic food industry is providing net benefit to society. This research reviews consumer perceptions regarding organic food products along with consumer demand for organic foods. This information reveals the consumer decisions when purchasing food. It explains why the organic food industry is expanding so fast. This study also examines how the organic certification policy and process impact the costs of the organic foods in a country and if paying a premium is worthwhile or justified. This research uses both a qualitative and quantitative approach to achieve the study goals. This study also addresses the uneven distribution of organically labeled foods between suppliers (South) and consumers (North), along with relevant environmental issues. Applying a case study, this paper will analyze the challenges faced by producers and consumers, the uneven distribution of the organic food in the North and South focusing on issues such as water scarcity, soil contamination and industrial seafood farming. My findings indicate that the level of development and the wealth in any specific country impacts the level of acceptance of organic foods and this study also reveals that benefits of consuming organic foods are still not significantly known. Further research is needed on the correlation between organic certification policy and process between the costs of the organic foods in a country.

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List of Abbreviation and Acronyms

LS	Bureau of Labor Statistics
AMS	Agricultural Marketing Service
ANDAH	Association of Shrimp Framers of Honduras
AUS	National Standard for Organic and Biodynamic Produce (Australia)
CDC	The U.S. Centers for Disease Control and Prevention
COI	Cost of illness
CP	Charoen Phakpond
EC	European Council Regulation
EFJ	European Federation of Journal
ERS	Economic Research Service
EU	European Union
FAO	The Food and Agriculture Organization
FAS	The Foreign agricultural Service
FDA	Food and Drug Association
FiBL	The Research Institute of Organic Agriculture
FSIS	Food Safety & Inspection Service
GAO	General Accounting Office
GDP	Gross Domestic Production
GMO	Genetically Modified Organism
GODDEAF	Grassroots Committee for the Defense and Development of the Flora
FAGOLF	and Fauna of the Gulf of Fonseca
GPRA	Government Performance and Results Act
HACCP	Hazard Analysis Critical Control Points
IFOAM	Organic International
IFSE	Institute for Food Science and Engineering at Texas A&M University
LPO	Ley de Productos Organicos (Mexico)
MAFF	The Japanese Ministry of Agriculture, Forest and Fisheries
NACA	Network of Aquaculture Centers in Asia Pacific
NGO	Non-Governmental Organization
NOP	The National Organic Program
NPOP	National Programme for Organic Production (India)
NSOB	National Standard of Organic Board
OFPA	The Organic Foods Production Act
ORACBA	Office of Risk Assessment and Cost Benefit Analysis
OSP	Organic System Plan

QCS	Quality Certification Services
RIA	Regulatory Impact Assessment
SPS	Sanitary and Phytosanitary
SSOP	Standard Sanitary Operating Procedures
TBT	Technical Barriers to Trade
UOS	Uganda Organic Source (Uganda)
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USTR	Office of the United States Trade Representative
VOSL	Value of a Statistical Life
WHO	World Health Organization
WTO	World Trade Organization
WTP	Willingness to Pay
WWF	The World Wildlife Fund

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Introduction

Today, organic is a mega billion-dollar business. Reganold and Watcher describe sales of organic foods and beverages as the most rapidly growing market segment in the global food industry, growing almost fivefold between 1999 and 2013 to US\$72 billion¹. According to Organic Trade Association, “the US totaled around \$47 billion in 2016, reflecting new sales of almost \$3.7 billion from the previous year”².

At the same time researcher Crystal L Smith-Spangler at Stanford University Medicine argues that, “There’s a definite lack of evidence”, especially when it comes to studies on people³. Critics of organic agriculture consider organic farming inefficient, that there are too many shortcomings, and that adopting organic agriculture on too large a scale could potentially threaten the world’s forests, wetlands and arable land. Skeptics considered organic agriculture to be ideologically driven⁴.

Aschemann-Witzel & Zielke argue that despite considerable growth rates, organic farming is still practiced on less than 1% of the world’s agriculture land⁵. Over the course of my research, I learned that China already has the fourth largest organic agricultural area and has added the largest number of hectares to its certified land area in 2011⁶. This assignment is larger than that of any other country. On the other hand, there is increasing concern regarding soil and water pollution in China. China’s per capita arable land area is less than half the world average and per capita arable water is about one quarter of the world average⁷. This data prompts me to explore the organic food industry in the North and the

¹ Reganold & Watcher 2016

² Organic Trade Association 2016

³ Smith-Spangler et al 2012

⁴ Bergström & Krehmann 2016

⁵ Aschemann-Witzel & Zielke 2014

⁶ Loebnitz & Aschemann-Witzel 2016

⁷ Lu et al 2015

South focusing on issues such as water scarcity, soil contamination, industrial seafood farming, and GMO in the global environment as whole.

I am from Japan and I extended my research to include Japan's organic industry and marketing strategies. As a result of my research, I found that Japan is one of the biggest food importers in the world; the country imports 60% of the food supply on a calorie basis from other countries. When retail and food services are combined the Japanese market is well over \$820 billion⁸ and there are serious food safety concerns among Japanese consumers. The growth potential of the organic market is significant.

According to the Japanese Ministry of Agriculture, Forest and Fisheries (MAFF), organic food in domestically grown agricultural products in Japan accounted for only 0.24% in 2011, but was still an increase, up 0.14% points from a decade ago⁹. However, it is small compared to Europe, the US, Korea and China. Organically grown agricultural food products in Italy is 8.6%, in Germany is 6.1%, UK is 4.0%, and France is 3.6%. The US and Canada lag behind Europe. Canada is 1.2%, the US is 0.6%. Korea is at 1.0%, China is 0.4%¹⁰, so even when compared to other countries in Asia. Japan is very low on the organic agriculture scale.

While concerns regarding environmental protection and food safety are rising, MAFF has been promoting a natural recycling system for domestic agriculture which it is hoped will maintain or increase the availability of land for organic farming. The system will enforce three rules.

1. Non-use of chemically synthesized fertilizers and agricultural chemicals

⁸ Motomura & Shnitzler 2015

⁹ Motomura & Shnitzler 2015

¹⁰ Ministry of agriculture and forestry and fisheries 2013

2. Exercising the productivity of the soil
3. Apply a cultivation method to minimize negative effects on the environment as much as possible¹¹

Over the years, despite MAFF's efforts to implement regulations and grading criteria, the desired outcome has not been achieved. Japan is a highly developed country and one of the leading countries in terms of economics and educational levels, so the data convinced me to address the reasons why domestic growth of organic agriculture in Japan is not as advanced as one would expect.

This study aims to:

1. Examine the overall net benefits of organic foods. Considering the extra costs to the consumer, the economic, social, and environmental impacts one might ask if the organic food industry is providing net benefit to society. Are the benefits large enough to outweigh the costs in the long-run? This research will review consumer perceptions regarding organic food products along with consumer demand for organic foods. I seek to determine if decisions consumers make are based on scientific evidence that organic food is healthier, or if it is a popular trend that will run its course and fade away. This information will be vital in analyzing consumer decisions when purchasing food. It is expected that the analysis will explain why the organic food industry is expanding so fast, and why Japan is lagging behind other countries. A comparison between Japan and trends in other countries will help refine the results. If in fact there are net benefits, positive or externalities, then

¹¹ Ministry of agriculture and forestry and fisheries 2007

perhaps Japan should develop an economic model that subsidizes the organic food industry.

2. This study also examines how the organic certification policy and process impact the costs of the organic foods in a country. I can select no more than 6 countries and select 3 products to make the research model for comparisons and analysis. With the data, I will examine to answer my question, if paying a premium is worthwhile, or justified.
3. Address the uneven distribution of organically labeled foods between suppliers (South) and consumers (North), along with relevant environmental issues. According to the World of Organic Agriculture, 2015, countries like India, Ethiopia, Mexico are big producers of organics products and the top countries in per capita consumption are Switzerland, Denmark, Sweden. With 179 countries producing organic crops, production has become global. However, over 90 percent of the organic foods grown in Latin America are produced exclusively for export markets. It suggests that organic farming should be included in an economic strategy for developing countries. Countries that have a comparative advantage, such as abundant biodiversity, cheap labor, government subsidiary would benefit from leveraging the demand for organic food. Less government regulation may help lower the cost of production. Applying a case study, this paper will analyze the challenges faced by producers and consumers, the uneven distribution of the organic food in the North and South focusing on issues such as water scarcity, soil contamination and industrial seafood farming.

In this paper I will provide the following:

1. Review of existing published work
2. History and current state of organic agricultural regulation in the US and Japan, and other selected countries
3. Research method I: To understand consumer's purchasing decisions on buying organic products
4. Research method II: To test the hypothesis correlation between organic the organic certification policy and process impact the costs of organic foods in a country
5. Present a case study: Shrimp farming in developing countries to discuss north and south issue
6. Draw conclusions, identify a potential path forward, and future research

This research will use both a qualitative and quantitative approach. As mentioned in the problem statement, there are three major questions to be answered.

First, the aim is to understand consumer's purchasing decisions regarding whether or not to buy organic products, and then to assess the impact of those decisions on organic foods industries which have seen dramatic development, expansion and accelerating growth rates. There is a substantial amount of literature that demonstrates a need for more research on the organic food industry.

Renee Shaw Hughner et al in 2007 used an exclusive research method and approach in their paper. The authors explain how their paper integrates and synthesizes the findings of published research on organic food consumption¹².

Hughner et al. set procedures and narrowed the focus to include only empirical studies related to organic food published in the 20-year period between 1985 and 2005. They then

¹² Renee Shaw Hughner et al. 2007

extracted several themes that explain motives and deterrents that may impact consumer decision on purchasing organic foods. Their studies occurred mainly in Europe and the US and the publications they reviewed were published around three decades ago. The most recent one available was in 2005, over 10 years ago. In this paper, I will adopt Hughner et al.'s approach, and update their study to include more recent information. In this paper I will include research published in more recent years, reviewing changes in the literature that relate to organic food publications between 2000-2020. The study will select 33 existing studies on organic food consumption that were published in European countries, the US, Japan and other advanced countries in Asia.

Second, I aim to examine how the organic certification policy and process impact the costs of organic foods in a country. Comparison model will be created for 6 countries and then data will be collected. Next, a statistical analysis will be conducted for all the data that has been gathered.

This paper will obtain reliable secondary data that enable to support researcher in conducting a comprehensive analysis to solve the particular questions under investigation. In order for the data to be illustrative for the study, a set of diverse countries will be selected, and ensure availability of sufficient data for each country in all categories described below.

Data Sources

1. Previously published survey results on illustrative research pertaining to consumers and organic food in selected 33 countries
2. Survey results Online Survey results from Bell Maison Lifestyle Research
3. Survey results from FiBL
4. Statistic data from the World Organic Agriculture

5. Statistic data from FAO Stat,
6. Statistic data from Agricultural Market Information System

Chapter One: Literature Review

A number of articles were reviewed and used to develop the data and information referenced in this research. Subject matter articles were accessed through websites, articles, textbooks, research papers, and surveys in the field and formed the basis for information needed to develop this dissertation. This section is broken into two parts. Part A discusses sources and references covering organic agriculture regulation, and Part B discusses available references covering economic regulation.

Organic Agriculture Regulation

Under this topic, a broad approach was taken to demonstrate information to support this effort. This approach is structured in six steps:

1. Overview of current organic industry status
2. The reasons of organic boom
3. History of organics
4. Emergence of organic regulation
5. Discussion of global regulation and regional regulation
6. The harmonization efforts and the gap between the regulatory functions

The organic food industry is one of the fastest growing sectors of world agriculture¹³. Throughout the 1990s's sales of organics in the United States grew by 20% each year, and certified organic cropland more than doubled¹⁴. "Organic" is one of the most powerful words in the national food marketplace¹⁵. Willer and Lernoud describe that the year 2017 was another record year for global organic agriculture. According to the

¹³ Verena Seufert, et al. Food Policy 68 (2017) 10-20

¹⁴ Michelle T. Friedland (2005)

¹⁵ Michelle T. Friedland (2005)

Central European Bank, global organic food and drink sales reached 97 billion US dollars¹⁶. Although currently 1.4% of the world's agricultural land is organic, the number of organic producers and organic retail sales continued to grow and reached another all-time high¹⁷. Organic foods are associated with some premium pricing over conventionally produced counterparts' items, but consumers are willing to pay a higher price and the organic food industry is booming.

Toomey explains that in the United States, the organic boom is due to increasing health and environmental concerns, as well as calls for increased flavor and nutrition, which have been the biggest contributors to the consumer demand for organic products¹⁸.

According to Verena Seufert, et al. the original concept of organic agriculture developed as a critique of the emerging industrial food system in the 1920s to 1950s. The organic food industry in the United States can trace its roots back to at least 1942¹⁹. The organic movement usually attributes its foundation to Jerome Rodale, a health-fanatic from New York who started Organic Farming and Gardening in 1940s. Rodale used the magazine as a platform to promote the ideas of Sir Albert Howard (1873-1947), a knighted English agronomist, who believed that using compost to enhance soil fertility instead of chemical fertilizers resulted in a healthier soil structure, more nutritious food, and subsequently, healthier human beings²⁰. His concept became the eleemosynary foundation for organic agriculture. Although initially Rodale suffered ridicule for his ideas, interest in avoiding pesticides grew after Rachel Carson published *Silent Spring* in 1962. By the early 1970s,

¹⁶ FiBL & IFOARM – Organic International (2019): The World of Organic Agriculture Statistics and Emerging Trends 2019

¹⁷ H. Willer and J. Lernoud FiBL & IFOARM – Organic International (2019): The World of Organic Agriculture Statistics and Emerging Trends 2019

¹⁸ Erin Toomey (2014)

¹⁹ Michelle T. Friedland (2005)

²⁰ Kate Harrison (2008)

farmers were marketing food as organic²¹. But it was only in the 1980s, driven by an emerging environmentalism and health concerns about exposure to pesticides, antibiotics and hormones, that organic agriculture, which promised a more “natural” and healthier agriculture, experienced a surge in popularity²². Some farmers, however, apparently tried improperly to obtain the price premium consumers were willing to pay for organic food by labeling conventional food as organic²³.

Harrison writes that as a miniscule segment of the food economy, organic food was largely ignored by the government for many years. This was a problem because, as an unregulated industry amoral producer could use organic claims unscrupulously to bolster the sales their products²⁴. In response to allegations of such fraudulent activity, Oregon passed the first organic

As organic sales began to sky-rocket, organic farming organizations and consumers group started lobbying for a legal regulation of the organic label and of organic practices, resulting in the development of national organic standards beginning in the 1980s²⁵.

Seufert, et al. describe that in the United States, the first stated-level organic regulations emerged in the 1970s, followed by the National Organic Program (NOP) nearly 30 years later. The NOP resides as a part of USDA. Detailed information covering USDA certification for organic food is reviewed and discussed in Chapter 2.

Figure 1 shows the milestone of the organic sector in the United States starting in 1940s with the America’s first organic farm established in Pennsylvania through 2018.

²¹ Michelle T. Friedland (2005)

²² Verena Seufert, et al. (2017)

²³ Michelle T. Friedland (2005)

²⁴ Kate L. Harrison (2008)

²⁵ Verena Seufert, et al. (2017)

Figure 1: Milestones of the organic sector in the United States²⁶

North America › United States › Milestones	
Milestones of the Organic Sector in the United States	
Year	Milestone
1946	Walnut Acres in Penns Creek, Pennsylvania, billed as America's original organic farm. Its apple butter was the first processed food marketed as organic in the United States.
1947	American publisher and entrepreneur J.I. Rodale founds the Rodale Institute.
1971	Northeast Organic Farmers Association founded in Vermont and New Hampshire (later added three other chapters and changed name to Northeast Organic Farming Association).
1985	As a result of discussions at a 1984 IFOAM meeting in Michigan, the Organic Foods Production Association of North America (OFFANA) incorporated as a non-profit corporation. In 1994, it changes its name to the Organic Trade Association.
1990	The Organic Farming Research Foundation is founded with the goal of advancing organic agriculture research.
1990	In September, Congress passes the Organic Foods Production Act as part of the 1990 Farm Bill, thus establishing national organic standards.
1996	The Organic Materials Review Institute Incorporated.
2000	US Congress enacted the Risk Management Act of 2000 that recognizes organic farming as a good farming practice and provides funding for organic risk management.
2000	The Organic Trade Association and IFOAM sign a memorandum of understanding to integrate the America Organic Standards into IFOAM's International organic guarantee system.
2000	Final rule establishing the National Organic Program published on Dec. 21.
2002	National Organic Program fully implemented in October.
2004	The Organic Trade Association begins managing the Organic Export Initiative funded by USDA's Foreign Agricultural Service's Market Access Program.
2006	The Global Organic Textile Standard (GOTS) is introduced as an international organic textile standard.
2009	Officials from Canada and the US sign the first bilateral organic equivalency agreement in the world.
2011	USDA's National Organic Program in May releases a Policy Memorandum addressing the labeling of textile products containing organic ingredients such as organic cotton, organic wool, and organic linen.
2012	US and European Union officials sign an historic organic equivalence arrangement at Biofach in Germany.
2013	US and Japanese officials sign an organic equivalence arrangement.
2015	Creation of the Organic Integrity Database listing all certified organic operations meeting National Organic Program standards.
2016	Conclusive "Hot Spots" research shows organic agriculture boosts local economies (Jansen et al. 2016)
2017	Organic Trade Association sue USDA over failure to advance organic livestock standards.
2018	A groundbreaking study shows organic agricultural practices build healthy soils and can help fight global warming (Ghabbour et al. 2017).
2018	Historic advancements and permanent research funding for organic in the 2018 Farm Bill.

Compiled by Barbara Haumann, Organic Trade Association

²⁶ FiBL & IFOARM – Organic International (2019): The World of Organic Agriculture Statistics and Emerging Trends 2019, Page 281. This milestone was compiled by Barbara Haumann, Organic Trade Association.

By 1990, twenty-one other states had passed laws of regulating organic food labeling however each of these laws slightly different, creating conflicting regulatory requirements for organic food labeling across the country²⁷. Harrison says that at one time, food labeled “organic” in the supermarket could contain anywhere from 20-100% organic ingredients and even these foods were competing with a number of other labels, including “ecologically grown,” “natural,” “wild,” and “residue free”, even savvy consumers were struggling to decipher the meaning of different labels²⁸. The market was in need for unifying the standards. Unsurprisingly, companies’ operation on a national level, the large-scale agribusiness, first pushed for federal regulation of organic food production, labeling, and distribution (although organic organization quickly got involved in the process). Congress began working on the regulations with initial goal of creating consistent federal regulations that would eliminate consumer confusion by providing “a clear picture of just what organically grown means²⁹. The Organic Foods Production Act, (OFPA) enacted under Title 21 of the 1990 farm bill, authorized the NOP to set these process-based national standards for the processing, production, handling of the organic growing food products. The stated purposes of the OFPA are:

1. To establish national standards governing the marketing of certain agricultural products as organically produced products.
2. To assure consumers that organically produced products meet a consistent standard.

²⁷ Michelle T. Friedland (2005)

²⁸ Kate L. Harrison (2008)

²⁹ Kate L. Harrison (2008)

3. To facilitate interstate commerce in fresh and processed food that is organically produced³⁰.

The first European wide organic regulation was established in 1991, replacing national regulations that had been established in most countries since the 1980s. In recent year, more and more low- and middle-income countries have started implementing organic regulations in order to ease trade with high-income country market. According to the Research Institute of Organic Agriculture (FiBL) which is one of the world's leading institutes in the field of organic agriculture, survey on standards and legislation, 93 countries had organic standards in 2018, and 16 countries were in the process of drafting legislation. At least 29 countries in Africa, and Oceania, have adopted national or regional standards for organic agriculture. At the international level, several organizations are attempting to harmonize organic standards globally. The international Federation of Organic Agriculture Movement (IFOAM) (an umbrella organization founded in 1972) and Codex Alimentarius (set up by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO) in 2001) aimed to establish a consensus definition of organic practices across different countries that facilitate free trade.

Today, the organic certified label is one of the most widely recognized food labels and most people in developed countries consume some of organic food³¹. Organic agriculture is often viewed as the best practice to contribute sustainability objectives. The organic consumers predominantly purchase organic because they believe that “chemical-free” farming makes it healthier and tastier. The most of consumers understand the basic

³⁰ Erin Toomey (2014)

³¹ Verena Seufert, et al. (2017)

meaning of products. And organic is the only farming system whose management practices are codified by law in most countries³². The consumers can rely with food safety regulation on organic certification process. However, despite of the booming market and the regulation has been implemented for 30 years, the definition of organic has a wide range of interpretation by different actors. The information that appears on an organic label is variable and depends on the percent of certified ingredients, as well as the manufactures' or supplier's desire to advertise the product as organic³³.

Verena Seufert et al. argue that the interpretation of organic as “chemical-free” farming does not entirely unify the original idea of organic that theoreticians who developed the concept as a holistic agriculture system aimed principally at improving soil more fertile and healthy in result would make crops healthier to eat and which lead animal and human, and societal health³⁴. The challenge is that lack of the understanding the principal of organic farming makes organic practice not aligned with it and contribute to “sustainable”. The researchers describe that regulation and certification is central to the current concept of organic agriculture in the most counties. Regulations are therefore a useful place to start understanding how the views of the different organic actors have been codified and what organic agriculture means today³⁵.

Verena Seufert et al. came up with this interesting approach where they examine eight different organic regulations from the international level to understand how the organizations have defined and codified organic agriculture.

³² Verena Seufert, et al. (2017)

³³ Daniele D. Treadwell and Mickie E. Swisher (2008)

³⁴ Verena Seufert, et al. (2017)

³⁵ Verena Seufert, et al. (2017)

The researchers selected a set of representative countries across the world. To identify the most crucial countries, they utilized the recent global organic data to select the top three countries under four different criteria. The table 2 shows that the following 11 countries were selected by this process: India, Uganda, Mexico, Australia, Argentina, USA, Falkland Islands, Austria, Sweden, Germany, France. For European countries the new harmonized EU regulation was analyzed. Australia does not have a legally binding organic regulation. Instead, the researchers used the National Standard for Organic and Biodynamic Produce, a voluntary standard for organic industry defined by the Australian government. In Argentina, organic agriculture is regulated through a large number of separate laws and there is no single organic standard. For that reason, the researchers exclude Argentina from the analysis. Overall, the researchers examined 8 different organic regulations representing 33 different countries³⁶. (Shown as the table 3.)

The researchers conducted this examination in use of several approaches to compare how organic agriculture is discussed in these selected regulations. First, the researchers classified various management practices in different regulations. The monument practice considered included land management, crop production, livestock production and processing. Second, they conducted a content analysis to assess the importance of different organic principles in regulations using a qualitative weighting and scoring approach. They identified seven key organic principles discussed in regulations: (1), natural, (2) local, (3) soil, (4) water, (5) biodiversity, (6) animal well-being, (7) human health. Next, the researchers created matrix and then they assigned scores to each

³⁶ Verena Seufert, et al. (2017)

regulation based on how strongly the relevant principles was represented in the discussion of each management practice. (See table 4.)

Absence of synthetic inputs is the single most important principle in almost every one of the regulations examined. The principle of “natural” does not however, only relate to non-synthetic inputs. Many regulations emphasize that the use of allowed should only be considered a last resort, when other measures have failed to achieve the intended management goal. Many current debates about constitutes sustainable agriculture management are consistent with Albert Howard’s idea that soil health is a core, and that closing nutrient cycle in agriculture is an important environmental goal. Bringing some of these organic concepts back into organic regulations could thus connect organic agriculture back to its roots, while also addressing food system sustainability challenges³⁷.

Verena Seufert, et al. conclude that their examination of organic regulations highlight no major differences in the regulation of organic practices between different national and international organic regulatory texts. International trade in organic food contributed greatly to a harmonization of organic regulations between different countries. There are some differences in practices regarding different organic regulations, however, as global trade in organic produce continues to increase, the need for equivalency or harmonization of organic regulations will become more important³⁸.

³⁷ Verena Seufert, et al. (2017)

³⁸ Verena Seufert, et al. (2017)

Table 1: Values represent number of organic producers³⁹

Countries included in the analysis. Values represent number of organic producers; total area certified organic and in conversion to organic agriculture (in ha); % of total agricultural area that is organic; organic sales (in Mio. €). Values are for the year 2013 if not otherwise indicated. Source: (Willer and Lernoud, 2015).

	Country	2013 value
Countries with most organic producers	India	650,000
	Uganda	189,610
		(2012)
Countries with highest total organic agricultural area	Mexico	169,703
	Australia	17,150,000 ha
	Argentina	3,191,255 ha
	USA	2,178,471 ha
Countries with highest share of organic agricultural land ^a	Falkland Islands	36.3%;
		403,212 ha
	Austria	19.5%;
		526,689 ha
	Sweden	16.3%;
Countries with the largest domestic organic markets		500,996 ha
	USA	24,347 Mio. €
	Germany	7550 Mio. €
	France	4380 Mio. €

^a Note that Liechtenstein (despite having the second highest share of organic agricultural land) was excluded due to its small size.

³⁹ Verena Seufert, et al. Food Policy 68 (2017) 10-20

Table 2: Organic regulations included in the analysis⁴⁰

Organic regulations included in the analysis.

Country	Regulation name	References
International	Joint FAO/WHO Food Standards Programme, Codex Alimentarius, Organically Produced Food (2001)	FAO and WHO (2001)
International	The IFOAM Norms for Organic Production and Processing, Version 2005	IFOAM (2006)
Australia	National Standard for Organic and Biodynamic Produce – Edition 3.4 (2009)	AUS (2009)
European Union	Council Regulation (EC) No 834/2007 on organic production and labelling of organic products & Commission Regulation (EC) No 889/2008 laying down the rules for the implementation of EC No 834/2007	EU (2007) EU (2008)
India	National Programme for Organic Production (NPOP), sixth edition (2005)	NPOP (2005)
Mexico	Ley de Productos Organicos (LPO), Nueva Ley DOF 07-02-2006 & Lineamientos para la Operación Orgánica de las actividades agropecuarias, October 2013	LPO (2006), LPO (2013)
Uganda	UgoCert (2005), Uganda Organic Standard (UOS) for organic production and processing	UOS (2005)
United States	National Organic Programme, e-CRF Data as of November 1, 2013	USDA (2013)

⁴⁰ Verena Seufert, et al. Food Policy 68 (2017) 10-20

Economic Regulation

The theory of economic regulation was examined and discussed by Stigler and Peltzman. They argue that the central tasks of the theory of economic regulation are to explain who will receive the benefits or burden of regulation, what form regulation will take, and the effects of regulation upon the allocation of resources. Regulation is acquired by the industry, and political benefits is designed and operated primarily for its benefit⁴¹. Two main alternative views of the regulation of industry are:

1. Regulation is instituted primarily for the protection and benefit of the public at large or some large subclass of the public.
2. Essentially that the political process defies rational explanation⁴².

According to Stigler, the state possesses the control of physical resources and economic decisions of household and firms without consent that is power to coerce. These powers grant the opportunities for the industry to increase its profitability. The industry which seeks regulation must be prepared to pay with the two things a party needs: votes and resources. The expression of preferences is voting will be less precise than the expressions of preferences in the marketplaces because many uninformed people will be voting and affecting the decision⁴³. Anthony Downs (1957) had argued that voters would be “rationally ignorant” about most public policies because of weak incentives to acquire information. For this reason, Stigler argued, consumers were an unreliable ally of the rational regulator. By contrast, the producer stake was typically large enough to

⁴¹ George J. Stigler (1971)

⁴² George J. Stigler (1971)

⁴³ George J. Stigler (1971)

overcome rational ignorance⁴⁴. Stigler describes regulations whose net effects upon the regulated industry are undeniably onerous⁴⁵.

Regulations provide protection and benefit to the society, however there are costs that paid by heavy taxation. In other words, the cost of the regulation is paid by consumers and voters through taxes in the exchange of receiving protection policy and information on the products. Stigler points to four main policies which an industry may seek from the state:

1. A direct subsidy of money
2. Control over entry by new rivals (e.g. the protective tariff)
3. Support of substitutes and compliments. (e.g. the airline corporations support airports- compliments. The butter producers suppress margarine and encourage bread producers)
4. Class of public policies sought by industry is directed to price-fixing. Price discrimination.

These policies help the industry becomes more profitable however, more regulations, more agencies, and resources are needed to manage legislation generated through taxation which becomes a burden that will be imposed on the consumers and voters.

Peltzman evaluates Stigler's 1971 article, an integration of the economics of regulation and the economics of politics in which transactions between self-interested suppliers and demanders determine the regulatory outcome. Because of this supplier-demander framework, the body of theory pioneered by Stigler, and his analysis in the 1971 article is the first serious inquiry into the costs of expressing a politically effective demand to

⁴⁴ Sam Peltzman (1993)

⁴⁵ George J. Stigler (1971)

regulators. This yielded an emphasis on the importance of organized interest group that remains an important part of contemporary analysis of regulation⁴⁶. It has been to raise the awareness of researchers to scrutinize interest group pressures for an understanding of the effects of regulation. One approach that economists took was analysis of the benefits and costs of food safety regulation, impact assessment. Antle, in his paper, writes that Domsetz (1969) laid the intellectual foundations for regulatory impact assessment based on benefit-cost analysis. He was critical of the view that regulation was needed to correct every perceived market imperfection and insisted that policy should be guided by an assessment of “which alternative real institutional arrangement seem best able to cope with the economic problem...” Even when some form of regulation can yield positive net benefits, experience in the field environmental regulation has shown that the costs of regulations can depend crucially on how the regulations are designed⁴⁷. Peltzman points out that observing the pattern of establishment of new agencies and of enactment of laws affecting their operation for the 20 presidential terms from 1900 to 1980. Over this whole period, 49 agencies were established, and 334 regulatory laws were enacted. Of the laws not enacted during the Nixon-Ford years, around two-thirds were produced in the two surrounding Democratic administrations⁴⁸. The economic costs of Health Safety, Environmental (HSE) regulations have come to dwarf those of the older forms of regulation. This is mainly by the costs of environmental regulation, which imposes direct costs exceeding \$100 billion per year and entails forgone output at least this large (Grandall 1992)⁴⁹.

⁴⁶ Sam Peltzman (1993)

⁴⁷ John M. Antle (1999)

⁴⁸ Sam Peltzman (1993)

⁴⁹ Sam Peltzman (1993)

Peltzman's argues that Democratic administrations tend to expand spending but on the other hand other administrations attempted to tighten up the regulatory expenditure.

Antle shows the history of regulatory impact of assessment which supports Peltzman's argument that republican administrations attempt to reduce spending by using a regulatory impact assessment.

- The earliest attempts at regulatory appear to be the work begun under the Ford and Carter administrations in the 1970s to assess the impacts of regulations on inflation.
- In 1982 President Reagan issued an Executive Order requiring that major new regulations pass a benefit-cost test.
- Executive Order was renewed by both President Bush and Clinton with some modifications.
- The US Congress also passed the Government Performance and Results Act in 1993 which requires federal agencies to review and justify their programs in terms of quantifiable performance indicators, which could include benefit-cost assessments.
- Responding to increased demands for assessments of its programs, the US Department of Agriculture instituted an Office of Regulatory Assessment and Cost-Benefit Analysis in 1995.

The US government has taken the lead in conducting regulatory impact assessments based on benefit-cost analysis, a part of the policy formation process⁵⁰.

⁵⁰ John M. Antle (1999)

The researchers write that the food supply in the US is generally considered healthy, nutritious, and safe. However, the modern industrial food system may result in undesired or unanticipated outcomes that pose a health hazard for consumers⁵¹. In economic terms, public interventions are justified by the economic benefit from improved food safety. As demands for regulatory accountability have increased, governments are increasingly required to use risk assessment and benefit-cost analysis to evaluate whether existing or proposed food regulations enhance public welfare. The agencies are also under increased pressure to design effective regulations due to new requirements under the Government Performance and Results Act (GPRA) of 1993⁵². Foodborne illness costs 14 to 152 billion USD in lost productivity and life in the US⁵³. Buzby et al. (1996) suggest that, even with partial coverage of pathogens and cost categories, the annual overall cost of bacterial foodborne disease alone in the United States is from \$2.9 to \$6.7 billion in 1993 dollars⁵⁴. The cost is based on estimates of 3.6-7.1 million cases of food borne disease and 2600-6500 deaths per year. The US Centers for Disease Control and Prevention (CDC) and the FDA estimate that each year, between 6.5 and 33 million people in the US become ill from microbial pathogens in their food; of these, up to 9,000 die (CAST, 1994). Researchers argue that actual number of reported cases is much smaller averaging about 18,000 cases of food borne diseases for the period 1983-1987 (CAST, 1994)⁵⁵. Interestingly, estimates of damages caused by food borne illness vary largely by which organization calculates and the number of deaths and the different ranges.

⁵¹ Stephen R. Crutchfield et al. (1997)

⁵² Julie A. Caswell (1996)

⁵³ L. Unnevehr and V. Hoffmann (2015)

⁵⁴ Julie A. Caswell (1996)

⁵⁵ Stephen R. Crutchfield et al. (1997)

Stephen R. Crutchfield et al. discuss the regulation of meat and poultry products from the economist's perspective. Economic analysis of the costs of foodborne disease helps put the social burden of unsafe food into a broader perspective. Finally, economic analysis of food safety policies helps public-and private-sector decisionmakers rank policy options on the basis of expected costs and benefits⁵⁶.

The researchers provide the historical background of US meat and poultry regulation before 1996.

- The US inspection of meat and poultry products began in 1891, when Congress provided for inspection of salted pork and bacon in response to European fears of trichinosis, a parasite transmitted by eating or handling raw pork. The legislation provided for inspection when required by an importing country or when requested by a purchaser, seller, or exporter. This act became a global effort.
- The Congress added a meat inspection amendment to the annual Agricultural Appropriation Bill in 1906.
- Federal poultry inspection began as a voluntary program, on an ad-hoc basis, and was formalized under the authority of the 1946 Agricultural Marketing Act.
- New scientific knowledge about the communicability of poultry disease to workers were the principal factors leading to the 1957 Poultry Products Inspection Act.
- In 1962, motivated by a desire to lower costs, the House Appropriation Committee required the Secretary of Agriculture to survey all State inspection

⁵⁶ Stephen R. Crutchfield et al. (1997)

programs. Highlighted by USDA survey, this resulted in a budget saving to the States, but greater Federal budget expenditures.

- The new regulations were enacted in two parts: the 1967 Wholesome Meat Act and the 1968 Wholesome Poultry Act.
- By the mid-1990's USDA's Food Safety & Inspection Service (FSIS) had more than 7,400 inspections in 6,200 slaughter and processing plants. Although this inspection system removed diseased animals from the food supply and enforced sanitary standard in meat slaughter and processing, as serious gap remained. The inspection system relied largely on organoleptic (sensory) methods – sight, smell, and sense of touch – to identify unsafe products. It didn't adequately target and reduce microbial pathogens on raw meat poultry.
- To close the gap, FSIS started to reinforce the inspection on meat and poultry in the 1990's. On February 3, 1995, the FSIS published to mandate that all federally inspected meat and poultry plants:
 1. Adopt Hazard Analysis and Critical Control Points (HACCP) procedures.
 2. Set target for microbial pathogen reduction
 3. Require microbial testing to determine compliance with the targets.
- After public review of its testing plan with SOP's, FSIS published a revised version of its pathogen reduction rules on May 17, 1996⁵⁷.

We can see progress on the meat and poultry regulations shown above, and remarkably there was a regulation reform action by the USDA following a survey intended to reduce costs in 1962. Stephen R. Crutchfield et al. describe the HACCP Regulatory System

⁵⁷ Stephen R. Crutchfield et al. (1997)

saying the new rules represent a comprehensive strategy on the part of FSIS to modernize the 90-year-old inspection program. The four elements of the HACCP are;

1. HACCP Plans
2. Sanitation SOPs
3. Testing for Salmonella
4. Testing E. coli

In addition to the four elements above, enforcement strategies were established. This new procedure gives inspectors authority to stop production lines until failures in HACCO and sanitation SOP's are corrected⁵⁸. The researchers argue that most government regulation will have economic effect on producers and consumers.

Regulations require resource commitments, which, in turn, may raise costs and product prices.

On the other hand, the regulations, which improve the safety on the food supply, will generate benefits for consumers by reducing the number and severity of foodborne illness⁵⁹.

Antle writes that until recently, food safety regulation was the domain of food technologists and government regulators; neither economic efficiency nor the possible distributional effects of relations played a role in the design of most legislation or regulations dealing food safety. The convergence of two trends has begun to change the way food safety regulation is written, designed and implemented.

1. Consumer concerns shifted from food availability to food quality, including tastes, nutritional content, and safety.

⁵⁸ Stephen R. Crutchfield et al. (1997)

⁵⁹ Stephen R. Crutchfield et al. (1997)

2. Since the 1980s, governments have been striving to improve the effectiveness, efficiency and transparency of regulations, both to reduce budget costs of government programs and to improve the efficiency and international competitiveness of their economies⁶⁰.

Antle reviews the concepts and methods that can be used to quantify the benefits and costs of food safety regulation, impact assessment.

Benefits of food safety regulation

First, Antle writes about benefits of food safety regulation. Antle argues that the benefits of food safety regulation are reductions in risk of morbidity and mortality associated with consuming foods that could be contaminated with microbial pathogens and other hazards.

Theoretical analysis of the benefits of food safety regulations is based on the economic approaches that have been developed to model and value reductions in health risk. At the theoretical level, Antle shows that an individual's demand for risky foods depends on income, prices the objective risk associated with the food, the perceived risk of the food, the likelihood that an individual will be exposed to the risk, and individual's susceptibility to the risk. It follows that market demand for foods that pose a health risk depend on income and prices, and also on the factors that determine how individual characteristics, such as risk perceptions and susceptibilities, are distributed in population of consumers. These factors are likely to include demographics⁶¹.

In this concept, Antle uses WTP- Willingness to pay. Theoretical models used to derive expressions for reduced risk of morbidity and mortality.

Four components of WTP are:

⁶⁰ John M. Antle (1999)

⁶¹ John M. Antle (1999)

1. Costs of treating the illness
2. Forgone income from lost work time
3. Costs of averting illness
4. The disutility of illness

Caswell tells us that the approach of using cost of illness has been developed in the US over the last ten years and the most used and perhaps most reliable, measure of the benefits of a higher quality food supply is actually a measure of avoided costs. For example, costs of avoided illness, deaths, losses in income and leisure, pain, and suffering⁶². However, Antle argues that COI- Cost of illness, the approach is based on the measurement of the medical costs of an illness plus the forgone market income due to lost work time. The COI is not equivalent to WTP, COI could be seriously bias a benefit-cost analysis. Various methods have been used to infer the value individuals place on risk of death, loss of income, etc., but none of the studies in the literature has utilized avoidance of death caused by foodborne illness.

Antle argues that most studies put the total annual cost of illness associated with food borne disease in the United States in the range of \$5-\$10 billion, although some studies obtain values in the range of \$20-\$30 billion by using higher values for a statistical life or by assuming larger numbers of illnesses and deaths⁶³. These large discrepancies in the range of estimate appears to depend on the different types of components and methods that were used to come up with the number.

⁶² Julie A. Caswell (1996)

⁶³ John M. Antle (1999)

Costs of food safety regulation

Antle writes that the costs of food safety regulation include the industry's cost of compliance, borne by both industry and the consumers of their products, as well as administrative costs borne by taxpayers and the deadweight loss associated with taxation. The focus here is on the plant-level costs of compliance with regulations. If these costs are large enough to affect the market price, then a complete analysis would need to consider market equilibrium effects of the regulations. The author criticizes methods for estimating plant-level regulatory lack of literature on the cost structure of meat and other food processing plants and potential costs that food safety regulations might impose on plants.

Analysis of food safety requires consideration of production models that allow quality-differentiated products. The overall efficiency of either a design standard or a performance standard also depends on what level of food safety a regulation is attempting to achieve. While economists argue that performance standards are likely to be more efficient than design standards in achieving a given level of safety, the crucial decision of what level of safety is socially desirable, given the benefits and costs of attaining them remains to be determined. Either a too lax or a too stringing goal will be inefficient (will entail social loss), even if it is achieved in a cost-effective way⁶⁴.

Antle describes several other approaches to estimate the cost of regulation.

- Accounting approach – The FDA and the FSIS estimated the costs of mandatory HACCP regulations for their Regulatory Impact Assessments using an accounting approach (FDA, 1994; FSIS, 1996). In this approach, the effects of regulations on

⁶⁴ John M. Antle (1999)

plant labor requirements and capital stock are identified and calculated, without estimating a parametric representation of the cost function. This approach is operationally straightforward and can accommodate details of quality control systems. However, there are several measurement shortcomings.

- Economic-engineering approach – In this approach, detailed engineering data are combined with data on input costs to construct a quantitative model of the production process. This process-based model of the plant's production function can be used to derive a parametric cost function.
- Econometric approach – Econometric methods can utilize data sets, such as the Census of Manufactures data maintained by the United States Bureau of the Census, that representative of the industry⁶⁵.

Antle points out that the conventional form of the benefit-cost analysis which used by HACCP and pathogen reduction in the United States is to compute the present discounted value of benefits and costs associated with the regulatory intervention. The benefits are derived from the reductions in food borne illness and death associated with the regulation, whereas the costs are based on the changes in cost of production in the industry, as well as costs associated with regulatory oversight. This proportional assumption was made in the regulatory impact assessment conducted by FSIS and was strongly criticized in public comments. As noted in previous section, the author writes that econometric studies have found evidence indicating that the impacts on overall operating efficiency represents a significant cost of quality regulation shows.

⁶⁵ John M. Antle (1999)

Under the assumption that regulations would be 20% effective, Antle shows data that an upper-bound cost estimate would be in range of \$600 million to \$5.4billion (1995 dollars). With 20% effectiveness, the annual benefits of the regulations would be in the range of \$200-\$738 million. Clearly, these higher costs raise questions about the social value of the regulations⁶⁶.

According to Caswell, economists found that in other contexts, gathering reliable cost estimate is a challenge⁶⁷. To date, benefits estimates have been based on assumed levels of pathogen and illness reduction, not on actual reductions. Likewise, cost estimates focus on the cost of adopting a quality management system such as HACCP but rarely link these costs to specific outcomes such as a reduction in pathogen levels⁶⁸.

Over the course of reviewing the literature on regulation, I learned from the theories discussed by Stigler and Peltzman, and information available from other sources how economists influence economic theory of regulation. I also learned that there have been a series of legal enactments and deregulation over the years. Although regulation is the essential framework to provide protection and benefits to the society, the costs of the regulation are paid by taxpayers and consumers. The question comes to my mind how much regulation is required and does it effectively control the industry. Caswell argues that internationally, trade and standards bodies are using agreements as a means of limiting the use of quality regulation as a non-tariff barrier to trade⁶⁹. This research considers the extra costs to the consumer, the economic, social, and environmental impacts and asks if the organic food industry is providing a net benefit to society and if

⁶⁶ John M. Antle (1999)

⁶⁷ Julie A. Caswell (1996)

⁶⁸ Julie A. Caswell (1996)

⁶⁹ Julie A. Caswell (1996)

the benefits are large enough to outweigh the costs in the long-run? In the next chapter, I examine how the organic certification policy and process managed by the USDA impacts the costs of the organic foods and look at practices that attempt to harmonize global efforts. I will then introduce and discuss my case study which deals with regulation of food production of shrimp in developing countries.

Chapter Two: USDA Practices

Overview

The original concept of organic agriculture developed as a critique of the emerging industrial food system in the early 1990s⁷⁰. In the 1940s, consumers, growers, retailers and other agricultural stakeholders reacted to the industrialization of agriculture to shape a new paradigm for agricultural production, an approach that avoided chemical inputs. Over time, consumer demand for organic food increased. By the 1980s, stakeholders in the organic-food industry had requested the creation of federally regulated standards to facilitate national and international trade⁷¹. By 1990, twenty-one other states had passed laws regulating organic labeling. Yet each of these laws was slightly different, creating conflicting regulatory requirements for organic food labeling across the country. Congress stepped in to unify the standards in 1990, passing the Organic Foods Production Act⁷². The act that established the National Organic Program (NOP) and its authority to enforce agricultural products sold or represented as “organic” within the US⁷³. According to Cohrssen and Miller, the act directed the USDA to establish:

- A national organic production certification program
- A label for organically produced and handled agricultural products
- A national list of approved and prohibited substances to be included in the organic production standards
- An accreditation program for certifying agents⁷⁴

⁷⁰ Verena Seufert, et al. (2016)

⁷¹ Danielle D. Treadwell and Mickie E. Swisher (2008)

⁷² Michelle T. Friedland (2005)

⁷³ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

⁷⁴ John J. Cohrssen and Henry I. Miller (2016)

In other words, the National Organic Program (NOP) is part of USDA's Agricultural Marketing Service (AMS) which has the responsibility to maintain organic standards, accredit organic certifying agents, and enforce the NOP rules. The NOP has authority to take legal action to enforce the NOP standards if needed⁷⁵.

To aid the USDA in the process of creating a "National List" of approved and prohibited substances, the OFPA created an advisory panel known as the National Organic Standards Board (NSOB).

National Organic Standards Board (NSOB)

The National Organic Standards Board (NSOB) is a Federal Advisory Board made up of 15 dedicated public volunteers from across the organic community. Each NOSB member is appointed by the US Secretary of Agriculture for a five-year term. USDA publishes a call for nominations each Spring, and newly appointed members begin service in January of the following year.

NOSB members include:

- 4 who own or operate an organic farming operation
- 2 who own or operate an organic handling operation
- 1 who own or operates a retail establishment with significant trade in organic products
- 3 with expertise in the areas of environmental protection and resource conservation.
- 3 who represent public interest or consumer interest groups
- 1 with expertise in the fields of toxicology, ecology, or biochemistry
- 1 who is a USDA accredited certifying agent

⁷⁵ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

NOSB generally meets twice per year at a public meeting to discuss the items on its work agenda, vote on proposals, and make recommendations to the Secretary. If a NOSB proposal receives a decisive vote (2/3 majority) by Board members in favor of the proposed motion, it becomes a recommendation to the USDA, and is provided to the Secretary through the AMS National Organic Program⁷⁶.

The Organic Seal

Organic certification allows a farm to sell their products labeled with the USDA Organic seal⁷⁷. Nartea and Githinji write that with consumer confusion over food branding terms such as “sustainably grown,” “pesticide-free,” “chemical free,” “naturally grown,” and “locally grown,” the USDA NOP certified organic label is trusted by more than 75 percent American households (OTA 2018). Within a competitive marketplace, producers may benefit from mainstream recognition of the certified organic label. Becoming certified organic may payoff economically: Researchers comparing the 40 years of financial performance data of 55 organic and conventional crops spanning five continents determined that organic farms are 35 percent more profitable than conventional farms⁷⁸. Since the definition of organic food is not clear to the consumers, organic consumers must rely on the certification seal to guarantee government approval. Harrison writes that to understand what it means for something to be “organic” today, it is important to understand the basic process of certification. The government monitors the production and distribution of organic foods in three primary ways: Certification, authentication, and labeling⁷⁹. It is a process where an independent third party, accredited by the USDA, certifies your produce

⁷⁶ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

⁷⁷ Tiffany Maughan and Dan Drost (2016)

⁷⁸ Theresa Nartea and Leonard Githinji (2019)

⁷⁹ Kate L. Harrison (2008)

was grown in accordance with the standards set by the National Organic Program (NOP). Certification is good one year and then needs to be renewed. While organic certification is voluntary, it may be required by certain buyers⁸⁰. Growers whose gross income from certification is \$5,000 or less are exempt from certification. In this case, you do not need to be certified in order to sell or represent your products as organic. However, use of the USDA ORGANIC seal is prohibited. If you wish to use the USDA ORGANIC seal, you must be certified regardless of gross income⁸¹. Certification costs vary depending on the certifying agent used and the size and the complexity of the farm. Official certification can be an expensive and time-consuming process⁸². The NOP states that certification costs range from a few hundred to several thousand dollars⁸³. This wide range may not be helpful especially for farmers with a relatively small business. However, funding may be available on annual basis through the USDA NOP providing reimbursement to eligible growers and processors for 75 percent of their certification costs, up to a maximum of \$750 per category of certification⁸⁴. Entities that make organic claims and sell or label a product “organic” when they know it does not meet USDA standards can be fined up to \$17,952 for each violation⁸⁵.

Certification

Once a decision is made to pursue organic certification, it takes a minimum of 3 years to transition from nonorganic production to certified organic production. Products grown during this transition period cannot be labeled as organic⁸⁶. Farmers or handlers of organic

⁸⁰ Theresa Nartea and Leonard Githinji (2019)

⁸¹ Tiffany Maughan and Dan Drost (2016)

⁸² Kate L. Harrison (2008)

⁸³ Tiffany Maughan and Dan Drost (2016)

⁸⁴ Theresa Nartea and Leonard Githinji (2019)

⁸⁵ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

⁸⁶ Tiffany Maughan and Dan Drost (2016)

food must develop an Organic System Plan (OSP) for farms or businesses and must implement the required practices in the areas seeking certification. The OSP outlines practices and procedures that, should be followed for each of the 3 transition years prior to applying for and becoming certified. After following your OSP for 3 years, the applicant must submit the application packet to the certification agent and schedule an inspection of the farm⁸⁷. The plan must include a three-year management history of the land to certify that no prohibited substances have been applied to it in violation of the organic standards⁸⁸. Although, the detailed description of the certification process is rigorous and onerous, the 5 basic steps of the process listed by USDA is surprisingly less complicated than details described by researchers.

Table 4 is USDA AMS webpage shows how to become certified organic⁸⁹. Harrison explains that because the process is so expensive and time consuming, small farms that can circumvent the process with direct marketing often opt to do so. However, this decision severely restricts their marketing and distribution opportunities⁹⁰.

⁸⁷ Tiffany Maughan and Dan Drost (2016)

⁸⁸ Kate L. Harrison (2008)

⁸⁹ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

⁹⁰ Kate L. Harrison (2008)

Table 3: How to become certified organic by USDA⁹¹

<p>How to Become Certified Organic</p> <p>Certifiers are responsible for making sure that USDA organic products meet all organic standards. There are five basic steps to organic certification:</p> <ol style="list-style-type: none"> 1. The farm or business adopts organic practices, selects a USDA-accredited certifying agent, and submits an application and fees to the certifying agent. 2. The certifying agent reviews the application to verify that practices comply with USDA organic regulations. 3. An inspector conducts an on-site inspection of the applicant's operation. 4. The certifying agent reviews the application and the inspector's report to determine if the applicant complies with the USDA organic regulations. 5. The certifying agent issues organic certificate. <p>To maintain organic certification, your certified organic farm or business will go through an annual review and inspection process. If your operation is not located in the U.S., see our International Trade page to learn about your options for organic certification.</p>
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⁹¹ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

Figure 2: USDA certified organic operations domestic 2002-2014⁹²

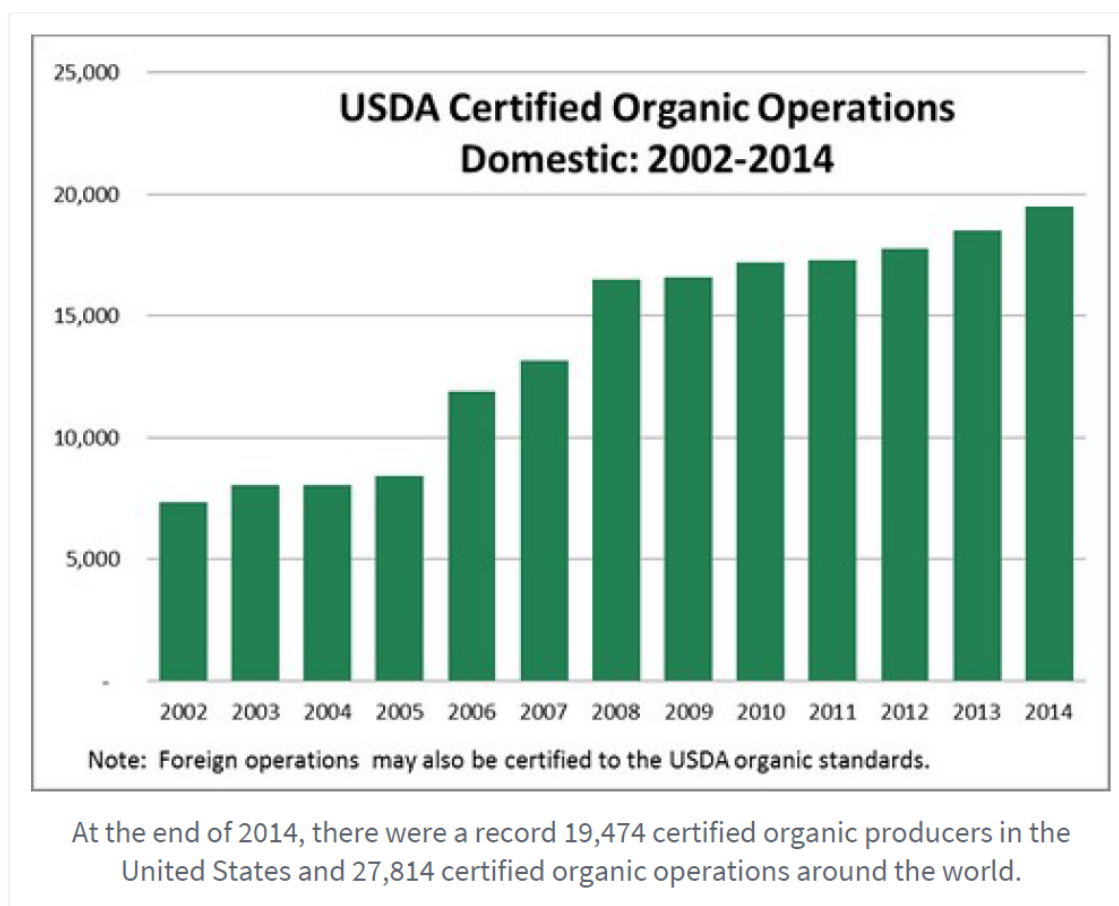


Table 4 shows the number of certified organic producers increased over the years between 2002 and 2014. There was a leap between the year 2005 and 2006, between 2008 and 2009. As the end of 2014, there were 19,475 certified organic producers in the United States.

Table 6 shows that the number of certified organic producers steadily continued to increase in the US and recorded the number of 27,631 in 2020. California is the largest number of the certified organic producers in the US and NY is ranked as the third.

⁹² USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

Table 4: Count of United States certified organic operations by state or territory⁹³

**Count of United States Certified Organic
Operations by State or Territory**

Data as of 08/19/2020

US State or Territory	Number of Operations
Alabama	31
Alaska	9
Arizona	235
Arkansas	153
California	5,027
Colorado	580
Connecticut	139
Delaware	28
District of Columbia	8
Florida	439
Georgia	300
Hawaii	155
Idaho	389
Illinois	634
Indiana	856
Iowa	1,021
Kansas	203
Kentucky	280
Louisiana	41
Maine	540
Maryland	212
Massachusetts	281
Michigan	765
Minnesota	967
Mississippi	38
Missouri	566
Montana	342
Nebraska	338
Nevada	108
New Hampshire	146
New Jersey	433
New Mexico	144
New York	1,859
North Carolina	609
North Dakota	204
Ohio	1,045
Oklahoma	85
Oregon	933
Pennsylvania	1,630
Puerto Rico	9
Rhode Island	54
South Carolina	101
South Dakota	123
Tennessee	110
Texas	743
Utah	186
Vermont	855
Virginia	275
Washington	1,389
West Virginia	52
Wisconsin	1,919
Wyoming	84
Grand Total	27,631

⁹³ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

Authentication

The USDA states that organic labeling assures consumers that producers have used approved methods and that prohibited substances, like synthetic pesticides, have not been used⁹⁴. In order to maintain accreditation, USDA ensures organic integrity through inspection. Harrison says that once a farm or handling operation receives organic certification, they are subject to periodic on-site inspections from certifying agents. In order to comply with these periodic audits, farmers must keep and retain their records going back at least five years. Those records must include a detailed history of substances applied to fields or agricultural products, and method of application, water test records, inspection reports, and sales records⁹⁵.

Labeling

As of October 21, 2002, all products that meet the national organic standard are required to follow the new USDA organic labeling guidelines. Today's organic labeling is based on the percentage of organic ingredients a product contains⁹⁶. The following describes the four general categories of multi-ingredient packaged organic products:

- 100% Organic = 100% of ingredients are certified organic, excluding salt and water.
- Certified Organic = 95% of ingredients are certified organic, excluding salt and water.
- Made with Organic Ingredients = At least 70% ingredients are certified organic, excluding salt and water.
- No Label Claims = Less than 70% of ingredients are certified organic⁹⁷.

⁹⁴ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

⁹⁵ Kate L. Harrison (2008)

⁹⁶ Kate L. Harrison (2008)

⁹⁷ Danielle D. Treadwell and Mickie E. Swisher (2007)

Organic product label is depending on the weight and ratio of the product, but it is still difficult to interpret. Table 5 show that Treadwell and Swisher use summary of Product Label Regulations under the NOP Rule⁹⁸.

Table 5: Summary of product label regulations under the NOP rule⁹⁹

	Product Category			
	100% Organic	95% Organic	>= 70% Organic	< 70% Organic
Identify ingredient as organic in the ingredient panel.	YES	YES	YES (One to three ingredients must total at least 70% by weight or volume)	OPTIONAL
Display the phrase in the ingredient panel: "Certified organic by *." (*Name and contact information of certifying agency).	YES	YES	YES	OPTIONAL
Display the USDA Organic Seal (Fig. 1).	OPTIONAL	OPTIONAL	OPTIONAL	PROHIBITED
Display the certifying agency seal (Fig. 2).	OPTIONAL	OPTIONAL	OPTIONAL	PROHIBITED

Adapted from National Organic Program: <http://www.ams.usda.gov/nop/indexIE.htm>

Figure 3: USDA organic seal and seal of a certifying agency



Figure 1. USDA Organic seal Credits: National Organic Program, USDA-ARS



Figure 2. Seal of a certifying agency

⁹⁸ Danielle D. Treadwell and Mickie E. Swisher (2007)

⁹⁹ Danielle D. Treadwell and Mickie E. Swisher (2007)

It is significant to note that products containing less than 95% organic ingredients are not allowed to use “organic” label. Instead, products that fall into category of “Made with Organic Ingredients” and less than 70% of ingredients are not allowed to use the word “Organic” on the package at all.

Despite the rigor of the certification process for organic, consumers are still receiving incomplete information on organic standards and this lack of information is causing the consumers to be confused when they need to make decisions on consumption choices. Harrison analyses shows that this is because the term “organic” represents a continuum of attitudes and practices, only some of which are represented in the organic standards¹⁰⁰.

International Trade

The United States facilitates trade with many trading partners. This opens new markets and provides diversity for consumers. The National Organic Program works with the Foreign agricultural Service (FAS) and Office of the United States Trade Representative (USTR) to establish international trade arrangements for organic products. The most common type of organic trade arrangement is an organic equivalency arrangement¹⁰¹.

Organic equivalency is when two countries recognize each other’s organic program as being equivalent. If two countries are equivalent, organic products can be sold in either country with just one organic certification. For US exporters, this reduces the number of certifications they must maintain¹⁰². USDA describes the steps for the organic equivalency as following:

¹⁰⁰ Kate L. Harrison (2008)

¹⁰¹ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

¹⁰² USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

1. Foreign governments seeking organic equivalence with the US contact USDA to request an equivalency determination. The country provides information about its organic system, organic standards (Conformity assessment).
2. USDA reviews requests for organic equivalency from foreign government based on budget and resources availability.
3. After a detailed side-by-sides review, USDA audits the foreign government's system to assess whether that system operates in the way the country has described. Differences must be resolved before an equivalence determination can be made.
4. If USDA determines that the foreign government's organic system is equivalent, the two governments exchange official letters. Once the process is completed AMS will publicly disclose on its website the terms of determination and the final resolution of differences between the US and foreign government's system.
5. USDA notes that maintaining organic equivalency is an ongoing process, with USDA officials conducting regular onsite audits of the foreign government's organic program. Onsite audits are completed on a two-year cycle, beginning at the close of the prior review process¹⁰³.

One example of “equivalence arrangement” was implemented between the US and Japan: As of January 1, 2014, organic products certified in Japan or in the US may be sold as organic in either country. In order to access the Japan market, products certified to the US Department of Agriculture (USDA) organic regulations must either be grown or

¹⁰³ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

produced in the US or have and their final processing or packaging (including final labeling) in the US.

This means that as long as the terms of the arrangement are met, US and Japanese organic products certified to the USDA organic standards or Japanese Agricultural Standards (JAS) maybe sold, labeled, and represented as organic in both countries. As long as the operation is certified by a USDA-accredited or Japan-accredited certifying agent, this arrangement facilitates access to each country's organic market¹⁰⁴. USDA states that this partnership streamlines the export certificate process, which also reduces the paperwork burden for farmers and businesses¹⁰⁵.

Countries seeking to participate in international organic trade try to illuminate major differences in the regulation of organic practices between different national and international regulations. International trade in organic food facilitates global harmonization on the regulations among the participating countries.

Criticism of USDA NOP

USDA's contribution to establishing organic practices in the US, and to the global harmonization effort on the regulations has been criticized by researchers and consumers and farmers through multiple publications. Cohrssen and Miller write that a primary driver of the marketing success is the USDA's regulated use of the word "organic" and the "USDA organic" label. Consumers interpret these symbols as indicating that the products are better for the environment and consumer health¹⁰⁶. Dave Chapman, Executive Director of Real Organic Project reminds us that the USDA was always a

¹⁰⁴ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

¹⁰⁵ USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

¹⁰⁶ John J. Cohrssen and Henry I. Miller (2016)

reluctant partner with the organic movement. As USDA Secretary Dan Glickman said in 2000, “Let me be clear about one thing. The organic label is a marketing tool. It is not a statement about food safety. Nor is ‘organic’ a value judgement about nutrition or quality.” No member of the real organic movement has ever agreed with this statement. No member of the USDA has ever disagreed with this statement¹⁰⁷. Chapman argues that farmers and eaters in our movement have a radically different viewpoint on the meaning of the organic. Everything in the culture of the USDA is oriented towards making “certified organic” a marketing term to be used by Big Ag and Big Food, their natural clients. That is not the spirit with which the Organic Food Production Act (OFPA) was written. OFPA is the law that provides the guidelines for all the organic standards. Theoretically, if a USDA standard violates OFPA, it is subject to a lawsuit and eventual change¹⁰⁸. The first such lawsuit came in 2002. This was the very early days of the National Organic Program. An organic blueberry farmer from Maine named Arthur Harvey sued the USDA for allowing synthetic and nonorganic ingredients to be used in “certified organic” products. Arthur was not a wealthy man; with not much in the way of financial resources. Still, he paid out of his pocket for the lawsuit. And he represented himself, without a lawyer. On appeal in 2005, Arthur Harvey actually won¹⁰⁹.

¹⁰⁷ Dave Chapman (2020) <https://www.realorganicproject.org/whose-government-is-it/>

¹⁰⁸ Dave Chapman (2020) <https://www.realorganicproject.org/whose-government-is-it/>

¹⁰⁹ Dave Chapman (2020) <https://www.realorganicproject.org/whose-government-is-it/>

Chapter Three: Methodology and Data Analysis

For the methodology section, qualitative and quantitative approach will be used.

Research method I: To understand consumer's purchasing decisions on buying organic products.

The aim is to understand consumer's purchasing decisions regarding whether or not to buy organic products, and then to assess the impact of those decisions on organic foods industries which have seen dramatic development, expansion and accelerating growth rates. There is a substantial amount of literature that demonstrates a need for more research on the organic food industry. Renee Shaw Hughner et al in 2007¹¹⁰ used an exclusive research method and approach in their paper. The authors explain how their paper integrates and synthesizes the findings of published research on organic food consumption.

Hughner et al. set procedures and narrowed the focus to include only empirical studies related to organic food published in the 20 years period between 1985–2005. They then extracted several themes that explain motives and deterrents that may impact consumer decision on purchasing organic foods. Table 8 depicts the results of studies conducted by Hughner et al., which occurred mainly in Europe and the US. Since the period of the publications they reviewed were published around three decades ago. The most recent one available was in 2005, over 10 years ago. In this paper, Hughner et al.'s approach was adopted, and update their study to include more recent information. In this paper, research articles published in recent years are included, reviewing changes in the literature that relate to organic food publications between 2000-2020. The study so far selected 33

¹¹⁰ Renee Shaw Hughner et al. 2007

existing studies on organic food consumption that were published in Japan and other advanced countries in Asia.

Table 6: Themes identified among buyers and non-buyers of organic food ¹¹¹

Themes identified among buyers and non-buyers of organic food	
I. Consumer's purchasing motives	
Theme 1.	Health and nutritious concern
Theme 2.	Superior taste
Theme 3.	Concern for the environment
Theme 4.	Food safety, lack of confidence in the conventional food industry
Theme 5.	Concern over animal welfare
Theme 6.	Support of local economy
Theme 7.	More wholesome
Theme 8.	Nostalgia
Theme 9.	Fashionable, curiosity
II. Deterrants	
Theme 10.	High price premiums
Theme 11.	Lack of organic food availability, poor merchandising
Theme 12.	Skepticism of certification boards, organic labels
Theme 13.	Insufficient marketing
Theme 14.	Certification with current food source
Theme 15.	Sensory defect

¹¹¹ Renee Shaw Hughner et al. 2007

Table 7: Illustrative research pertaining to consumers and organic food in Japan

Reference	Method and Findings
Belle Maison Life Style Research ¹¹² July – August 2016 3304 total Female between 20's and 60's	Online Survey – Examined consumers' awareness of "Organics" and explored consumer attitudes towards organics. Considerable confusion about the definition of organic, among organic purchasers. 70% of consumers do not know exactly what "Organics" means. Consumer holds image towards organics "healthy, expensive, safe, and good for environment." The organic food purchasers are concerned food safety, qualities, and environmental issues. Availability and price were identified as deterrent.
Greenpeace Japan ¹¹³ March 2016 1000 total Male and Female in 20's, 30's, 40's, 50's, 60's 100 each)	Survey – Explored consumer's perception of organic market and identify the challenge, what the purchasers' desire to supermarket when they purchase organic food. 80% of regular organic purchasers buy organic food at supermarkets. Regular organic purchasers show strong interests in safety and health. 80% of regular organic purchasers do not care of the shape of the vegetables as long as it is a good condition. Main discouragement factor for purchasing organic food is the price, 70% of respondents agree that if the organics are available at supermarket, they are willing to pay 10-30% premium. 70% of respondents indicated that their supermarkets in their town do not have enough variety of organics in the stores. 70% among the respondents mentioned lack of variety; they would purchase organics at supermarket if the variety is satisfactory. 90% of respondent answered they want to support organic farmers. Purchasers have positive impression towards supermarkets for supporting organic farmers and their awareness of environmental concerns if the store has good variety of organics.
Japan Organic Agriculture Association ¹¹⁴ October - December 2008 2000 respondents	Online Survey – Most of consumer has heard the word "organic", but only less than 10% understand JAS certification correctly. Concerns for food safety and tastes, protection of environment are the reasons for purchasing organic food. Most of consumer hold strong believes to support domestic producers and concerns for environment conservation.

¹¹² Belle Maison Life Style Research 2016

¹¹³ Greenpeace Japan 2016

¹¹⁴ Japan Organic Agriculture Association 2008

Tokyo University of Science ¹¹⁵ October – November 2009 225 Female age over 25 years old	Written Survey – conducted conjoint analysis, covariance structure analysis, and multiple group analysis. Price, place of production, cultivation methods, production management were most influential in consumer food purchase decisions. Consumer is willing to pay up to 20% premium to purchase organic food. Organic purchasers are holding strong attitude for health, food, environment, community and these are the reasons for purchasing decisions.
Japanese Ministry of Agriculture, Forest and Fisheries (MAFF) ¹¹⁶ November 2007 1207 respondents	Written Survey – Terms of purchase are reliable labeling, availability and price. Food safety and concern for environment, tastes are the reasons for purchase organic food. 41% of consumer is willing to pay 20-30% premium for organic food and 25% is willing to pay 10% premium.
Japanese Ministry of Agriculture, Forest and Fisheries (MAFF) ¹¹⁷ February 2016 893 respondents	Written Survey - Explored consumer's perception of organic food. Consumer holds image towards organic food such as safe, healthy, good for environment. Safety, and support for organic farmer, tastes are the reasons for purchasing organic food. Majority of consumer is willing to pay 10-20% premium for organic food. Price and availability, skepticism toward the organic label were identified as deterrent.
Organic Agriculture Market Research ¹¹⁸ January 2012 2000 respondents	Online Survey – Consumer's perception of organic food. Safe, healthy, environment protection are the image towards organic food. More than a half didn't know about JAS certification. Terms of purchase price and information of producers, freshness. Price and availability, skepticism toward the organic label were identified as deterrent.

¹¹⁵ Tokyo University of Science 2011

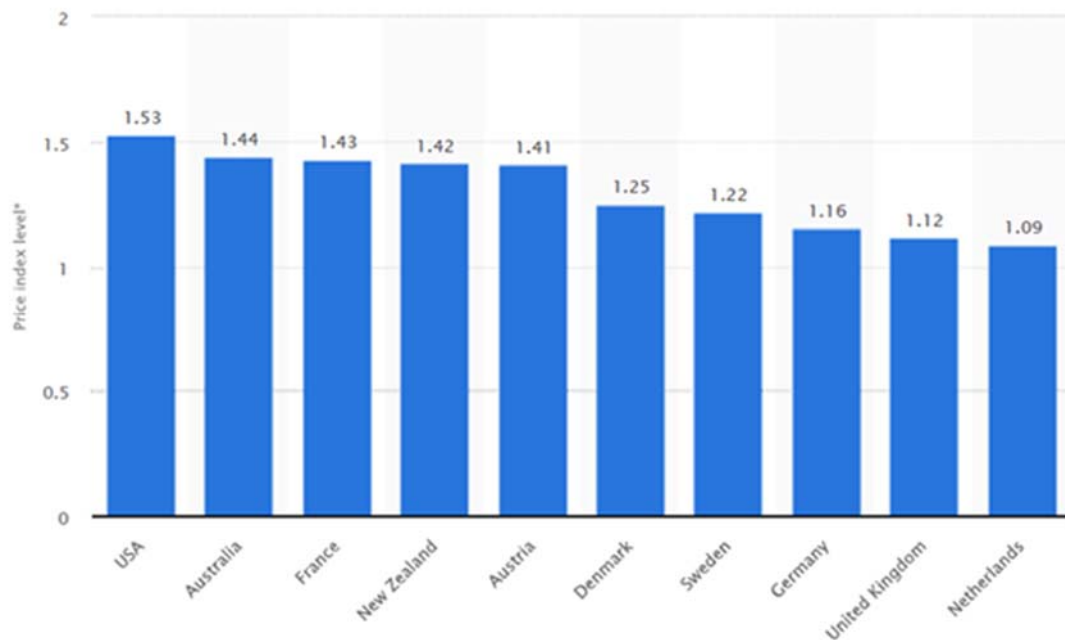
¹¹⁶ Japanese Ministry of Agriculture, Forest and Fisheries 2007

¹¹⁷ Japanese Ministry of Agriculture, Forest and Fisheries 2016

¹¹⁸ Organic Agriculture Market Research 2012

Research method II: To test the hypothesis correlation between organic the organic certification policy and process impact the costs of organic foods in a country. The research strategy for this section is to examine how the organic certification policy and process impact the costs of organic foods in a country. In order to test the hypothesis, cross tabulation analysis is conducted with 10 countries and 1 organic product. First, organic milk was selected and as the table below, price of organic milk premium in selected countries was collected. This statistic table depicts the retail price premium of organic milk compared to conventional milk in 2018, by selected countries. Conventional non-private label milk is indexed as 1.0. By comparison, organic milk in the United States has a price index of 1.53¹¹⁹.

Figure 4: Global retail price premium of organic milk in 2018, by country ¹²⁰



¹¹⁹ Statista (2018) <https://www.statista.com/statistics/1029605/retail-price-premium-organic-milk-in-selected-countries/>

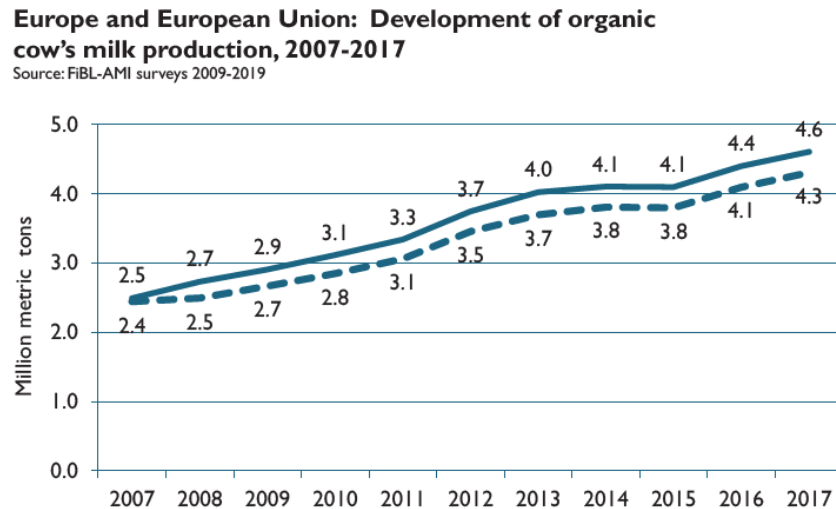
¹²⁰ Statista (2018) <https://www.statista.com/statistics/1029605/retail-price-premium-organic-milk-in-selected-countries/>

Critical reason to use the comparison table as the main source of data in this analysis is, because the exchange rate was already calculated and converted as a price index by country. The selection of the countries in the comparison also includes the most of key countries that considered to be included in the analysis for this research. The major reasons for selecting the US and Germany are listed for the top 5 largest global markets for organic products and Australia is listed No. 1 for the countries with largest arable area for organic agriculture and easiness of collecting data for each country.

Milk was selected for this comparison because the it is a basic and standard commodity being consumed in the major developed countries. According to the world of organic agriculture, organic cow's milk production is one of the production related indicators with good coverage across all European countries. Organic cow's milk has almost doubled since 2008 to meet rising demand for milk and dairy products. Production now stands at 4.7 million metric tons (European Union: 4.4 million), constituting 3.0 percent of the European Union's milk production from dairy cows in 2017¹²¹.

¹²¹ FiBL & IFOARM – Organic International (2019): The World of Organic Agriculture Statistics and Emerging Trends 2019

Figure 5: Europe and European Union - Development of organic cow's milk production, 2007 -2017¹²²



Details of the variables

- The following countries are selected for those 10 countries to test the hypothesis.
 1. The United States
 2. Australia
 3. France
 4. New Zealand
 5. Austria
 6. Denmark
 7. Sweden
 8. Germany
 9. United Kingdom
 10. Netherlands

And the price of organic milk is selected to test the correlation between and the regulation. Then data for the control variables are collected as following:

¹²² FiBL & IFOARM – Organic International (2019): The World of Organic Agriculture Statistics and Emerging Trends 2019

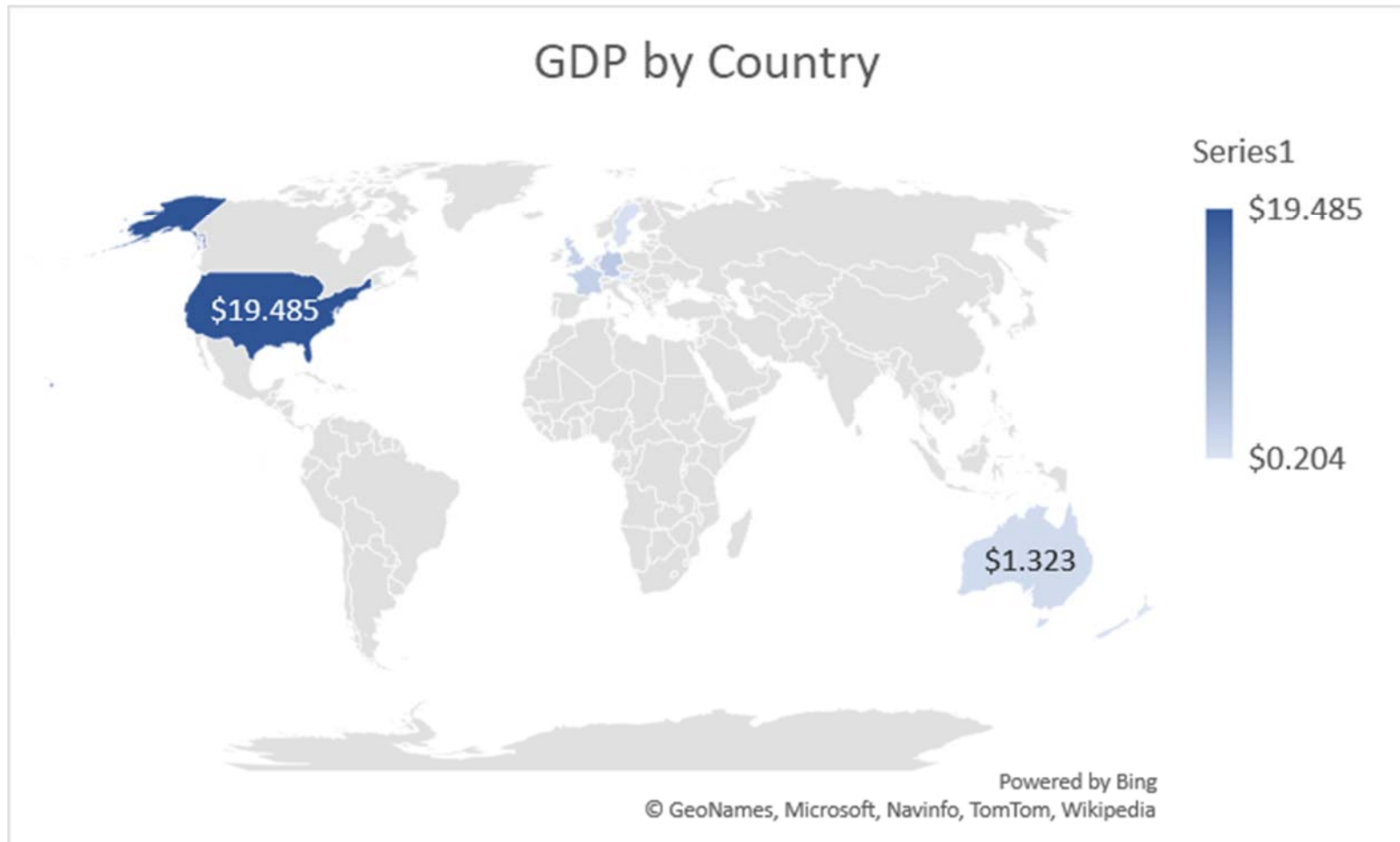
1. Price of Organic Milk by Country (Organic milk price premium created by Statista is used. The price is indexed to conventional milk unit price)
2. Number of Certified Operations by USDA
3. GDP (Data collected from World Bank)
4. GDP per Capita (Data collected from World Bank)
5. Population
6. Gender Ratio (Considering the organic consumers average age, the age group 25-54 was selected for this research)
7. Age (Country's average age is used)
8. Education (Number of School Year)
9. Organic Consumption Level (Data collected from the world of organic agriculture)
10. Organic Agricultural Land (Data collected from the world of organic agriculture)
11. Life Expectancy (for males and for females, a combined figure is used)
12. Birth Rate

Based on the plan, set of the data have been collected and compiled as table below.

Table 8: Set of data for Tabulation Analysis

Country	Price Index of Organic Milk	Certified Organic Operation (by USDA)	GDP (Abbrev. in trillion)	GDP Per Capita	Population	Education (Mean of Education Years)	Organic Agricultural Land (Hectares)	Organic Shares of Total Agricultural Land	Organic Consumption Per Capita	Gender Ratio (at Age 25-54)	Age	Life Expectancy	Birth Rate
United States	1.53	27,641	\$19.485	\$59,939	325,084,756	13.2	2,031,318	0.6%	146	1.01	38.5	78.9	1.7
Australia	1.44	574	\$1.323	\$39,532	24,584,620	13.2	35,645,038	8.8%	20	0.99	37.5	83.3	1.7
France	1.43	49	\$2.583	\$39,827	64,842,509	11.6	1,744,420	6.3%	124	1.02	41.7	82.5	1.9
New Zealand	1.42	-	\$0.204	\$43,415	4,702,034	12.5	88,871	0.8%	28	1.02	37.2	82.1	1.7
Austria	1.41	7	\$0.417	\$47,261	24,584,620	11.3	620,764	24.0%	221	1.00	44.5	81.4	1.5
Denmark	1.25	-	\$0.330	\$57,545	5,732,274	12.7	226,307	8.6%	279	1.02	42	80.8	1.7
Sweden	1.22	-	\$0.536	\$54,075	9,904,896	12.3	576,845	18.8%	242	1.10	41.1	82.7	1.8
Germany	1.16	85	\$3.693	\$44,680	82,658,409	13.2	1,373,157	8.2%	142	1.01	47.8	81.2	1.6
United Kingdom	1.12	7	\$2.638	\$39,532	66,727,461	13.4	497,742	2.9%	48	1.05	40.6	81.2	1.7
Netherlands	1.09	86	\$0.831	48,796	17,021,347	11.9	56,203	3.0%	49	1.01	42.8	82.1	1.6
Year	2018	2020	2017	2017	2017	2015	2017	2017	2016-2017	2020	2020	2018	2018

Figure 6: Map chart of GDP by country



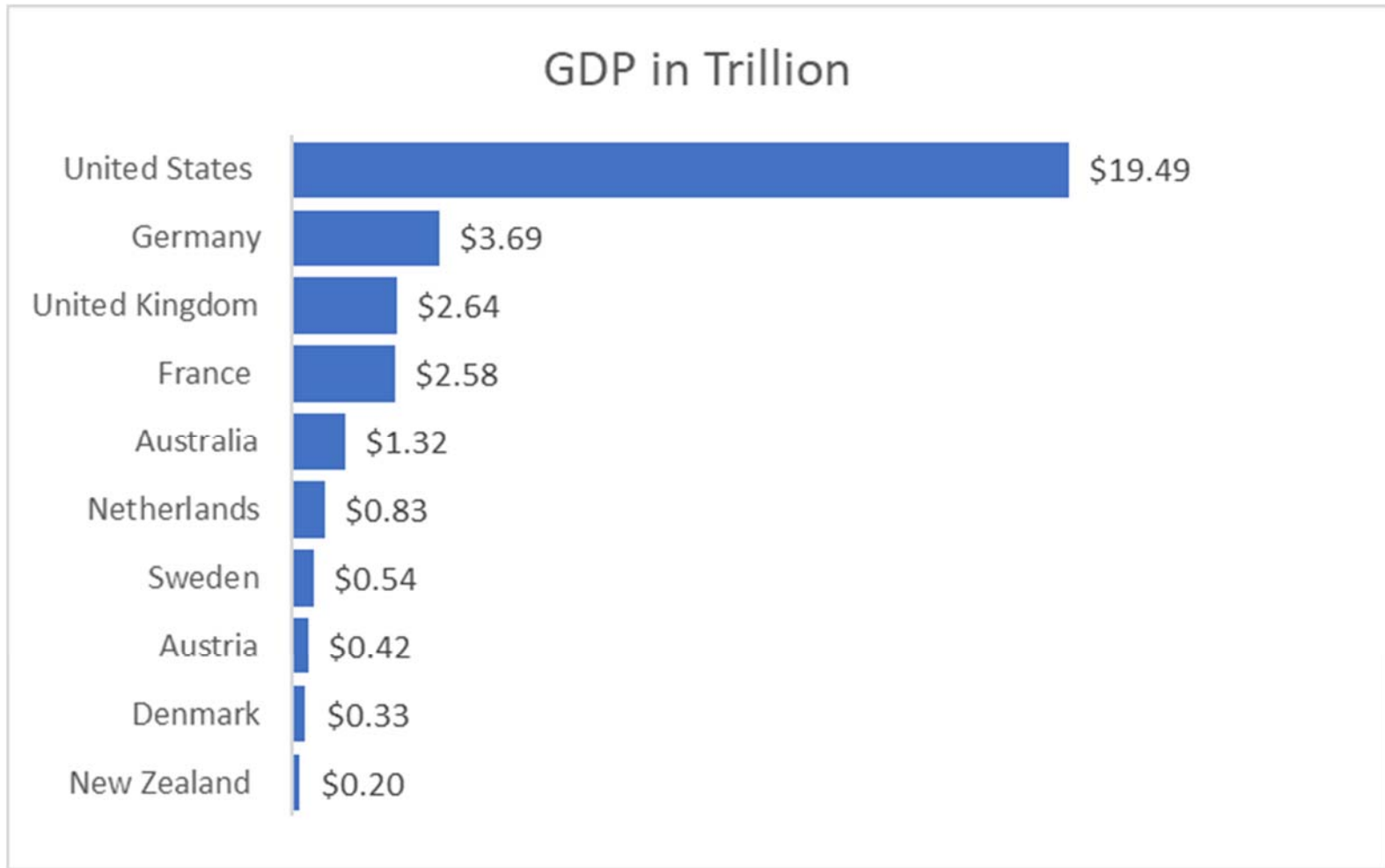
Map chart is used to allow further visualization which part of world the selected countries for the comparison are located. The color in blues highlights the spectrum of GDP level and the range is between \$19.49 trillion and \$2 billion. The darkest blue area

is the US and most of the selected countries are in Europe. On the right side, the continental highlighted in light blue is Oceania, Australia and New Zealand are both included to the comparison. The chart emphasizes that the US is by far wealthier than any other countries and the wealthiest. New Zealand ranks the lowest in the list, however, New Zealand holds No. 50 in the world.

Table 9: GDP by country

Countries	GDP (Abbrev. in trillion)
United States	\$19.49
Germany	\$3.69
United Kingdom	\$2.64
France	\$2.58
Australia	\$1.32
Netherlands	\$0.83
Sweden	\$0.54
Austria	\$0.42
Denmark	\$0.33
New Zealand	\$0.20
Grand Total	\$32.04

Figure 7: GDP by country in chart¹²³



¹²³ Worldometers Info <https://www.worldometers.info/gdp/gdp-by-country/> Latest official GDP figures published by the World Bank. Population figures based on United Nations data.

Table 10: Hypothesis 1; If GDP affects the number of certified operations?

Countries	GDP (Abbrev. in trillion)	Sum of Certified Organic Operation (by USDA)
United States	19.485	27,641
Australia	1.323	574
Netherlands	0.831	86
Germany	3.693	85
France	2.583	49
United Kingdom	2.638	7
Austria	0.417	7
Denmark	0.33	0
Sweden	0.536	0
New Zealand	0.204	0
Grand Total	32.04	28,449

Table 11: Hypothesis 2; If GDP per capita affect the price of organic milk?

United States	59,939	1.53
Australia	39,532	1.44
France	39,827	1.43
New Zealand	43,415	1.42
Austria	47,261	1.41
Denmark	57,545	1.25
Sweden	54,075	1.22
Germany	44,680	1.16
United Kingdom	39,532	1.12
Netherlands	48,796	1.09
Grand Total	474.602	13.07

Table 12: Hypothesis 3; Is there correlation between the number of certified organic operation and price of organic milk?

Countries	Price of Organic Milk	Sum of Certified Organic Operation (by USDA)
United States	1.53	27,641
Australia	1.44	574
France	1.43	49
New Zealand	1.42	0
Austria	1.41	7
Denmark	1.25	0
Sweden	1.22	0
Germany	1.16	85
United Kingdom	1.12	7
Netherlands	1.09	86
Grand Total	13.07	28,449

Chapter Four: Case Study

Violence, Environment, and Industrial Shrimp Farming

The motivation to research this topic was based on an interest in how shrimp farming is operated as a business. There is some controversy regarding the quality of farmed fish, and seafood produced to satisfy global demand. To meet the demand, the seafood industry has adopted and expanded shrimp farming in Asia, Latin America, and Africa. Using a case study approach to examine the business of shrimp farming will help us to explore the linkage between the organic food market trends on supply side and environmental issues that result from the trend. Stonich and Vandergeest write that the methods used by the industry creates conflicts among resource users in tropical areas impacted by industrial shrimp farming and has at times escalated to violent confrontations.

This case study starts with the quote “I say that those who eat shrimp – and only the rich people from the industrialized countries eat shrimp – I say that they are eating at the same time the blood, sweat and livelihood of the poor people of the Third World” Banka Behary Das, Indian activist, quoted in (Ahmad 1998)¹²⁴.

Shrimp farming in Thailand and Honduras is considered a great development opportunity and is promoted by governments, international development banks, and agri-business to generate foreign exchange and enhance national income. Shrimp Aquaculture proponents emphasize goals such as:

- Broadening the economic base of coastal areas
- Generating local employment

¹²⁴ Susan C. Stonich and Peter Vandergeest (2001, p261)

- Enhancing food security

In the green security scenario discussed in the introduction of this book, environmental violence occurs where an increase in population leads to resource depletion causing conflict over scarcer resources. Stonich and Vandergeest explain that aquaculture frequently is hailed as the “Blue Revolution”. Many believed that it is an essential solution to feed a growing human population. It is considered a critical source of high-quality animal protein¹²⁵.

From an optimistic viewpoint, aquaculture replaces declining marine resources and mitigates violence that arises because of resource scarcity. While a consortium including the World Bank, the Network of Aquaculture Centers in Asia Pacific (NACA), the World Wildlife Fund (WWF), and the UN Food and Agriculture Organization (FAO) concluded in 2002 that ‘... there are many positive developments with regard to the social impact of shrimp farming aquaculture throughout the world ... [and] several examples of efforts being made to develop solutions that are economically remunerative, environmentally sound and socially beneficial¹²⁶. However, at the same time, numerous researchers expressed their concerns and augured that this is not the case in the shrimp farming business, that shrimp farming is associated with violence for a set of complex reasons. The rapid expansion of the industry has also been a source of significant environmental and sociological disturbances associated with changes in land use, the ecology of aquatic species and patterns of global trade¹²⁷. The EJF report conveys that people have been killed or murdered in violence related to the shrimp industry in almost every country

¹²⁵ Susan C. Stonich and Peter Vandergeest (2001, p264)

¹²⁶ Christophe Béné (2005, p586)

¹²⁷ Peter J. Walker and C.V. Mohan (2009 p125)

where it has developed: Mexico, Guatemala, Honduras, Ecuador, Brazil, India, Bangladesh, Thailand, Vietnam, Indonesia, the Philippines¹²⁸.

Industry Background

According to Stonich and Vandergeest, shrimp farming had the fastest rate of growth in the aquaculture industry during the 1990s worldwide. In 1998, world production of cultured shrimp was estimated 737,200 metric tons, roughly 30 percent of total shrimp supply produced globally. Approximately 72 percent of cultured shrimp are raised in Asia, the rest comes from Latin America. Although 99 percent of cultured shrimp are raised in the Third World, virtually all are exported to industrial countries, the US, Europe, and Japan¹²⁹. In 2002 FAO states that shrimp is a major export commodity that can generate enormous revenues. In value terms, the production from shrimp farming is worth more than US\$7 billion per year, which represents one-sixth of all aquaculture trade¹³⁰. Shrimp accounted for 15% of the total value of internationally traded fishery products in 2008. Shrimp remains the most valuable farmed species and the seafood species with the highest trade value¹³¹.

Environment and Livelihood Security

There are two zone types shrimp farming usually located in the region. First type is coastal common pool resource zones that are managed by state or communally at the local level. Second type is zones near canals or rivers that are on privately owned agricultural land¹³². In coastal zones, the most serious ecological threats include:

¹²⁸ Christophe Béné (2005, p586)

¹²⁹ Susan C. Stonich and Peter Vandergeest (2001, p264)

¹³⁰ Christophe Béné (2005, p585)

¹³¹ Melba G. Bondad-Reantaso, et al (2012, p160)

¹³² Susan C. Stonich and Peter Vandergeest (2001, p265)

- The destruction of mangrove and other coastal ecosystems associated with construction of shrimp ponds and related infrastructure
- Pollution from pond waste
- Destruction of hydrological systems

Natural resources from coastal ecosystems have traditionally been critical to the subsistence and commercial economic strategies of the rural poor such as:

- Providing food
- Medicine
- Shelter
- Fuel wood
- Marketable commodities

The implementation of industrial shrimp farming altered what was a communally used area for multiple users and for multiple purposes into privately owned, sole purpose land use dedicated to shrimp farming. The social consequences of shrimp aquaculture have become increasingly contentious. The enclosure and loss of coastal common resources created social equality.

Most shrimp produced by commercial farms are tiger shrimp, a warm, brackish water species. Such farms require substantial quantities of water, and primarily located alongside rivers, estuaries and coastal areas¹³³. In these areas, shrimp farmers use large

¹³³ Coralie Thornton, Mike Shanahan, Juliette Williams (2003, p 48)

volumes of fresh water, and degrade surface water. Shrimp farmers also use high-salinity sea water and disposal of the water led to the widespread salinization.

Adopting shrimp farm processes creates a vicious cycle of degradation of environment in the areas and loss of resources. Numerous environmental effects caused by the introduction of shrimp farming undermine rural livelihoods including depletion of catches for artisanal fishers. Damage to rice fields, trees, freshwater fish and other flora and fauna, shortage of water, use of chemicals to control shrimp diseases which will likely lead to conflicts with local farmers and fishers. Vandergeest et al. claim that in addition to negative effects to the environment, the social impacts include dramatically increased incomes for some patients and loss of livelihoods and food security for many due to resources degradation; alienation of land to absentee owners; high debt; increased violence; and proletarianization, as former farmers who cannot participate in shrimp farming¹³⁴.

Conflict and violence surrounding shrimp farming

Containment of shrimp farming often becomes cause of pollution and disease which destabilize shrimp farming in the long run and leads to degrade local resources remained and hurt the local entrepreneurs or corporations and leaving indebt farmers. This results in forcing displacement of many rural people. The location of shrimp farms is often preceded by state land law, and enclosures often protected by local police¹³⁵. Economic interest in shrimp farming is facilitated and is protected by regulations and state.

Confrontations between shrimp farmers and non-shrimp farmers lead to violence. Police often refused to file cases of violence.

¹³⁴ Peter Vandergeest et al. (1999 p577)

¹³⁵ Susan C. Stonich and Peter Vandergeest (2001, p267)

In Thailand, most small farmers obtain investment capital through loans from local banks and relatives. If shrimp prices are high, and the farmers do not have serious disease problems, they can easily recoup this investment less than a year and, within two years, can be making previously unimagined incomes. Fluctuations in the price of shrimp, disease, theft, and rising feed prices, however, can just as easily leave farmers with equally unimagined debts¹³⁶.

Stonich and Vandergeest assert it is important that shrimp farming is based on containment. By containing shrimp in ponds, shrimp farming becomes a capitalist production, not simply harvesting wild stocks after “natural growth” and maturation. Containment makes possible a dramatic intensification of production, although the degree of intensity as measured by stocking density varies significantly depending on factors such as availability of land, credit, and labor¹³⁷.

This case study explains that shrimp farming creates the potential for various forms of violence. At the same time, the repertoires of violence differ significantly from country to country. In this section, I will discuss comparison of Thailand and Honduras in terms of agrarian structure and history how the structure of the industry makes a systematic difference in the repertoires of violence in the two countries.

Forms and repertoires of violence in Thailand and Honduras

Among fisheries, shrimp accounted for 15% of the total value of internationally traded seafood products. Shrimp production increased by 63% in 34 years, rising from 6% in

¹³⁶ Peter Vandergeest et al. (1999 p578)

¹³⁷ Susan C. Stonich and Peter Vandergeest (2001, p268)

1998 and to 69 % in 2004. The annual growth from 1970 has been of 8.9% and has doubled since the mid-1990s¹³⁸.

Shrimp exports have become a significant source of foreign exchange earnings in shrimp producing countries. In Thailand, shrimp is among Thailand's three largest exports and earnings, range between US\$ and 2 billion per year¹³⁹. For several years, Thailand has been the world's largest producer and exporter of cultivated shrimp. It currently accounts for about 29 percent of world production. Honduras contributes less than 2 percent of world production¹⁴⁰. Although the size of the economy and the production level are so different in the two countries, both are almost equally dependent on the export earnings from shrimp farming. Thailand has a wide range in terms of the size of shrimp farms. In 1998, Rosenberry estimates that there were 25,000 farms covering 70,000 hectares, giving an average size of just under 3 hectares, there was estimate of 80 percent the farms are less than 1.5 hectares and less than 2 percent are larger than 10 hectares¹⁴¹. In Asia, land for agricultural purpose is frequently privately owned by small landowners, which can prevent the creation of large farms and remained smaller shrimp farms operated by local dweller.

On the other hand, in Honduras, coastal land titles or concessions are controlled by government. Entrance of communal users is blocked by armed guards and leases are given to national elites who have connections to political power and corporations. The significant difference in shrimp farming industry between Thailand and Honduras is land ownership. In Honduras, all together there are only about 90 farms in the country, but the

¹³⁸ Marth G Rivera-Ferre (2009, p303)

¹³⁹ Marth G Rivera-Ferre (2009, p304)

¹⁴⁰ Susan C. Stonich and Peter Vandergeest (2001, p272)

¹⁴¹ Susan C. Stonich and Peter Vandergeest (2001, p273)

industry is dominated by a few large companies. They are two large international companies that account for about half the total area in the production as well as the majority of exports. The Table 14 shows the comparison between two countries.

Table 13: The comparison of two countries in shrimp farming¹⁴²

Categories	Thailand	Honduras
Gross National Product (GNP)	US\$170 billion	US\$4.4 billion
Exports of goods and services	37% of GDP	39% of GDP
Exports of cultured shrimp	US\$1.72 billion	US\$164 million
Farm size	Wide ranges of sizes	Dominated by few large farms
Total Farm Area for Shrimp Farming	70,000 Hectares	14,000 Hectares
Number of farms	About 25,000 farms	About 90 farms
Land ownership	Privately owned	70% owned by government
Density – Farming method	High thirty pieces or more per sq. meter	Semi-intensive

Honduras

According to the southern Honduras Chamber of Commerce, the shrimp industry provides employment to 11,900 people. The largest enterprise in Honduras, Grupo Granjas Marina (Sea Farms Group) ranks among the largest shrimp farming business in the world, producing 60 percent of Honduras' cultivated shrimp exports from 6,500 hectares. The second largest integrated shrimp farm is Grupo Deli with 700 hectares of ponds that average 20 hectares each¹⁴³.

¹⁴² Susan C. Stonich and Peter Vandergeest (2001)

¹⁴³ Susan C. Stonich and Peter Vandergeest (2001, p273)

Investment in the shrimp industry is supported by international development organizations, including the World Bank and United States Agency for International Development (USAID). To facilitate the expansion of the business, the state began to assert its legal rights to coastal land through a concession process. Renewable concessions are leased to individuals or corporations for 25 years at a ridiculously low cost of about US\$4-5 per year¹⁴⁴. Since WW II, the government has promoted a series of agricultural commodities for the global market as a rural survival strategy for Southern Honduras.

- By 1990, 110,000 people lived in rural areas of Gulf of Fonseca.
- The settlers survived by exploring the surrounding common wetlands to access and cultivated crops.
- By 1987, shrimp became Honduras' third highest source of foreign exchange after bananas and coffee.
- Investment supported by USAID, World Bank
- State offered renewable lease at ridiculously cost, US\$4-5 per year

High environmental cost, degradation, reduced catches for artisanal fishers, mangrove loss (2,000 to 4,000 ha) Association of Shrimp Framers of Honduras (ANDAH) insist that environmental issues were not caused by the farm, stress the economic value of the farms and continue to promote the shrimp industry. Collusion of international and national actors (including financial donors such World Bank, USAID, national/local elites) Intimidation, thuggery, terror and murder took place in the area to sustain the shrimp farming industry.

¹⁴⁴ Susan C. Stonich and Peter Vandergeest (2001, p275)

Since the 1950s, Southern Honduras has been a center of well-organized peasant movements resisting the loss of common pool resources associated with the earlier spread of the cotton, sugar, and beef cattle industries¹⁴⁵.

GODDEAFFAGOLF – Grassroots Committee for the Defense and Development of the Flora and Fauna of the Gulf of Fonseca, claimed that Honduran laws and international treaties were broken by, amongst others, Natural Resources and Environment Ministers in the granting of licenses allowing shrimp farms to operate in protected areas¹⁴⁶. The members challenge the collusion of international and national actors controlling titles and land use.

Stonich and Vandergeest say repertoires of resistance ranged from noncompliance and protest marches to more violent confrontations, such as physically obstructing earth moving equipment, barricading roads of shrimp farms, destroy canals, and burring farm buildings¹⁴⁷.

Today, southern Honduras is a “critically endangered region” designated by the United Nations and an area where basic life support systems, including water and soils, are in jeopardy.

- Deforestation
- Erosion
- Deterioration of watersheds
- Indiscriminate use of agricultural pesticides
- Overgrazing have transformed the southern Honduras landscape

¹⁴⁵ Susan C. Stonich and Peter Vandergeest (2001, p277)

¹⁴⁶ Coralie Thornton, Mike Shanahan, Juliette Williams (2003, p 51)

¹⁴⁷ Susan C. Stonich and Peter Vandergeest (2001, p277)

- Among the poorest in Latin America, (much poorer than their counterparts in Thailand)
- 65% of children less than 5 years of age and 37% of first graders suffer from moderate to severe under-nutrition.

Thailand

Stonich and Vandergeest explain that extensive shrimp farming was practiced since at least the mid-1930s in the upper gulf area near Bangkok. In the 1970s, the government began to promote the industry¹⁴⁸. In the mid-1980s, the industry continued to expand by growing demand in Japan, and the other industrial countries such as the US, Europe. Further incentives over 1986-91, in the form of US\$84 million in assistance, sought to encourage the expansion of the shrimp aquaculture sector during the period of the Six national Development Plan¹⁴⁹. Although in the late 1980, the industry collapsed due to disease, total production continued to increase after the second expansion placed along the east coast of the southern peninsula.

As in Honduras, shrimp farming in Thailand was also promoted by the government, international development banks and corporations to generate national income and support domestic economy.

Shrimp production in Thailand is organized through 10 specialized feed companies¹⁵⁰.

One corporation Charoen Phakpond (CP) dominates the feed industry and provides powerful political support for the industry. There are also a number of influential shrimp farmer's associations composed most of medium and large operators¹⁵¹. Shrimp farming

¹⁴⁸ Susan C. Stonich and Peter Vandergeest (2001, p279)

¹⁴⁹ Jesper Goss, David Birch, and Roy E. Rickson (2000 p517)

¹⁵⁰ Jesper Goss, David Birch, and Roy E. Rickson (2000 p518)

¹⁵¹ Susan C. Stonich and Peter Vandergeest (2001, p279)

brought exports and generated corporate profits for suppliers. However, large number of evidences illustrates that many of the inhabitants have seen their water and rice fields salinized and they have to face serious environmental issues and social consequences as we seen in Honduras.

Stonich and Vandergeest explain that shrimp almost ready for harvesting are the most common targets for thieves, but the thieves also take expensive equipment, such as pumps and aerators¹⁵².

Compared to Honduras, in addition to everyday forms of violence associate with theft, murders and intimidation, there has been a few major violent confrontations between shrimp farmers and peasant organization in Thailand. Although there hasn't been a revolution or confrontation activity linked to transnational environmental network against shrimp farming, one NGO, the Raindrop Association represents Thailand in the global movement against industrial shrimp farming. The repertoire includes media coverage, often arranged by activists with connections in the print media, and it usually avoids violence¹⁵³.

The reasons for the relatively low level of organized opposition to shrimp farming are:

- Large numbers of villagers participate in shrimp farming making it difficult to form solidarity against shrimp farming in rural area.
- Non shrimp farm owners are linked to the industry in various ways to earn wages.
- Many villagers who complain about the negative impacts of shrimp farming are at the same time reliant on the industry.

¹⁵² Susan C. Stonich and Peter Vandergeest (2001, p280)

¹⁵³ Susan C. Stonich and Peter Vandergeest (2001, p281)

Conclusion

The case study covering industrial shrimp farming in Honduras and Thailand portrays that the “Blue Revolution” ignores the linkage between resource degradation and violence.

Honduras and Thailand, both countries located in Global South are poor but have abundant biodiversity resources, so the governments and international development banks promoted this aquaculture commodity for the global market as a rural survival strategy plan. Shrimp farming has been successful in terms of bringing profits to the shrimp farm owners and generating national income, but at the same time the shrimp farming caused environmental issues and industrialization of the area previously used communally by poor is being exploited, leaving the locals a legacy of degraded land. Because the shrimp farming business is supported by the government and protected by local police, the violence and social impact associated shrimp farming have been ignored.

Today in Honduras, a high percentage of the population live in poverty (64%) and extreme poverty (40%), with most of the extremely poor living in rural areas (69%)¹⁵⁴

Honduras also ranked as the most vulnerable country to the negative impacts of extreme climate events¹⁵⁵.

¹⁵⁴ JL Pacheco, S Lopez, A Hernandez... - Nutrition Exchange ..., 2020 - ennonline.net

¹⁵⁵ A Sanders, TS Thomas, A Rios, S Dunston - 2019 - researchgate.net

Chapter Five: Conclusion

My goal in this project was to:

- Examine the perceived overall net benefit of organic foods
- Examine consumer purchasing decisions regarding organic foods
- Look at the certification policy and the processes that impact the cost of organic foods

My plan was to review existing published work on the topic to assess the regulations, theories and history that led to the current status of organic agriculture in the US and selected countries.

To accomplish that I created a research plan and covered the main research goals in each chapter. In first chapter, I reviewed a number of articles and existing published work used to develop the data and the information referenced in this study. The section was broken into two parts. In Part A, I reviewed the sources covering organic agriculture regulations. The topic was structured in six steps to present the information and to apply it to the research goal. 1) Overview of current organic industry status, 2) Reasons for organic industry's current status, 3) History of the organic industry , 4) Emergence of organic regulation, 5) Discussion of global regulation and regional regulations 6) The harmonization efforts and the gap between the regulatory functions. The goal of this part of the particular review was to show the historical overview of the establishment of the USDA.

In Part B, I reviewed the references covering regulations in the perspective of economics. Under this topic, I discussed the theory of economic regulation, which was developed by Stigler and Peltzman, and then demonstrated the impact that the study made on

economists and the various approaches they took to assess the costs and benefits analysis of food safety regulations.

In chapter 2, I discuss an overview of USDA practices how the Organic Foods Production Act in 1990 was implemented. The historical background which was reviewed in chapter 1 is carried through to this chapter. I discuss how the USDA established the National Organic Program (NOP) and its authoritarian figure to enforce regulation for organic market within the US. The functions of National Organic Program (NOP) and National Organic Standard Board (NSOB) were reviewed as major part of USDA practices. National Organic Program (NOP) regulates: 1) national organic production certification program, 2) label for organically produced and handled agricultural products, 3) national list of approved and prohibited substances to be included in the organic production standards 4) accreditation program for certifying agents. National Organic Standard Board (NOSB) is a Federal Advisory Board to aid the USDA in the process of maintain “National List” of approved and prohibited substances. NSOB regularly meets twice per year to discuss the items, vote on proposals, and make recommendation to secretary. Under the topic of USDA practices, organic certification process was reviewed. Organic certification allows a farm to sell their products labeled with the USDA organic seal. Certification process takes minimum of 3 years to transition from conventional production to certified organic production. The detail of the certification process was described in the 5 basic steps; 1) the farm contact USDA agent, and submit an application and fees to the certifying agent, 2) the certifying agent review the application, 3) an inspector conducts on-site inspection of the applicant’s operation, 4) the certifying agent reviews the application and inspection report to determine if the

applicant complies with the USDA organic regulations, 5) the certifying agent issues organic seal. The certification process is rigorous and onerous, however as organic food industry continue to expand, the organic certification allows to enter the markets in international trade. The US facilitates trade with many trading partners. USDA's equivalency program was described in the chapter. I explained that USDA's global harmonization has been criticized by researchers and consumers and farmers. Critics say that a primary driver of the marketing success is the USDA's regulated use of the word "organic" and the USDA "organic" label. Consumers interpreted these symbols as indicating that the products are better for the environment and consumer health.

In chapter 3, methodology and data analysis were discussed. In this section, both qualitative and quantitative approaches were used. Research method I: To understand consumer's purchasing decisions on buying organic products. In this method, Hughner et al.'s approach was adopted, and update their study to include more recent information. In this paper, research articles published in Japan in recent years were selected, reviewing changes in the literature that relate to organic food publications between 2000 and 2020. After reviewing 7 research publications, the top 5 themes identified among consumer's purchasing motives are 1) health and nutritious concern, 2) food safety, 3) concern for environment, 4) support organic farmer, 5) and taste. Main discouragement factor for purchasing organic food is 1) high price premium, 2) lack of availability, 3) skepticism of certification boards, organic labels.

Research method II: To test if the correlation between organic food and the organic certification policy and process impact the costs of organic foods in a country a cross tabulation analysis was conducted with 10 countries and 1 organic product. Organic milk

was selected and price of organic milk premiums in selected countries was collected. The 10 selected countries for the analysis were: 1) The United States, 2) Australia, 3) France, 4) New Zealand, 5) Austria, 6) Denmark, 7) Sweden, 8) Germany, 9) United Kingdom 10) Netherlands. I created the data source chart and conducted the cross-tabulation analysis to test three hypotheses. Hypothesis 1: If GDP affects the number of certified operations? The number 1 country is the US, and by far the US has a large number of certified operations. The second country is Australia. Top 5 countries, except Netherlands are relatively high GDP countries. Although the cross tabulation indicates that rich countries tend to have more certified operations, since the certifier is USDA it was expected that the US would be on top and the comparison is lacking validity.

Hypothesis 2: GDP per capita affects the price of organic milk. The US has both the highest price index of organic milk and GDP per capita among the countries. However, the second highest country for price index of organic milk is Australia but its GDP per capita is the lowest. The third highest country for price index of organic milk is France but like Australia, France's GDP per capita is the second lowest. The cross tabulation indicates that there is no correlation between the level of GDP per capita and the price of organic milk. Interesting remark in this analysis is that Denmark ranks the second highest GDP per capita but the price of organic milk is not high as the US. While the US consumers are paying 53% more premium for organic milk compare conventionally produced milk, Denmark is paying 25% more premium for organic milk. It appears that further research with additional data is needed to understand this outcome.

Hypothesis 3: There is a correlation between the number of Certified Organic Operation and Price of Organic Milk.

The US is the number 1 country in both the price of milk and the number of certified organic operation. The second country, Australia also ranks the second highest in both the price of milk and the number of certified organic operation. However, the third highest country for the number of certified organic operation is New Zealand has the lowest of Price of Organic Milk. Thus, the cross tabulation indicates that there is no correlation between the number of Certified Organic Operation and Price of Organic Milk.

In chapter 4, case study of shrimp farming was discussed. The reason to extend my research to the shrimp farming in Honduras and Thailand was to depict the uneven distribution of organically labeled foods between suppliers (South) and consumers (North), along with relevant environmental issues. According to the World of Organic Agriculture, 2015, countries like India, Ethiopia, Mexico are big producers of organics products and the top countries in per capita consumption are Switzerland, Denmark, Sweden. With 179 countries producing organic crops, production has become global. However, over 90 percent of the organic foods grown in Latin America are produced exclusively for export markets¹⁵⁶. Honduras and Thailand, both countries located in Global South are poor but have abundant biodiversity resources, so the governments and international development banks promoted this aquaculture commodity for the global market as a rural survival strategy plan. Shrimp farming has been successful in terms of bringing profits to the shrimp farm owners and generating national income, but at the same time the shrimp farming caused environmental issues and industrialization of the

¹⁵⁶ Willer, Helga, and Julia Lernoud. The world of organic agriculture. Statistics and emerging trends 2019. Research Institute of Organic Agriculture FiBL and IFOAM Organics International, 2019.

area previously used communally by poor is being exploited, leaving the locals a legacy of degraded land.

My findings indicate that the level of development and the wealth in any specific country impacts the level of acceptance of organic foods. In this research I learned that the top 5 themes identified that impacted purchasing decisions when buying organic are 1) health and nutritious concern, 2) food safety, 3) concern for environment, 4) support organic farmer, 5) and taste. The consumers in the wealthy countries can afford to purchase organic foods and are willing to pay a premium when motivated by the reasons above. Ironically, concerns for the health and food safety, environment are mainly created by consumers themselves and are due to their own industrialization of society, economic development and modernized mass production. As the organic boom escalates, the poor but rich in biodiversity countries adopted to produce organic foods and the suppliers in production sites are converged in South This North (consumer) and South (supplier) structure has been seen in many similar cases with various commodities markets for a long time. Organic certification and regulation are used by the government of wealth countries and poor countries to facilitate international trade. The challenge in this organic boom is that the principal of organic farming and the practices of organic farming are not aligned preventing organic agriculture from becoming more “sustainable”. Benefits of consuming organic foods are still not significantly known. However, Organic agriculture is often viewed as the best avenue to reach sustainability objectives.

The researchers argue that regulation and certification is central to the current concept of organic agriculture in the most counties. Regulations are therefore a useful place to begin to understand how the views of the different organic actors have been codified and what

organic agriculture means today. Regulation has responsibility to educate the producers as well the consumer and I think the arrangement of global market structure would work if the understanding of the principle of organic farming is more properly and more broadly spread. Organic certification should not be merely the marketing tool. The organic boom can be used as an opportunity to rethink the ecosystem in the world where we live.

Chapter 5 Conclusion

My goal in this project was to:

- Examine the perceived overall net benefit of organic foods
- Examine consumer purchasing decisions regarding organic foods
- Look at the certification policy and the processes that impact the cost of organic foods

My plan was to review existing published work on the topic to assess the regulations, theories and history that led to the current status of organic agriculture in the US and selected countries.

To accomplish that I created the research plan and I tried to achieve the main research goals in each chapter. In first chapter, I reviewed a number of articles and existing published work used to develop the data and the information referenced in this study. The section was broken into two parts. In Part A, I reviewed the sources covering organic agriculture regulations. Under the topic, it was structured in six steps to demonstrate the information to achieve the research goal. In this approach 1) Overview of current organic industry status, 2) The reason of organic industry status, 3) History of organics, 4) Emergence of organic regulation, 5) Discussion of global regulation and regional regulations 6) The

harmonization efforts and the gap between the regulatory functions. The goal of this part of the particular review was to show the historical overview of the establishment of the USDA.

In Part B, I reviewed the references covering regulations in the perspective of economics. Under this topic, I discussed the theory of economic regulation, which was developed by Stigler and Peltzman, and then I demonstrated the impact that their study made on economists, and with their various approaches that they took to assess the costs and benefits analysis of food safety regulations.

In chapter 2, I discussed the overview of USDA practices how the Organic Foods Production Act in 1990 was implemented. The historical background of organic food movement was reviewed in chapter 1 and the development is carried through to this chapter. The act directed the USDA to establish the National Organic Program (NOP) and its authoritarian figure to enforce regulation for organic market within the US. The functions of National Organic Program (NOP) and National Organic Standard Board (NSOB) were reviewed as major part of USDA practiced. National Organic Program (NOP) regulates: 1) national organic production certification program, 2) label for organically produced and handled agricultural products, 3) national list of approved and prohibited substances to be included in the organic production standards 4) accreditation program for certifying agents. National Organic Standard Board (NOSB) is a Federal Advisory Board to aid the USDA in the process of maintain “National List” of approved and prohibited substances. NSOB regularly meets twice per year to discuss the items, vote on proposals, and make recommendation to secretary. Under the topic of USDA practices, organic certification process was reviewed. Organic certification allows a farm to sell their products labeled

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¹⁵⁷ Renee Shaw Hughner et al. 2007

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Research method II: To test the hypothesis correlation between organic food and the organic certification policy and process impact the costs of organic foods in a country. In order to test the hypothesis, cross tabulation analysis is conducted with 10 countries and 1 organic product. First, organic milk was selected and price of organic milk premium in selected countries was collected. The 10 selected countries for the analysis are: 1) The United States, 2) Australia, 3) France, 4) New Zealand, 5) Austria, 6) Denmark, 7) Sweden, 8) Germany, 9), United Kingdom 10) Netherlands. And then I created the data source chart and conducted the cross-tabulation analysis to test three hypotheses. Hypothesis 1: If GDP affects the number of certified operations? The number 1 country is the US, and by far the US has large number of certified operations. The second country is Australia. Top 5 countries, except Netherlands are relatively high GDP countries. Although the cross tabulation indicates that rich countries tend to have more certified operations, since the certifier is USDA it is natural the US to be top and the comparison is lacking validity.

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The researchers describe that regulation and certification is central to the current concept of organic agriculture in the most countries. Regulations are therefore a useful place to start understanding how the views of the different organic actors have been codified and what organic agriculture means today. Regulation has responsibility to educate the producers as well the consumer and I think the arrangement of global market structure would work if the understanding of the principle of organic farming is more properly spread. Organic certification should not be merely the marketing tool and this organic boom can be used as an opportunity to rethink the ecosystem of the place we live in.

Bibliography

Antle, John M. "Benefits and costs of food safety regulation." *Food policy* 24.6 (1999): 605-623.

Aschemann-Witzel J & Zielke S "Income and price as a barrier to organic food choice": Building Organic Bridges at the Organic World Congress 13-15 October 2015

Béné, Christophe. "The good, the bad and the ugly: Discourse, policy controversies and the role of science in the politics of shrimp farming development." *Development Policy Review* 23.5 (2005): 585-614.

Belle Maison Lifestyle Research "About Organic" August 2016:

Bergström, L. & Kirchmann, H. *Nature Plants* 2, 16099 (2016).

Bondad-Reantaso, Melba G., et al. "The role of crustacean fisheries and aquaculture in global food security: past, present and future." *Journal of invertebrate pathology* 110.2 (2012): 158-165.

Caswell, Julie A. "Valuing the benefits and costs of improved food safety and nutrition." *Australian Journal of Agricultural and Resource Economics* 42.4 (1998): 409-424.

Chapman, David "Whose government is this?" Real Organic Project (2020)
<https://www.realorganicproject.org/whose-government-is-it/>

Cohrssen, John J., and Henry I. Miller. "The USDA's Meaningless Organic Label." *Regulation* 39 (2016): 24.

Crutchfield, Stephen R., et al. Economic assessment of food safety regulations: The new approach to meat and poultry inspection. No. 1473-2016-120749. 1997.

Friedland, Michelle T. "You call that organic-the USDA's misleading food regulations." *NYU Env'tl. LJ* 13 (2005): 379. Harrison, Kate L. "Organic Plus: Regulating Beyond the Current Organic Standards." *Pace Env'tl. L. Rev.* 25 (2008): 211.

Gasparro A "Whole Foods to cut 1,500 jobs": *Wall Street Journal* 29 September 2015

Greenpeace Japan "Consumer survey on organic foods and agricultural chemicals"
<https://www.greenpeace.org/japan/sustainable/story/2016/03/30/2817> March 2016

Goss, Jasper, David Burch, and Roy E. Rickson. "Agri-food restructuring and third world transnationals: Thailand, the CP Group and the global shrimp industry." *World Development* 28.3 (2000): 513-530.

Harrison, Kate L. "Organic Plus: Regulating Beyond the Current Organic Standards." *Pace Envtl. L. Rev.* 25 (2008) <http://www.b-desse.jp/report/1450>

Hughner RS, McDonagh P, Prothero A, Shultz II CJ, Santon J. "Who are organic food consumers? A compilation and review of why people purchase organic food": *Journal Consumer Behavior* Mar.-Jun. 2007

Japan Organic Agriculture Association "Consumer Survey Report on Organic farming" March 2008

Loebnitz N & Aschemann-Witzel J "Communicating organic quality in China: Consumer perceptions of organic products and the effect of environmental value priming": *Food Quality and Preference* 50 (2016) 102-108

Lu Y et al "Impacts of soil and water pollution on food safety and health risks": *Environmental International* 15 May 2015

Maughan, Tiffany, and Dan Drost. "Fruit and Vegetable Organic Certification Basics." (2016). digitalcommons.usu.edu

Ministry of agriculture and forestry and fisheries "Overview of the Organic Japanese Agricultural Standard" March 2007

Ministry of agriculture and forestry and fisheries "Promotion of Organic Agriculture" August 2013

Ministry of agriculture and forestry and fisheries "Survey on knowledge of sustainable farming and organic foods" February 2016

Ministry of agriculture and forestry and fisheries "Survey on organic farming and sustainable farming" November 2007

Motomura C & Shnitzler S "Japanese Organic Market": USDA Foreign Agricultural Service Gain report 20 June, 2015 Gain report number JA3705

Nartea, Theresa J., and Leonard Githinji. "Becoming a Certified Organic Producer in Virginia." (2019).

Organic Agriculture Market Research "Survey on consumer's understanding and interest towards organic farming" January 2012

Organic Trade Association. "Robust organic sector stays on upward climb, posts new records in US Sales." press release, May 24 (2017): 2002-2014.

Pacheco, José Lino, et al. "Adaptation and mitigation of climate-change effects on food and nutrition security in Honduras." *Nutrition Exchange* 13 (2020): 26.

Peltzman, Sam. "George Stigler's contribution to the economic analysis of regulation." *Journal of Political Economy* 101.5 (1993): 818-832.

Reganold, John P., and Jonathan M. Wachter. "Organic agriculture in the twenty-first century." *Nature plants* 2.2 (2016): 1-8.

Rivera-Ferre, Marta G. "Can export-oriented aquaculture in developing countries be sustainable and promote sustainable development? The shrimp case." *Journal of Agricultural and Environmental Ethics* 22.4 (2009): 301-321.

Sanders, Arie, et al. "Climate Change, Agriculture, and Adaptation Options for Honduras." (2019).

Statista (2018) <https://www.statista.com/statistics/1029605/retail-price-premium-organic-milk-in-selected-countries/>

Seufert, Verena, Navin Ramankutty, and Tabea Mayerhofer. "What is this thing called organic? How organic farming is codified in regulations." *Food Policy* 68 (2017): 10-20.

Smith-Spangler, Crystal, et al. "Are organic foods safer or healthier than conventional alternatives? A systematic review." *Annals of internal medicine* 157.5 (2012): 348-366.

Stigler, George J. "The theory of economic regulation." *The Bell journal of economics and management science* (1971): 3-21.

Stonich, Susan, and Peter Vandergeest. "Violence, environment, and industrial shrimp farming." *Violent environments* (2001): 261-286.

The Ministry of Agriculture, Forestry and Fisheries of Japan, "Overview of the revised JAS Law" Published by: Japanese Agricultural Standards Association (JAS Association) Website: <http://www.jasnet.or.jp> March 2006

The World of Organic Agriculture System "Statistics and Emerging Trends 2017"

Thornton, Coralie, Mike Shanahan, and Juliette Williams. "From wetlands to wastelands: impacts of shrimp farming." *Wetland Science and Practice* 20.1 (2003): 48-53.

Thompson GD. "Consumer Demand for Organic Foods: What we know and what we need to know": Emergence of U.S. Organic Agriculture – Can we compete? (Luanne Lohr, University of Georgia, presiding): *Amer. J. Agr. Econ.* 80 (Number 5, 1998)

Tokyo University of Science "Analysis on consumer's purchasing decision for organic foods" August 2011

Toomey, Erin. "How Organic is Organic-Do the USDA's Organic Food Production Act and National Organic Program Regulations Need an Overhaul." *Drake J. Agric. L.* 19 (2014): 127.

Treadwell, D., and M. Swisher. "Understanding the 'USDA Organic Label.'." *The University of Florida IFAS Extension* (2008): 1-6.: 211.

Turner N & Wang S & Soper S "Amazon to acquire Wholefoods" : Bloomberg 16 June, 2017 : <https://www.bloomberg.com/news/articles/2017-06-16/amazon-to-acquire-wholefoods-in-13-7-billion-bet-on-groceries>

Unnevehr, L., and V. Hoffmann. "Food safety management and regulation: International experiences and lessons for China." *Journal of Integrative Agriculture* 14.11 (2015): 2218-2230.

USDA.gov <https://www.ams.usda.gov/rules-regulations/organic> (2020)

Vandergeest, Peter, Mark Flaherty, and Paul Miller. "A Political Ecology of Shrimp Aquaculture in Thailand 1." *Rural Sociology* 64.4 (1999): 573-596.

Walker, Peter J., and C. V. Mohan. "Viral disease emergence in shrimp aquaculture: origins, impact and the effectiveness of health management strategies." *Reviews in aquaculture* 1.2 (2009): 125-154.

Willer, Helga, and Julia Lernoud. *The world of organic agriculture. Statistics and emerging trends 2019*. Research Institute of Organic Agriculture FiBL and IFOAM Organics International, 2019.

Worldometers Info <https://www.worldometers.info/gdp/gdp-by-country/> 2020