

**Case study for the European Green Deal**

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## ABSTRACT

There is little room for debate that the climate is changing, and action is needed to prevent disasters from occurring. The debate comes when deciding how to take action to mitigate the impacts of climate change.

The research question we are focusing on is this: What do we not know about what needs to change to ensure a successful execution of a Farm-to-Fork policy embedded in climate neutrality? In other words, what are the knowledge gaps between where we are and where we need to be when it comes to implementing a Farm-to-Fork sustainability strategy? Answering this question makes a very important contribution to the conversation about addressing what some have described as an existential problem facing humanity today.

The European Commission is enacting a strategy to address the Sustainable Development Goals, which includes climate change, called the European Green Deal. The European Green Deal is an initiative to move European society from a linear economy to a circular economy. That is, it seeks to position Europe to eliminate waste and pollution, circulate products and materials at their highest value, and regenerate nature. The European Green Deal is part of Europe's NextGenerationEU Recovery Plan and has a price tag of about €600 billion. Within the Green Deal is the Farm-to-Fork initiative aimed at transforming the food system into a circular economic system.

The overall objective of this thesis is to provide a context for filling the knowledge and information gaps influencing the probability of a successful transition to a food system built on a Farm-to-Fork principle. This is accomplished through a literature review and carefully exploring the physical challenges, the impacts on the people, the economy, and the

interconnections between them and the physical environment. The thesis presents some ideas of how the strategy may be implemented to increase its probability of success.

The Farm-to-Fork initiative is very ambitious. It is a necessary initiative if the perceived challenges associated with the food system in the unfolding transformation in climatic conditions are to be addressed. Its prime limitation is the timeframe and the policy details. This research finds that the timeframe is unrealistic given the breadth and depth of changes that need to be made. Changing a linear system to a circular system requires a rebuild from the foundations and 2030 does not seem realistic from what progress has been made thus far. The risk of a failed policy due to unreasonable expectations can be severe for not only Europe but its trading partners, such as the United States, and the developing economies whose policies it influences.

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Bert, thank you for the edits. You are a great friend!

## DEDICATION

I dedicate this to the many people who have helped along the way, including but not limited to; Nkemjika, Ifeanyi, Mom, Dad, Aaron, and Grandpa. Thanks for all your continued support. I love you all.

Ifeanyi and little Dos (sorry you don't have a name yet as we have yet to meet you and are super excited to meet you in a couple of months), know that you can do anything and you *will do and be everything*, nothing will stop you if you work hard and keep going, even if it takes you longer than it takes others. I, and Mama, will always be behind you encouraging, supporting, and challenging you. I love you both.



## CHAPTER I: INTRODUCTION

In the 1930s, the United States was in the Great Depression. Many people lost their life savings, their homes, and everything that they had worked hard for. Franklin D. Roosevelt came up with an economic plan to help bring the economy out of its doldrums and to a path of growth. Christened The New Deal, it was bold and aggressive. It encompassed numerous programs implemented through the force of both laws passed by Congress and presidential executive orders. The New Deal's programs covered financial reforms, public works projects, workforce development, and social programs, and some, like Social Security, have become part of the American identity. While its impact and legacy are still be debated, there is an agreement that it helped the country weather the Great Depression without dismantling the capitalist system (Billington 1981). While it increased employment, it also increased the federal deficit, which at 3.7%, was not enough to offset the decline in private sector spending between 1933 and 1939 (Billington 1981). This view is supported by Zelizer (2000) who argued that the New Deal was fiscally conservative, and thus received significant support from Wall Street and most of the business community. The New Deal increased employment and renewed economy (Britannica 2022).

The European Green Deal is modeled after the New Deal: A bold and aggressive plan to transform the European economy in ways that seem unfathomable. Through the Green Deal initiative, the European Union (EU) seeks to radically transform its climate, energy, transportation and taxation policies to reduce its greenhouse emissions by at least 55% by 2030 compared to 1990 levels (European Union 2021). Through this initiative, the EU envisions improving the wellbeing of its current and future citizens by, among several

things, providing fresh air, clean water, healthy soils, and ensuring biodiversity. It will produce and provide affordable and healthy food as well as more public transportation while future-proofing jobs and skills training for the transition to the new economy the Green Deal will produce. The Green Deal, the EU also envisions, will ensure European industries are globally competitive resilient.

In 2015, the United Nations (UN) Member States all signed the 2030 Agenda for Sustainable Development. This agenda builds upon a long history of the UN to work towards global peace and poverty reduction. Member States take different actions in order to meet these agreed upon goals. In 2019, the European Commission (EC) announced the European Green Deal as the EU's strategy to achieve its Sustainable Development Goals. The European Green Deal "is a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient, and competitive economy where there are no net emissions of greenhouse gases by 2050 and where economic growth is decoupled from resource use." (European Commission 2019)

At the center of the Green Deal is climate neutrality as the EU's strategy for its contribution towards the reduction of the threat of climate change. Climate neutrality involves a system to measure emissions and takes steps to offset them through carbon sinks or sequestration. Carbon offsets are important when it is recognized that certain segments of the economy can move towards reducing or eliminating their carbon production while others are incapable due to their production and operational realities. Carbon offsetting is achieved by reducing or removing carbon from one sector so that another sector without technology to reduce carbon can continue to emit. These sectors, thus, offset each other while allowing for the economy to continue to grow. Carbon sinks or sequestration

involves using soil, forests, and oceans to hold and store carbon dioxide produced without allowing it to get into the atmosphere. Climate neutrality is to be accomplished through several policy initiatives, including clean energy, biodiversity, sustainable industry, building and renovation, sustainable mobility, eliminating pollution, sustainable agriculture, and Farm-to-Fork food system. Each the initiatives has its own set of goals and timelines which together support the overall EU Green Deal agenda (European Parliament 2021).

The dimensions of the European Green Deal are illustrated in Figure 1.1. They include providing clean, affordable, and secure energy; mobilizing industry for a clean and circular economy; building and renovating in an energy and resource efficient way; accelerating the shift to sustainable and smart mobility; and rethinking agriculture and the food industry.

**Figure 1.1: European Green Deal Actions**



Other initiatives are designing a fair, healthy, and environmentally friendly food system, preserving and restoring ecosystems and biodiversity, zero pollution ambition for a toxic free environment; sustainable industry; and a sustainable financial system. Within each of the focus areas are a subset of focus areas to facilitate the advance towards the goal of carbon neutrality. The EU is trying to create a paradigm shift in society which encompasses as many sectors as necessary to reach carbon neutrality (European Commission 2019).

According to climate modeling of surface air temperatures conducted by NASA, temperatures between 1880 and 1980 remained relatively consistent with fluctuation of less than 0.25°C (Buis 2020). Global temperatures have been rising since 1980, and temperatures are projected to rise over 2°C by the end of this century (Buis, Study Confirms Climate Models are Getting Future Warming Projections Right 2020). The EU believes that drastic action is needed slow or halt this trend. This is why the EU is starting to implement the Green Deal.

The Green Deal's central objective is to move the EU to a clean, circular economy and to restore biodiversity and cut pollution. The circular economy is based on three principles: waste and pollution elimination; circulation of products and materials; and regeneration of nature. The last principle changes the economy from extractive to regenerative use of resources. The second principle focuses on circulating products to their highest value use. The first principle is self-explanatory and is reinforced by the other two. Creating a circular economic system maintains the value of products and materials by extending their useful life as long as possible and incorporating them back into reusable materials. This contrasts with the linear throughput system, which creates inputs to

produce a product and then disposes of the waste without or limited re-use or recycling (European Commission 2019).

Currently, 75% of the EU's greenhouse gas emissions comes from the production and use of energy (European Commission 2019). In order to meet the goals outlined, member states have outlined their plans to reduce this and increase the use of renewable energy sources. The transition will involve all citizens and consider their needs and situation. Herein lies the risk of accelerated implementation of the policy. People who are already constrained economically might have difficulty adjusting to the changes without massive social support and subsidies. These will be needed across all the dimensions that touch people's daily living. While the is cognizant of this challenge and is implementing programs that support its low-income citizens, the challenge does not disappear since individual approaches to life and living come into the picture and influence their ability to adapt and adopt the support offered by the state.

The Farm-to-Fork strategy is central to the European Green Deal. It sees sustainability of the food system as the foundation for resilient communities. The focus of the strategy is on three principles of the circular economy. It envisages a food system that is neutral or positive in its environmental impact, helping it contribute to the mitigation of climate change while adapting to its impacts. Such a system would also reverse lost biodiversity and ensure sufficient and affordable supply of food and adequate nutrition for a healthy population.

### **1.1 Research Problem and Question**

The principal challenge from the foregoing is the information and knowledge gap between the current situation and the pathway to reaching the defined destination. Getting to a climate neutral Farm-to-Fork would require a rethinking of the food system and its

supporting infrastructure. It would require a reconfiguration of the food production and processing systems as well as the food consumption systems. This would demand different capabilities for the systems' employees and their relationships with what they do and how they do what they do. The research problem being tackled here is framing the execution process for a farm-to-fork policy and identifying the challenges and opportunities surrounding the journey.

The research question we are focusing on is this: What do we not know about what needs to change to ensure a successful execution of a Farm-to-Fork policy embedded in climate neutrality? In other words, what are the knowledge gaps between where we are and where we need to be? Answering this question makes a very important contribution to the conversation about addressing what some have described as an existential problem facing humanity today. It provides insights into how the US agri-food system may prepare to deal with trade opportunities and challenges in Europe and other countries within the European orbit.

## **1.2 Objectives**

The overall objective of this thesis is to provide a context for filling the knowledge and information gaps influencing the probability of a successful transition to a food system built on a Farm-to-Fork principle. The specific objectives are as follows:

1. Describe the Farm-to-Fork policy proposal and evaluate the literature on the subject to assess the level of consensus surrounding the strategy.
2. Evaluate the physical challenges surrounding the implementation of the Farm-to-Fork initiative.
3. Evaluate the human and people challenges surrounding the implementation of the Farm-to-Fork initiative.

4. Evaluate the economic challenges surrounding the implementation of the Farm-to-Fork initiative.
5. Explore the inter-relationships among the physical, human, and economic factors surrounding the Farm-to-Fork policy initiative with the view of identifying an effective pathway to reaching the desired destination more economically.

### **1.3 Thesis Outline**

In this chapter, we have presented the background and the rationale for the thesis problem, defined the problem and research question. We have also presented the objectives the thesis seeks to achieve. In the next chapter, we present an overview of the pertinent literature and identify the challenges the farm-to-fork policy initiative engenders. Chapter 3 organizes the challenges into three principal groups – physical, people, and economics – and the final section ties the three components of the problem together to illustrate the pathway to success. The summary and conclusions from the study are presented in Chapter 4. This final chapter also presents the recommendations for policy changes and for further research.

## **CHAPTER II: LITERATURE REVIEW**

The EU Green Deal is a very ambitious and progressive initiative. It has been met with criticism from both within and outside of Europe. The initiative covers eight very broad and economy-wide actions (Figure 1.1). The interest of this research is on a part of the agriculture and food action: Farm-to-Fork strategy. This chapter reviews the literature on the strategy, exploring the perspectives of researchers and analysts on its opportunities and challenges. The chapter is organized as follows. The first part provides a brief history of the farm-to-fork movement and the second an overview of how farm-to-fork is envisioned by the European Union. The third and final section reviews criticisms or perspectives that reveal the limitations or challenges emanating from or associated with the Green Deal.

### **2.1 Farm-to-Fork: What it Means**

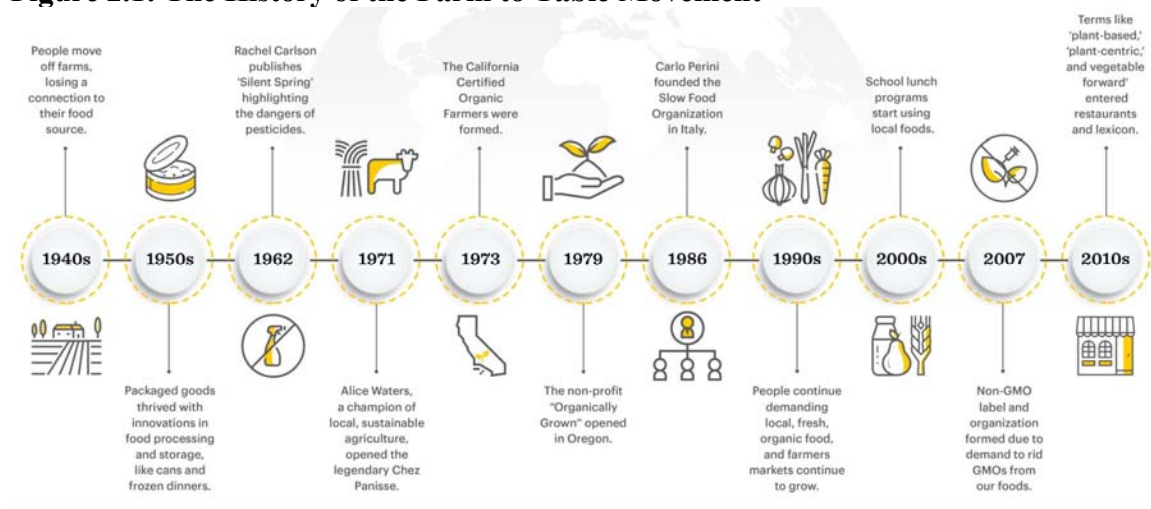
The foundation of the farm-to-fork initiative is environmental sustainability through an environment-friendly food system. It is a broader movement of people interested in making the food system equitable and sustainable even as it ensures food is nutritious, available, and affordable. The US farm-to-fork initiative has a mission to make this a reality through advocacy and education. (Farm to Fork Initiative 2021). The idea is to structure the various processes in the agri-food supply chain to ensure activities at each node in the chain is sustainable economically and environmentally. Some also include in their expectations about the farm-to-fork initiative the idea of traceability. They seek to support local, regional, and federal policies that commit to building thriving local and regional food systems.

Sometimes referred to as the Farm to Table process, the farm-to-fork efforts focus on the production of food and related products, the processing of agricultural products, the transportation and distribution of these products, and the preparation and consumption food



and related products in the home (Long 2022). Each node eliminates all current processes that do not contribute to the sustainability agenda and introduce innovations that support it. For example, in contrast to traditional transportation networks, farm-to-fork transportation seeks to minimize the distance travelled by food even as it reduces packaging. The reduction in weight and distance implies a reduction in the amount of fossil fuel used, and hence the transportation carbon footprint of the food. Figure 2.1 illustrates the timeline of the movement that has pushed the farm-to-fork agenda in the US over the past several years. This also establishes the fact that the idea of farm-to-fork is not a European monopoly even if they are the first to pursue it as a broad policy to attract the environmental and other challenges related to food and climate and/or environmental sustainability (Janzer 2018).

**Figure 2.1: The History of the Farm to Table Movement**



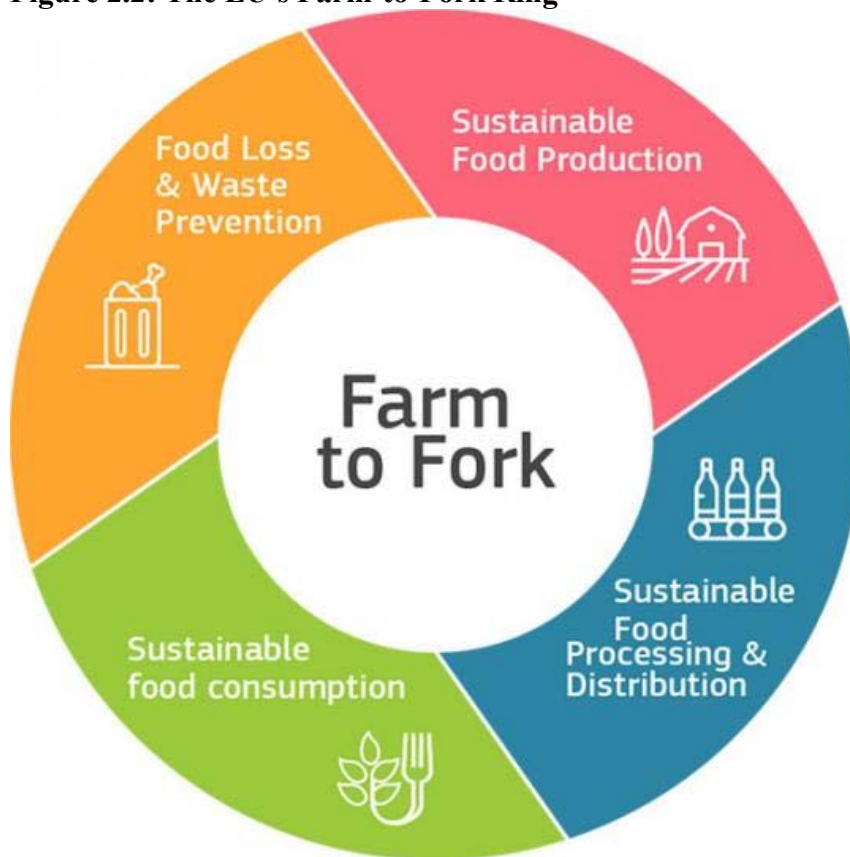
Source: Janzer (2018)

## 2.2 Farm-to-Fork Strategy of the EU

The EU has taken the farm-to-fork idea from its humble beginning as a community of local advocates for a different lifestyle and relationship with food and the environment to

a regional policy initiative. It seeks to use the policy to accelerate the community's transition to a sustainable food system that has a neutral or positive impact on the environment with the ultimate objective of mitigating climate change. The envisaged food system under this initiative will also work to reverse the loss in biodiversity and ensure food and nutrition security. It will be available and accessible to everyone. The conceptual framework of the EU's farm-to-fork strategy is illustrated in the EU's farm-to-fork ring presented in Figure 2.2.

**Figure 2.2: The EU's Farm-to-Fork Ring**



The farm-to-fork ring encompasses a sustainable food production system and food processing system that produces products that are consumed in a sustainable manner. This system would minimize or prevent food waste, contributing to a sustainable food system.

The EU strategy comprises both regulatory and non-regulatory initiatives all focused on agriculture and fisheries. The non-regulatory initiatives include empowering citizens to make healthy and sustainable choices, supporting farmers and fisheries in their transition, and the use and processes that support the environment, nature, and climate. For example, by the fourth quarter of 2022, EU citizens will get increased access to information about the nutrient profiles of their food aimed at restricting the promotion of high salt, sugar and/or fat foods. In the same period, the EU will revise its marketing standards for agricultural, fisheries, and aquacultural products to ensure consumers support sustainable products. By the second quarter of 2023, there will be EU level targets for food waste reduction in place. The non-regulatory initiatives will be backed in some cases with regulations. For example, nutrient profiles to restrict promotion of sugar, salt, and/or fat will be mandated across the community. Another legislative initiative is the country-of-origin requirement for certain food products and a revision to its rules on date marking, i.e., use by and best before dates, with the view of reducing food waste.

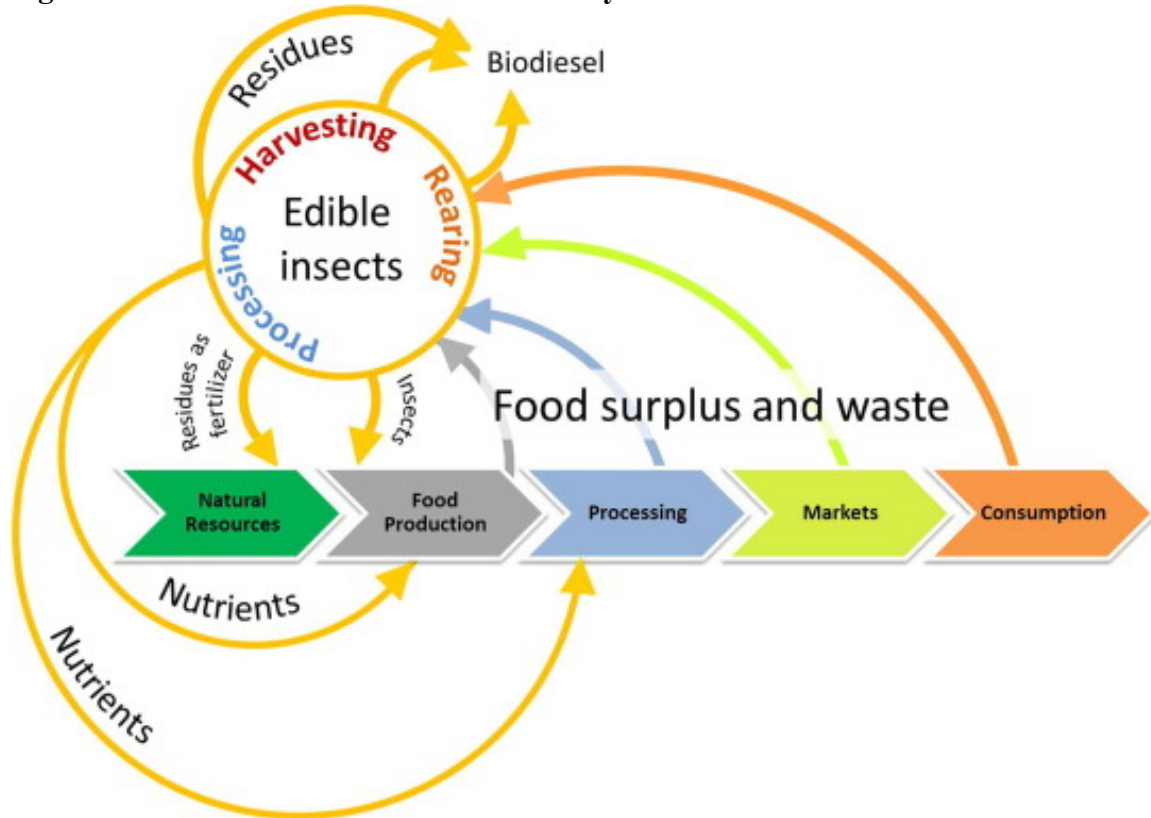
Recognizing the potential of the strategy to disrupt food supply, the European Commission has also developed a contingency plan for ensuring food supply and food security during the implementation phase. It recognizes the need for reform in its advisory services, financial regulations, as well as research, innovation, and development processes. It is important to recognize that the EU is not setting its eyes only on changing the European food system; it is looking to change the global food system through its trade policies and international cooperation tools. This is why an appreciation of the challenges associated with the aggressive and bold plan needs to be understood.

In the end, the farm-to-fork strategy as envisioned by the EU aims to reduce the environmental and climate footprint of the food system and strengthen its resilience, ensure food security, and become a global leader in the transition towards competitive sustainability while tapping into new opportunities. The EU defines a sustainable food system as being able to “deliver food security and nutrition for all in such a way that the economic, social, and environmental bases to generate food security and nutrition for future generations are not compromised” (Group of Chief Scientific Advisors 2020). For the Chief Scientific Advisors, a sustainable food system should ensure and contribute to all elements of environmental, social, and economic sustainability. They saw sustainable intensification and/or agro-ecological approaches to food production, reduction in food loss and waste, promotion of healthier less resource intense diets, diversified food system, and an increase of accountability of producers and consumers as necessary conditions for this sustainable food system.

The elements of the circular economy are embedded in the agricultural, fisheries, and environment elements of the Green Deal. sector, the largely revolves around the nutrient cycle of soil and pesticide use. Agricultural runoff has been linked to water pollution in streams, rivers, lakes, and groundwater. Therefore, the loss of nutrients into waterways can create unsafe drinking water and inhospitable environments for fish and wildlife. A circular economy would create policies which vastly reduce the runoff through the use of buffers, soil tests, point application, and well-timed application for fertilizers. The valorization opportunities in the food system envisaged within a circular economy looking through the narrow lens of edible insects (Ojha 2020) as a solution to animal

protein may provide an example of the extent of circularity that is envisioned for the sustainable food system. This is captured in Figure 2.3.

**Figure 2.3: The Circular Sustainable Food System**



Source: Ojha et al. (2020).

Let us take another single lens view on the food circular economy: the question of reducing food waste to maximize the value of food produced and consumed. Composting leftover foods that currently go into the landfill or into the wastewater stream provides upcycling opportunities by producing richer nutrient soil additives that could reduce the need for certain fertilizers or reduce the volume of fertilizer and chemicals needed. By increasing the soil organic matter, the risk of soil erosion is reduced, and overall soil health improved. That improves the quality of food produced and positions consumers to enjoy healthier food with little waste. At the farm level, farmers may use cover crops to conserve

water and reduce runoffs, which may produce eutrophication in surface water and contaminate ground water. Into this midst may be introduced the benefits of integrated pest management, coupled with crop rotations, mixed farming, and other hitherto management systems that were considered “inefficient” despite their significant value to nature and the environment. These changes get food production closer to becoming more organic, increasing the current about 5% of European agriculture is organic. The goal is to increase organic food production to 25% by 2030 (European Commission 2020).

Farm-to-Fork emphasizes food security and a promotion of healthy sustainable diets. While a sufficient quantity of food is grown for the population, it sometimes does not reach the people who need it. This can occur through a breakdown in the supply chain, food deserts, or affordability. Systems will be created to ensure that all populations have access to sufficient food. It is estimated that around half of all Europeans are overweight, thus campaigns promoting sustainable and healthy diets will occur. Campaigns and education will focus on the benefits of plant-based diets with a reduction in red and processed meats. Instead of meats, the education will focus on legumes, fruits, and vegetable consumption and the health benefits that eating a diet based on them creates. Efforts to reduce the price of these products will be essential to promotion.

To achieve the efforts of the Farm-to-Fork initiative the EU will increase investment in research and innovation. Research will focus on growing food with less petrochemicals, increased organic material in soil, reduction in pests through integrated pest management, while increasing yield. It will consider food processing and packaging ensure that food waste is minimized, and food is packaged in a sustainable manner with packaging being reduced, composted, or recycled.

### **2.3 Challenges to the Farm-to-Fork Strategy**

A year after the Farm-to-Fork strategy was presented in May 2020, an open letter was sent to the EU Commission by a group of European cooperators demanding an impact study of the strategy on businesses, farmers, citizens, and European competitiveness (EuroSeeds 2021). The letter recognized the need for a change in order to attain a sustainable food system but argued that “a year of debate” has only increased their concerns about the farm-to-fork strategy. They expressed concern that all the implications of the strategy have not been addressed.

A group of researchers at the Economic Research Service (ERS) did an impact study on the Farm-to-Fork strategy (Beckman 2020). They considered three scenarios: EU adaptation without trade restrictions; a middle adaptation, defined to include trade restrictions on countries that export food and agricultural products to the EU; and a global adaptation. They also looked at a reduction of pesticide use by 50%, fertilizer use by 20%, antimicrobial use in livestock use by 50%, and a 10% reduction in farmland. Each modeled scenario produced winners and losers, yet all the models resulted in net losses across all countries. The paper reported higher food prices as a result of lower production under all scenarios and across all countries and regions. The scenario for imports found that most countries and regions would decrease their food imports, but exports will vary greatly. Exports levels vary greatly, with the biggest gains in Africa.

Beckman et al. (2020) also assessed societal wellbeing in their study. In all three scenarios, net wellbeing decreased, although most countries and regions did not see large impacts. The EU saw fairly significant reductions in all the scenarios. China saw a very significant decrease in the global scenario. The countries and regions that do gain in welfare are large agriculture producing areas. Those gains are most likely due to increased

prices. Beckman et al. (2020) results for the impacts the Farm-to-Fork strategy on GDP also indicated declines with the exception of two regions under the EU-only model: Argentina and Ukraine.

Agricultural land use has been on a steady decline for the past few decades around the world. Therefore, it was presumed by ERS that this trend would continue. The models further showed that the actual reduction in farmland use would be greater than 10% due to decreased use of fertilizers, pesticides, and antimicrobials.

Farm income is largely projected to increase, due to demand through lower production that the models forecasted. European farmers lost significantly in the EU-only scenario. They were projected to have a loss in production. Therefore, they would not be able to compete with other regions.

The last model that ERS forecasted was the change in annual food expenditures per capita. This model projects, with three exceptions, that per capita food expenditures will rise in all countries and regions under all three scenarios. The exceptions are small decreases in the middle-scenario in Argentina, Brazil, and other countries in South America.

Given this information, they then looked at the effects on food insecurity around the world. Under the EU-only scenario, 22 million people around the world would become food insecure. Under the middle-scenario, roughly 105 million people around the world would become food insecure. Under the global-scenario, 185 million people would become food insecure. (Jayson Beckman 2020)

The International Panel on Climate Change (IPCC) as well as most governments throughout the world recognize that something needs to be done to combat climate change.



The IPCC is the United Nations intergovernmental panel responsible for advancing knowledge on climate change. They have studied and reported on climate change impacts since 1988. In their 2022 report, they highlight that human-induced climate change has caused frequent and widespread extreme events that have negative impacts on people and the environment. These events include heat extremes, heavy precipitation, drought, and fires, all of which are attributed to human activity and the release of greenhouse gases into the atmosphere. Although these events impact everyone, they disproportionately impact marginalized populations. They also disproportionately impact sensitive environments. IPCC reports, that although agriculture's productivity has increased, through climate change this growth has slowed over the past 50 years. Climate change has also caused degradation and destruction in ecosystems through unsustainable land use, loss of soil coverage, deforestation, natural resource extraction, loss of biodiversity, habitat fragmentation, and pollution. These are the elements that are currently happening and have been happening for a while.

The IPCC presents modeling of what they think will occur if nothing is done or if current policies remain the same, this analysis forecasts until 2100. They predict that biodiversity loss will continue, species extinction will occur at high levels, water availability will decrease especially in areas dependent on snow melt, water related hazards will increase. Agriculture will be impacted and threaten food security and nutrition, especially in vulnerable areas. The increase of droughts, floods, and extreme heat will strain soil health and thus raise the likelihood of food insecurity in many areas of the world. (Pörtner 2022)

## **CHAPTER III: FRAMING THE POTENTIAL IMPACT OF EUROPE’S FARM-TO-FORK POLICY**

From the literature review, it is evident that there are barriers to the implementation of the Farm-to-Fork policy. Because the European Green Deal is based on the idea of the circular economy and constrained by the aspiration that “no one be left behind,” it is critical that an appreciation of the system dynamics of the policy is understood before it is implemented. Indeed, the socio-economic implications of the policy may extend beyond European borders.

This chapter attempts to frame the potential impacts of Europe’s Farm-to-Fork policy in a systematic manner. It organizes the potential impacts of the policy into three broad categories: physical; people; and the economy. The physical category focuses on the resources and their availability and distribution as the result of the potential changes that would be imposed on these with the policy. The people category focuses on the heterogeneity of the population and the potential impact of the policy change on the current socio-economic realities of people. The economy category explores the policy’s potential macroeconomic consequences. The chapter ends with a synthesis of the embedded challenges of making such radical shift within the short time-frame without the detailed assessments necessary for developing effective responses to minimize the policy’s potential adverse effects.

### **3.1 Physical**

To create the type of shift envisaged by the Farm-to-Fork strategy, large amounts of infrastructure will be needed. Farms will need to change their current linear operations and adopt the circular model and start using more compost and more labor-intensive farming practices. It is expected that in the first few years after switching to this mode of

farming, yields will also decline as a result of the learning curve farmers have to go through. There is also the resource constraints that they need to overcome. Over time they will increase to previous levels. (Rodale Institute 2011) New farm equipment may be needed to consider the differences in how weed and pest control are managed. This equipment and these materials will need to be available for purchase or old equipment would need to be retrofitted to accommodate any needed changes.

Compost facilities or areas of farm will need to be converted to process materials for composting. After they have been composted, the compost will then be spread on fields to provide the nutrients for crops to use. Farmers may need to learn these techniques and nuances in courses or through extension offices. Tractors and farm equipment, at least partially, will need to switch to electric instead of petrol based. Electric equipment will have to be available as well as repairable by nearby mechanics and the electricity to power them would need to be from a source that creates minimal ecological disturbance.

Processing crops under the Green Deal will demand additional infrastructure changes. These changes will be needed the most in packaging, which will need to incorporate either new technologies, less plastic, more recyclable plastic, glass and metal that is easily recycled, and paper products that is either compostable or recyclable. Materials for these will be needed and then captured for reuse. Any food waste that is created throughout processing would need to be captured and composted either onsite or taken offsite. The processing facilities need to be powered sustainably and efficiently.

Stores and markets would be powered through sustainable methods in a manner that reduces electricity. They also would reduce waste by capturing all waste in a manner

that sorts it into recycling and compost. Water reduction and conservation practices will be implemented to reduce the amount of water used.

In homes, similar systems will need to be in place. High efficiency refrigerators, freezers, and stoves will run off sustainable electricity. Recycling and compost pick up at all households needs to be enforced and managed. Ideally, homes would be able to compost their own materials and put the finished product on their own gardens and yards.

While this is an over simplified vision of what challenges and changes in physical systems are needed to implement Farm-to-Fork, the challenges are not trivial. Yet, the strategy presents potential benefits. Processing plants often have large flat roofs which could house solar panels, they often also have large parking lots which can be covered with solar panels or house a couple small wind turbines. With the surge in electric vehicles in the market, there are more mechanics who are being trained on repairing electric vehicles and this training could include tractors. Processors, markets, and consumers already try to minimize waste as much as possible in order to keep costs down and profits high, putting in place additional systems to further reduce waste would bolster these practices.

### **3.2 People and Communities**

The farm-to-fork strategy would affect people and their communities in ways similar and different from the broad issues identified for farmers. The strategy has intent of increasing consumer awareness about the content of what they eat in the hope of changing their preferences and demand for certain product types. The Green Deal has embedded in it a campaign to educate the public on the benefits of switching to a plant-based diet. Some people will welcome this change and may become healthier. Others will reject the process and most likely pay higher prices to maintain their current diet.

The fact that these changes will not be costless for individuals is a very important consideration that must not be overlooked for the success of the policy.

Food prices, as shown through the ERS study, will increase, creating hardship for many people, especially low-income people. More labor is needed to produce food organically and currently it sells at a premium causing lower-income people hardship to afford it. If new technologies are needed and used in the supply chain to reduce waste and create the circular economy, this will raise prices as well.

A way to combat higher prices for food is for people to grow their own food. This is a wonderful way for people to connect to the food they eat and can create community through bumper crop sharing or even selling excess to neighbors. There are studies which show that being outside and in the garden is a benefit for mental and physical health (Thompson 2018). However, this is not a costless endeavor. People who are unfamiliar with food production will need to learn this skill and learn how to tend gardens, pest management, seed storage, seed starting, composting, and food preservation. Home gardens are also a luxury item as time, space, and money are needed to create them. Time is needed to put the learning into practice. Space is needed in order to have a sufficient plot of land to grow, but the data shows that the majority of people now live in urban areas where gardening is prohibitive due to space constraints. This constraint is not only in developed countries but rapidly emerging in virtually all developing countries. It is forecasted that more than 70% of the Earth's nearly 10 billion people will live in cities by the end of the second half of the 21<sup>st</sup> Century. To put in context this challenge of urbanization, there were only two megacities (i.e., cities with more than 10 million people) in the world in 1950: Tokyo and New York. That number

doubled by 1995, and reached 34 by 2020 (Designing Building, 2022; UN Department of Economic and Social Affairs).

Even if the land can be provided, as some cities have been doing – offering some of their citizens small plots of land to turn into gardens – people still need the resources to purchase materials such as shovels, seeds, water hoses, fencing, and potentially trellises, irrigation, and other non-essential materials that can boost production. The risk of hunger and famine may increase if people become so dependent on their own production and there is a weather-driven crop failure. Since everyone is producing just enough for their own consumption, the potential to address this challenge can be catastrophic. The current scale economies in the food production system enables sporadic food shortages emerging from around the world to be dealt with by moving products. The envisaged model puts a lot of pressure on this option to solve local food shortages with global supply.

Food waste management is another area of concern addressed by the Green Deal. Like production, the knowledge and space to do this cannot be taken for granted. Let us discuss space first. If people have to compost on their own land, then some portion of the already limited supply of land available to most urban dwellers would have to be taken from production and allocated to composting. If it will be done in a central location, then the waste has to be collected and the compost returned. This will not be free, and someone will have to pay, even if the individual is not.

Next is the knowledge about composting. Knowledge of composting is needed being that it is a great and inexpensive way to increase soil health yet, if it is done improperly it can heat to a degree of catching fire or attract pests both of which can cause

great damage not only to their property but potentially their neighbors. If homeowners use pesticides or fertilizers they will need to educate themselves on proper application as to not cause damage to themselves or the environment, this is true whether they are using organic or conventional products.

### **3.3 Economic**

The Farm-to-Fork initiative will increase prices on food and potentially land. With Farm-to-Fork and the biodiversity initiative, more land will be put into preservation and more land may be needed for agriculture if there truly is a decrease in harvest due to organic practices. The increase in demand and the decrease of available land will create a scarcity issue and drive prices up.

Organic agricultural products demand a premium in the market, with the increase of the amount of organic food and decrease in production will create a supply and demand issue, increasing prices. Transportation, manufacturing, and packaging will all help increase the prices as new technologies and equipment will be needed to transport and process the products. The low-income population may feel this impact the most as they may have to make decisions based on calories instead of nutritional value.

The new technologies and more labor-intensive farming practices will create new jobs and help grow the economy. These jobs will need to be good paying jobs in order for the employees to afford the higher prices of products, the trick with companies and farmers paying higher wages is that they then need to charge more for their product. A potential way around this is to limit the amount the heads of a company can earn in proportion to their workers. This is a tactic that most companies do not want to pursue and will be difficult to convince companies to enact.

In theory the Green Deal and Farm-to-Fork will create a healthier environment and healthier foods. Less nutrients will leach into the environment and the soil, water, and air will become cleaner for people and animals to live with. This will have a direct correlation on quality of life and health for everyone. Healthier people will result in lower health care costs, less missed days of school and work, and better quality of life for many people. All of these items will positively impact society and the economy.

### **3.4 Interconnections Among Physical, People, and the Economic Categories**

Farm-to-Fork will have huge impacts and create a paradigm shift in the way society operates as has already been outlined. In many ways Farm-to-Fork appears as though it will force the economy into an agrarian economic model. More land will need to go into farming or gardening and people will need to be compensated appropriately for their time to have the luxury of growing some of their own food and be able to afford the higher costs at market that they will pay. Education campaigns will be integral into explaining why the policies are being implemented and people will need to be shown what the benefits are. Currently, the EU enjoys relatively low food prices compared to income levels. This will change with Farm-to-Fork and people will be impacted daily, they will then need to be shown that by doing these steps and composting their food scrapes and food packaging will help improve their health as well as the environment. Climate change has been linked to increased weather events which has had a huge economic impact and cause people have lose their homes and possessions. All of these things are felt by a relatively small part of the population. Therefore, most people do not feel the impacts and will not see the correlation between food prices, extra waste sorting, and additional steps that are needed to fully implement the initiative.



Farm-to-Fork will create opportunities for innovation, new businesses, and job creation while some current businesses and jobs will be lost. Continual innovation on incorporating organic farming practices while maintaining or increasing yield will be a field for expanding. Petrochemical companies will shift research and development from petroleum-based chemicals to chemicals with less fossil fuel input which will cut old jobs and force people to learn new skills in producing and packaging of the new products. Farms will need additional labor and systems in place such as drip irrigation and mechanics who can fix solar powered tractors.

Ranchers and butchers will be significantly negatively impacted since Farm-to-Fork is suggesting that society eats less meat products and obtains more protein from plants. Many may be forced out of jobs due to the low demand and eventual higher prices of their product. While this will be the case, jobs in creating new plant-based protein products will be available as a market for them will be created.

Garbage emanating from food production, processing and consumption is envisioned to decrease, creating a more beautiful environment and healthier home for animals. Given that single use plastic would no longer be used in packaging, bags, or in any other products the chance for them to be lost out of the circular cycle would decrease. These plastics would not end up in waterways, forests, or prairies where animals can get trapped in them or accidentally eat them.

Farm-to-Fork and the entire Green Deal is a whole-of-society economic shift to achieve the objectives of the Green Deal. The population will need to be educated on the issues creating buy-in and understanding. The education system could incorporate the details in social studies classes highlighting the need for change and how climate change

impacts different populations. As climate change impacts people of color and people in poverty disproportionately, often the need to help and support these communities is overlooked and not fully understood by the rest of the population and policy makers. If people had proper education and understanding they act in ways that help all of society. This method is already taking shape through global youth movements to educate and address climate issues. A key missing element in the movements is putting more emphasis into school curricula and incorporating it across all schools.

## CHAPTER IV: CONCLUSION

There is no denying that action is needed to combat climate change. The adverse effects of climate change are projected to get worse if action is not taken to arrest them (Pörtner 2022). It seems that the option of doing nothing has become extinct given the increasing number of people who have accepted the human role in climate change. The EU has decided to take a bold and aggressive action to combat its contribution to the problem through the Green Deal, and one of the dimensions of its approach to achieve its objectives is the Farm-to-Fork initiative.

The farm-to-fork initiative is great in theory. It highlights the need for action and defines the steps needed to achieve carbon neutrality by 2030. The details are still being debated as to how this will happen in real life (European Commission 2022). The shift to Farm-to-Fork, as with the Green Deal as a whole, is a paradigm shift in from how society currently functions. The economic model will be adjusted to one of a circular economy which in itself is not a small feat given all the elements that go into the economy. Agriculture is an economic model that could become circular easier than many sectors and by doing so may decrease yield causing higher food prices and potentially more food insecurity two things no one wants.

The major gap is the absence of clear path to implementation. There is a recognition that changes in operations are needed. However, there is seems to be no clarity on whether how those changes will be addressed have been completely explored. For example, so far, there have been no studies showing whether the suppliers of the inputs into the different stages of the farm-to-fork strategy (see Figure 2.3) are prepared and ready to meet the needs of their emerging clients. The potential implications for reducing pesticides, herbicides and inorganic fertilizers on food availability and accessibility have not

completely determined even as accessibility and affordability remain cornerstone expectations of the strategy. In short, the idea is powerful if the objective to achieve climate neutrality remains valid, but the pathway to implementation remains blurred.

People need to be educated and taught about Farm-to-Fork and what impacts it will have on their lives. The initiative states a push towards plant-based diets and away from meat. Not everyone will be willing to convert to plant-based diet. It does not also explain how the livestock producers who will be harmed by this policy are going to be compensated as they transition to new production systems or new lifestyles. It is often assumed that such changes in people's lifestyles could be instantaneous. However, traditions die hard. And without a careful appreciation of what it would take for people to find their feet in the new world, the strategy can present some steep economic and social costs to people.

Some people will be able and willing to pay for higher food prices and many people will be hard pressed to do that. For the population that cannot afford the higher food prices, the government will have to assist them through subsidies. Governments are often quick to use interventions, such as subsidies, to address challenges like this one. Yet, the question is how long would the policy be in place? And if and when the subsidy ends, is there not a risk that some people will be left behind because they did not move fast enough for the policymakers?

The strategy assumes that increased plant-based diet, organic production, and lower chemical use would produce a healthier population. It then presumes that a healthier population would consume less of health care. Indeed, the strategy does not say anything about health care cost changes resulting from its implementation. Therefore, research is

needed to see if the envisioned changes would lower health care costs. If it does reduce health care costs, then its economic value to society would have been established. If the strategy does not decrease health care costs, then it is important to assess the links between the proposed dietary changes and value of human health.

The way the policy has been framed; the economy will need to become completely circular. Policy makers will have to look at every aspect of the population and economy, ensuring that all are accounted for, and no one has to bear the majority of the impacts. Ideally the cost of the new infrastructure, education, and rising food costs would be shared evenly as a percentage of earned income across the population. There are benefits to how the current food production system has evolved. There also are costs. These costs must be weighed against the benefits and compared to the net benefits of the alternative being presented by the Green Deal. The amount of outstanding work required to ensure the success of this policy and its aggressive timeline must be reconciled. A 200-year evolution cannot be undone in a decade to produce good results.

## REFERENCES

- Beckman, J., M. Ivanic, J. Jelliffe, F.G. Baquedano, and S. Scott. 2020. *Economic and Food Security Impacts of Agricultural Input Reduction Under the European Union Green Deal's Farm to Fork and Biodiversity Strategies*. Economic Brief No. EB-30, U.S. Department of Agriculture (USDA), Economic Research Service.
- Billington, R.A. and M. Ridge. 1981. *American History after 1865*. Rowan & Littlefield.
- Britannica, The Editors of Encyclopaedia. 2022. *New Deal*. March 13. <https://www.britannica.com/event/New-Deal>.
- Buis, Alan. 2020. "Study Confirms Climate Models are Getting Future Warming Projections Right." *Feature: NASA Global Climate Change Vital Signs of the Planet*, January 9. Accessed June 30, 2022. <https://climate.nasa.gov/news/2943/study-confirms-climate-models-are-getting-future-warming-projections-right/>.
- Buis, Alan. 2020. *Study Confirms Climate Models are Getting Future Warming Projections Right*. NASA's Jet Propulsion Laboratory.
- European Commission. 2019. *Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, and the Committee of Regions*. Brussels: European Commission.
- European Commission. 2020. *Farm to Fork Strategy For a fair, healthy and environmentally-friendly food system*. European Union.
- . 2022. "Legislative framework for sustainable food systems." *Sustainable food systems*. European Parliament. 2021. *What is carbon neutrality and how can it be achieved by 2050?* European Parliament.
- European Union. 2021. *Delivering the European Green Deal*. July 14. [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en).
- EuroSeeds. 2021. "Without impact assessment, no celebration of the EU Farm to Fork strategy anniversary." *Joint Statement*. Brussels, May 20.
- Farm to Fork Initiative. 2021. *Farm to Fork Initiative*. <https://www.farmtoforkinitiative.org/>.
- Group of Chief Scientific Advisors. 2020. *Towards a Sustainable Food System*. Brussels: European Commission.
- Janzer, Cinnamon. 2018. "The History of the Farm to Table Movement." *Upserve.com*. June 22. Accessed June 26, 2022.

- Jayson Beckman, Maros Ivanic, Jeremy L. Jelliffe, Felix G. Baquedano, and Sara G. Scott. 2020. *Economic and Food Security Impacts of Agricultural Input Reduction Under the European Union Green Deal's Farm to Fork and Biodiversity Strategies*. United States Department of Agriculture, Economic Research Service.
- Long, Evelyn. 2022. "Farm to Table Process: Tracking Food Through the Food Industry [2022]." *MindsetEco*. <https://mindseteco.co/farm-to-table-process/>.
- Ojha, S., S. Bussler, and O.K. Schluter. 2020. "Food waste valorisation and circular economy concepts in insect production and processing." *Waste Management* 118: 600-609.
- Pörtner, H.-O., D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.). 2022. *IPCC, 2022: Summary for Policymakers*. Cambridge: Cambridge University Press.
- Rodale Institute . 2011. *The Farming Systems Trial, Celebrating 30 Years*. Kutztown: Rodale Institute.
- Thompson, Richard. 2018. *Gardening for health: a regular dose of gardening*. London: Clinical Medicine.
- Zelizer, Julian E. 2000. "The Forgotten Legacy of the New Deal: Fiscal Conservatism and the Roosevelt Administration, 1933–1938." *Presidential Studies Quarterly* 30: 332-359. doi: <https://doi-org.er.lib.k-state.edu/10.1111/j.0360-4918.2000.00115.x>.