

FOOD CRISIS

Planning in a Turbulent Future

Marcos Fava Neves



FUNPEC-RP
Editora



Harven

AGRIBUSINESS
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INDEX

Chapter 1

<i>Introduction and objectives</i>	1
------------------------------------	---

Chapter 2

<i>The food crisis will be back</i>	4
-------------------------------------	---

Chapter 3

<i>There are alternative solutions for the food crisis</i>	9
--	---

Chapter 4

<i>The impacts of coronavirus on food, and agribusiness chains</i>	14
--	----

Chapter 5

<i>Importance of sustainability in food Production</i>	27
--	----

Chapter 6

<i>How do we feed the world as war disrupts the global food system?</i>	36
---	----

Chapter 7

<i>The expansion of grain production in Brazil avoided a deeper food crisis and hunger</i>	41
--	----

Chapter 8

<i>The new macroenvironment for food, agribusiness and biofuels chains</i>	45
--	----

Chapter 9

<i>Taking actions: public and private policies and strategies to get prepared for a turbulent future</i>	59
--	----

<i>Meet the author</i>	62
------------------------	----

<i>Meet Harven Agribusiness School</i>	65
--	----

1

Introduction and objectives

In one of the world's most serious food crises, with the FAO Food Price Index at an unprecedented historical level, I would like to share this collection of articles written on the subject over the last 15 years to see how things end up repeating themselves one year after another, as well as to recommend public policies to increase supply in a sustainable way. The first article is from 2009 when I was in China for an event and had the opportunity to publish the summary of my lecture in the China Daily. This article, written almost 15 years ago, anticipated that the food crisis would return. After this first article, it has been a pleasure to write over 80 articles for this leading Chinese newspaper, which can be found on their website if you are interested.

The second article, written in 2011, proposed solutions to the food crisis. 10 possible solutions to the problem to be more exact. It is interesting to see some of them being discussed in 2022 during the current crisis.

The third article, written in 2020, explored the drastic changes we have had in food chains during the pandemic. The fourth article, written a year later, addresses the fundamental importance of sustainability in food production, setting out the example of how Brazil has been able to expand its agriculture in the last 20 years by improving sustainability.

The next article explores the terrible war situation in two key agricultural countries, creating food supply problems and several others. After that, I report the story of Brazil's expansion of grain production, averting a deeper food crisis and starvation.

Finally, the last article is a summary of a chapter of our book "Food and Agribusiness in 2030" published by Wageningen Publishers in 2020 (a free pdf can be downloaded from their website) which raises the most important facts that should be considered in each of the four most important macroenvironmental variables: political/regulatory, economic/natural, socio-cultural and technological.

It then recommends a matrix to help businesses and governments organize ideas and projects based on the factors. We then conclude by highlighting the most important topics for 2023-2033.

How to use this book?

As someone who is both a businessman and a professor, I highly recommend using this book for lectures or company workshops. It would be beneficial to suggest that participants read the chapters beforehand and, during the class or workshop, encourage a discussion about the future using the last table. The most relevant facts and impacts can be discussed, along with potential actions such as projects or ideas that could be taken. This exercise can be applied to the entire agribusiness of a country, a specific food, fiber, or biofuel chain, or even a particular company.

2

The food crisis will be back

China Daily, July 7th 2009



The food crisis, a problem we faced in 2007 and 2008, will be back sooner than expected. This is due to several factors, stemming from the economic and financial crisis, which are putting pressure on our food supply capacity.

First, there has been a rise in the amount of land dedicated to producing biofuels. Several countries have lately started biofuel production. This increase is causing concern as it is taking up space that was previously used for growing food. As a result, there is now a competition between our car's fuel tank and our stomach for resources. Although biofuels have shown positive results in some areas where both food production and biofuel production have increased, they still need to be considered as a contributing factor to the issue.

Second, it is predicted that the global population will reach 9 billion by 2050, resulting in a need for greater food production. FAO has estimated that we will need to increase food production by at least 50 percent over the next 15 years. Economic development and income distribution in countries with high population densities like India, Brazil, China, and Indonesia are generating more food consumers. The growth of megacities due to migration and urbanization is also contributing to the rise in food consumption. Furthermore, consumption habits are shifting towards less grain and more protein, becoming more individualized, sophisticated, and

energy-consuming. In addition, it is important to consider that more than 50 percent of the population in some countries still live in rural areas.

Third, as the price of oil continues to increase, there is a growing economic motivation to invest in biofuel initiatives. This, in turn, puts more pressure on land, particularly land that is occupied by crops like corn and other grains. I anticipate that oil prices will hover around \$70-80 per barrel. Additionally, the depreciation of the dollar over the past few years has also played a role in driving up commodity prices.

Finally, farm production shortages due to lower margins, climate, droughts and diseases are a major concern. Due to the credit crunch and higher price fluctuations, we have had a downturn in prices and a huge loss of confidence. This is resulting in lower productivity, lower inventories, lower margins and farmers switching to cheaper crops. Some exporting countries will become importers, like the case of Argentina's beef, wheat and other items. This year's agricultural output will be lower in several countries, and global production is expected to fall by 5 percent.

The FAO reports that although global hunger is decreasing, certain countries still face a significant increase in food prices of up to 80% from two years ago. To address this concerning issue, here are some essential tips:

To begin with, we need to focus on expanding production horizontally to new areas while ensuring environmental sustainability. Currently, only 25% of South America's land capacity is being utilized, and there are millions of hectares of poorly used land on all continents. In Brazil, reputable institutions have conducted studies that confirm the availability of over 100 million hectares for food and biofuel production without disrupting fragile ecosystems.

It is evident that productivity can be increased. Farmland in South America, in Africa, in Asia, and even in developed nations can produce more with better technology and investment.

Besides, it is important to reduce food import taxes and barriers besides protectionism. Food prices in some countries are artificially inflated due to import taxes and protectionist measures. For example, beef in the European Union costs four or five times more than the same quality beef in an Argentinian or Brazilian store owned by the same European retailer. The usual argument is that lowering protectionist barriers could harm agriculture in less developed countries. However, it should be considered that the new level of commodity prices may enable local agriculture to become more competitive.

Furthermore, investments in international logistics are needed to reduce food costs. Many grain-producing countries face significant challenges due to

inadequate logistics. Governments should invest, and society should work harder to facilitate public-private partnerships for the privatization of ports, roads, and other food distribution logistical channels to make the flow faster and less energy-consuming.

To improve the efficiency of major international food chains, it is crucial to reduce transaction costs. These chains are currently facing coordination issues, redundancies, and poor asset utilization.

Moreover, it is important to prioritize the use of sustainable sources for biofuels. Crops that offer high yields and do not disrupt food chains should be given priority in the global development of biofuels. One example of this is sugarcane ethanol, which has an energy balance that is 4.5 times greater than that of ethanol produced from sugar beet or wheat, and almost seven times better than ethanol produced from corn. It is crucial for biofuels to be produced sustainably without negatively impacting food crops.

3

There are alternative solutions for the food crisis

China Daily, September 2nd, 2011



My first article published in China Daily (July 7th, 2009), almost 20 months ago, addressed the food crisis debate ("The Food Crisis will be Back"). The article ideas came from previous research and were then further developed and published in two important academic journals.

At the time of the article, we had comfortable food commodity prices and I explained that the 2007/08 crisis was serious and structural, caused by nine factors, with different levels of responsibility (effect). Let's get back to them: use of grains and agricultural land for biofuels; population growth (with 220 thousand new stomachs to feed each day); strong income growth and distribution in emerging economies (with inaccurate consumption data); the urbanization of populations into megacities; income support programs from local governments; high oil prices; production shortages caused by climate issues, unsustainable water usage, plagues and diseases, low prices and other factors) as well as dollar devaluation and investment fund speculation.

It is not surprising that we are experiencing yet another food crisis, given the current trend in consumption. For instance, the global consumption of wheat has increased by an average of 10 million tons yearly over the past three years, while corn consumption has grown by almost 30 million tons per year, and soybeans by 20 million tons per year. Meat consumption has also surged, with an almost 20%

increase in the past nine years. In essence, people are gaining better access to food.

Food commodities prices raised 40% in one year, and nonfood commodities almost 94%. This price increase is bringing back inflation, hunger and political disturbances in some developing countries where the population spends between 30-50% of their income on food and relies heavily on imported oil.

And where does President Sarkozy come into this story? As the G20 leader, he is concerned about food prices and is proposing a strategy for the G20 to intervene in order to lower prices. Besides, he suggests regulating financial markets for commodities and building global stocks. However, it is important to remember that food commodities chains face all types of interventions and distortions, from US\$ billions spent on subsidies to high import duties, which have historically harmed agricultural export-based economies in developing nations. While his concern is valid, in my opinion addressing the root causes of the problem would be a more positive long-term solution.

In that same 2009 article, I pointed out 10 potential solutions to address the food crisis. My aim was to bring more balance by basically promoting a shock in the offer increasing production and efficiency, which is a “win-win” strategy. These solutions were: sustainable horizontal expansion in food production using newly available areas in South America and

Africa where water is not scarce; vertical expansion, increasing productivity; reduction in food taxes besides other market protections and barriers that increase costs and inflate food prices for the final consumers; investment in global logistics to reduce food waste and transportation costs; use of the best sources for biofuels production that don't compete with food chains (ethanol from sugar cane is the best example here, compared to corn for feed); investments towards a reduction in transaction costs that occur in all food chains; new generation of cheaper and innovative sources of fertilizers (today they represent a high cost for farmers); sustainable supply contracts to farmers for more balanced margins allocation; spreading innovations (GMO's, nanotechnology and others) and, finally, consumer behavior changes to avoid losses and even overconsumption of food (obesity). This 10-point list could be useful for President Sarkozy and other global politicians and strategists to broaden their ideas and policies.

Fostering a policy of global stockpiling and price controls, as is being proposed, will make food markets even more artificial. Leading OECD economists have studied these policies and found that intervention has not been effective. While export quotas and high export taxes can initially control inflation in local markets, they can harm farmers' incentive to increase production and productivity in the long run.

For years, farmers have been adversely affected by production subsidies in certain countries. These subsidies have resulted in lower commodity prices, which in turn have discouraged farmers from increasing production and promoting fair income distribution around the world. It is now time to change. Farmers worldwide, particularly in emerging countries and Africa, require price incentives, access to technology, credit, and purchasing contracts (market access) to invest and boost production to levels that can meet the increasing demand for food in the next 10-20 years and tackle the food crisis.

If United Nations, FAO and the G20 are worried about the food prices rise in the coming months, one solution could be immediately reducing taxes on food and even providing lower-income people with temporary government support. Moreover, it would be beneficial to focus on implementing these ten proposed development points.

We will need to double food production in ten years' time, and fortunately the world possesses the necessary resources, including lands, technology, water and skilled farmers to do so. It is essential that we take steps in the right direction by creating incentives for sustainable growth in global farm production and trade. This will not only promote welfare and inclusion, but also contribute to global peace.

4

The impacts of coronavirus on food, and agribusiness chains

China Daily, April 10th 2020



The goal of this article is to provide an overview of how the food and agribusiness industry has been affected by the lockdown policy and the ongoing global crisis. Through analyzing these facts, I aim to contribute to decision-making and provide insight into the potential impacts. Brazil is used as a case study to help achieve this objective. Additionally, I present 10 points of behavioral changes that are likely to impact our lives and should be further analyzed as they present both threats and opportunities.

The international arena has experienced one of the biggest changes in decades due to the coronavirus crisis. As in a tsunami, the impact of the coronavirus crisis has been devastating, resulting in loss of lives and economic shutdowns that are unprecedented in recent history. Global GDP growth has been negatively reviewed, with bleak projections and disastrous outcomes being announced. This environmental change, which I had never seen in my whole career, requires a new norm - stopping the world to reduce the spread of the virus and working together to prevent the collapse of the health system, protecting vulnerable segments of the population, particularly the elderly and at-risk individuals.

Halting an activity is not an easy task, particularly in a world where value chains are interdependent and logistics chains are complex and fragile, especially for perishable goods. The consequences

can be severe, starting with the immediate collapse of the service sector, followed by the industry, and eventually, agriculture, as food is the last item to be affected by job and income losses. In essence, a drastic change has occurred in just two months, and the future looks challenging.

The World Trade Organization (WTO) predicts a catastrophic scenario. Global trade in 2020 is expected to fall by about 5 to 30 percent, spreading value destruction across producers, buyers and carriers, among others. The WTO predicts that world GDP, previously estimated at around 3 percent, will fall to 5 to 6 percent, or an 8-point difference. This would be an even steeper drop than the one observed in the last global crisis in 2009. In addition to the economic damage, the return of confidence among people and businesses could be very slow as the virus continues to threaten our lives. The greater the share of the service sector in GDP, as mentioned earlier in the first paragraph, the greater the fall. According to Banco Bradesco, the US economy is expected to shrink by 1.5%, China's is expected to grow by 3% (it was previously estimated at 6%) and Europe's shall decrease by 2.2%.

The world kneels before the virus, which has brought many changes in a very short period and will continue to do so. In general, agribusiness will be one of the least affected, but this is not true for all production chains and all sectors, as we will see below.

One of the players that benefited from the crisis has been the supermarket since there has been a dramatic change in the food sales channel from restaurants, fast-food chains and other types of so-called food service to the supermarket channel. The figures are impressive. In England, the expenditure in supermarkets has increased by 361 million pounds a week, around 13 pounds per household per week, a growth of 21 percent (Blacktower). English retailers have hired thousands of people due to the increase in demand, offering almost 45 thousand job positions. In the US, the research company Chicory has observed a growth of 123 percent in online sales in supermarkets, compared to the same period of the previous year. As in Europe and in the US, Brazil's sales in supermarkets have grown by an average of 20 percent in the weeks of circulation restrictions. Last week, according to some retailers, looked like Christmas Eve but the situation is starting to go back to normal. For restaurants and other food service providers, though, the scenario is bleak. A real disaster, since delivery strategies have been created and enhanced but they don't offset the loss of sales.

China, who is in a more advanced phase of the fight against coronavirus, is recomposing its import activities with a policy that includes increasing stocks consumed during the months of lockdown. However, as part of the crisis, China shall suffer in exports with the reduction

of global growth and face fewer imports. It will be strong in the purchase of beef and other products in the first two quarters of this year, being a positive factor for exporting countries. Countries producing beef, poultry, pork and fish shall benefit from more exports at better prices, mainly in the first two quarters. However, they will have the downside of higher feed and input prices, especially in the countries that have undergone currency devaluation, such as Brazil.

There is growing concern about the global food supply chain amidst the coronavirus pandemic. This issue was brought up during a World Trade Organization (WTO) meeting in late March, and the WTO, along with the UNFAO and the World Health Organization, released a document addressing the matter. Some countries, such as Russia and Kazakhstan, have already blocked exports of wheat and other products, while Vietnam and Thailand have done the same with rice and eggs, respectively. The US meat sector is also experiencing some disruptions. It is important to ensure that the food supply chain remains stable during this time.

During this crisis, Brazil has the opportunity to establish itself as a dependable food supplier to the world by providing a record harvest. This could help the country attain a respected position as a noble food producer. Other countries are even accelerating their permissions to access Brazil's markets, which will enable the country to increase its food production and

prevent a return to food security policies that several nations had to adopt. Moreover, Brazil's efforts can assist countries that lack natural resources to maintain food security.

It is likely that the focus on food safety and sanitation will become even stronger in the wake of this health crisis. To ensure that food remains safe for both domestic and international markets, the food and agribusiness industries will need to invest heavily in control mechanisms, whether they are public or private.

A fact that may represent an opportunity is that governments all over the world, including Brazil, will have to expand public expenditures to contain part of the damages in the economic systems, destruction of jobs and companies, and an important part of these public expenditures will be reverted to food vouchers, aiming at guaranteeing basic support to the survival of families, and this shall translate into an increase in the world consumption of food, or in the worst case scenario, offset any potential decrease in demand.

Though Brazil's economy has also been hit hard. The Central Bank revised the GDP from a growth of 1.48% to a drop of 0.48% this year, to 2.5% in 2021. Among the measures applied and suggested in Brazil, we can mention: a drop in interest rates; reinforcement of the Bolsa Família support Program; the anticipation of the 13th salary; transportation vouchers for informal

workers; temporary reduction of salaries in the executive, legislative and judiciary under discussion in the three spheres of government; and programs for companies to ensure the safety of their employees. At the global level, policies are being designed that include reducing interest rates, injecting liquidity, credit lines, tax relief, removing regulatory obstacles, expanding public spending, restoring confidence, sending resources to those who need them most, stimulating small and medium-sized companies, simplifying decision-making structures, unemployment insurance for companies that have kept jobs and accelerating infrastructure projects.

The COVID-19 crisis has impacted the food and agribusiness chains in various ways. However, the situation is comfortable for soybeans and corn as prices are advantageous due to the exchange rate and consumption aspects. Additionally, much of the future production has already been sold, so there is no concern about the impacts of COVID-19. In fact, there might even be a higher demand for feed due to the increase in meat exports. It's worth noting that many growers have made anticipated purchases of supplies, which is a winning strategy in times of a more devalued Brazilian Reais.

Though there are two main reasons why soybean and corn prices might have been negatively impacted. Firstly, the USDA has predicted an 8%

growth in corn and a 10% growth in soybeans for the US harvest in 2020. Secondly, the closure of many corn ethanol operations in the US due to reduced fuel consumption has affected the corn and soybean industries, as the corn that would have been processed is now being sent to the international market, which may cause prices to drop and impact future planting decisions in the US.

The cotton industry has been negatively impacted by the coronavirus pandemic, resulting in a 17% decrease in prices in March. Additionally, textile product purchases have been postponed, many textile industries have halted production, and synthetic fiber has become more competitive due to the lower price of oil. However, there is hope for the next harvest as prices have already been fixed at better rates and the exchange rate is working in favor of the industry. Unfortunately, there will be some loss in consumption that will need to be addressed later on. The rubber industry is also struggling due to lower sales of automobiles, tires, and rubber goods, resulting in factory closures and labor difficulties. The leather industry is also facing challenges.

The sugarcane industry in Brazil is currently facing a significant crisis. Despite expectations of a successful harvest with high production and prices, the situation has drastically changed due to the oil price war and the impact of the coronavirus. In the past month, the

price of oil has dropped by 65 percent, though it has started to rise again. The lockdown has resulted in a sharp decline in the consumption of hydrated ethanol, leading to an oversupply of sugarcane for sugar production. Consequently, the price of sugarcane has fallen by almost 30 percent.

Among those who benefit from the coronavirus is the orange juice chain. Prices have gone up in the New York Stock Exchange, practically 24 percent in just over a week and consumption this month in the largest consumer in the world, the US, has gone up 10 percent, something not seen in the last few years. The orange juice chain needs to maintain consumption now by reinforcing the juice's appeal for health and "liquid nutrition". Other fruits which carry a high content of vitamin C shall benefit, including limes, in this coronavirus situation. Another sector that has benefited is paper and cellulose due to the demand for tissues, papers, and packaging, and the sector is working at full capacity to meet the demand for aseptic products.

Coffee is also doing well as demand continues to grow and Brazil is expected to have a good harvest, around 68 million tons. Of this, 50 million tons are Arabica coffee, indicating a 15 percent growth. It is worth noting that while coffee shops, restaurants, and other service channels may temporarily close, it is only significant if the decrease in consumption is offset by higher sales in the retail market. An important reminder

is that the service channel works more with premium coffees, which may be more impacted.

Regarding fruit and vegetable products, on the one hand, consumption remains strong in supermarkets and groceries but has fallen in other types of channels, in open-air markets and especially in restaurants. This is one of the sectors that deserve more attention so that markets can urgently resume operations with new standardized safety rules. It may also take advantage of this moment to look for delivery solutions and direct connections between producers and final consumers through apps so that distribution channels work with creative credit mechanisms. However, it also presents workforce issues.

The food and agribusiness sector has been compelled to adopt digital platforms and apps, which are making a significant contribution. Apps are providing simplifying solutions, such as enabling truckers to connect with the demand for shipping goods, scanning payments and contracts, and offering marketplaces for spare parts and items with delivery services. These digital financial operations are boosting sales and generating great savings through procedure scanning. Fruit and vegetable distribution centers and wholesale are adopting these initiatives to reduce people's flow. Sophisticated delivery models have also emerged, allowing centralized parties to deliver directly to final consumers or small businesses through the motorcycle

courier structure of food delivery companies. These advancements have brought about a huge efficiency gain that will continue to be relevant.

There is another product that requires attention, which is milk. It is important to come up with innovative solutions to prevent any loss of this product since its supply chain has a short shelf-life and does not have any time for breaks. While the consumption of milk is not expected to decrease, there are some logistical issues that need to be considered.

The flower industry has suffered a significant blow due to the loss of sales from channels such as events, weddings, exhibits, and masses. This has resulted in a significant loss for the whole production chain. In order to support this sector, it is essential to provide credit and stronger support to the retail market. This can be achieved through opening up more space, running campaigns and dedicating a portion of profits from other products to the flower sector. Garden centers and other sales points must be revitalized. It is important to raise consumer awareness about the need to support the flower industry.

During the COVID-19 crisis, food producers and agribusinesses received a positive boost in reputation due to their efforts in ensuring a steady supply of food. The public recognized the importance of having access to food during a time when shortages and empty shelves were prevalent worldwide. Additionally,

many companies and organizations in the food industry generously donated items such as alcohol gel and liquid alcohol to those who were less fortunate during the pandemic. These donations were used as antiseptics to help combat the spread of the virus.

Brazilian agribusiness is operating normally in the field, while cooperatives, trading companies, ports, and the world at large are focused on maintaining the activities of this vital food supplier. A coordination effort has emerged between ministries, retail and food industry companies, logistics companies, and other organizations to establish a permanent dialogue and information hub. This collaboration allows for the anticipation of any issues in the food supply chain, enabling quick action to avoid disruptions. Other countries should consider following this model to ensure a stable food supply and establish similar intelligence centers.

I would like to conclude this article about the effects of the coronavirus on food chains by highlighting certain behavioral changes that warrant further analysis to understand how they will affect food and agribusiness chains, companies, and other entities in the near future. The COVID-19 pandemic has revealed a different world, which I believe can lead to: 1) increased global solidarity and integration among societies; 2) heightened sensitivity towards those who suffer from a lack of resources; 3) greater risk

calculations, flexibility, and adaptation; 4) increased caution against “infotoxication,” which refers to the excess of false, alarmist, unchecked information that only harms people; 5) the emergence of digital benefits in our lives, transforming education, medical services, home offices, apps, deliveries, productivity gains, online meetings, and other aspects, leading to the rethinking of the need for large offices and overhead costs for companies; 6) the strengthening of collective actions like cooperatives, associations, and other forms of gatherings; 7) the acceleration of new media and new sources of information in this era; 8) a better image of the food and agribusiness sectors that have been able to supply people in times of crisis and shortages; 9) more tolerance for aggressive environmental groups towards food and agribusiness production, as society realized during the lockdown that pollution is mostly in cities and fostered by our lifestyle; and finally, 10) the adoption of simplicity as the next big thing. As we stayed at home during the pandemic, we realized that we do not need as many things as we used to have in our old life, and significant changes will come, leading to a better future.

5

Importance of sustainability in food production

China Daily – March 15th 2021



The concepts of agribusiness and agro-industrial chains and systems were introduced to me exactly 30 years ago when I was studying agronomy at the University of São Paulo in Brazil. Although these concepts emerged in the United States through the works of John Davis and Ray Goldberg in 1957 and 1968, respectively, they only arrived in Brazil in 1990, when Ney Bittencourt de Araújo and Decio Zylbersztajn disseminated this analytical model both in the private sector and academia.

Over the last three decades, the concept of agriculture has evolved into a complex activity that involves close integration between producers and suppliers of agricultural inputs, as well as industry, distributors, retailers, and service providers. This integrated approach is now the dominant way of thinking and is the foundation for private strategies and public policies aimed at the development of these chains.

The growth of integrated thinking in food production chains has gone hand in hand with the strong growth of agribusiness and food production in Brazil, whose exports in these 30 years have jumped from around \$5-10 billion per year to \$100.81 billion in 2020. This was the second-largest number of exports, second only to 2018, and represented a growth rate of 4.1 percent compared to 2019. This sector contributed 48 percent of Brazil's total foreign trade. Consolidated imports, on the other hand, accounted for \$13.05 billion (down 5.2

percent), leaving the agribusiness trade balance with a surplus of \$87.76 billion, which offset the deficit of other sectors in the region of \$36.87 billion.

According to data collected by the Ministry of Economy, Brazilian agribusiness has contributed approximately \$1 trillion in exports over the past decade, resulting in a surplus of \$800 billion for the country's trade balance. These figures suggest that food exports have significantly boosted Brazil's income.

In the past decade, the gross value of production has increased by 95% in real value, amounting to approximately \$1.44 trillion. The Ministry of Agriculture, Livestock and Supply reported that the 2020 GVP reached a record high of around \$170.3 billion, which is 17% higher than 2019. The ministry anticipates a 10.1% growth in the GVP for 2021, projecting it to reach \$195 billion.

Such food production, which today helps feed almost 1 billion people around the world, represents a great success in income generation, bringing development and opportunities to the Brazilian hinterland. Data provided by the Ministry of Agriculture show how these resources have helped build up important social indicators. Currently, 94.4 percent of 5-year-old children attend school and 98.2 percent have access to clean drinking water. The agricultural sector alone provides almost 15 million jobs, and several education centers and technical schools offer training for careers in agriculture.

The resources generated by agriculture and food production have led to the creation of prosperous cities, with the growth of commerce, services and industry, generating jobs and bringing development to the countryside. This process has reduced the rural exodus to the outskirts of large urban centers, with the consequent creation of slums. Instead, it has brought a better life in these smaller cities, with more social, cultural and leisure alternatives. As a result, many young people are no longer leaving but building their lives in these “agro-cities”.

There are many examples of “agro-cities” in Brazil, but I would like to highlight one since we have conducted sustainability studies there. The city in question is Quirinópolis and it is located in the state of Goiás. Data from the last 10 years show a solid agricultural development and industrialization of products. Between 2000 and 2010, the population grew from 35,000 to 45,000 inhabitants; jobs increased from 4,000 to 10,000; the average salary rose almost four times; per capita income from R\$ 1,160.00 to R\$ 2,170.00; tax collection for the state and the number of vehicles have multiplied by 3; among others. However, one of the most striking indicators of progress is the significant increase in the number of companies - from 650 to 3,100 - revealing vast opportunities for people across various sectors of the economy.

Another interesting trend, mainly observed in the last 10 years, is that agriculture has become popular

among young Brazilians. They are innovating and creating startups in this sector due to its high potential. Many young people who had gone to study in bigger cities are now returning to help their families with the modern management tools available in the sector. These tools include aerial monitoring, remote sensing, big data, and localized application of products which allow the management of productive areas no longer by square meter instead of hectare, resulting in greater efficiency as well as waste reduction.

The benefits that agribusiness and food chains have brought to Brazil over the past 30 years are well known, accounting for 50 percent of the country's exports and generating about one-third of GDP, one-third of jobs, and almost one-third of tax revenue, depending on the sectors included in the definition of agribusiness.

If the main idea at the beginning of these 30 years was to promote development, it is remarkable how, at the end of this period, the concept of sustainability became so crucial. Its evolution is also worth noting, as it was initially associated only with the environmental issue. Still, with the arrival of the Triple Bottom Line model or PPP (people, planet, and profit), there was a recognition of the importance of interaction and cooperation between agents in these three dimensions. In line with this thinking, the UN created the 2030 Agenda in 2015 as an action plan for a more sustainable future. This is composed of 17 Sustainable

Development Goals, which call for bold, transformative measures to achieve them, and agriculture has much to contribute to eradicating poverty, protecting the planet, and ensuring peace and prosperity for people.

More recently, the concept of ESG, a new set of environmental, social and governance scores, has emerged, giving investment professionals, analysts and corporations insight into how companies are performing on these matters. We consider ESG to be an evolution of the 3Ps, two of them being virtually identical: the P for planet and environment, the P for people and the S for social. The evolution in terms of refinement lies in the P of profit, which has evolved into a broader concept of G of governance, implying much more structural actions. Profit is indeed an outcome of good governance.

The food and agribusiness sector has reached a new high in ESG reporting. Companies are now disclosing their activities transparently, following good governance, environmental and social criteria. This helps mitigate risks and focus on achieving long-term results. The Brazilian Stock Exchange has established the Carbon Efficient Index portfolio, providing funding towards this direction. The impressive results achieved in the initial public offerings of companies in this sector have attracted many international investors who are keen on high-level ESG indicators. This presents a multi-billion-dollar opportunity.

Regulation on payment for environmental services is a mandatory law in Brazil, promoting sustainable development through monetary compensation for the preserved asset. This payment can be made in different ways, such as cash payments, provision of services, compensation, or through bonds. The so-called green bonds can grant Brazilian agriculture US\$ 135.9 billion in resources by 2030, according to a projection made by the Climate Bonds Initiative, a British NGO that certifies organizations to issue these bonds.

The public sector's signals, along with private initiatives for sustainability, are strengthening Brazil's position as a global supplier of sustainable food, bioenergy (including ethanol, biodiesel, and bioelectricity), and other agricultural products such as cotton, tobacco, wood, furniture, leather, paper, and cellulose. Social media's transparency and engagement are also contributing to this trend. Despite the continuous increase of illegal deforestation in the Amazon Forest, which is being fought and has a viable solution, Brazil shows excellent indicators in the environmental area, often not recognized by the international community, namely:

- a) *being one of the countries with the largest number of protected areas, covered with natural vegetation (estimated at 66 percent of the country's total area) and with one of the strictest forest codes on the planet.*

- b) *being one of the countries with the lowest CO2 emissions per capita on the planet.*
- c) *being one of the countries with the highest use of renewable energy in its energy matrix (estimated at 47 percent of the total, compared to 10 percent in OECD countries).*
- d) *being the country with the highest proportion of bio-fuel use in its fuel matrix (close to 50 percent for automobiles and 15 percent for trucks and buses) and with one of the most modern decarbonization programs in place (Renovabio).*
- e) *having an agricultural sector with one of the highest levels of innovation in terms of resource-saving technologies, such as bio-inputs (bio-pesticides, bio-fertilizers and biogas, among others), crop-live-stock-forest integration, per-square-meter management of agricultural activities, regenerative agriculture, circular agriculture and resource-sharing agriculture, with the great development of collective activity via cooperatives and associations.*

Brazil faces a significant sustainability challenge over the next 30 years, but it can be overcome with international investments. To keep up with the global demand for crops, Brazil will need to increase its land usage for grain and other crop production by about 15-20 million hectares by the year 2030. Currently, Brazil

uses 80 million hectares for this purpose, not including livestock. The good news is that advancements in livestock technology mean that the additional land needed can be taken from the 160 million hectares currently used for pasture. Despite this increase, Brazil will still use less than 15% of its total land area, which is just over 850 million hectares, for agriculture.

Incorporating those ESG principles into an already consolidated way of thinking about production chains was just the spur needed to promote sustainable development. The challenge for Brazil is to keep moving forward at a fast pace and in a sustainable way in the efficiency of its agribusiness in order to meet the needs of a growing global population with increasingly urban lifestyles. By achieving greater productivity and efficiency, Brazil can better regulate global primary food commodities prices, ultimately reducing worldwide hunger.

To sum up, the “S” in ESG represents society's creativity. As agribusiness and food production continue to expand, we must also focus on fostering inclusion, creating opportunities, and promoting social development. This approach will lead to innovative solutions in our digital, remote, and automated world. In the coming thirty years, our primary goal should be prioritizing people.

6

How do we feed the world as war disrupts the global food system?

New Europe – August 01 – 2022 (<https://www.neweurope.eu/article/as-war-in-ukraine-disrupts-the-global-food-system-how-do-we-feed-the-world/>)



Even before Russia invaded Ukraine, the world's food supply chains had been severely disrupted by the Covid pandemic.

Now the war has derailed Ukraine's agricultural exports, imposed sanctions against Russia, and dramatically raised the price of food and fertilizer. Governments from India to Argentina have responded by imposing export bans on key crops. All of this threatens to lead to food shortages and famine for the world's poorest people.

In June 2022, the G7 summit concluded with a Statement on Global Food Security, which pledged to "spare no effort to increase global food and nutrition security" and "to protect the most vulnerable, whom the food crisis threatens to hit the hardest."

Forty years ago, Brazil was one of those impoverished countries facing food shortages and requesting aid from the international community. But in the past four decades, Brazil's agri-food sector, supported by successive governments and international partners, has transformed the country into a major food producer. Between 1980 and 2020, Brazil increased grain production by 406%, while the areas planted grew by under 65%.

Today, Brazil's agri-food sector exports to 160 countries and is determined to be part of the solution to the hunger crisis.

A recent study shows Brazil's grains and oilseeds feed around 10% of the world's population. By working with major food producers and strategic partners, such as the EU and the UK, we can mitigate the effects of this crisis in food-insecure regions of the world.

Brazil is the world's largest producer of sugarcane – a major source of calories and energy. Brazil alone grows almost 40% of the total global supply.

Brazil is also the number one producer of soybeans, growing approximately 122 million metric tons, or 34% of global production in 2020. The third biggest exporter of maize. And over the past three years, Brazil has consistently been one of the top three global exporters of cotton.

Concerns have been raised that a shortage of grains in the Middle East and North Africa could cause extreme food shortages, leading to another refugee crisis. The economic think tank Bruegel has identified this region as most at risk of famine due to the disruption of Ukrainian and Russian grain supplies. Thankfully, Brazil has strong existing trade bonds with the region. Even before the war, 30% of Brazil's corn harvest was shipped to the region, mainly to Egypt and Iran.

Even though Brazil comes second to the US in terms of beef - and total meat - production, much of that is retained for domestic US consumption. Consequently, Brazil is the top international exporter of beef and all meat. In 2020, Brazil accounted for 17% of global beef

exports, ahead of Australia (11%), then India and the United States (both accounting for 9%).

Brazil is also the world's fourth biggest exporter of pork meat. Besides, we are the third largest exporter of chicken meat, accounting for 12% of global production. Next in line, Russia, the fourth largest exporter, produces only 4% of the global supply. In real terms, this means that in 2021 Brazil exported 4.4 million tons of chicken meat.

With fertilizer prices rising worldwide, the Government of Brazil has launched a national fertilizer plan to make the country more self-sufficient, focusing on potash (where Belarus is one of the leading producers). The program aims to more than halve Brazil's dependence on imported fertilizers.

To achieve this objective, it is planned to increase the implementation of biological nitrogen fixation (BNF). This cost-effective and eco-friendly method involves introducing microorganisms to crops that extract nitrogen from the air, which greatly reduces the need for nitrogen fertilizers.

BNF is just one example of Brazilian farmers developing innovative, environmentally friendly technologies which allow us to boost food production while respecting environmental regulations. The Ministry of Agriculture shares information about these technologies on its website and encourages food producers worldwide to participate in mutually beneficial partnerships.

While some individuals in South America may view the events in Ukraine as distant, the Brazilian agri-food industry recognizes the significant disruption these tragic events are causing to our food system.

During times of plenty, Brazilian farmers may find themselves in competition with British and European counterparts for market share. However, in times of war, crisis, and scarcity, it is crucial for all of us to work toward sustainable production to provide for the world's most vulnerable populations. Let's all do our part to ensure that everyone has access to food.

7

The expansion of grain production in Brazil avoided a deeper food crisis and hunger

China Daily – July 11th 2023



During April and May of 2022, the world experienced an extreme shortage in global food supply. This was reflected in the FAO Food Price Index, which registered its highest level to date. Unfortunately, this situation disproportionately affects those in poverty, as they are forced to substitute their diets with cheaper alternatives or even face starvation.

There are numerous reasons why global prices have increased lately. These include the pandemic causing disruptions in food supply chains, climate-related problems affecting crop yields, conflicts between major agricultural nations that have interfered with global production, trade issues, transportation availability, lack of containers, reduced availability of chemicals and fertilizers, among others. Additionally, public policies adopted during the pandemic have led to an increase in food demand.

When examining historical global supply and demand data from FAO/ONU, it's crucial to note that there needs to be a balance between supply and demand. In order to achieve this balance, the supply side must produce an additional 30-40 million tons of grains every year. This requires better yields and the cultivation of new production areas, estimated to be around 6.5 million hectares according to a recent study by the University of Illinois. The need for more grains is driven by several factors, including an increase in the

global population, larger portion sizes, urbanization, and changing consumption habits due to increased income levels.

Many countries are implementing regulations to increase the use of renewable energy in fossil fuels, leading to a high demand in the international bioenergy market. Ethanol production is growing in India, Thailand, France, South Africa, and other countries, while biodiesel is seeing new targets in Indonesia, Europe, and beyond. The US has a strong demand for renewable diesel from soybeans and other sources. Additionally, there is potential for a large market in jet fuel and renewable fuel for maritime transport, but further investments, developments, and innovation in agriculture are needed to meet these demands.

One positive aspect that deserves attention is that Brazil's production of grains has expanded from 63.26 million hectares in 2018/19 to 78.13 million in 2022/23. This increase is largely due to the conversion of degraded pastures into agricultural land, which has resulted in the addition of almost 15 million new hectares for grain production in the past four years. It's important to note that some of this growth is attributed to the cultivation of second crops, utilizing the same area and employing sustainable agricultural practices such as crop rotation, biological inputs, and technology advancements.

Farmers made a bold investment in a challenging environment where input costs, land prices, workforce

shortage, storage capacity, and logistics issues were on the rise. The investment involved converting one hectare of degraded pasture to grains, which cost approximately US\$3,000 or more. Despite the high costs and falling prices during the current harvest, previous prices have yielded positive returns.

Thanks to its impressive growth, Brazil has been able to significantly increase its grain production from 246 million tons in 2018/19 to an estimated 316 million tons this year. This is an additional 70 million tons of grains in just four years, which is quite remarkable. As of now, Brazil is the largest corn exporter, and about 55% of the world's imported soybean and 30% of the imported corn are supplied by it. Without Brazil's contribution, the FAO world food price index would have been much worse. Unfortunately, the hunger situation on the planet and even the stability of some democracies has deteriorated. However, this was the most significant growth ever seen in an agricultural country, and Brazilian farmers deserve recognition for this contribution. If it were not for Brazil, where would we be now?

8

The new macroenvironment for food, agribusiness and biofuels chains

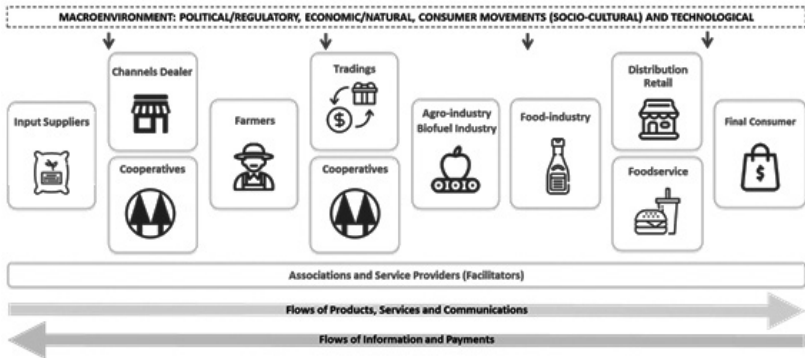


We are facing a surreal moment in our lives, only seen before in the movies. In almost 30 years working with strategic planning applied to food chains, I have never seen so many changes in such a short time. The 3V's have happened: variables varying violently, resulting in about ten years of transformation in 60 days. Like a tsunami, the coronavirus crisis has profoundly affected the world, with effects unprecedented in the recent history of civilization, especially regarding the loss of lives and the paralysis of economic activity. Global GDP growth forecasts have been dramatically revised with disastrous consequences predicted, forcing businesses to readjust rapidly and decisively.

The macroenvironment always has an impact on the daily operations of food, agriculture, and biofuel supply chains. This affects the flow of products, services, and communication from upstream to downstream, as well as the flow of information and payments from downstream to upstream. However, a post-pandemic macroenvironment brings about unforeseen challenges and opportunities, which require on-the-fly adjustments and adaptations.

The macroenvironment can best be understood as an aggregate of four major areas: the political/regulatory environment; the economic/natural environment; the sociocultural environment; and the technological environment (**Figure 1**).

Figure 1. Food, Agribusiness and Biofuels Chains.



SOURCE: Developed by the author, Marcos Fava Neves.

As we move into the “new normal,” the analysis of the macroenvironment’s four aspects has become an even more crucial management task. Organizations must consider more than just the traditional factors to remain relevant and viable in today’s changing scenario.

This chapter aims to summarize what is happening in the food and agribusiness arena during the global crisis and lockdown, to understand the facts, and to anticipate their possible impacts in order to contribute to effective decision-making. My goal is to share my post-pandemic checklist to be considered by companies at a moment when all strategies are being revisited.

For each environment, I have identified the most relevant issues:

Socio/Cultural Environment – Consumer Movements

- Concern over food waste, recycling, reusing, and increasing value of the circular economy.
- Concern over inclusion and social innovation (smallholders).
- Food miles movement leveraging “buy local” and other regional initiatives.
- Increasing demand for country of origin, image, and geographical denomination.
- Ethnic foods, homemade products, organic and other experiences.
- Authenticity, simplicity, ethics, and openness to dialogue.
- Slow-food movement (eating and enjoying).
- Positive attitudes toward direct “farmers-to-consumers” channels (farmer’s markets).
- Multicultural approach: cultures differ in markets as do consumer’s behavior, diets, lifestyles, and insights.
- The increasing purchasing power of consumers as well as more choices’ possibilities.
- Issues regarding land use (preservation) and animal welfare (free range and others); greater social pressure in relation to resources scarcity; increasing engagement of Millennials in sustainability matters.

- *Climate change and climate-related issues; concern over carbon measurement and management (carbon footprint); climate- and planet-friendly behavior.*
- *Simple lifestyle; time-saving movements (buying time, learning how to use time, and others).*
- *Aging population issues (+ 65 will double by 2030).*
- *Gender roles and related food products.*
- *The new role of influencers over consumers.*
- *Rise in online shopping behavior (also households growing their own fruits and vegetables).*
- *Increasing collectivism and engagement approach.*
- *Increasing appreciation of small and local businesses.*
- *Increased sanitation, hygiene care, and greater knowledge of virology.*
- *Increasing awareness for certification, demanding greater product safety and traceability.*
- *More care about diets (feeling good and healthy, focus on well-being and nutrition).*
- *Increasing curiosity and acceptance of alternative and sustainable ingredients sources (lab-grown meat, other plant-based products, insect protein).*
- *Greater interest in the origin, sources, and reliability of news.*

- *Increasing trust in science and agriculture.*
- *The increasing value of “made in...my country”.*
- *Increasing activists’ approach and engagement; increasing connectivity of food consumers.*
- *Appreciation of moments with family (cooking, eating together).*
- *Expansion of Asian culture and influence (on food and others).*
- *Others.*

Economic and Natural Environments

- *Asian and emerging nations (70% of global GDP in 2030) and their rapid recovery from the crisis.*
- *GDP growth/demand and diet changes.*
- *Pandemic and its impacts on global economic growth and development.*
- *Exchange rates, interest rates, and inflation.*
- *Economic borders (agreements and trade).*
- *More transparent income and profit allocation and distribution; searching for inequalities and solutions to poverty and hunger.*
- *Growth of bioeconomy-based chains (mass, plastic, fuel, electricity).*

- *Natural resources scarcity.*
- *Different world regions' productivity levels and gaps.*
- *New types of insurance & other risk management tools.*
- *Circular economy (using by-products as inputs).*
- *Industries consolidation and growth of Chinese influence.*
- *Global investors and faster capital flows (credit) with new currencies arising.*
- *Terrorism risks on food stocks and food transportation.*
- *The volatility of global food prices.*
- *The increasing value of biodiversity.*
- *Education as a primary source of competitiveness.*
- *Sharing economy (Uber model).*
- *The food bridge: from the Americas (food production) to Asia (food consumption).*
- *New labor formats and work models (at home, commuting, part-time, and others).*
- *Increase in home office and simplification of processes, resulting in less demand for workers and brick-and-mortar office spaces.*
- *New sources of protectionism.*
- *Instability: employment and income insecurity.*

- *Public (Government) debt.*
- *Health risks in industrial food production units and other stages of the chains.*
- *Private companies providing more micro credit plans and fintech.*
- *Crowdfunding movements.*
- *Restaurants moving towards a delivery model.*
- *Increase in raw material stocks.*
- *Natural disasters.*
- *Diseases and plagues.*
- *Effects of climate change on production areas.*
- *Likely water shortage, floods, and weather events.*

Political/Legal (Regulatory) Environment

- *Government/public policy interventions and regulations.*
- *The evolving role of NGOs (non-governmental organizations) and pressure groups as influencers.*
- *Labor legislation and trade unions.*
- *Environmental legislation.*
- *Tariff barriers.*
- *Agricultural subsidy policies.*
- *Certification regulations.*

- *Investments incentive programs.*
- *International trade regulations.*
- *Tax policies.*
- *Crisis-related interest rate cuts; liquidity injection; credit lines; tax relief; and suppression of some regulatory obstacles; vouchers for informal workers.*
- *Governments going "on line".*
- *Increase in health budget and regulation.*
- *Increase in budgets for public R&D.*
- *Ban on the trade of exotic products and further "wet markets" regulations.*
- *Policies encouraging local production.*
- *Stricter product labeling and traceability requirements.*
- *Data and information protection.*
- *Changes in labor safety laws.*
- *Restrictions on freedom and individual movement.*
- *Interruption of some production and distribution chains, prices, and tax regulations.*
- *Embargos over some products due to shortages and international political conflicts.*
- *Problems of stability and political crisis.*
- *Labor restrictions and shortages for agricultural activities (handpicked and others).*

- *Increase in food safety standards.*
- *Increase in food self-sufficiency policies after the Coronavirus incident.*

cRegulations for pollution, plastic, and others.

Technological Environment

- *Increasing data generation, ownership, and usage.*
- *Increasing information flows, transparency, traceability, and identity preservation.*
- *Increasing levels of security (on data, quality assurance, zero contaminations).*
- *Implementation of communication tools with consumers (from in-person to digital platforms).*
- *Digital contracts.*
- *Higher levels of innovation and entrepreneurship in food chains.*
- *Increasing gaps among users and non-users.*
- *Smart farms and precision agriculture: digital farming everywhere with GPS-guided equipment, data-driven drones, analytics software, and advanced devices.*
- *Convergence of industries (food and medicine, food and cosmetics).*
- *Gene editing: resistance, resource usage, productivity, and consumers; the rise of biotechnology,*

genomics, traits; fungi, bacteria, and drought-resistant crops.

- *Enhancing intellectual property.*
- *Natural lab-produced food substitutes (food coming from different sources); an increase of meat substitutes (plant-based).*
- *Organic products and productivity.*
- *The increasing number of start-ups.*
- *The increasing range of tablets/phones and their gadgets.*
- *Artificial intelligence (robots).*
- *3-D printing (seeds and others).*
- *Alternative energy sources (solar and others much more affordable); energy generation technologies are expected to become cheaper.*
- *Increasing tech innovations related to services, experiences, and relationship marketing.*
- *Technology-driven diversification towards complete solutions: a chemical company to a seed company, to precision planting, to climate monitoring and high-tech services.*
- *Greater use of digital and mobile, with an increase in online meetings for socializing and business.*
- *Expansion of support areas to the digital environment.*

- *Increase in online trading platforms (marketplaces).*
- *Aerospace technology, nanotechnology, and others.*
- *New tech-inspired marketing approaches (the use of "lives" and others).*
- *Tech and urban agriculture.*
- *Super plants and superfoods (with high levels of proteins, minerals, and others).*
- *Regenerative agriculture.*
- *Bioplastics and all other bio developments.*
- *Accelerating R&D and robotics (mainly for harvesting).*
- *Increasing technology and data in the retail sector.*
- *Apps in several food production activities.*

So far, we have seen chains that have benefited from the pandemic, others that haven't been affected, and some of them that have been negatively impacted. We have observed a wide range of impacts in soybeans, corn, cotton, orange juice, coffee, wheat, eggs, and meat. A thorough analysis of the items listed above can provide insight into the reasons for the different impacts and help predict future outcomes.

To help with future discussions, I would like to share some important points from recent workshops. These

points cover the significant changes expected for 2022/2023, as well as the new strategies that companies have discussed.

Most relevant facts and impacts of 2018-2023

- *Extreme weather events (droughts, frosts, rain, and others).*
- *Animal and human pandemics (African Swine Fever, Covid...).*
- *Government incentive programs.*
- *Trade war (China x EUA), tariffs, and others*
- *Nationalist governments (Brexit).*
- *Invasion, wars, and public/private embargos.*
- *Consumer movements (social media, influencers, activism, opinions) connectivity, digitalization, and measurement.*
- *Transport disruptions (strikes, interruptions, Suez, and others).*
- *Huge price variations, lack of products.*
- *Energy/fuel prices and supply issues.*
- *Inflation, rising interest rates, and volatility.*
- *Plagues and disease resistance; production costs rise.*

- *Lack of workforce and increasing labor costs.*
- *Others.*

Most relevant strategies for 2023-2033:

- *“Just in time” or “just in case”. More stocks throughout the chain. The stocks era!*
- *Vertical integration backward.*
- *Encouragement of local production for security reasons (fertilizers, chemicals, local production).*
- *Diversification of suppliers (geographically speaking).*
- *Alternative sources of products (organic, among others).*
- *Renewable energy sources (bioethanol, biodiesel, biomethane, and others).*
- *Great opportunity to collaborate and to plan collective actions.*
- *The crucial correlation sustainability x inputs scarcity and costs!*

9

Taking actions: public and private policies and strategies to get prepared for a turbulent future



How can businesses, governments, and organizations use the facts explored in Chapter 08 and the relevant issues discussed in all other chapters?

Since simplicity is one of the game's new rules from now on, I have developed a straightforward tool that will provide an effective assessment. I call it the FIA Matrix: Facts, Impacts, and Acts. Any organization can understand the Facts listed in this book's chapters in the four main macro-environment settings. Depending on the user's perspective, these Facts will bring Impacts on individuals, organizations, agribusiness, chains, countries, and regions, which can represent challenges and opportunities. Finally, the Acts are what an organization, whether private or public, can do to face these challenges, maximize opportunities, and minimize threats (**Figure 2**).

My goal is to introduce the FIA Matrix tool to aid decision-makers in the food, agribusiness, and biofuel industries in adapting and adjusting to the changes brought about by the post-pandemic world.

Now it's time to focus on your homework which may already be overdue. Go back to the book chapters and complete the FIA Matrix for both your organization and career.

Last but not least, achieving success requires both discipline and the support of a strong team.

Wishing you all the best!

Planning Method: FIA Matrix – Facts, Impacts and Acts.

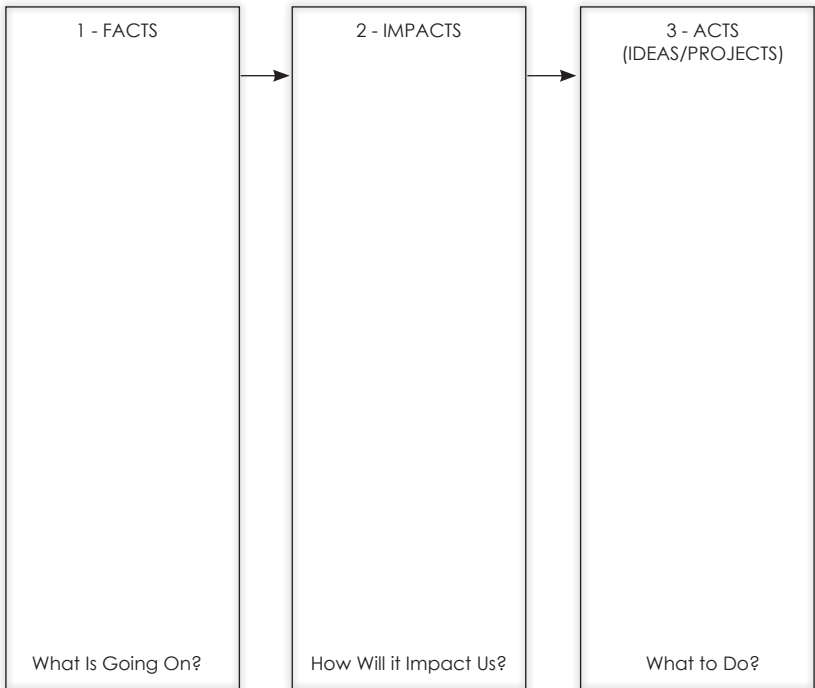


Figure 2. FIA Matrix

SOURCE: Developed by the author, Marcos Fava Neves.

Meet the author



Marcos Fava Neves

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Marcos Fava Neves is a renowned international expert in strategic planning for global food, agribusiness and bioenergy chains. He serves as a part-time professor of Planning and Strategy at the University of São Paulo Business School (FEARP-USP) as well as FGV Business School, both located in Brazil. In 1991, he graduated as an Agronomist from ESALQ/USP - Piracicaba. He earned his Master's degree in 1995 and his Ph.D. in Management in 1999 from FEA/USP Business School – São Paulo. Marcos also completed postgraduate studies in European agribusiness at ESSEC-IGIA in France in 1995 and in chains/networks at Wageningen University in the Netherlands (1998-1999). His contributions have been recognized globally, and in 2013, he spent a

year as a visiting international professor at Purdue University (Indiana, USA), where he still holds the title of Permanent International Adjunct Professor. Since 2006 he has been an international professor at the University of Buenos Aires, Argentina, and since 2020, he has also been an international professor at the University of Pretoria, South Africa. Additionally, he founded Harven Agribusiness School in 2023.

He has specialized in strategic-planning processes for companies and food chains. Besides, he serves as a board member of both public and private organizations, having held over 10 international boards since 2004. In that same year, he co-founded Markestrat, a think-tank that currently employs about 60 people and conducts international research and projects focused on strategic planning and management for more than 250 agri-food business organizations. Several of these projects have had a significant impact on public policies for food chains implemented in Brazil, resulting in both economic and social benefits.

Marcos has been a part of the academic world since 1995, when he was hired by USP. Throughout his career, he has supervised over 35 Doctorate dissertations and master's theses and has helped prepare roughly 1500 bachelor's in business administration in Brazil. He has also taught around 120 courses to undergraduates at USP. Marcos' writing focuses on providing simple and effective methods for business, resulting

in over 100 articles published in international journals. He has also authored and edited 63 books for 10 different publishers in countries such as Brazil, Uruguay, Argentina, South Africa, Singapore, the Netherlands, China, the United Kingdom, and the United States. In addition, he frequently contributes to China Daily Newspaper and has authored two case studies for Harvard Business School (in 2009 and 2010), three for Purdue (2013, 2021 and 2023), and five for Pensa/USP in the 90s. One of the most cited Brazilian authors in food and agribusiness, he has more than 6300 citations in the Google Scholar index.

Marcos is one of the most active Brazilian speakers who has delivered over 1700 lectures and presentations in 25 countries. He has received approximately 150 accolades from both Brazilian and international organizations and holds the prestigious title of "Fellow" of the International Food and Agribusiness Management Association (IFAMA), which he was awarded in Minneapolis in 2015.

Meet Harven Agribusiness School



Harven

AGRIBUSINESS
SCHOOL

Harven Agribusiness School has a distinct purpose: to nurture the next generation of agribusiness leaders. Its mission revolves around providing an immersive and comprehensive educational experience that extends well beyond the confines of a classroom. From the very outset of their academic journey, students are seamlessly integrated into the market, fostering an environment that champions creativity and entrepreneurship.

The university was conceived through the collaboration of two prominent companies: Grupo SEB and MKS Group. Grupo SEB stands as one of the world's largest educational conglomerates, with a global presence spanning across various countries. Renowned for its expertise in the educational sector, cutting-edge

educational technology, and premium infrastructure, Grupo SEB brings a wealth of knowledge to the table.

On the other hand, MKS Group boasts a rich history of experience in consultancy and in-company training within the agricultural sector. Their portfolio includes projects implemented in 450 companies located in over 30 countries. With a focus on agribusiness knowledge, strong industry connections, and specialized market and business acumen, MKS Group complements the partnership by adding invaluable expertise in agriculture, business connections, and market specialization.

The commitment of Harven Agribusiness School transcends the conventional boundaries of education. It serves as a global nexus for connecting individuals within the agricultural sector. Its faculty members are worldwide renowned luminaries in the industry. With a modern approach and dynamic learning methods, Harven distinguishes itself by blending theory and practice, delivering applied education that equips its students for the real challenges of agribusiness. Furthermore, with its global vision, the institution provides enriching international experiences and a network of professors from the world's most prestigious universities, preparing the future leaders of the industry to thrive in an increasingly interconnected market.

The campus is strategically situated in the heart of Ribeirão Preto (SP), the epicenter of Brazilian agribusiness. This location facilitates the development of robust

networks and the exchange of insights with the foremost figures in the field. Harven offers graduation in Administration, Law, and Production Engineering, besides postgraduation and corporate education programs, always with a unique focus on agribusiness.

The vision at Harven Agribusiness School extends beyond being just an educational institution; it aspires to be a cohesive and dynamic community that propels the growth and success of its students. In doing so, it plays an instrumental role in advancing sustainable development within the agribusiness sector and society at large.



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