



How diversification in production is understood and used by farmers to manage risks

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Acknowledgments

During two years as a Nuffield Scholar, I had the privilege of visiting and talking to people from more than 30 countries, whether on individual trips, during my Global Focus Program (GFP), or even participating in events of organizations that are part of the Nuffield network. My search to understand two particular themes of our agricultural sector later made me understand that the answers are scarce and that we live in a world of increasing doubts and uncertainties.

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Figure 1: GFP Group – Baladna – Qatar – April 2019

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It is worth mentioning that this is not an academic document, much less it claims to be a scientific article. This is an attempt to organize the reports obtained during the two years of studies and, even when research methodologies were applied, no statistically relevant indexes or anything like that were sought. It is an objective report, for farmers and ag professionals worldwide.

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1. Executive Summary

The theme of diversification in production and how it has been used and understood by farmers is complex, since diversification can be, and is, addressed in different aspects by farmers around the world. This broad spectrum of analysis is influenced by the most diverse topics, from practical business issues to the production culture of a given region, the history of the country, its origin and even in the relationship of its population with agriculture.

Theme Motivation

My motivation from the study comes from the many misunderstandings regarding diversification and risk management in different groups of farmers, and during the process of training professionals in agribusiness/agriculture. Since university, when risk management is discussed, emphasis is always around future market tools, with heads, derivatives, options, etc.

Diversification appears hidden within some discipline of economics when it comes to economies of scope and scale. There is barely a structured discussion of risk management and how the company, whether rural or not, should look at the topic. Therefore, I tried to understand how farmers, in practice, see the subject, study it and consider it within the management of their businesses.

Recommendations

The recommendations made in this report are there to encourage farmers to seek knowledge on specific topics, rather than to create a prescription on the subject. It is also not claiming to suggest generic implementations, which would in no way apply to a large group of farmers, given the heterogeneity of rural enterprises and farms. But is intended to generate reflection:

- a. Knowledge about a business must be organized and described, regardless of the size of the company, seeking to facilitate its understanding is the mapping of processes, the uniformity of this information among the members of the company and, consequently, enable the beginning of more complex analyses.

- b. Understanding and separating the end/core activities and other/middle activities of the company is fundamental for the construction of a long-term strategy, as well as for the analysis of possible synergy gains within the business, whether these gains come from diversification or not.
- c. Creating risk matrices to better map, understand and manage them is fundamental for businesses, thus seeking to support the strategic planning of companies, as well as expansion and/or diversification analyses.
- d. Specialization and diversification should not be treated corporately as paradoxes. These are often interdependent processes, having an impact on each other and sometimes happening with a cause-effect relation.
- e. Economies, both scale and scope, have great ability to impact business by reducing average cost of production. Thus, it is recommended that, through studies, seek to understand how each one applies to its business.
- f. The eventual increase in complexity in the management of a business due to its diversification should not be neglected, since technical and market factors can derail a project or the business entirely.
- g. The use of tools of technical and economic viability should be considered essential for investment in any activity, whether to diversify or not. In this phase of the study, the necessary resources should be spent so that the study can anticipate different scenarios to have more accuracy, thus reducing the chance of an error in implementation.

Other Stories

I also present in the report some stories of how I could see the theme from different perspectives during the trips, whether direct or indirect in this theme. In addition, some data collected in order to gather more information that helps to define the knowledge of farmers on the subject, thus enabling greater capacity to generate recommendations from the study.

2. Introduction

Leaving aside the history of diversification in agriculture, it is important to clarify the understanding farmers have of it, including those who practice it, or those who do not practice it.

By definition diversification is closely related to economy of scope and risk management. When a company, regardless of its motivation, adopts more than one product in its portfolio, it is diversifying production and, consequently, its revenue. As a result of this diversification, the economic theory predicts the reduction of the average cost of the product(s) (PINDYCK and RUBINFELD, 2015). This spraying of revenue, through portfolio diversification, is also fundamental in the organization's risk management.

This reasoning, however objective, clear and logical it may seem, is far from the main motivation of farmers in the diversification of their production, according to the information gathered and compiled in the interviews conducted, presented ahead in this report. Usually, these elements appear in the business speech and strategy, after the diversification happened, as a justification given to a decision that originally has another motivator.

Therefore, it is clear the existence of a relationship between definition and motivation. This relationship can be paradoxical, when the motivation for the adoption of diversification is not related to its definition, or complementary, when diversification is adopted so that the company takes advantage of the benefits from economy of scope and risk management.

3. Methodology

To better understand the perception of farmers in relation to the theme, four forms of research were used, all of them applied to professionals in the ag sector in Brazil and overseas. The first of these, an online questionnaire (following survey methodology), applied to farmers. The second was face-to-face interviews with farmers and ag professionals, with a pre-defined script, seeking to capture the information necessary to understand the theme. Third, these same interviews with predefined scripts were applied online. Finally, informal interviews, conducted along the trips, with farmers and people involved in agriculture.

The studies and discussions were conducted in Brazil more specifically in the states of Mato Grosso do Sul, Mato Grosso, Goiás, São Paulo, Minas Gerais and Paraná. Outside Brazil, countries visited included: Argentina, Bolivia, Paraguay, United States, United Kingdom, Netherlands, Germany, France, Italy, Belgium, Czech Republic, Romania, Bulgaria, Hungary, Qatar and Kenya. In addition to the countries visited, non-face-to-face interviews were conducted with farmers and members of farmers representative organizations from Chile, Canada, Sweden, Australia, New Zealand, Zimbabwe and South Africa.

When seeking to understand how these people understand diversification, questions were asked so that the term 'diversification' only appeared as the interviewees brought it the conversation, in order not to induce answers. In addition, other topics were investigated, with the goal of understanding what relationship farmers would make of these themes with diversification.

After interviews, the countries were added in small cluster groups aiming for correlation with the answers.

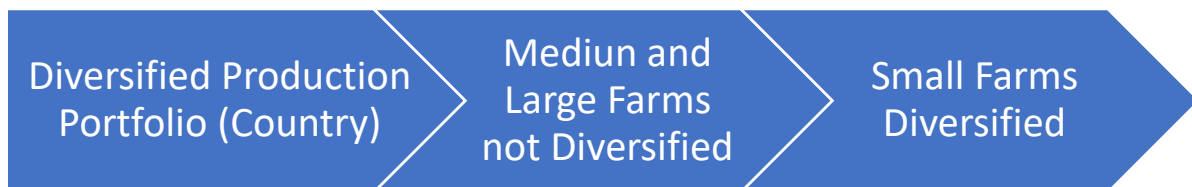
- In the first group, Brazil, USA, Argentina, Canada, Australia and New Zealand.
- In the second, European and African countries.
- In the third, the only representative of the Middle East in the analysis, Qatar.

It is noteworthy that the agglomeration of these countries in these three clusters is due to the answers and evidence collected in these countries, having no relation to their economic, social or productive structure. Also, it is important to remark that no statistic work was conducted in this analysis.

4. Results on the Data Collected

Group 1 - Brazil, USA, Argentina, Canada, Australia and New Zealand

This group was characterized by greater theoretical knowledge regarding diversification in production and its impacts, both in productive terms and in risk management. Nevertheless, it was the group characterized by the largest number of farmers that does not practice diversification in production, especially in some regions and specific belts, a fact that is not repeated in groups 2 and 3. Looking at the productive structure of group 1 member countries, they are on a very diversified production portfolio as countries, however, when looking inside the farms individually, diversification still struggles for space, especially in medium and large properties.



The work does not intend to criticize the existence or lack of diversification in certain regions. It is known that, in many situations, diversification does not happen by technical impediments of that region. Examples of regions in these countries that still have a poorly diversified production structure:

- a. **USA Midwest**, focused on grain production, especially soybeans and corn. Although these regions produce other products, there is hardly any diversification within properties.
- b. **North of Brazil**, with a large number of medium and large farms focused on the production of beef cattle.
- c. **Midwest of Brazil**, with properties focused on the production of grains, sugarcane or beef cattle, with little support to diversified systems, even if they are composed of these crops.
- d. **Australian Outback**, focusing on extensive beef cattle production.
- e. **Regions of New Zealand**, mainly = south, with a focus on dairy or sheep farming.
- f. Among others.

Group 2 - European and African countries

This group was characterized **by the greater adoption of diversification in production**, which will be discussed and analyzed later. With the knowledge of the formal definition of diversification and its benefits, the fact that most farmers have more than one product in their production portfolio imply in a more uniform and natural discourse in relation to its benefits. This fact does not allow us to infer the existence of greater theoretical knowledge in relation to the subject, since the productive bases of these countries, as already mentioned, are extremely diverse.



The countries in this group have a larger number of small properties in percentage terms compared to the total existing agricultural properties than the group 1. Therefore, as diversification is more present in small properties, this scenario is characterized as a rule in this region.

Group 3 - Qatar

The existing production structure in Qatar is very particular and its basic structure cannot be compared with the rest of the Middle East in many aspects, although many countries in the region have the same *modus operandi* in agricultural production, of investing heavily in production and subsidizing prices to ensure food security.

The agricultural activity in the country is divided into two, the pre-blockade period by the neighboring countries, and the period after the blockade (the importance of this historical fact for the formation of the production structure of the country in question will be addressed further). Data presented by the government at visits show that most of the current agricultural enterprises are less than three years old and have emerged to meet the country's specific needs and to meet clear food security objectives. Thus, diversification clearly stands aside in discussions of the formulation of business models, since the volumes demanded of these companies make them seek scale above all.

Brief Access of Collected Data

More than 100 farmers answered questions that sought to understand some aspects related to the subject. One of the main questions was how risk management was understood and what was part of it. When asked what they considered risk management and what main points/tools within risk management would be named, the following scenario was obtained:

- Only 10% cited diversification as one of the main tools for risk management.
- 30% did not even mention diversification, or a similar term;
- 60% mentioned diversification, but it only appeared in the final third of the list;

Terms such as *future markets*, *future sales* and *head* dominated the lists and were almost always at the top. One of the most interesting points of the analysis is the fact that, within the sample used, almost 90% of the farmers practiced diversification, having more than one product within their ag portfolio, but did not point the theme, or gave it low priority.

This analysis shows that there is a tendency, even among those who practice diversification, to neglect it or give it less importance as a risk management tool.

This inference is interesting and disturbing at the same time, since if an imaginary line is created that has the farmer at the beginning and the risk management tools spread along it, (with the simplest ones that depend less on external factors at the beginning of the line, closer to the farmer, and the more complex, with greater dependence on specific knowledge and influence of external factors, further away from it), at the end of the line, there is the feeling that the farmer is looking for the farther and more complex, than to the closest and simplest issues.

As much as the whole decision-making process is complex and formed by an almost endless series of factors, some of them less objective, it is difficult to imagine that some tools of operation in the future market, with daily adjustments, sometimes influenced by exchange rate, need of intermediaries, among other factors, may be more present in the farmer's thinking than mere analysis of what to produce.

All risk management tools have their importance, and it is difficult to say which one is more or less important, which, however, does not affirm that the discussion about what to produce is, or should be, number one on the priority scale.

This should not also be confused with the process of analysis, study, implementation and management of a new activity. This is arguably the most complex of all. It is related, however, with considering diversification in production to manage risk, have more

profitability (due to the reduction generated by the economy of scope) and provide greater sustainability of the business in the long term. And as observed in discussions, the subject is not being considered as it should, or at least not in the same proportion that it can bring benefits to the business.

Diversification in Perspective

In addition to dividing the analyses in these groups, an important concept is the differentiation of the term diversification when applied within the same agricultural production system. Looking more superficially, when placing a farm or an agricultural business as the only business within an investment portfolio, (regardless of how many different products it produces), one can consider the investment portfolio without diversification, specialized in this kind of production. The focus of the work, however, is to look at the structure of agricultural production isolated, in order to understand how, within the primary production portfolio, diversification happens.

Similarly, it is important to understand that within the same production segment there may be diversification. As the concept considered by the work concerns the economy of scope, every time it happens, it can be inferred that there was diversification. For example, a company that produces vegetables, but takes advantage of the benefits when it decides to produce more than one type of vegetable, is diversifying portfolio, even within the same segment. Producing carrots, beets and radish has a positive impact of reducing average costs and spraying production and market risks in relation to only one of the three products. Therefore, there is portfolio diversification.

Both the **economy of scale** and the **economy of scope** addresses the reduction of average unit cost of production. However, what causes this reduction differs for each. In the economy of scale, the increase in the amount produced generates this cost reduction. This is what happens when farmers increase from 500 to 1,000 hectares of soybean production, the cost of production per hectare will be lower, and so on, up to a certain limit, when the economy reduces and stops. In the economy of scope, this reduction occurs by inserting another product into the production portfolio. This is what happens when grain farming and livestock are carried out at the same time, since livestock production can benefit from the internal production of winter grains and pastures, being possible to produce a meat at a lower

cost. For further theoretical and technical deepening in the theme, it is recommended access to Pindyck & Rubinfeld's work on microeconomics, which is the theoretical basis used.

Scale Vs. Scope

As seen above, if the economy of scope comes from reducing the average cost of production when a company diversifies its portfolio, the scale is when this cost reduction is caused by the increase in the amount produced of the same product.

Many companies treat these two types of economies as antagonistic, when in fact they are different models and have interesting relationships with each other, always coexisting. Those relationships are fully related to the concepts of specialization/diversification, apparently also paradoxical, but which have some important nuances.

Going back to scale and scope, some exercises are important to understand its relationship. Take as an example a corn farm in the USA, where only an annual crop is possible. The farmer, taking advantage of a good market and the fact he/she produces corn, decides to build a cattle feedlot, in an area that would be impossible to plant corn. Immediately, one can perceive the diversification of activity and intuitively infers that there will be savings in scope. However, it is known that such a phenomenon only happens if there is also the reduction of average cost, which is easily justified. For example, by the fact that the farmer uses its own corn that even having its market price considered in the cost of beef production, will have no cost with freight, logistics, contracts, among others. Immediately, it is assumed that the average cost of production of the kg of meat, or of the animal ready for slaughter, will be lower, thus generating greater gains, thanks to the savings of scope. Similarly, part of the labor that works in corn production and would be idle for the rest of the year, can be used in the work related to livestock activity, without costs of termination of the labor contract, indemnification, rehiring, etc. Again, the gain is clear by the economy of scope.

One of the basic sources for pasture production on this property is Urea, also used in corn fertilization. With the new activity, the volume demanded of Urea increases by 15% at the farm. This increase can impact the prices paid by the farmer, since it starts to negotiate a volume 15% higher. This time, the new activity generates a positive impact for the existing activity. This impact, however, is not only related to scope savings, but is closely related to the increased scale of use of a specific input. It can thus be said that the average cost of a raw

material suffers an impact that will result in reducing corn production cost. This reduction is generated by diversification, or if preferred, by scope.

This simple example shows some important things about the relationship between scale and scope economies:

- a. They are not completely antagonistic and paradoxical concepts, and there is a type of interaction and interrelationship among them.
- b. It is not a binary choice of a business model for the business, but perhaps an evolution of the business, more natural for some companies and less for others.
- c. The gain of scale in the negotiation of an input is not necessarily tied only to the gain of economy of scale by the increase in production of the same product.
- d. Since scale and scope are respectively linked to specialization and diversification, it is likely that there is also a similar relationship between those, with interaction and interrelation.

Paradox Specialization/Diversification

Even stronger than the relationship between scale and scope, is the relationship between specialization and diversification. Again, common sense makes us think that the two concepts are paradoxical, which happens sometimes. To understand the relationship between them, it is important to understand the decision-making process that a company goes through at a time it decides to specialize or diversify. It is also necessary to understand that these are not absolute and definitive decisions, since they can and must be changed, seeking to keep up with the dynamism of the agricultural sector.

Several cases were studied to try to understand the relationship that exists between the concepts. And it was precisely in the observation and study of the decision-making process of some farmers that it was possible to clarify some important points. Some points observed are interesting and deserve further deepening, as they help us understand these decision-making processes.

- a. Every production activity, whether agricultural or not, has core/end activities and additional activities. The core/end activities are those totally associated with the agricultural activity of that farmer, capable of impacting in large proportion and directly the quantity and quality of what is produced. There is, for example, in the soybean production, processes such as planting, cultivation and harvesting, which

are part of the core/end activity entirely and indisputably. But other activities are demanded within the farm in the scope of soybean production, among them: maintenance of machinery, cleaning and storage of the product, transportation of grains, among others. The farmer may well outsource his maintenance to the dealer who sold the machines, as well as sell his product at the time of harvest, without the need for storage, still making the sale in 'free on board' (FOB), leaving the buyer responsible for transportation. Thus, these three types of services, would not impact their production in a sudden way, either from the point of view of quantity or quality – they are additional/middle activities, not core/end activities. What often happens is that, by seeking operational improvement and cost reduction, farmers end up internalizing services such as those mentioned, starting to do them themselves. This internalization, over time, leads to the specialization of the company in these additional activities/services, giving greater support to the core/end activities and reducing (or at least should reduce) the production costs. Some rural business stop there, and there is no relationship between specialization and diversification. However, some companies take advantage of the specialization acquired in these activities and expand their operations. Using quick examples to illustrate this, a farmer who, after mastering the cleaning and storage of grains, starts to provide this service to neighbors who do not have this infrastructure and, thus, create a new revenue within its properties, in addition to reducing the average cost of its storage, thus reducing its average cost of soybean production. The economy of scope happened by diversification from a specialization process of a not core/end activity. Having storage capacity and competence to manage inventories, can provide for example a corn farmer to enter the activity of cattle feedlot, since he will be able to mitigate various costs, such as freight, preparation of contracts to even compensate for possible sudden market volatilities. There are numerous examples these help to understand that specialization and diversification are not necessarily antagonistic and can lead to each other.

b. In some countries, such as Brazil, Bolivia and Argentina, integrated crop-livestock (sometimes forestry) systems have demonstrated a great capacity to gain results by use of synergies existing in different agricultural systems. The

integrated crop-livestock system began to be studied and adopted in Brazil not in the primary purpose of diversifying production. In fact, as a mere consequence it produced this effect in some properties, in others it was able to make livestock and agriculture feasible, providing the permanence of livestock in areas of more noble soil, providing risk management in agricultural production and the improvement of the soil profile through the implementation of straw production systems that, when grazed perform even more. In the specific case of integrated crop-livestock system, especially in Brazil, it cannot be affirmed that specialization in a specific activity of the production process allowed the insertion of another, thus generating diversification. The synergy between the activities is so great and noticeable, that in some places it is as if they had never existed without the other. However, in Brazil, for example, grain agriculture began to replace almost entirely the livestock in the noble soils in the south, southeast and Midwest regions between the mid-60s until the end of the 1990s, when integrated systems began to become increasingly popular.



Figure 2: Newborn Brangus calf in a crop-livestock integration area at the Sapé farm in Mato Grosso do Sul - Brazil. It is observed the pasture of *brachiaria ruziziensis* in intercropping with the recently harvested corn (Source: Author)

The observation of different structures, business developments and decision-making processes in the countries mentioned at the beginning of the work, makes it possible to design

a concept, which is not claiming to be a conclusion on the subject, but helps to homogenize the discussion.

- Diversification is not a one-off choice, it is the maturation of a business model that aims to maximize the overall gains of the business, either by the synergies existing in its production processes, or by specialization in additional activities. The fact is that, when well executed, the diversification of production systems has the ability to generate reduction of the overall cost of the company, dilute the market risk by expanding the sources of revenue, thus generating not only more interesting global results, but also longer lasting in the long term.

When it comes to being sensible, just like food production, one can always count on some company, government or country that contradicts a little homogeneity of concepts. In the specific case of the group of countries studied there is Qatar, which shows that sometimes diversification may have nothing to do with what was discussed above, but rather with a government strategy, sponsored and to some extent imposed.

In the case of Qatar (which will be further discussed), less than five rural establishments produce almost 100% of the food produced in the country. Qatar does not have the capacity to produce all the food it consumes, but this percentage has increased year after year with the government's investment in food production to ensure food security.

Therefore, the diversification of the production portfolio of the few farms in the country has to do with the willingness of the government or its partner companies to invest their resources in the production of the x, y or z product, and nothing to do with specialization, additional vs. core activities, synergy or any other concept that has been discussed previously.



Figure 3: Supermarket in Doha – Qatar: a quick tour in a city supermarket shows us how much the country is dependent on imports for its supply.

5. Other Stories

Influence of the Historical Process and Culture

All the countries in the world have had their productive structure shaped by their history. Since the first agricultural revolution involving *Homo Sapiens*, which happened 70,000 years ago, history, culture, climate, government and markets have profound impacts on the production structure of these countries, in addition to numerous other factors (it is recommended to read *Sapiens*, by Yuval Noah Harari).

Some historical passages experienced in practice during the two-year Nuffield Scholarship are especially interesting so that one can understand what impacts these factors have on the production structure and how often decisions like diversify, specialize, (or create a succession between the two), does not make much sense, because there are more critical factors in the list of priorities of some countries/companies or even historical phenomena difficult to prediction take place, changing not only the decision-making process of farmers, but also the entire political structure of the country, its productive structure and, in more extreme cases, changing the course of its history.

The Influence of Communism

Eastern Europe is a very peculiar region of the European continent. Although many countries did not join the Soviet Union, they had very strict communist regimes that each of their own form and with their specific timing, have had impacts in the region that are felt and lived to this day.



Figure 4: A soil sample in Bulgaria (Source: Author)

Agriculture is highly influenced by governments policies and politics. Countries such as Romania and Bulgaria, belonging to the European Union's most recent group of entrants, had their land structure completely altered by the policies of agricultural production and land distribution during communist governments that aligned with the Soviet Union, implemented the forced collectivization of rural properties, a practice that consisted of the expropriation of private rural properties, transforming them into cooperatives or state productive units.

The legacy of this period is vast and has historically built each of these countries in its regions and in the world. For agriculture, however, there were only a few positive contributions of that time, but some details draw attention within the analysis.

The distribution of land generates diverse and variable perceptions, which depends on where the person is positioned in society. The perception of those who had their property taken is different from the perception of an unemployed person who went to work in one of the state cooperatives and who previously did not have this possibility.

This paradoxical effect is further aggravated by the collapse of communism, preceded by the great supply crises experienced by those countries, which would cause a new change in the land structure, causing farms to be divided again, not necessarily respecting their size and their old ownership.

This historical passage of these countries caused extreme effects on the relationship of these populations with land and agriculture. Those who had their land subtracted, even partially, developed a negative feeling to agricultural activity and land. Some people, who gained a piece of land or went to work within one of the cooperatives, lived very different situations, from generating opportunity for some who eventually would not have it, to the frustration of people without the slightest aptitude for agriculture, having to forcibly become farmers. And finally, with the end of the regime, many of the happy farmers who had small pieces of land entrusted to them, lost everything.

This whole situation has created some situations that can be well perceived in some of these countries.

First, the inefficiency in the resumption of agriculture in these places, since virtually all land had been divided into well-known slices of land of Eastern Europe, small pieces of land six meters wide, which can be seen on all sides in countries such as Bulgaria, Romania, Hungary and the Czech Republic, making impossible for any kind of large operation that could bring some scale to agriculture.

Secondly, a generation of people with an extremely conflicting relationship with land and agricultural activity, which has impacted the sector's image in these countries. It was possible to talk to people who were on both sides of the story. Those who lost possession of their land during the agrarian reform and establishment of cooperatives and, therefore, have a bad reference of this time, as well as those who somehow began to have access to land, which did not last after the end of the influence of communism in these countries, leaving some of these people in extreme poverty.

Finally, very few companies specialized in buying and exchanging land, trying to gain scale and enable industrial agriculture in these countries. Agricultural companies, but very different, as the case of one of the companies visited in Romania during the Global Focus Program, owned by an Irish family, where 50% of the staff is allocated in offices, dividing between administrative and legal services of buying, selling and exchanging land.

In this environment, which is still under the umbrella of the European Union's agricultural subsidy policies, where what to produce is not always a complex decision taken on the basis of market, efficiency or anything else. Sometimes it is about obtaining the most advantageous subsidy or following what the family has been doing for over a century, continuing what the family started during the communist regime, or even trying to be as efficient as possible, knowing that the risk of living in extreme poverty in the countryside is the reality of most owners of small strips of land, even if they are on the European continent.

Subsidies

Subsidies are public policy tools used by countries in the search to give higher competitiveness to their productive sector. Under the pretext of reducing any inequalities in the competition of the international market, some countries end up crossing the line of the search for higher competitiveness, using subsidies as tools of market protectionism. Leaving judgments on the subject aside and being simplistic, subsidies have an ability to generate distortions in the balance of markets, since they enable the natural displacement of supply, demand and prices of products. If there was no subsidies for soybean production in France and Germany, for example, these countries would have to import 100% of their demand into the international market, which would certainly have some impact on this market, benefiting the actual producing countries.

One of the main criticisms reported by farmers during studies on agricultural subsidy systems is that by seeking to give more efficiency to farmers through artificial mechanisms, it is possible that these same farmers are not always eager to seek maximum efficiency in their production, which would somehow delay them, in relation to the sector as a whole. This vicious cycle would culminate with farmers who, with the withdrawal of subsidies (because it is understood that they are tools that should be used for a period of time and not indefinitely) would not be able to compete in the international market. A clear example of this is milk production in Qatar. Baladna, Qatar's largest milk farmer, produced milk, according to the information presented on the visit, at more than USD 2 per litre in 2018 (Figure 5). This production cost was more than five times the cost of milk production in Brazil at the time, which would certainly make it feasible for Brazilian farmers to export milk powder to Qatar, for example. Yet, it would not help solving Qatar's food security problem.

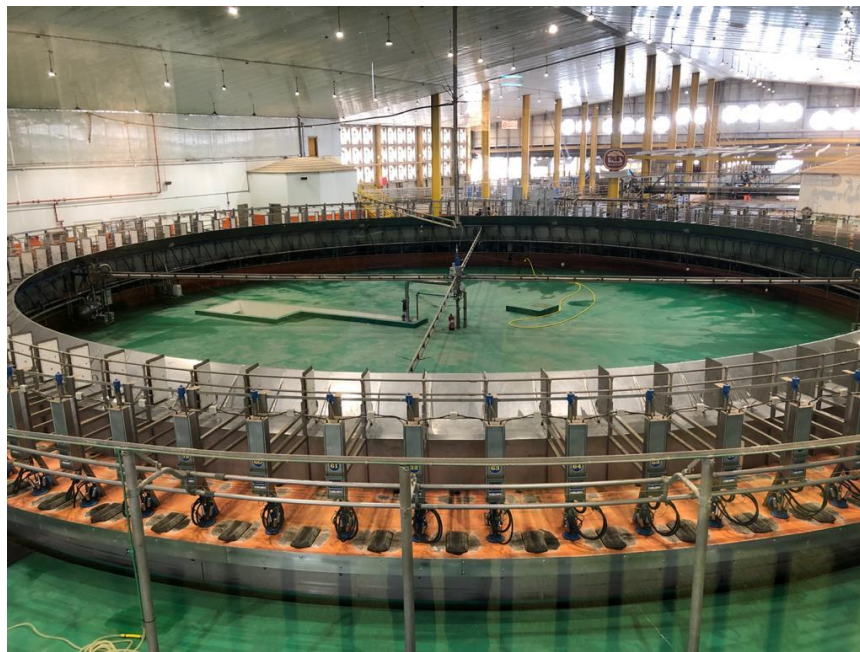


Figure 5: Main parlor at Baladna, Qatar's largest milk producer (Source: Author)

Regardless of the type of subsidy, it can be ascertained that the policies adopted by certain countries can influence the decision-making of farmers worldwide. Thus a relationship can be established between the theme of diversification, decision-making and subsidies (or public policies focused on production in general).

For example, the European Union has a complex and comprehensive system of agricultural subsidies, with direct and indirect payments. The direct payment system remunerates farmers on the products produced, techniques used, inputs applied, among

others. For example, the payment system to which Arnaud (a French farmer located in Bulgaria, who held one of the visits during the Global Focus Program visit to Eastern Europe) is attached to, receiving a value per hectare for each crop he can produce e.g. soybeans. Added to this there is a subsidy if the production is organic e.g. organic soybean, also paid per hectare. There is still the payment per hectare of planting a cover crop that is made after the harvest of this soybean, as well as an additional amount paid for those who incorporate the straw left by this cover crop. Therefore, there are four values per hectare added to Arnaud's income. This payment is tied to some conditions, mainly documental proof or productivity, but nothing that passes close to be challenging, after all, productivity at any cost can be achieved easily.

The decision-making process of this farmer is affected and, therefore, the decision of what to produce, how to form the production portfolio, to diversify or not, is affected by a public policy.

Regardless the judgment of the validity of this kind of policy as a tool to promote the strengthening of the business or sector, it is a fact that it causes market distortions as it inserts a new element that has an impact on the decision of what and how much is produced.

Qatar and its Food Security

Qatar gained independence from the United Kingdom in 1971. The country historically lives off oil and gas exploration, having the highest per capita income in the world. It is a small peninsula of 11,000 square kilometers, with approximately three million inhabitants, of which only about 10% are native.

A small peninsula surrounded by large neighbors, it is a huge desert with a few large cities established over time. And the combination of desert, absence of rivers and average annual rainfall of 50mm is not compatible in any way with agricultural production. Over time, with this established formula, the country has become one of the largest importers of food in the world. By the beginning of 2017, the country imported almost 99% of all food, whether of plant origin or animal origin, of which 80% of its imports were from neighboring or nearby Arabic countries (Official Government Data, 2018).

The trade blockade, however, changed that and forced the country to take some drastic steps to begin a walk towards food security. To explain, in 2017, Saudi Arabia led a movement that caused seven other countries to completely cut their relations with Qatar,

using the country's support for Iran and alleged funding for Middle Eastern terrorist organizations such as Al Qaeda as justification. The Saudis, as well as their allies, banned Qatari vessels from docking at their ports, closed airspace for any flight to or from Qatar, banned the flow of people and goods entirely, gave 48 hours for the withdrawal of all Qatari diplomats from Saudi soil and a two-week deadline for any Qatari citizen to return to his country of origin.

The Saudi attitude, considered radical by the Qataris, had its main effect of the measure seen in less than 24 hours in the gondolas of local supermarkets, where basic foods such as milk, grains and meat simply disappeared, causing a huge supply crisis in the country. The country, under the coordination of its government, began importing a large amount of food from the USA, Australia, Europe, Brazil, among others, trying to replace its typical trading partners (Gulf Crisis: The view from Qatar, 2018).

The traumatic experience started a national food security plan with the ambition to produce 60% of the food consumed in the country quickly (data presented at Hassad Foods, 2018). Yet how could it produce food which has historically never done so? How to produce food in the desert? How to overcome the challenges that demands high degree of expertise from farmers in countries where agriculture has already been done for centuries, where there is a strong relationship with land and agricultural identity, unlike the case of Qatar?

a) HASSAD FOODS

Hassad Foods, for example, is a subsidiary of the Qatari government that has the long-term goal of providing 60% of the food that the country demands, either through traditional imports or by investment in other countries (logistics, infrastructure, farms) for food production that will be imported, or by investing in production in the country itself. (Video Suggestion: Hassad Contribution During Blockade on YouTube)

b) BALADNA DAIRY

The largest milk farm in the country, with 24,000 Friesian cows milking, divided into several cross-ventilation or tunnel ventilation sheds, ten milking parlors equipped with 80-position carousels and a gigantic heifer breeding infrastructure. 100% of the silage used in the feeding of cows, something around 21,000 tons/month is imported from other countries, arriving daily by ship to Qatar mainly from Europe. (www.baladna.com)

c) HASSAD ALFALFA FARM

A farm with several irrigation pivots (Figure 6), producing alfalfa in a place where not even flies survive. With annual rainfall of 30mm, the farm has a sewage treatment plant, which performs a triple filtration process of the sewage of the capital, Doha. This sewer is pumped for 150 kilometers until reaching the treatment plant and, from there, it is pumped to the pivots.



Figure 6: Author viewing irrigation pivots in the desert in Qatar

d) HASSAD FOODS GLASSHOUSE

Using the most advanced and efficient hydroponics techniques (after all, water is scarce resource), a glass greenhouse with a total area of 5.5 hectares produces tomatoes (Figure 7), cucumbers, eggplants, among other vegetables, to supply local markets. In summer, irrigation takes place for 22 hours/day, trying to minimize the stress caused by the average 42 degrees Celsius daily.



Figure 7: Hassad Foods Glasshouse, Qatar (Source: Author)

Those are some of Qatar's examples that show that its government is willing to invest whatever it takes to ensure the food security of its people. The majority of companies visited made it clear that production operations are positive, exclusively thanks to subsidies and investments received from the government.

The government also invests in partnerships. Some products are not produced in the country which, for example, imports almost all cattle and sheep slaughtered there. It happens through imports of live animals, which can be finished in feedlots in the country (with imported feed) or slaughtered on their arrival.

This live and recent example shows the impact that history can have on the productive structure of a country and it is clear that elements that are usually at the top of the list for decision-making on what to produce, are shifted to the end of the list, if they are even on it. Among them, crucial elements such as agricultural aptitude, tradition in production, climate characteristics and potential foreign markets are left aside in exchange for food safety.

In Qatar, this decision is about what you want to produce and what money allows them to do so. If there is a solid trading partner, able to provide the demand with long-term contracts and guarantees, the relationship is established, otherwise the government is willing to spend what is necessary to do well, be technically efficient – not necessarily economically – and ensure supply.

The Complexities of Africa

No place in the world is as paradoxical as the African continent. There is the coexistence of some of the greatest natural beauties of the world, people with immense cultural wealth, some regions of extreme fertile soil and great agricultural aptitude. On the other hand, a process of colonization extremely harmful to the continent, a succession of corrupt and totalitarian governments, regions that coexist with almost total absence of water and cities that, while boasting mansions and worthy communities at a Dubai standard, have the majority of its population living in conditions of extreme poverty.



Figure 8: Kenya's dryland soil sample (Source: Author)

Agriculture is an unprecedented challenge. As incredible as it sounds, most of the time it seemed easier to do agriculture in the deserts of Qatar than in some places on the African continent. For example, regions of Kenya had gone without rain for eight months and absolutely no irrigation infrastructure or water storage. Moreover, most of the time this perception occurred not due to lack of natural resources, but because of infrastructure, institutional environment, legal certainty, among other topics.

As it would not be different, the decision-making process of what and how to produce is surrounded by a series of factors that, as always, are far from the management of farmers, being in charge of agents of the institutional environment, an environment that, with globalization, becomes increasingly larger and more complex.

Case Study Africa: Coffee

Decades ago, producing coffee was one of the businesses with the greatest profit potential for Africans. The product is still part of the production portfolio of some countries to this day, but far from being what was once. Some changes in the international coffee market were responsible for the collapse of activity on the African continent, directly affecting farmers decision making.

One of these was during the Vietnam War, when the USA faced enormous challenges. Among them, the consumption of drugs such as heroin by its soldiers. It is estimated that at least 20% of American soldiers returned to the USA from the war with some synthetic drug addiction. This factor, among others, was fundamental for the then USA President Nixon to finance the great expansion of drug control programs. Among the measures was the financing of Vietnamese farmers to stop producing plants used in the synthesis of drugs, starting to produce other products. The focus by the time was on coffee production. In the following years, Vietnam became one of the main producers of the coffe, causing drastic changes in the commodity market, throwing its prices down and making its production unfeasible in places with less productive efficiency, and that was the case of the African continent.

The decision to leave the activity was made and someone practically made it by the African farmers. In this case, as in others, it is not a question of diversifying or not diversifying the portfolio. It is a fact that those who did not have their income dependent only on coffee survived in agriculture. But failing to produce coffee was not the result of a complex decision based on opportunity cost, synergies, economy of scale, scope or whatever. It was a matter of survival of the business, of permanence on earth, a matter almost of greater force.

6. Conclusion

The decision of 'what to produce' can be affected by many factors and to some extent serves as justification for those who still do not have the subject on its discussion agenda. But what about those with farms in regions with great agricultural aptitude, ample resources, which already operate with positive results in some agricultural activity and still have room to test and learn?

The characterization of the three groups presented in this report can give the false feeling that it is possible to find some pattern in the way farmers deal with the theme of diversification, whether they are from different countries or not.

However, as analysis on the subject deepens, it becomes increasingly difficult to create any form of typification, since invariably the discussion is moving towards the subject of decision-making, which by itself it is a process with great complexity, making the discussion even more challenging.

The points observed that limit both the vision of diversification as a risk management tool, as well as the beginning of the process of switching to diversified systems are:

- The excessive characterization of market mechanisms as the only risk management tools.
- Lack of mastery of project analysis tools and their feasibility.
- Emotional attachment to the production activity that is practiced, making it impossible to consider another activity for the company/farm.
- Difficulties in managing current activities, making it impossible to consider new activities.
- Lack of practical examples of diverse systems that have worked and are delivering profit.
- In the case of some countries, such as Brazil, Argentina, Mexico and other countries that have been under process of colonization, the monoculture production systems that happened cyclic in the past (coffee, sugar cane, etc.) still impact culturally the agricultural production.

- Historical and/or colonization processes cultivating products imposed over time, which creates an environment in the sector with low capacity for change in the production structure.
- Entrepreneurial capacity limited by several institutional factors.

It would be pretentious to try to understand and translate the decision-making process of an entire, global, diverse and complex sector such as agriculture. But the above points seem to represent almost all farmers interviewed during this two-year scholarship. Obviously, each point has the potential to unfold in many others, with even more complex aspects, since psychological and even totally subjective components are part of the whole decision-making process.

However, there is a point of common agreement between respondents and those visited when it comes to diversification or even scale increase. Despite the possible gains generated, the increase in the complexity of business management is right and liquid.

7. Recommendations for Farmers

The recommendations made in this report are to encourage farmers to seek knowledge on topics, rather than create a prescription on the subject. It is also not claiming to suggest generic implementations, which would in no way apply to a large group of farmers, given the heterogeneity of rural enterprises and farms. But is intended to generate reflection.

- h. Knowledge about a business must be organized and described, regardless of the size of the company, seeking to facilitate its understanding is the mapping of processes, the uniformity of this information among the members of the company and, consequently, enable the beginning of more complex analyses.
- i. Understanding and separating the core/end activities and other/middle activities of the company is fundamental for the construction of a long-term strategy, as well as for the analysis of possible synergy gains within the business, whether these gains come from diversification or not.
- j. Creating risk matrices to better map, understand and manage them is fundamental for businesses, thus seeking to support the strategic planning of companies, as well as expansion and/or diversification analyses.
- k. Specialization and diversification should not be treated corporately as paradoxes. These are often interdependent processes, having an impact on each other and sometimes happening with a cause-effect relation.
- l. Economies, both scale and scope, have great ability to impact business by reducing average cost of production. Thus, it is recommended that, through studies, seek to understand how each one applies to its business.
- m. The eventual increase in complexity in the management of a business due to its diversification should not be neglected, since technical and market factors can derail a project or the business entirely.
- n. The use of tools of technical and economic viability should be considered essential for investment in any activity, whether in order to diversify or not. In this phase of the study, the necessary resources should be spent so that the study can anticipate different scenarios in order to have more accuracy, thus reducing the chance of an error in implementation.

8. References

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Most of the data presented was collect in field during the following travels:

2018

CSC – The Netherlands

First Individual Travel to Europe, attending the CFS from FAO (Rome) and visiting other 6 European countries.

2019

Second Individual Travel to South America Countries

CSC – The USA

GFP – USA, Czech Rep., Bulgaria, Romenia, Hungary, Qatar and Kenya.

Third Individual Travel to the USA

Fourth Individual Travel do Europe, covering more 10 European Countries.