European Journal of Agriculture and Food Sciences
www.ejfood.org

Outlook on Mozambique's Agribusiness as a Driving Force for Family Farmers

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ABSTRACT

Family farming is the predominant mode of agricultural production in the world and in Mozambique, producing food, preserving traditional food systems, contributing to a balanced diet, and safeguarding the world's agro-biodiversity. Micro and family farms have the potential to deal with the complex set of challenges faced in the region, if they are provided with the necessary support, such as agri-technology assistance, infrastructures, and organizational development, to boost local economies and lift communities out of poverty. The present review aimed at showing whether, and to what extent, services of entrepreneurial value could be provided by agrarian incubators to nurture small farmers, namely youngsters and women, to meet market requirements and make a living in the agriculture sector. The focus was on the clarification of the question to what extent smallholder farmers are currently educated at professional schools on how to become successfully self-employed. The answer to this question is needed to outline the current mismatch between vocational agriculture education of farmers and actual market requirements. It was evident that farmers are not educated to successfully meet market requirements and that agriculture incubators considering investment in agribusiness, could be a promising alternative or useful addition for farmers' vocational preparation. Incubators provides suitable plans for market technologies with agritech start-ups delivering state-of-the-art means to motivate local adaptation, and use, of sustainable practices. There is the need to investigate how to maintain and improve family farmers' organizations, creating vibrant and inclusive rural societies, while increasing agricultural output with product quality and safety.

Keywords: extension services, poverty, smallholder farmer, southern Africa, start-up.

Submitted: November 28, 2022

Published: February 16, 2023

ISSN: 2684-1827

DOI: 10.24018/ejfood.2023.5.1.618

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I. Introduction

Although Although Agriculture has a history of over 12,000 years, strangely enough the debates on its efficacy and productivity remain. Africa detains more than 50% of the globe's unutilized productive arable land, and notable but unexploited water reserves but this has been to no avail since African governments, community leaders and business entrepreneurs have been deprived of the necessary motivations and ambitions, powerful drivers of the continent's relentless growth.

After decades of neglect, lately the panorama seemed to be changing, but the outbreak of war in Europe, affecting global and mainly African economies, resulted on a step backwards and the near future is unknown. Nevertheless, all stakeholders, from farmers to large food producers and retailers, are certain on the need to refocus the present and forthcoming agricultural growth strategies.

Africa's vast agricultural commodities (e.g. coffee, tea, cocoa, cotton, sugar, tobacco, nuts, tropical fruits) with little or no processing involved, are exported to multinationals and their finished products and high-value crops and livestock products, are imported at alarming prices. Nevertheless, SSA have lately become agricultural export powerhouses, with a net agricultural trade surplus, therefore the disturbing statement is broadly imprecise [1].

The Sub-Saharan Africa (SSA) is confronted with four basic challenges: a global food crisis, extreme climate change, rising energy costs and never-ending poverty. Sustainable agriculture with the objective to reach community needs, may only be achieved avoiding monoculture, practicing agriculture crop rotation, and using natural fertilizers. However, the present global model scenario of agricultural development is hinged on exactly the opposite, high specialization, less diversity and intensive use of agrochemicals, leading to inequalities, increasing social differences, and environmental degradation [2].

Since the transition to independent states the economic and social development in African countries has been the consideration of all governments. Progress however has been hostage to many factors and should be based on a debate among politicians, citizens, social society organizations, entrepreneurs, and researchers, with the goals and enormous

challenges of contributing to elimination of extreme hunger, malnutrition, poverty, and increased prosperity.

Talking about what we want to do and how to do it best is important, but action is better instead of talking. Public sector institutions are affected and guided by politics. And politics is about future. Who wants to talk about the past if we can only adjust or change the future? Indeed, African agriculture will have to change "beyond recognition" [3].

Agriculture is still a crucial sector at the SSA level since it remains the major source of employment accounting for 65% of full-time employment, 25 to 30% of grow domestic product (GDP) and over half of total export earnings. The African agribusiness's present share of total GDP is very low, the higher portion of revenue of agriculture, forestry and fishing in Mozambique in 2020 being 25.6 (%GDP), when in SSA the average is 17.2 (%GDP) [4].

It is imperative to continue to press for Africa's determination to boost its present growth rates, create more jobs, significantly reduce poverty, and grow enough cheap, nutritious food to feed its families, export its surplus crops, while safeguarding the continent's environment [5]. To transform agriculture for development and opportunity across Africa we believe that governments need to first address the impact of the vicious cycle of extreme poverty, the root of diseases, lack of education, and unemployment. Poverty alleviation is therefore directly linked to agriculture and its reduction can be attained by several and concomitant initiatives [6].

Agricultural value chains are notably changing in SSA countries involving merchants and farmers as upstream players, and processors, storekeepers, wholesalers, and distributors as downstream actors. Financial embargo remains the main challenge to family farmers' engagement in agricultural value chains in Mozambique [7].

Other main barriers well identified in Africa include the poor infrastructures, fragmented markets, poorly functioning input markets, difficulties in accessing land, water and finance weak resources, and inadequate skills and technology [8]. All these hurdles are responsible for continuous and progressive loss of competitiveness although these adverse trends could be reversed but requires strong effective governmental policies and finances [9].

However, investing in agriculture, decelerating population growth, using adaptive research to solve farmer's problems, strengthening farmer's organizations and the formation of non-state cooperatives in Africa, recognized as crucial means for poverty alleviation, are not easy tasks due to multifactorial influences [10].

The first step to be conducted towards a snapshot of the existing panorama is to collect reliable data on agricultural production of different farm commodities, services and produce and a diagnosis of specific value chains, to understand how the dynamic agribusiness sector can contribute to growth [11].

Rural areas in African countries have limited agro-processing activity and capacity and almost none at all of the people of rural Africa are connected with reliable, high-speed internet which could bring new and innovative ideas, and most even do not have mains electricity. Furthermore, the adoption of the ICT innovation services is constrained by poor technological infrastructure, and low level of user skills, especially of farmers, in using the technologies [12].

The food supply chain is vulnerable to biased business arrangements due to abrupt imbalances between small and large operators. The drama of agriculture is, being a multitrillion-euro business, only invests less than 0.5% annually in innovation, research and development across the complete farm-to-table agricultural supply value chain [13].

For decades, we were chasing yield, trying to figure out how to produce large amounts of food cheaply. It is no longer how much can we produce cheaply, but how much can we produce sustainably, preserving the natural habitat biodiversity, reduce wastes, and responding to the climate crisis [14].

While most of the world is presently facing escalating and prohibitive costs due to cascading global events of the 2020s, which seems to have no end in sight, the developing world, particularly SSA, is facing high food shortages and insecurity, hunger, and social unrest risks, which are predicted to raise over the next few years.

A possible enduring resolution for agricultural productivity in SSA resides in the application of special economic zones (SEZs), in which the business and trade laws are different from the rest of the country, to promote the growth of a more resilient agriculture industry, particularly agribusiness, including farming itself.

However, invariably, SEZs in Africa, experienced diverse achievements, while some were massively financed by government, but did not succeed in yielding the desired outcomes, mainly the creation of a significant number of low-skill jobs in export-oriented activities [15].

In SSA the large majority of agribusinesses are micro or small and have been a way of life rather than a business-oriented sector, while there is not a one-size-fits-all platform, and the majority they do not drive investment and innovation [16].

The majority of farmers are engaged in low-scale subsistence family farming and accessing agricultural finances and paying it back is weak and problematic, since the existing banking systems do not provide enough support to new economic initiatives and, in particular, they do not consider micro farmer borrowers as creditworthy [17].

There is no single definition of family farming which include poor smallholders, native folks, classic old communities, artisanal fishing for a living, hinterland farmers, shepherds, pastoralists, and many other small scale food producer parties representing different world ecosystems, characterized by a heterogeneous mosaic of habitats.

Mozambique, despite being considered a fragile country and having accepted economic growth, as an essential commitment to be taken, has been providing living standards to adjust earnings and resilience of communities in rural areas. Indeed, it is one of the fastest-growing countries in SSA per capita, but growth was not broadly shared and income inequality increased [18].

Blessed with abundant arable land, all methods of agricultural are present throughout the country but the dominant form is still based on primordial survival type crop farming and fishing. Some Provinces specialise in growing certain crops commercially, while others grow the same crops as a subsistence farming activity, with different scale and size

of farm system [19].

Some 1.3 billion tons of post-harvested food, at all points in the supply chain, is lost each year globally, mainly due to lack of refrigeration facilities, and the problem is particularly acute in sub-Saharan Africa, with more than a third (37%) of food lost, mostly due to feeble and disorganised supply chains [20].

The connections between established large players entrepreneurial ecosystems and start-ups are important because it helps bring some of these solutions to customers in ways, they would not have been able to do on their own. In order to drive agribusiness development in Africa, the world's largest free-trade area, it is necessary to upgrade informal value chains and link them to formal value chains [21].

Mozambican workers, including women, were guaranteed the right to form trade unions and the right to strike in the 1990 constitution. Presently, one cannot consider production agriculture without recognizing there is a labour challenge, although rural workforce in Africa normally is not joined in strong trade unions with strikes only occurring in large enterprises.

Agricultural employment is a cardinal benchmark used in development, since as salaries ascent, the quota of pool of labour force in agriculture drops as farming systems become more effective and profitable, and people relocate themselves to other sectors such as industry and services.

To unlock the potential of African agrarian enterprises, private or state-owned, it is necessary to leave behind the years of neglect and empower them to realize its huge, largely untapped agriculture potential, boosting its growth rates, create more jobs, significantly reduce poverty, and grow enough cheap, nutritious food [22].

There is the need to support and link smallholders' family producers and small enterprises to productive value chains, trying to convert production agriculture accessing higher-value markets in an integrated profitable agribusiness, warranting food security [23].

Economic well-being and quality of life of a community is the result of contributions and efforts of multiple stakeholders placed at different levels and sectors of activities. Mini, small and medium size enterprises are key actors but they are not a homogeneous group, however the majority of existing family smallholders are out of contest if not grouped in cooperatives or other means of specialty markets' associations [24].

Natural market demands and dynamics are not enough to promote entrepreneurship since the institutional and regulatory environments where they are located add up for a successful implementation of projects and businesses. In the present scenery of uncertainty, family farmers need to organise themselves, if possible, in partnership with larger ventures aiming at cooperation with integration of different productive cultures, strengthening local initiatives and systems.

Although in the near future the average size of family farmer in Mozambique and SSA will not change, optimal farm size is a dynamic concept that alters as a country's overall economy grows and as non-agricultural sectors develop. There is need for further research on how family smallholders can move from subsistence to commercially oriented agricultural systems [25].

However, in most Sub-Saharan countries, including Mozambique, there are a number of barriers which hinder or totally impede the establishment and growth of family and small business, namely the excessive regulatory hurdles, land tenure, weak finance and banking systems, low-skilled labour, lack of training and adequate general incentives.

Productivity of almost all agricultural subsectors in Mozambique has performed poorly with few exceptions (e.g. sugar, tobacco) despite in 2020/2021 national agriculture growth registered 8.2%, much higher than the last decade average of 3.1% [26].

In the North of Mozambique, for the rural smallholder family farming, it is not just agriculture production, trading, market competition, and business activity, but mainly a factor of survival as peasant's endurance has limits to sustain harsh lifestyles resulting on migration to urban areas and increasing growth of unprepared cities. And by micro or family dealings one includes the means of organizing agricultural, forestry, fisheries, pastoral, livestock and poultry, bee and aquaculture production [27].

Due to the huge diversity of SSA's agro-ecological, market, and business environments, necessarily means that each country, and indeed regions within countries, must adapt the broad guidance to local context [28].

The present trade and agricultural policies in Mozambique, reveals how agribusiness development strategies emphasizes the convenience and borderlines of start-ups, and postulates that some research domains should be next considered.

Far from claiming to solve the question of which public policy is the most adequate to answer the challenges of agricultural development for poverty-alleviation and food security in Mozambique, this review just aims at throwing light on the real underlying debates.

II. Emerging Markets

Despite well-known criticisms of the IMF (International Monetary Fund), considered heavily biased by the political and economic interests of rich countries, they have upgraded Botswana, Ghana, Kenya, Mozambique, Nigeria, Tanzania, Uganda and Zambia as "emerging" or "frontiers" markets as a result of their economic growth [29]. However, contrary to Egypt, Morocco, South Africa, and Tunisia, classified as advanced economies, the emerging economies still lack well-developed manufacturing and service industries.

Mozambique, with budget deficit status bordering 120% of gross domestic product (GDP) in 2020, reduced its budget deficit (before donations) from 7.9% to 4.5% of GDP in 2021, but still presents less stable and low macroeconomic growth rates and its prestige among international donors, with regard to its capacity to accomplish, has declined [30], [31].

As economies develop, agriculture and natural resources account for a smaller and smaller share of GDP, while the share of manufacturing and services grows, and smallholder farmers loose gradually their battle for livelihood [32].

Mozambique still has relatively very low per capita incomes, no means to create productive new jobs nor assist advanced poverty curtailment, despite the finest expectation of oil and gas business sectors, all operated by foreign investors, though represented by the state-owned

hydrocarbon company ENH, participating as a Governmental stakeholder in production operations [33].

These extractive activities are located in the northern Cabo Delgado Province of the country, with limited linkages with the rest of the economy, despite being already on its stage of sales to transcontinental multinationals. Paralleled with extremely low-productivity agriculture, this industry deserved new model of adequate policy and institutional framework, not yet implemented, despite recent introduced several legislative reforms.

Besides the opportunities in place for the potential and volatile gas and oil industries, most investments are very slow to enter Mozambique due to considerable high risks of instability and the colossal uncertainty that businesses must cope in the region.

Unfortunately, needed pillar infrastructures and institutions are still absent, talent is scarce, and poverty, famine, and disease still regularly afflict the country, all constituting genuine obstruction to people's seeking for a better life. The final objective must not be to maintain millions of small farmers, but to eliminate their absolute poverty [34].

It seems that SSA and Mozambique's long-haul expectations could be secure, if internal and external investments inflows will be aimed at driving its growth, through developments on education and productivity. Along the agricultural commodity value chains, opportunities are opening in sectors such as retailing, telecommunications, banking, infrastructure-related industries, resource-related businesses, but poverty, lack of housing, energy and malnutrition prevails [33].

Meanwhile, and despite some pro-poor policies, most rural families spend more than half their income on food items although the picture as subsistence farmers is slowly and gradually changing [35].

While African's climate is very suitable for solar power and other sources of renewable energy, this potential for cheap energy has been largely untapped. Under the present worldwide energy upheaval the top priority for affordable and sustainable energy sources will continue to rise, but global demand for oil, and natural gas is also increasing [36].

Successful businesses request expert executive administrators which appreciate and comprehend the market environment and do shape their plans and methods accordingly. It requires ideas and innovation, tackling complex challenges with creativity [37].

On starting an agribusiness four other elements are critical to success. 1) Choose the right plan of action; 2) Know exactly consumer preferences, variable within the country; 3) Select skilled staff; 4) Know how to manage hazards and risks [38].

Our present goal was to identify Mozambican's agribusiness sources of growth, determine if it would continue over time, and size opportunities in key sectors despite socio-political troubles, gender inequality, conflicts in the Northern region, natural disasters, and poor policies.

III. Mozambique's Market Overview

The Mozambican agricultural sector is dominated by 3.2 million smallholder farmers (some 10% of the total population), accounting for ca. 80% of total employment, who produce for own consumption while the country remains a clear net importer of all food items. However, in the near future, most of the food systems' related jobs will move from the rural areas to be newly created in processing and services such as packaging, distribution, and commercialization, mainly within development corridors [39].

As in most countries, economic activity in Mozambique was hurt by the pandemics, but the escalating conflict in the northern province of Cabo Delgado, spreading sporadically to Nampula and Niassa, have been the main drivers for the deceleration. The already constrained national budget and the high levels of public debt (ca. 20 billion U.S. $ in 2021) offer limited fiscal space to stimulate private sector-led growth and leverage social programs, which affects the vulnerable groups. On average, the farm size ranges from 1-2 ha for family farmers and the agriculture sector contributes to some 24% of GDP [40].

Agriculture has always been of great importance for Mozambique, as feeding a large 33 million population is not an easy task, namely due to its vast surface area and weak communication systems. The Mozambique government has been supporting the agriculture industry with a number of policies, trying to stabilise the output and seeking ways to ensure the sector is growing healthily and sustainably.

At central governmental level there has been highly compassionate of agriculture for decades, and there is broad political consensus as to the need for land, labour, wages, and tax reforms to help the sector reach its potential [41]. However, at the province level the dynamics necessary for smallholder farmers has not been successfully established mainly due to meagre participatory agricultural extension services.

Due to supportive policies, largely through the input of foreign aid, the agriculture sector's performance has been very slowly improving in recent years. Mozambique in terms of farming output, does not produce enough for self-sufficiency in fruits and vegetables, cassava, rice, maize, sorghum, cotton, dairy, meat, poultry, eggs, and fishery products, despite contrary official claims.

The new strategy calls for more attempts to warrant the production and supply of key farm products, stimulating the supply-side economics to propel growth and reform, by transforming agriculture from a solitary struggle to survive into farming as a business that thrives. And agribusiness is one of the main conceivers of employment and income [42].

Although Mozambique is not a country globally responsible for high pollution levels, and therefore with low level responsibility regarding the climate changes, while it is quite clear which countries are the most responsible for environmental contamination, Mozambique authorities have rightly been enhancing environmental protection as well as pollution prevention and waste treatment, however, one must consider that for oil and gas industries, on or offshore, there is no such thing as zero risk [43].

Despite the steady development of Mozambique's agriculture sector, trying to reach at least some colonial self-sufficient production levels of, rice, maize, beans, peanuts, sesame, sunflower oil, sugar, tea, cashew nuts, lobster, prawns, tuna, mackerel, sardines, copra, sisal, vegetables,

bananas, and others, progress has been obstructed by huge and uncontrolled demographic increases and other aspects.

The land ownership, the global shrinking arable land, the deteriorating ecological status of environment due to the heavy use of fertilisers and pesticides, and the interconnected issues of soil and food security are considerable concerns. In SSA, more than 10% of main season cultivators use pesticides [44].

There is also much room to improve in terms of increasing the use of appliances and more advanced technologies in the agriculture sector. However, although agrotechnology and digital tools started to penetrate few SSA settings, necessary for transforming the food system and reducing the guesswork in farming, lack or energy and internet in rural livelihoods is strolling this development.

Mozambique's agriculture sector made rapid development, by accommodating new agricultural technologies to upgrade the sector's productivity and increase land fertility. The major constraints of the agriculture sector are the overpriced consumables and weak gains. The transformation of subsistence agriculture holds tremendous promise but there are many factors restricting the growth of farmers' income and leading to shrinking of the labour force in agriculture and fisheries [45].

The share of forestry, fisheries, livestock, and poultry are not well documented and the contribution of the World Bank SUSTENTA Programme for Mozambique in 2020, with $60 million to integrate rural households into sustainable agriculture and forest-based value chains, suffered the pandemic impact. It must be enhanced that this programme rather than establish sustainable enterprises, is guided to incite development and eradicate poverty [46].

Open-air informal markets remain an enduring feature all over Africa and Mozambique is no exception (see Fig. 1).

Fig. 1. Informal markets in Nampula trading local food produce using places instead of weight scales.

Like in many other parts of the world, most food commodities, if not exported or consumed by the local communities, turn out as food refusals and wastes, along the entire food supply chain. This indicates that substantial inputs of assets and funds depleted in agriculture are applied to no purpose and that a contraction in food losses could have an instant and direct influence on their livelihoods [20].

Smallholder family farmers remain largely disconnected from markets due to low levels of organization and capacity, face difficulties in producing competitive, high quality and affordable products which meet adequate food safety standards, namely the absence of mycotoxins contamination, therefore inaccessible to integrate export-ready value chains [47].

Besides the well described chronic malnutrition, and food insecurity in the country, namely in central and northern provinces [48], food safety has been an issue of apprehension for Mozambique's urban consumers, especially concerning farm untraceable produce such as cassava, maize, meat, vegetables and seafood. The misuse of pesticides has been primarily due to the farmers' lack of knowledge.

Recent misconducts have somewhat dampened consumers' confidence in food safety, and in response, the government has introduced regulations to improve food safety and strengthen quality monitoring, although there are no sufficient certified laboratory facilities for this hazard control and the mandatory rules still not compulsory to all farmers.

The increasing demand for lower price high-quality agricultural products versus their limited supply ultimately results in increased imports, mainly from South Africa, as Mozambique cannot compete with the treasuries of larger agriculture players. Some major product categories, including soybeans and dairy foods, which have been heavily dependent on imports for many years [49].

Other inhibitors to sector's growth include the ageing workforce with a low level of education and the underdeveloped rural financial services system [50]. It is imperative to make agricultural activities more attractive to young farmers, creating decent employment, and decreasing rural-urban migration where slums spur with this flux of unsatisfied youth, enabling proper urban planning and further rural development.

Through a network of public institutions and vast number of aid programmes and schemes, Mozambique's central and regional authorities are trying to protect agricultural producers and boost production. A number of policy measures have been taken to address two major factors, soil and water, critical for improving agricultural output, while the key is the need to maximise opportunities for farmers to increase production and protect soils, biodiversity, and ecosystem health for sustainable production.

A recent example of investment in 2022, is the Feed the Future Mozambique Activity "Integrated Resilience for Nutrition and Agriculture" (FTF RESINA), a five-year ca. $30 M combined agriculture, water, sanitation, hygiene, and nutrition activities, aimed to reinforce the capacity of communities and practices to sustain, accommodate, and remodel the recurrent traumas and stressors they overlook. Located in Zambezia and Nampula Provinces, RESINA will aim at heterogeneous and climate-smart agriculture production, extended approach to potable water, and improved nutrition scores for women and children under 2 year old [51].

Overall, The Ministry of Agriculture of Mozambique has taken several steps to incorporate and institutionalize climate actions into the development agenda, but never managed to attain all its goals. Agricultural schools and universities are also considered responsible since they did not provide the authorities with the necessary ideas, innovation, research, technical developments, policies and the answers for the

present despondent agricultural situation [52].

IV. Surveys

In Mozambique only few agricultural surveys have been conducted regularly, mainly during the vital population and housing census with the financial assistance from a multi-donor Trust Fund. It aims at providing a wide range of information on the current and historical economic performance of local rural business units in their farmyards.

A rustic family unit, namely consisting of parents and their children, are very disperse and mainly with the sole objective of feeding their household and sometimes their community. Most of them are poor and food insecure and have limited access to markets and services and they must overcome considerable constraints.

The authorities may conduct some evaluations and diagnosis of the performance by Province and achievement by industry, however, local analysis of farm costs, receipts, income, profit, rates of return, and their relative contribution to provincial output is not regularly conducted. Agricultural staff on Extension Services neither have the entire ability nor the facilities to perform these tasks.

Despite the existence of basic ideas from FAO to help countries strengthening their national agricultural surveys systems, the fact is that the collection, dissemination, and use of sound, harmonized, timely and regular data on agriculture is not performed consistently in Nampula, Mozambique.

The scarcity of reliable data for sure is not a national but an African problem and it is very difficult to overcome the challenges of data inadequacy which impacts on determining national indicators. These are essential, but not enough, for enabling evidence-based better decision-making by government agencies, civil society, and the private sector. Few countries, e.g. Uganda and Senegal, were supported by FAO to conduct national surveys [53], [54].

Surveys need to be short, by not asking too many questions, and not take more than a few minutes to answer. They should be clear and easy to understand. This will help getting more useful information and reduce the chances of participants losing interest or giving misleading answers. The interview questions should be first tested on friends, colleagues or family to make sure they are easy to answer [55].

V. The Creation of Start-Ups

There at least 3 types of ventures: *accelerators*, *incubators*, and *start-ups*. The accelerators just assist establishing joint force teams moving their endeavour from the initial traction momentum stage. Business incubators are organizations that intensifies and systematises the process meant for the development and accomplishment of start-ups and early-stage companies, preceding the rapid growth phase.

Start-ups, i.e. companies in the beginning of its creation, are driving forces for innovation and growth [56], and have a certain ability and freedom to modernise quickly, with access to funding from many different sources [57]. However, they do not necessarily have access to the end customer, condition required to bring the product to market, enabling a technology to scale [58].

Start-ups are the best display of enterprise venture and innovation. They are differentiated from other commercial firms by dynamic business evolution mainly accomplished by adopting modern technologies, such as information and communication [57].

A start-up, as a newly established business with specific encouragement and ambition, founded on recognised demand for its product or service, converting an idea or a big dream into a reality. Being a small business at the beginning with a good chance of becoming a success story or even a massive lucrative industry, start-ups are driving forces of the local and regional economy [59].

Technological start-ups are usually endorsed and administered by a single person, few patrons, or universities, offering assistance, spin-off, and services not readily available in the market.

Start-ups have become a global phenomenon with start-up ecosystem emerging universally. Start-ups are major drivers of job chances and economic growth opening the gate to prosperity with new opportunities. They play a significant role in the growth, development and industrialisation of many economies globally when inserted in the best possible environment to thrive [60].

Obviously, there is no point, and it is impossible to recreate a business model such as the unique Silicon Valley model since technologies are moving fast and in different directions, while the world and innovations are changing, and for the fact that what is involved is not just funds and technology, but also about ideas, culture and the people.

When one has the initiative to start a business, a service or a product, it is imperative to have been thinking for long in how to set the enterprise and acknowledge the eventual existing competition. How the market is and how it will behave once the start-up is implemented it is important to study or if a person is not happy with a current product in the market. The influence of technology business incubators and science parks on the creation of start-ups is still considered not very clear [61].

To begin with, it is necessary a coherent and compact manifesto, with an idea well defined, which needs to be aligned with existing marketing efforts and with the start-up selling point. This will help designing the organizational structure, and function processes, consolidate agribusiness operations, and advance toward a common goal while reaching customer needs.

Last year (2021), African start-ups captivated $ 5.2 billion in initial investment, and West Africa, led by Nigeria, contributed for the greatest quota of funding, taking advantage of Africa's crowded population of young people and untouched markets. In 2020 the number of start-ups in Nigeria was appraised at about 3,300, the uppermost number in Africa. In the same year, South Africa and Kenya accounted approximately 650 start-ups, respectively and Tanzania 159 [62].

In Mozambique the implementation of start-ups started in 2015, but to date few are related to an agriculture and fisheries initiatives. Aimed at increasing affordable protein availability through aquaculture for the population in the northern Tete's region, a start-up was built on the shores of Lake Cahora Bassa in the Zambezi River, where tilapia fish is produced,

for consumption and exported regionally. Admittedly and paradoxically, this foreign start-up is claimed to fill in the gap of seafood supply in a country with 2,500 km coastline.

The business models of start-ups are variable, and several are still being tested. A start-up is like a living growing organism and it is constantly changing trying to maintain a trajectory of growth and evolution toward a viable solution [63], but in competitive markets, some grow and others do not or grow at slower pace than others [64].

Job creation with increased levels of employment and competitiveness through start-ups may be achieved by robust and competitive markets but they per se do not stimulate the necessary education, innovation, and creativity to generate income and meet consumer needs. Taking advantage of the opportunities emerging from the present crisis is not the same as being able to seize them and the main focus is on business continuity.

VI. Launching a Start-Up in Mozambique

It is a fact that the great majority of start-ups do not succeed or provide a desired outcome to their investors, since it is not easy to transition from a start-up to a company. Several main things one needs to start a successful business: 1) The genuine market need for the product or service; 2) Hold the credible expertise to initiate the business; 3) Have adequate resources of people, production, distribution, and funds; 4) Know your product better than anyone near; 5) Know your customer capacities, tastes, and commitment to acquire your product or services; 6) Have a sound business model; 7) Hold a burning desire to succeed [65].

Economies across Africa are experiencing massive growth powered by foreign direct investments and international donations from companies and institutions that serve as counterpart of their investments in many African resources, and global flows of foreign direct investment recovered to pre-pandemic levels last year, although the war in Europe is presently an added uncertainty and stress [66].

Mozambique, the 9th least developed country in the world indexed in the low human development, with the decent standard of living category classified only as number 181 country, among 189, represents one of the continent's less advanced agricultural and technological industries [67].

International investors do not recognise the agricultural potential of Mozambique to invest in start-ups and usually give priority to South Africa and other neighbouring countries also due to language facilities and differences. It is recognised the large tracts of land available for rain fed smallholder farm cultivation and the monitoring of previous problems of malpractices and misappropriation of land by large concessions in order to avoid conflict with local communities [68].

Start-ups need initial capital, association opportunities, office premises and visibility to investors for businesses preparing to submit their product to market. Funding may be found in a number of grants available by the government to small enterprises and businessmen and women, to assist projects set in motion and bring them to the next stage of development. But unfair bureaucracy by state officials often hinders the process.

To launch a start-up, the preparation stage is a decisive key for future success. It is imperative to know exactly the resources allocated to the project. Incubators and start-up programmes are planned to guide entrepreneurs through these early hurdles and enable them to focus on developing their unique product or service. The type of contractor of target client must be evaluated namely where rural candidates are to be involved. On the preparation stage special attention must be given on estimating the requirements for the next stages and where is the outcome to be marketed.

The working place needs to be conveniently situated and prepared for coaction team work on an effort to serve as precious asset station for accomplishment of key goals, seeking for networking ambient and associate to outside people with common activities.

The business in isolation is forced to failure if strong relationships are not built from the onset. Even a pilot study like the one we propose in the Northern Province of Nampula, needs interconnecting with regional networks with similar mission.

The know-how and skills of an advisor or business coordinator is essential not to say the most valuable asset of a start-up initiative. This should be open to ally youngsters with business veterans since rural venture is a though struggle and confinement from urban areas prevent the detection of unforeseen chances in various sectors.

Mozambique's authorities defined a "Strategy for the Development of Small and Medium Enterprises in Mozambique (2007–2022)" for industry and commerce, which is presently ending but outcomes still not clear, mainly for the agriculture business sector [69].

It was found from the results so far obtained that the difficulties caused by the local business environment are due to the existing regulations, financial situation, labour market, access to markets and connections between small and medium enterprises network [70].

The facilitating factors for start-ups are diverse and depends seriously on the economic conditions of the region of the country and can be expected to flourish in the market or subside, innovation being a bottom line of any start-up [57].

We believe that the present number of higher education institutes in the most populated Province of Mozambique may provide a pool of perspective talent for the ecosystem. When there are hardly any start-ups involved in the similar type of business, they may be more competitive if the authorities supply as much support as possible.

Our present goal was to identify Mozambican's agricultural sources of growth, determine if it would continue over time, and size opportunities in key sectors despite socio-political troubles, gender inequality, conflicts in the Northern region, natural disasters, and poor policies.

VII. Identifying and Challenging Some Assumptions

The problematization methodology is often used, gaining new insights, for recognising and confronting our propositions underlying existing literature and based on that, formulating research questions that are likely to lead to more influential theories.

Indeed, the perpetual, weak and enduring development of

the agrarian sector in Mozambique, make us wonder on which practices one should adopt in order that the country may really profit from the excellent natural conditions and from the national and international financial inputs.

Notwithstanding almost the whole territory having easy access to a vast hydric network, fertile soils, and the majority of the population being rural (67%) and young (53%), no authentic positive results were obtained from past agricultural interventions on nutritional outcomes and malnutrition [71], [72].

Globally and nationally, the existing long value food chains have proved not to help or adjust to required needs in improvements in nutrition and health of communities, with huge losses as by-products and wastes, more obvious during the pandemic. Small-scale producers must be supported to both enhance their productivity and market the food they produce, ensuring the well-being of the less privileged [73].

The brisk and expedite farming systems transition in SSA have been shown to be unsustainable and conceivably an alternative must be investigated aspiring traditional direct sales and short chain food supply systems, leading to a "safe and just" operating area [74].

In Mozambique and most SSA countries, public agrarian policies have not been fully implemented, by lack of knowledge, interest or technical unfamiliarity, resulting in food insecurity and malnutrition, unbalancing social and economic lives and often becoming a cyclic need for emergency food aid campaigns [75].

The susceptibility to weather, environmental impacts, and armed struggles in several regions of Mozambique, prolonged for decades, displacing millions of people, as well as the demographic explosion, and the uncertainty of land ownership, makes that most governmental planning and extension services are of very little efficacy [76].

At the top of this unfavourable panorama resides the low-quality education and training systems and shortage of competent educators and related trained teaching staff. Further to outdated or defective curriculum, there is a lack of educational resources, structural school facilities, absenteeism of teachers, and above all the lack of "hands-on" learning experience in agriculture ventures.

These is a need for a comprehensive and comparative analysis of agricultural degree programmes at different levels and extracurricular training offerings at higher and medium educational institutions and agricultural incubation programmes in Mozambique in order to propose positive changes [77].

Presently, the main focus of Mozambique, perhaps debatable and in excess, is on the gleaming mineral and gas discovery and extraction, with correspondent impact on population migration, rendering agriculture production for self-sufficiency secondary. Reconciling mining with agriculture in Mozambique, will not be easy and ultimately may be incompatible [78].

The complex relationship between mineral, coal, petrol, and gas industries and surrounding rural and sea environmental impact have not been the subject of independent preliminary studies since it is well known that there is no zero risk. Furthermore, the major oil and gas companies involved are exactly considered the most polluted in the world.

The co-existence of large or small mineral industry and the rural universe is not always very conciliatory, on the contrary [79]. Further to land disputes from the local communities there is a weak compensation on the trade of agriculture products, not only for the lack of standardisation of price formulation but also for the large direct imports of foods from abroad to sustain the large groups of workers in sizeable enterprises.

The expanding mining sector has contributed to perspectives of strong economic growth, not development, in some countries but has also generated social conflicts in rural areas that must be urgently addressed. Tensions over control of land and, most importantly, water, have led to frequent community protests, and farmers displaced by mining projects turn to small-scale mining as a replacement livelihood. Besides direct taxes, foreign mining companies also pay for community development programmes, build schools and roads, health centres, and make other investments [80].

In Mozambique there is a vast number of agriculture educational courses and degrees at all levels, from basic to professional, university and polytechnic graduate and post graduate levels. Technical professional basic schools were in 2016 transformed into training institutes or centres, holding over hundred thousand students. The exact number of agricultural students and graduates in related subjects is not known but are well spread across the whole country, however, the training received has been considered of no practical significance since they do not have access to training experimental farms therefore not equipped with problem solving skills and aptitudes.

VIII. Role of Incubators

The central function of any incubator is to assist emerging firms by delivering basic assets, connection to industry advisers, and exchanges with other business administrators, and perhaps most importantly, venture funds, to overcome the survival stage. Despite many studies on business incubators, the answer to the importance of entrepreneurial skills in the development of successful incubators is still not clear. The duty of business incubators in establishing a start-up is as important as helping the complete business process [81].

Business incubators are management institutions created to expand the chances of survival and durability of cutting-edge start-ups and support the prolonging of the business operation [82].

Despite many attempts to raise agriculture prosperity in SSA and Mozambique, small-scale family farming remains neglected in the region, and major policies related to agriculture, food and social security did not improve the existing inequalities [83]. These small family farms are facing enormous constraints resulting primarily from their exclusion from the benefits and opportunities that could be provided by specific and well-targeted agricultural and rural development policies.

IX. Types of Business Incubators

There are several factors that may affect the achievement

of business incubators sine it depends on the management competence, bookkeeping and financial control, workforce management, and the shortfall of skilled people. Presently, there are 4 different types of incubators predominant in the market: *1) Cooperative Incubators.* Cooperative incubators focus on projects concerning the activities of a company. Their interests are to boost business competences and to assist start-ups link and challenge with other stakeholders [84]. *2) Community Economic Growth Incubators*, aiming at elevating the society as a whole, they support smallholder and medium enterprises and specific groups, such as vocational handicraft businesses, and the indigenous initiatives [85]. *3) Private Investors' Incubators* that help technology-intensive start-ups without business model in place but with significant prospective businesses and enjoying its advantages by disposing stocks. *4) Academic Incubators*, providing different financial resources mainly to outside projects while aiding the business vision and concentrating on community liability.

X. Family Farmer's Business Sustainability

Who controls Nature, can humans control it, can it be controllable, why humans try to control it, what can and cannot be controlled by humans and many more questions are raised with no specific answers. Nevertheless, the need to protect Nature is clear being the vital support system for human health as it provides energy, food, water, and air.

Creating communities and societies free of poverty that are ecologically sustainable is the great challenge of our time, which our long-term survival depends. Cooperating with the inherent ability of Nature to sustain integrated plant, animal and microbiota lives will protect biodiversity and ecosystems [86].

Sustainability or the approach considering holistically ecological health, social equity, and economic welfare, in SSA and Mozambique should aim at accessing the poor and vulnerable people to property and control over land while promoting viable agriculture. Sustainability is not an individual property, but the property of an entire network.

The nexus of sustainable development, i.e., judicious use of water, energy, and food, determines the impacts on the environment. The global food system prioritises profit over social, health and environmental concerns, causing poor health, misspend water and energy, waste production, and loss of biological and cultural diversity, socio-economic exclusion, environmental degradation, and climate changes, through reduced emissions and enhanced soil carbon sequestration [87].

Smallholders and family farmers, often the most food insecure and vulnerable, generate a significant fraction of the world food production, and, contrary to common belief, they can really be creative, fruitful, transformative, and sustainable. Organic agriculture in SSA delivers positive gains to the family and community, embracing better nutritive foods, well-being, and health, minimizing professional risks by declining liability to pesticides.

The transition of farms and communities to holistic agrosystems (plant roots, soil minerals, fauna, and microbiota, crop, farm or whole economy), by embracing agricultural innovation and technology for producers at all levels, is now possible with the latest technology developments presently accessible in SSA, respecting agroecology [88].

The sustainability of agriculture has long been a research question aggravated by the wide diversity of agricultural products but 75% of the world's food is generated from only 12 plants and 5 animal species [89]. Building on existing indicators and sustainability evaluation frameworks, and capitalizing on the multiple existing experience, it is possible to measure the impact of small-scale farmers, pastoralists, forest keepers, and fishers who manage land areas up to one hectare.

From a qualified frame of reference, a societal pedagogy aiming at people's learning for sustainability promotes candidate farmers to become family farmers because they are at the bottom of the pyramid and experience hardship meeting core requirements and be independent [90].

The large-scale tendencies intrinsic to the food system include intensification, consolidation, and specialisation. Modern agriculture has been changing in developed countries with application of emerging technologies such as artificial intelligence, robotics, precision agriculture, and internet, transforming the way food is produced, handled, transported, and consumed.

However, it is evident that most of these practical applications will not, in the short period, transform the lives of smallholder family farmers who feed the world. Subsistence-oriented small farmers have been marginalized for a variety of reasons, however, are the producers who generate approximately 80% of the food consumed in parts of the developing world yet making up a majority of the world's undernourished population.

Some existing technologies have the ability to link family farmers to new assets, guidance, instruction and markets. Indeed, some of these innovations already exist, such as access to electricity and internet, the challenge resides in rescaling them in ways that are comprehensive. Presently there is a crucial need of clusters of wholesalers, cold storages, processors, and logistics enterprises that provide vital services that enable small farmers to access urban markets.

Smallholder farmers are not a uniform group, and policy formulation should differentiate accordingly, while few of them can adjust their living plans to contemporary demands but need a safeguard aiding policy context [25].

African subsistence farmers, with the family as the centre of planning, produce food to meet the needs of themselves and their families on farmsteads, with no more than 2 ha of land and few animals, prepared by themselves by fire and hand spading, and not even considered within the smallholder farms group.

Ultimate adoption of new production technologies, a synonym for innovation [91], and the farming of upscale outcomes, demands that they have the adequate paybacks and allowed access to markets, presently facilitated by growing rural and urban markets, better transport routes, and the voluntary gathering of businesses across the food supply chain. However, if this picture is emerging as possible for smallholder farms, subsistence family farms are far from this goal [92].

Subsistence small farmers lack the cash to invest in seeds, expensive fertilisers, in machines and training technical skills, or simply the time to spend farming when involved a non-farm labour participation of a family member.

Public institutions should benefit subsistence small farmers through contributions to sustainable land handling and protection, aiming at food security and reduction of malnutrition. Technological development must not enlarge the inequality gap and the training of peasant farmers by extension services is imperative to benefit the ecosystem services.

Agricultural activities cannot be separated from indigenous knowledge and integration with science and technology developments is essential to preserve local culture and transfer modern technology. Furthermore, traditional rural agriculture do not introduce new factors, therefore new risks and uncertainties do not occur, only appearing at the transformation stage [93].

To enhance the transitional farmers' competitiveness stage to pursue larger market opportunities, government policies and public investments are necessary, without restrictive bureaucracies, to build infrastructures and namely promote education for rural women and youth.

XI. Concluding Remarks

Research and development activities should be towards new technologies and methods that can merge with unique traditional indigenous knowledge, sustainable development, and modern science, adapted to feasible small-scale family producers.

National and Provincial authorities must foment the rehabilitation of local resilient grains, pulses and oilseeds for biodiversity conservation and save local races in danger of extinction, for both self-sufficiency and climate adjustment goals.

Poor family farmers must participate in policy dialogue and decision-making processes that affect their livelihoods. The vast number of tools necessary to support family farmers from inclusive rural finance to women and youth empowerment and enabling cooperatives, must be the subject of economic support, while new farmers associations must be encouraged.

How women and youth are economically and socially affected on the transition from sustainable smallholder agriculture to new types of ventures must also be investigatedPublication Principles

The contents of the journal are peer-reviewed and archival. The journal publishes scholarly articles of archival value as well as tutorial expositions and critical reviews of classical subjects and topics of current interest.

Authors should consider the following points:

1) Technical papers submitted for publication must advance the state of knowledge and must cite relevant prior work.
2) The length of a submitted paper should be commensurate with the importance, or appropriate to the complexity, of the work. For example, an obvious extension of previously published work might not be appropriate for publication or might be adequately treated in just a few pages.
3) Authors must convince both peer reviewers and the editors of the scientific and technical merit of a paper; the standards of proof are higher when extraordinary or unexpected results are reported.
4) Because replication is required for scientific progress, papers submitted for publication must provide sufficient information to allow readers to perform similar experiments or calculations and use the reported results. Although not everything needs to be disclosed, a paper must contain new, useable, and fully described information. For example, a specimen's chemical composition need not be reported if the main purpose of a paper is to introduce a new measurement technique. Authors should expect to be challenged by reviewers if the results are not supported by adequate data and critical details.

Acknowledgment

The present work is supported by CIISA for publication fees by FCT- Fundação para a Ciência e Tecnologia, Portugal, grant UIDB/00276/2020.

Author Contributions

Conceptualization JG, NS; methodology, JG, JF; investigation, JG, JF, NS; original draft preparation TF, JG; writing: review and editing, TF, JG, JF. All authors have read and agreed to the published version of the manuscript.

Conflict of Interest

Authors declare that they do not have any conflict of interest.

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