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Role Of Agribusiness Incubation in Developing the Agricultural Sector In Algeria (Deep Concepts and Lessons from India's Experience)

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Abstract:

This research paper focused on the concept of Agribusiness Incubator, rather than other types of business incubators. It is well known that the growth of economic sectors generates significant multiplier effects in agricultural businesses through forward and backward linkages. To advance agriculture, specialized incubators called Agribusiness Incubator have emerged. Their characteristics include adapting to the specific conditions of the agricultural sector and related industries. Through our research, we found that India has a pioneering experience in Agribusiness Incubator. Therefore, this research paper aims to extract some of the Indian lessons from this experience, with the aim of utilizing them in Algeria. Hence, the research question arose regarding the possibility of benefiting from the experience of Agribusiness Incubator in India, extracting lessons, and attempting to apply them in Algeria. To answer this question, we used a set of techniques, such as analyzing a set of documents that addressed Agribusiness Incubator, in addition to reviewing numerous studies on the experience of Agribusiness Incubator in India.

This study has reached very important results in the experience of Indian Agribusiness Incubator, including: The incubators created a cooperative agricultural ecosystem among entrepreneurs, and they also contributed to sustainable development processes and work to finance opportunities for emerging companies in the food sector. There was also a clear contribution from the business incubators in generating income and promoting emerging companies and encouraged innovation and agricultural technology and its affiliated industries. The incubators worked to market modern and innovative technologies in the field of agriculture and food industries.

Keywords: *Agribusiness Incubator; agricultural business; Agriculture in India; Agriculture in Algeria*

Jel Classification Codes : *M; Q22; Q140; Q160*

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1. Introduction

Several studies suggest that agricultural growth can reduce poverty rates by more than four-fold. With potential for growth in other economic sectors, investments in agribusiness produce significant multiplier effects through their forward and backward linkages. (Vogel, S. J. 1994) These investments in agriculture generate demand for agricultural products and related inputs and services, which in turn creates many jobs. Interventions that help highlight comparative advantages in agribusiness markets can also lead to competitive advantages. These interventions are highly differentiated and have a significant development impact. Agricultural investments can also have a significant impact on economic and social development and poverty reduction, (https://www.fao.org/4/y1860e/y1860e11.htm) as demonstrated by numerous global experiences.

Creating and establishing a competitive agribusiness sector at the national level requires an effective ecosystem based on innovation and entrepreneurship. An important factor in the agribusiness environment is effective policies and regulations that connect investors with appropriate financing. It is also essential to establish a good infrastructure in this context. Access to innovation while encouraging the spirit of agribusiness is of utmost importance in the agricultural sector. Innovation and entrepreneurship contribute well to the growth of innovative agricultural projects. Skills and innovation are also essential for the development of the agricultural sector. (FAO, 2018) Effective regulations and policies play an important role in supporting this work.

Through many experiences in countries around the world, it can be noted that business incubators play a fundamental role in enabling emerging projects and innovative projects in the field of agriculture. Business incubators also have a direct impact on projects and job creation. (Awonuga, K. F. et al. 2024) They are an important factor in establishing the innovation and business system, and play an important role in supporting innovative projects. They have a significant positive impact in creating job opportunities and contributing to strengthening the innovation system.

Business incubators are known to have strategic relationships with several entities that support innovation and entrepreneurship, and provide various services to small and medium enterprises, academia, and financiers. Business incubators play an important and major role in stimulating the start-up of projects, transforming products, and financing them through small projects. This means that business incubators work to overcome the risks facing emerging small projects, provide innovative companies, and develop their supply chain. Business incubators also work to transform academics' scientific research into economic goods that can employ graduates. (Stal, E. Andreassi, T. & Fujino, A. 2016)

It is known that agriculture has very special features, and poses a great challenge to the business incubator, as agricultural businesses face multiple and different risks, such as biological risks, weather risks and fluctuations, and risks of price fluctuations and basic materials in agricultural activity, so specialized incubators have emerged, which we call agricultural incubators, and they must adapt to the special conditions of the agricultural sector, (Newell, R. et al. 2021) so Agribusiness Incubator must take into account the risks specific to agricultural activity, and support small agricultural enterprises that work to develop and activate the agricultural sector.

Through our desk research on information related to Agribusiness Incubator, we noticed that there is a lack of literature related to Agribusiness Incubator. This study aims to clarify and understand the role of Agribusiness Incubator in empowering institutions operating in the agricultural sector. This study also aims to identify the lessons and practices that can be learned from the Indian experience in supporting and activating Agribusiness Incubator. This study attempts to develop a good vision for activating Agribusiness Incubator in Algeria through the Indian experience.

India ranks second in the world in agricultural production. With its diverse climate, it produces 90% of the country's total horticultural produce of vegetables, fruits, and spices. (Sah, S. et al. 2022) The growing demand from the population and their adoption of a healthy diet has also made horticulture flourish. The horticulture sector has contributed significantly to helping people in India achieve self-sufficiency in their country's produce. One of the main reasons for the development of the horticultural sector in India is the Agribusiness Incubator, which has played a significant role in supporting farmers, transferring innovations and technology to rural populations, and addressing many agricultural problems through technology, significantly reducing and saving the cost of agriculture. Agribusiness Incubators have also contributed significantly to transforming university research into marketable products.

1.1.Study Problem

Through the above-mentioned information about Agribusiness Incubator and India's experience in encouraging agriculture through Agribusiness Incubator, we can raise the main problem in this study.

How can we benefit from the experience of Agribusiness Incubator in India and extract lessons learned from them and try to apply them in Algeria?

We can divide the main problem into several sub-problems

1) What are the best practices in supporting Agribusiness Incubator in India?
2) What is the status of agriculture in Algeria and the available resources?
3) What are the best lessons learned from the Indian experience?

1.2.Research Objectives

There are many goals that we have set by raising the topic of Agribusiness Incubator and benefiting from India's experience in this field, and we can mention a set of goals as follows:

1) Spreading awareness of the concept of Agribusiness Incubator among entrepreneurs, society and decision makers in Algeria.
2) Participating in work and experience in the field of Agribusiness Incubator for agricultural development in Algeria.
3) Working to encourage and enhance agricultural entrepreneurs through the activity of the Agribusiness Incubator through partnership, technology exchange, business development and financing for agricultural institutions.
4) Attempting to develop a roadmap for Algerian Agribusiness Incubator through the Indian experience.

2. Methods and Materials

This study adopts the philosophy of extracting important learning points from the Indian experiences in the field of agribusiness incubators. For this purpose, a specific methodology was designed. We used a set of techniques, including an analysis of a set of documents that studied agribusiness incubators, as well as an extensive review of studies that focused on agribusiness incubators in India. We have tried to provide important quotes throughout this study to summarize the lessons learned from several perspectives. Our study covers an important research period from 2011 to 2022. This extended period for which we obtained studies and reports, as it is not reasonable to plan all aspects of agribusiness incubators, as there is varying information in the literature on agribusiness incubators. The concept of agribusiness incubators was developed and we provided an overview of the best practices of agribusiness incubators from the Indian experience. In this study, we focused on extracting lessons and living and successful experiences of several agribusiness incubators. In India, it is considered a source of insight into the possibility of establishing a series of Agribusiness Incubator in Algeria and attempts to apply successful practices in the Indian experience. This study aims to make the reader well-informed about the subject of Agribusiness Incubator and summarize general ideas about them to benefit from the good experience that India has gone through in encouraging and developing agriculture through Agribusiness Incubator.

3. Agribusiness Incubators Concepts

Agribusiness Incubators stand out from other business incubators in that they have unique characteristics. Below, we will outline the concepts of business incubators focused on agriculture and related industries. We will then attempt to classify Agribusiness Incubators into several types that have become clear through numerous experiments. We can then summarize and comment on the success factors of Agribusiness Incubators.

3.1.Definition of Agribusiness Incubation

Agribusiness incubators are a form of an entrepreneurial 'intervention' that develops viable Agribusiness through guidance and support for entrepreneurs engaged in a business development cycle. These incubators provide the environment for developing young businesses by creating an entrepreneurial ecosystem that assists creation and growth (Krishnan, 2024, p.3). Incubation-support services provided by these incubators include access to or development of commercially viable agricultural technologies, the provision of seed funds, co-working spaces, and business and technical mentoring.

Agricultural business incubation can also be defined as a process focusing on supporting innovative early-stage businesses that have strong growth potential that can become competitive agribusinesses by servicing, or adding value or connecting to farm producers. The agricultural business incubation process usually provides some or all of the following (infoDev, No date, p. 38):

- Shared facilities and equipment;
- Business development, market access, and technology assessment services;
- Financial services;
- Mentoring and networking.

One of the most important things that agribusiness incubators offer is accelerating agricultural development, as they contribute to accessing new markets. This benefits the startups incubated within the incubators. Thus, agribusiness incubators play an important role in various agricultural sectors with the aim of achieving self-sufficiency in agricultural products and related

industries. (Singh, R., et al. 2023) They can also contribute to the export of agricultural products abroad. Agribusiness incubators also primarily focus on good performance in agriculture and related industries. Therefore, agribusiness incubators must have a rigorous selection process to incubate startups, based on their needs and managerial capabilities. Therefore, it is very important to provide employees within agribusiness incubators with extensive experience and good knowledge of the selection process for startups that want to benefit from agribusiness incubators.

There is no single Agribusiness Incubator experience. Rather, there are numerous experiences in various countries in Africa, India, and elsewhere. In this study, we will rely on the Indian experience and try to benefit from the Indian approach to encouraging Agribusiness Incubation. It has several stages in encouraging startups. (Bose, M. S., & Goyal, D. 2018) First, the startup must prove its feasibility and future success. Agribusiness Incubation in India works to connect researchers with farmers and transform agricultural research into commodities. Agribusiness Incubation also opens a channel for exchange between technology and new agricultural products or related industries. Agribusiness Incubation in India also works to strengthen the links between startups and business opportunities.

Agribusiness Incubators are organizations with practices that support entrepreneurs in launching their new agricultural projects, providing them with business consulting and technological support in the field of agriculture. Agribusiness Incubators also provide and guide entrepreneurs to access financial funding and provide the necessary infrastructure. Thus, Agribusiness Incubators contribute to creating new job opportunities for the unemployed. Agribusiness incubators also help identify entrepreneurial and leadership talent in emerging economies.

They also provide new opportunities for local customization of products, new employment, new technology, creating entrepreneurial talent and leadership that are required for emerging economies. There is no single “right way” to perform agribusiness incubation. Rather the work of agribusiness incubation depends on the state of development of the agribusiness ecosystem and changes over time as that ecosystem matures and develops (Ashutosh, C. Rakesh, R. 2022. pp. 1-6).

3.2.Types of Agribusiness Incubators

Through numerous studies, we have found that there are different designs for Agribusiness Incubator, as each experience has its own advantages and natural conditions. Therefore, specific incubator designs provide the optimal option for developers of new businesses in light of each experience. In general, we find three basic types of Agribusiness Incubator. (infoDev, No date, p. 50) These three types of Agribusiness Incubator, as research indicates, are designed according to the requirements of each experience and the capabilities of each country, as they vary from one experience to another. (Alberto & Varcando, 2020, p. 11)

1) Agribusiness Value Chain/Sector Development Incubators

- Their goal is to provide integrated services in the agricultural sector;
- They work to integrate the essential elements of the value chain and bridge gaps;
- They prepare for new opportunities.

2) Agricultural Research And Commercialization Incubators

- Transforming agricultural research into economic commodities
- Disseminating new technologies

3) Technology Transfer Incubators

- Incubators that focus on facilitating the transfer of technology at the low tech end or at the
- high tech end of the spectrum.
- At the low-tech end, with incubators specializing at the grass roots, supporting innovation and entrepreneurship and incubating a diversity of small scale in under-served rural areas.
- At the high tech end, supporting technology transfer across borders and across corporate boundaries in the multiple forms of Intellectual property (IP), contract manufacturing, joint technology ventures, and access to venture capital.

In general, the objectives of various types of Agribusiness Incubator are as follows:

1) Agribusiness Incubator work to set and determine the appropriate requirements for each company and the technologies required for it.
2) The incubator also works to open up commercial communication channels and build links by creating value chains to integrate rural activities with urban needs.
3) Incubators work to stimulate entrepreneurs interested in agriculture, especially those located in rural areas.
4) The Agribusiness Incubator opens new job opportunities and generates wealth at the local and national levels.
5) Agribusiness services support local small businesses and thus support industrial centers linked to food production.
6) Agricultural companies are constantly trying to address market failures related to knowledge, scientific research and innovation processes.
7) The Agribusiness Incubator is a technological platform that provides technology, markets it, supports new innovation, and develops agriculture in an innovative and creative way.
8) The Agribusiness Incubator strengthens the links between universities and research centers on the one hand, and the business community and the agricultural sector on the other hand, and works to transform scientific ideas and research in the agricultural field into commodities that have an economic dimension and are acceptable in the market.

3.3. Success factors for Agribusiness Incubator

1) Clarity of mission

One of the most important factors for the success of Agribusiness Incubator is a clear and understandable mission statement for agricultural startups. It is essential for Agribusiness Incubator to have a clear purpose and a clear vision for the small agricultural enterprises they support. Therefore, incubators should have a clear and easy-to-understand mission statement. (Bose, Kiran, & Goyal, 2019) This statement helps provide a mix of work and services for the enterprises supported by the agribusiness incubator. Also important is how the tenant enters or exits the incubator. The mission statement also helps the incubator gain acceptance in the community. (Akcomak, S, 2009).

2) Clear entry and exit method

Setting the entry and exit policy for startups in and out of the incubator after a period of residence within it is essential for the success of Agribusiness Incubator. The method of entry and exit must be well linked so that the startup benefits as well as the incubator. (Hackett, S. M., & Dilts, D. M. 2004) Therefore, it is necessary to find a set of indicators through which we measure

the companies that want to enter our case, as well as other indicators through which the startup graduates from the incubator. Among these indicators is submitting an official request to accept the policy and method of entry and work within the incubator, as well as accepting the method of exit from it, then approving the post-incubator scenario. Thanks to this entry and exit policy, we can accurately identify important and promising companies that want to benefit from the present. This is very important for the companies themselves and for the incubator as well. This depends precisely on the criteria for selecting the surviving company. Therefore, the entry and exit policy must be clear and understandable for everyone. As for the post-incubation scenario, it must be clear and practical to ensure that startups remain in the market after graduating from the incubator.

3) Having a strong network

One of the success factors of Agribusiness Incubator is the networking they create. This networking drives the development of business incubators and is shaped and nurtured through a clear policy for networking and mutual benefit. Networking encourages relationships among agribusiness incubator members and develops business relationships. It also facilitates the informal exchange of ideas, and everyone benefits from everyone else. This networking reduces the isolation of each organization and creates channels of communication between startups supported by Agribusiness Incubator. Networking helps pressure to improve the business environment. The goals of this networking include facilitating and increasing the viability of projects in the market. It also provides a wealth of diverse information, increases knowledge, and develops competence and experience among agribusiness incubator members. (Collinson, S. & Gregson, G. 2003)

4) Provides good facilities

Among the factors for the success of Agribusiness Incubator, we note through numerous studies the necessity of providing good and useful facilities in all agricultural incubators. Facilities affect the incubator's performance and are considered a decisive factor. (Pattanasak, P., et al 2022) There is a strong relationship between the availability of facilities and business performance within the incubator, especially facilities, including offices, laboratories, telephones, and copy machines. There are also common facilities shared by everyone, such as telephones, faxes, and laboratories. Shared facilities save costs by allowing everyone to benefit from them. They also free up funds for other activities, as they can be used for other activities rather than being spent on individual facilities. (Hackett, S. M., & Dilts, D. M. 2004)

5) Providing the required services

The services provided by Agribusiness Incubator are a crucial factor in their success. They are an essential and integral component of the business incubator. Services offered by the incubator range from financial services, information services, legal advice, cost management and troubleshooting services, to functional support services. (Wolniak, R., et al. 2019) These services are essential for startups affiliated with business incubators. These incubators also provide technical services to their affiliated companies. Services are generally important for all companies, and they are also crucial to the success of the incubator itself. They constitute an indispensable infrastructure for Agribusiness Incubator.

6) Appropriate assessment methods

The Assessment process is another critical factor in the success of Agribusiness Incubator. (Bose, Kiran, & Goyal, 2019) It is essential within any incubator that seeks to provide quality and effective services for the success of agricultural startups. Assessment are based on the level of satisfaction, as well as the needs of members and incubators, and on the incubator's performance. Therefore, it is essential to adopt appropriate Assessment methods that drive incubators' performance to the best and most optimal levels. Assessment factors must also be provided, as they rely on the business plan as well as the strong skills of the management team. The incubator manager is an important intermediary who skillfully works between the Assessmentof the institution (i.e., the business incubators) and the incubator's performance.

7) Provides management skills

Through numerous studies on this topic, we note that management skills in business incubators are considered essential for the success of Agribusiness Incubator. Management skills are a critical factor in the success of incubators, as they consist of two important aspects: experience and competence on the one hand, and functional skills on the other. Through these skills, the incubator's management team examines the management team of the companies supported by the incubators, which benefit from the incubator's services through specific operations. The incubator's management team works to identify the needs of small enterprises interested in agriculture. The management team determines the appropriate mix of facilities and services that will benefit emerging agricultural enterprises. (Hackett, S. M., & Dilts, D. M. 2004)A good needs definition helps in evaluating and organizing the companies benefiting from the incubator and determines the actual support required. The incubator manager's ability to implement the evaluation process is vital and important for achieving successful results through this performance. From another perspective, the incubator's management team provides specific design. The skills of the manager who acts as a good mediator between the evaluation and the incubator members are pivotal. (Aerts, K., et al. 2007) A positive driver of Agribusiness Incubator' performance is the manager's ability and skills to assess beneficiary companies and their needs, which contributes to the development of new business entities.

4. The agricultural sector in Algeria

The agricultural sector is one of the vital sectors in economic development and is a very important measure of the development of the economies of countries. Agriculture and economic and social development are closely linked. It is also considered the first basic pillar in the comprehensive development process of any country. (Janker, J., & Mann, S. 2020) If agricultural performance is low, it has a very negative impact on the economy as a whole. In contrast, the development of agriculture in a particular country necessarily means the development of the economy in a better way than before. Algeria has important and large potential in the agricultural field. It has fertile lands and vast lands, whether in the north or in the south. (Yacef, & Chen, 2024) Recently, agricultural experiments in the desert have proven their success in a good and excellent way. As for water resources, Algeria has significant and large surface and groundwater resources. As for human capabilities, Algeria has important human capabilities that can play a large and important role in the agricultural sector and become a basic driver of the economy later. Algeria also has significant financial resources. It does not need to borrow from outsiders, but can, through its own financial capabilities, finance the agricultural sector comfortably. Algeria is considered the gateway to Africa from the north and its location is very strategic, as it is close to Europe where there are large markets and important opportunities in trade and export operations. (Rais, F. Z., & Rais, M. 2024) It is also close to the African depth, as it is directly connected to many countries, whether in North or Central Africa, and is not far from South Africa. Therefore, agricultural export is important and primary to reduce dependence on oil and gas. Agricultural export can be considered and become an alternative to a significant part of oil and gas export.

In our study on Agribusiness Incubator and how the country can benefit from this idea, it is necessary to understand the agricultural sector in Algeria and determine the potential and capabilities that Algeria possesses, with the necessity of analyzing the current situation of agriculture in Algeria. Therefore, we must quickly mention the strengths and weaknesses of the agricultural sector in Algeria, where we can later contribute to understanding the agricultural reality and look well at the strengths and how to preserve them and enumerate the weaknesses and how they can be addressed through a progressive vision for agriculture in our country, Algeria, in order to advance this vital and important sector and improve its performance well.

4.1.Algerian agricultural potential

Due to Algeria's strategic location, vast territory and diverse climate, the Algerian agricultural sector contains great wealth, which is directly reflected in the diversity of crops and agricultural production. (Hamza, A. Zainab, B. 2023) This can be explained as follows:

1) Agricultural land

According to 2017 statistics, land is a natural resource and the basis of agricultural production in Algeria is approximately 44 million hectares, covering 17% of the total area (Junaidi, M. Salami, A. 2018)

2) Water resources

Although most of Algeria is located in arid and semi-arid regions, it has large water resources (surface water and groundwater), estimated at 19.2 billion cubic meters, of which 7 billion cubic meters are groundwater (5 billion cubic meters are groundwater In the south). (Merrad, M. 2019)

3) Plant wealth

Among the most important plant crops in Algeria we find: (Sofiane, H. 2020)

- Grains: Grains are considered one of the most important crops in Algeria and are concentrated in the interior plains and highlands. For example, in 2015 it was estimated at about 3.76 million tons.
- Vegetables: Vegetables are considered one of the most widely consumed items, mostly in hilly areas, especially and even to the south, especially the state of El Oued. The most important are potatoes, tomatoes, shallots, garlic and peppers, with an estimated production of about 12.47 million tons in 2015. The Directorate of Agricultural Services in El Oued expects to produce approximately 10.5 million quintals of late-ripening potatoes for the 2024/2025 season. (www.annasronline.com. 2025/02/15)
- Fruits: The area is estimated at about 326,000 hectares, and production in 2015 was about 4.323 million tons.
- Livestock: It is considered the second part of the agricultural sector after crop production and is characterized by a certain stability compared to agricultural production due to the great interest in animal husbandry especially cattle and sheep (Ghazi, I. Baghna, S. 2018) In addition, Algeria has 9 million hectares of marine fishing area. (Jaddi, A. Shariak, R. 2018)

4.2. Contribution of agriculture to the national economy

The importance of agriculture in the national economy is reflected in several aspects,

1) Contribution of the agricultural sector to gross national product

The gross domestic product index is considered one of the most important indicators to measure a country's economy, especially its reliance on economic diversification policies. (Grishin, V. I., et al. 2019) The table below shows the contribution of the agricultural sector to the gross domestic product for the period (2017-2021):

Table (2): Contribution of the agricultural sector to the GDP for the period (2017-2021)

Unit: billion DZ

Year	Gross domestic product	Gross domestic product of the agricultural sector	Agricultural production to GDP ratio %
2017	18876.2	2219.1	11.75
2018	20452.3	2421.6	11.84
2019	20501.1	2529.1	12.33
2020	18383.8	2598.1	14.13
2021	22021.5	2869.6	13.03

Source: Bank of Algeria, December 2022, p. 102.

2) Contribution of the agricultural sector to job creation

The agricultural sector's contribution to job creation is one of the important economic indicators of the total agricultural resources provided by this sector. (Irz, X., et al. 2001) which can be said to be the main human component in the production process of the material. Because human labor, therefore, is the main productive nerve in the production process. The table below shows the contribution of the agricultural sector to job creation in Algeria for the period (2015-2020):

Table (3): Contribution of the agricultural sector to the employment of labor in Algeria during the period (2015-2020)

Unit: thousand people

Year	Total workforce	agricultural labor force	ratio %
2015	11931	4959.8	41.57
2016	10845	2545.19	23.46
2017	10858	2608.77	24.03
2018	12400	2648.98	21.36
2019	12700	2693.55	21.20
2020	12102.76	2650.00	21.89

Source: Arab Statistics Yearbook, Volume No.: 41, 40, 39, Years 2021 2020 2019

3) Contribution of the agricultural sector to promoting foreign trade in agricultural products

In recent years, Algeria has implemented in its reform policy the liberalization of trade, including agricultural trade, (Bouabdallah, K. Mohamed, R. 2025) by reducing customs tariffs and providing support and incentives for exports, which led to an increase in agricultural participation in foreign trade through the export of these products. As a result, the contribution of agricultural production to the growth of non-oil exports has increased in recent years, as the country seeks to reduce its dependence on some imported foods and achieve self-sufficiency in foods such as potatoes, eggs, meat, etc. according to the opportunities availa ble in the sector. It has begun to encourage farmers and workers in the agricultural sector through programs to provide them with the necessary support in accordance with the national plan for agricultural development. The state also provides the necessary infrastructure and animal feed at subsidized prices, as well as pesticides and veterinary supplies, and intervenes to maintain the prices of some basic commodities at appropriate

levels for the benefit of producers. The table below shows the contribution of agricultural production to exports during the period 2015-2020.

Table (4): Contribution of agricultural production to exports during the period 2015-2020.

Unit: Million DZ

Year	Total exports outside the petroleum sector	Agricultural exports	Food exports
2015	197751.6	5519.2	18440.9
2016	197681.2	6053.2	30357.1
2017	214151.7	8519.7	30886.3
2018	341167.3	11004.7	33681.0
2019	310664.1	11933.9	38042.9
2020	285898.7	13540.3	43634.8

Source: National Office of Statistics, N: 228, Algiers, August 2022, pp: 25-67.

5. India's Experience in Agribusiness Incubators

Agriculture plays a vital role in the Indian economy, contributing 17.8 percent to the GDP and employing 58 percent of the total workforce (Gina, N. Shakir, A. Aparna, G. Ajay, B. 2024). India is the world's largest importer (14%), user (27% of global consumption) and producer (25% of global production) of pulses. India is also the world's largest producer of milk, along with jute and pulses, with an annual milk production of 210 metric tons in 2020-21, or 24 percent of global milk production. It is the second largest producer of rice, wheat, sugarcane, cotton and groundnuts, as well as the second largest producer of fruits and vegetables, accounting for 10.9% and 8.6% of global fruit and vegetable production respectively. They contribute around 8.80 and 8.39 per cent of the Gross Value Added (GVA) in manufacturing and agriculture respectively, 13 per cent of India's exports and 6 per cent of total industrial investment (Mole, S. S. 2018). These figures highlight the importance of agribusiness incubators in two ways, viz. strong mentoring to founders on the intricacies of agribusiness and mentoring agriculture students towards agripreneurship. These startups generate great technologies that have great applications in agriculture. But at the same time, they lack expertise on how to apply them to overcome the challenges of Indian agriculture. An agribusiness incubator is the place that provides all the support to nurture these startups to transform their idea into a viable business entity. As per (Gina, N. Shakir, A. Aparna, G. Ajay, B. 2024) there are 456 registered incubators in country, out of which 100 provide business incubation in agriculture and allied fields.

India's experience with business incubators began in Indian Agricultural Research Institute (ICAR-IARI). has taken steps in establishing its tech transfer office 'Zonal Technology Management Unit' in 2009 with the support of ICAR. In 2014, (Bhooshan, N., & Sharma, A. 2020) coupled with ICAR's ambitious National Agricultural Innovation Project (NAIP), a foundation for agribusiness incubation was laid and the unit was renamed as 'Zonal Technology Management and Business Planning & Development Unit'. The unit operates as IP management and tech transfer office at the Institute level and hand holding unit for other ICAR institutes at the zonal level. At the same time, it works as an incubation facility for nurturing ideas into commercially viable start-ups.

To give impetus to innovative research and its applications, in 2017, ICAR launched its new scheme National Agriculture Innovation Fund (NAIF) and created incubation fund under the same. Simultaneously after gaining a good experience and crossing some milestones, the unit has become a DST supported Technology Business Incubator (TBI) in 2018. ICAR Agribusiness Incubators (ABIs) provide technical backstopping and other incubation services to startups /entrepreneurs including agritech startups. The Indian Institute of Agricultural Research (ICAR) through its incubators at its institutes has supported hundreds of startups, including agritech startups so

far.(Singh, P. K. et al. 2022). In this research paper, we will present three experiences of Agribusiness Incubators in India and try to extract the most important lessons from these three experiences and others after studying them well.

5.1. Experience of Centre for Innovation and Agripreneurship (CIA)

The Centre for Innovation and Agri-Entrepreneurship (CIA) is India's foremost agribusiness incubator, associated with National Institute of Agricultural Extension Management (MANAGE). (https://www.manage.gov.in/managecia/AboutCIA.aspx) This one center is a complete and unique solution for establishing small businesses in the branch as well as in connected sectors. CIA is dedicated to its entrepreneurs, helping them to develop and reach their aspirations. It provides all aspiring entrepreneurs, guidance in the agri business sector with innovation and creativity, from the idea stage to a marketable product, CIA provides a process for developing a sustainable model. CIA has a unique methodology providing a unique and rich environment to identify, create and build upon good ideas until they coalesce into viable products and sustainable enterprises. One of the key ambitions of the centre is to create a sustainable environment for developing fledgling enterprises in the area of agriculture.

The Centre for Innovation and Agri-Entrepreneurship (CIA) also develops innovative products for its startups. This center also aims to solve most of the problems facing the agricultural sector in India. One of its objectives, like others in India, is to create more employment opportunities and increase wealth for aspiring young people working in the agricultural sector. The center has trained around 72,136 professionals through various training and capacity building programs, resulting in the creation of 28,757 enterprises created by professionals trained by the center. (https://www.manage.gov.in/managecia/AboutCIA.aspx) The Center for Innovation and Agri-Entrepreneurship (CIA) works to elevate agripreneurs and develop them to different levels of productivity and innovation in the agricultural sector. One of its good plans is to create high-impact and wide-ranging projects through its incubation process for agricultural startups.

Pre-Incubation Mentoring Programme

The Centre for Agri-Innovation and Entrepreneurship (CIA) is one of the pioneers of agribusiness incubation in India. (CIA) has trained and incubated many startups interested in agriculture and food industries. (CIA) has incubated a diverse group of startups in the field of agri-food processing and contributed to post-incubation agricultural technology, as well as creating value chains for startups, supporting agricultural mechanization, and also focused on livestock and fisheries. It has also provided incubation for startups interested in dairy processing and provided a lot of agricultural consultancy and guidance on supply chains. However, agripreneurs faced a lack of appropriate guidance. The Centre for Agri-Innovation and Entrepreneurship (CIA) was one of the important centers that addressed this deficiency. (https://www.manage.gov.in/managecia/PreIncMenProg.aspx) It also found that entrepreneurs suffer from weakness in refining their ideas. It was a one-stop center that worked on developing entrepreneurs' ideas and provided them with basic guidance. And enabled them to succeed at the lowest costs. The Centre for Agri-Innovation and Entrepreneurship (CIA) also tried to bridge and narrow the gap between entrepreneurs' business ideas and their consolidation in reality. The Centre built an ecosystem for agricultural businesses and was able to bridge the gap between enabling entrepreneurs to transform their ideas into commodities and then into success in the field of business.

The Centre for Agri-Innovation and Entrepreneurship (CIA) has developed a pre-incubation program that aims to help entrepreneurs with innovative agricultural ideas and empower them to build an agricultural ecosystem. This program aims to guide individuals properly to generate

innovative ideas and launch agricultural operations. This program provides those interested in agriculture with a good ecosystem. The pre-incubation program includes 30 hours of sessions for 15 days, followed by a full week of individual sessions with the aim of enabling aspiring entrepreneurs to transfer their ideas into application and practice. It works to train entrepreneurs to face and deal with challenges on the one hand and seize and exploit opportunities on the other hand. The pre-incubation program helped build and develop multiple capabilities for entrepreneurs.

Participants in the pre-incubation program will gain excellent and important information about organizing a startup interested in agriculture. Participants in this program will also benefit from understanding the near future of the agricultural sector and mapping out their ambitions and the benefits they will obtain through their incubation within The Centre for Agri-Innovation and Entrepreneurship (CIA). This will enable them to develop their ideas and products and benefit from the services of the center. Participants in the incubation will also receive guidance from investors. Moreover, owners of money and businessmen will encourage investors to participate and finance the work of the new startup. An investor, by nature, if he finds a good idea, will have a desire to enter into a partnership and develop this idea until it succeeds in order to bring him profits in the future. Investors support successful partnerships with emerging agricultural projects.

Eligible participants

- Agri-startups
- Idea stage/pre-idea stage entrepreneurs
- Aspiring entrepreneurs
- Students and youth interested in agripreneurship
- Professionals in the agri-startup ecosystem
- Professionals in agricultural extension

5.2. Experience of Technology Business Incubator (SINED-TBI)

The SINED Technology Incubation Center (SINED-TBI) is a joint initiative of the Ministry of Higher Education of the Government of India, and the National Dairy Research Institute (NDRI). (https://www.ndritbi.com/about/) The goal of this initiative is to foster knowledge-based and innovative dairy enterprises in India. The SINED-TBI has a congregation of dairy startups. It is a modern, startup-friendly facility that affords the opportunity to have new entrepreneurs, students, and technicians from all over India participate. The SINED-TBI has a very skilled and knowledgeable management team, that is wholly integrated and committed to this endeavor. The management staff has an extensive background in entrepreneurship, product innovation, marketing, and securing capital. The center has an advanced dairy product sponsorship. The center is on the NDRI campus, so it benefits from all other facilities on the campus supporting dairy research, such as production of milk at our number one milk production unit, milk processing unit, feed processing unit, supporting laboratories, workshops, libraries, resources, computers, internet, and human resource expertise. At NDRI, human resources itself supported with dairy processing specialists. The SINED-TBI Center has a network of eminent professionals, academics, bankers, and even investors and entrepreneurs that avail support for the startups incubated.

The SINED-TBI Technology Incubation Center (TBI) was designed to be a platform that supports emerging entrepreneurs interested in agriculture who want to invest in dairy projects specifically and work on introducing high technology to the dairy industry. This platform aims to provide significant support to dairy entrepreneurs and transform their ideas into realistic projects and successful commercial products by exploiting high technology. The SINED-TBI Technology Incubation Center (TBI) is an innovative environmental platform that supports and reduces the problems and obstacles facing entrepreneurs. This platform has contributed to creating a

technology-based business environment that cares about the dairy sector, through which entrepreneurs achieve their successes, profits, and survival in the market.

1) Incubation Process

SINED-TBI offers entrepreneurs an entry point into technology based business and allows them to start a career in entrepreneurship. An incubator allows entrepreneurs, all the support that they need to be successful in their technology based business ventures, through the use of the following steps. (https://www.ndritbi.com/pre-incubation-process/)

2) Post-Acceptance Process

The pre-incubation phase is critical for The SINED-TBI Technology Incubation Center (TBI). As the incubator assesses the startup, multiple negotiations occur with the startup to utilize the incubator's services. The incubator comes to an agreement with the entrepreneurs before accepting startups. The agreement establishes several clear goals, both short and long-term, before the incubation process has started. The startups together with the supportive owner have a common plan with the incubator that establishes the resources and needs of the entrepreneurs where the startup relies on the support and guidance of consultants and service providers to meet incubation goals. This sets the table for supporting and getting each entrepreneur to succeed and achieve their goals. After the aforementioned steps, startups can join the incubator and use the various services on offer. This signals the start of real work with The SINED-TBI Technology Incubation Center (TBI) and the entrepreneurs.

3) Graduation

The project graduates from the incubation program upon meeting any of the following conditions.

- The period specified in the license agreement has expired unless extended by the competent authority.
- The company’s revenue stream is sufficient for self-sustainability.
- The entrepreneurs are able to connect investors to finance the expansion plans of the project and incubator support is no longer necessary.

In the event of any of the above events, the project will be treated as having graduated from the incubation program and membership in the incubator will be discontinued.

4) Progress Review

The performance of startups within The SINED-TBI Technology Incubation Center (TBI) is reviewed twice a year by a group of experts. The performance of these companies is evaluated against their previously set goals. This results in a comprehensive report on the quality of the incubator’s services and their impact on the performance of the incubated startups. The team of experts can then identify the needs of entrepreneurs. Additional assistance can then be determined after consulting with mentors and service providers within our organization. In this way, the incubator’s services can contribute to supporting startups and achieving their goals. In the event that some goals are not achieved, the startup must submit an official request to the incubator management and the team of experts, which includes a clear justification for not achieving its goals. The startup is then asked to develop a clear strategic plan with several short- and long-term goals and a vision for solving the problems it may face. This contributes effectively and periodically to improving the performance of the startups incubated within The SINED-TBI Technology

Incubation Center. (TBI) This supports the review of the success of startups and the achievement of their goals.

5) Duration of the Incubation Program

The incubation period at The SINED-TBI Technology Incubation Center (TBI) is 18 months. In case of good performance of the startups, they can leave the incubator. However, if the incubated startup does not achieve its goals, another incubation period of 18 months can be added. This depends on the report of the expert committee. After the end of the incubation period, the entrepreneurs leave The SINED-TBI Technology Incubation Center (TBI) after completing the official period and completing the licensing process.

5.3. Experience of Agribusiness Incubation Centre (ZTM-ABI)

The Agribusiness Incubation Centre (ZTM-ABI) is situated at the Central Institute of Fisheries Technology (ICAR-CIFT) located in Kochi, for the third case study of agribusiness incubators in India. The key functions of Centre is to empower business operations, thus, eventually establishing industrial backgrounds enhanced by modern as well as innovative technologies, thus constructing a knowledge-based economy. ZTM-ABI will support potential entrepreneurs; and provide proactive, value adding support systems. Such support networks will include, technical advice, access to experts, mentorship, training and design of sustainable technology based business propositions. The incubation centre will provide a range of services and amenities.

The Central Institute of Fisheries Technology (ICAR-CIFT) was motivated because technology-based industries are theoretical, existing in reality, in that location and region, where there is a high level of fish production characteristics, locally present to serve which allow startups and new businesses to exploit local knowledge and business connections to extract value from those synergies. (https://cift.res.in/abi) They plan to service the whole of India, including fishing communities, by establishing technology-based services for fisheries and other related industries. ICAR-CIFT is developing its service level from a technology standpoint with a view to achieving better, more successful outcomes with some businesses at, less cost . Certainly , ICAR-CIFT has good infrastructure which gives them a very strong platform to establish good businesses.

1) Incubation Facilities Under One Roof

The Agribusiness Incubation Centre focuses on incubating start-ups that have just a basic need in a small range. It operates under one roof for different types of businesses, providing a full range of services. At this centre for incubated companies, there is office infrastructure and trials and tests for new products before moving to market. This incubation and direct support is part of the early-stages, start-up process for new start-ups.

Several amenities offered by the user incubator to alleviate risks are noted below: (https://cift.res.in/abi)

- Providing technology and knowledge, supported with evidence from science .
- Initial product and business Isolation of Assessment: Looking at the commercial potential of the business plan and identifying technology gaps and needs .
- Regulatory, compliance, and standards support: quality regulation and related training; on-site inspection and preparation of corrective actions; and support in obtaining certifications or regulatory standards .
- Infrastructure and production unit: modern pilot-scale production capability; adequate office location in a formal business environment

- Training and skills development
- Product development and testing
- Setting up and expansion of new facilities

2) Modern Technologies for Harvest and Post-Harvest Sectors

As part of the agricultural incubation process, a pilot plant has been implemented at the Agribusiness Incubation Center (ZTM-ABI). The pilot plant contains nine modern lines for cooking and preparation at the center, which the incubated companies use to assess their products' quality standards. This incubated startup is using these facilities to produce meat and fish products for its market.

- Who can apply?

Entrepreneurs, partnerships, private limited companies, non-governmental organizations, cooperatives, governments, startup companies, universities, colleges, and students who want mentoring and support in technology. The applicant-ed clients should fill out an application for the Agribusiness Incubation Center (ZTM-ABI), and enclose a brief proposal of the project.

- Incubation Period:

The stay period for direct incubatees is one year, which can be extended by another year in special cases depending on the progression of I n cubation. An incubation registration fee of Rs. 2000 plus applicable GST is applicable. Office facility can be operated on a monthly rental basis and Pilot Plant activity charges are charged on an operational basis.

6. Conclusion:

After exploring the three previous experiences with Agribusiness Incubator in India, and considering many other experiences effective in explaining the ideas from multiple perspectives of agricultural business experiences, we have identified good practices from a number of the leading studies on Agribusiness Incubator in India. We observed successful Agribusiness Incubator and identified good practices. We can then present a number of points of views as recommendations for this study, from successful experiences and good practices, and recommend them as recommendations for future experiences of Agribusiness Incubator in Algeria. We note that the recommendations or guidelines that we extracted from the experience of business incubators in India are key, important, and valuable points that Algeria should consider in its future experience, developing its agricultural environment, and achieving self sufficiency with agricultural and food products. We can set out our recommendations as follows:

1) The need to provide administrative competencies

Through the study of Agribusiness Incubator in India, we observe opportunity for Agribusiness Incubator in Algeria to be design well to partner with them to accomplish their central mission. Great attention should be paid to the capabilities of the management and management staff. It is important to put together a small team with diverse and high-quality capabilities. There is a necessity for guidance and counseling abilities in an agribusiness incubator. In addition, analytical abilities for factual review, data analysis and experience analysis for learning are needed. In addition, technical transfer abilities for agricultural technology development within Algeria and experience accumulation in agricultural business management. These abilities are needed for the management team to make agribusiness incubators successful in Algeria at shorter and faster rate. These capabilities also contribute significant role in the early identification of issues. Agribusinesses need high quality competencies for early identification, so they can find solutions

quickly. It stands to reason that management abilities can contribute a significant role in a timely response to marketing opportunities. Therefore, support for incubators is needed to encourage their startups to take this marketing opportunity to mitigate hastily organized solution without resolving an issue, convince the startup to robust their positions. Luckily, Algerian Agribusiness Incubator need to adapt to the region, since Algeria is a large geographic area.

2) Continuing Education

A significant recommendation of the research study is that the Agribusiness Incubator in Algeria must be able to learn rapidly. It is critical that these incubators are rapidly able to learn, transport, and assimilate knowledge from all the interactions and experiences they develop whether internally or externally to Algeria for the benefit of the startups that are within them. It is also critical that the incubators have capable organizational flexibility and able to adapt, exploit, and distribute new knowledge to their incubatees. Therefore, they must also hire motivated administrators who can expand their capabilities through learning from experiences with, from other incubators they have been a part of, and even by learning from experiences from incubators in other countries. From another perspective, moderate employee turnover in the incubator can serve to accumulate and protect good information and new knowledge within the incubator. Organizational skills are also valuable to address the good and excellent working relationships between the incubator and agricultural entrepreneurs; the good relationship that exists between the incubator and its agricultural entrepreneurs is significant to the dissemination of knowledge and the transfer of experience from the business incubator to the entrepreneurs, which helps support the incubator's growth and its increased efficacy at supporting agricultural startups and advancing the agricultural ecosystem in Algeria.

3) Well-built value chain

There have been many examples where we observed the necessity for agribusiness incubators in Algeria to embrace and develop an effective value chain model because they can help in coordinating agribusiness development activities. After all, a value chain is an organization focused firmly on the agricultural sector and industries that farm, and are generally interrelated, oriented, and connected to markets. While the value chain industry has challenges, the major challenges are the farm itself and the market. Additionally, supply and demand must explicitly challenge the model and not over-rely on supply chain and development. A model with all of these inter-related aspects must apply to the value chain from the perspective of supply and demand. If the agribusiness incubators want to develop an increased and more effective application of the value chain model, they must do so from the context of what is good supply and demand practices. When referring to a value chain model, you must consider how they apply to the quality and price of an agricultural industry product. Agribusiness incubators must want to consider developing retail channels, wholesaling, inventory sales, financing, and buyer's willingness to pay. All these must be considered with respect to consumer preferences. A value chain model can contribute ongoing clarity to the market and its needs during the year and seasonal cycle. Therefore, an effective agribusiness development plan must develop from a value chain perspective.

4) Providing financial support structures

In the future, Agribusiness Incubator in Algeria will need strong support from donors or official bodies. Numerous studies on Agribusiness Incubator in India suggest that incubators that receive support in the form of grants and ongoing allocations fare better than those that receive program-based, rather than ongoing, funding. Other studies indicate that incubators are better positioned to receive funding from budgets or fixed sources, which impacts the effectiveness and success of Agribusiness Incubator. Therefore, it is essential to find funding for Agribusiness Incubator in Algeria that is sustainable and annual, rather than based on temporary programs.

5) Building a good reputation for incubators

An important observation in the experiences of Agribusiness Incubator is that Agribusiness Incubator in Algeria should create a strong brand in order to maintain cooperation with stakeholders and key players in the broader ecosystem. This brand gives the incubator a good reputation in the market, and this is essential for the success of the incubator itself. The incubator must give stakeholders more than they expect from it. This is essential to build our reputation and market our success. Stakeholders include donors and institutions that finance the activities of the incubator and other incubators, political decision-makers, government owners, and established companies that support the field of agricultural business. This contributes to creating a good mental image for all stakeholders related to Agribusiness Incubator. From here, the incubator benefits from financial and marketing support and increases its effectiveness in supporting emerging companies in the agricultural field and the food industry.

6) Building strong networks

The Agribusiness Incubator in Algeria will also need to put in place dense and complex networks of relationships on behalf of startups. Networks are helpful for marketing and distribution and rank perhaps a close second to technical knowledge in farming activities. Networks contribute in important ways to the sustainability of agricultural startups in that they provide acceptable technology from companies under which incubated companies can bulk ship acceptable quality. And networks cover business operations and financing diversification after startups have graduated from the incubator. Well-established networks are also provided by the incubator in which agribusiness facilities, equipment, and supplies are furnished, such as a normal fully equipped business center, laboratories, an industrial kitchen, and maybe a small factory and pilot warehouse. Networks can facilitate the distribution and marketing of useable resources, and support the success of startups, positively impacting the sustainability and effectiveness of startups competing in the marketplace.

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