Chia Seeds Cultivation – A Study of Youngsters from Farmer Families in Akola District

Chaitanya N. Mahalle

Department of Business Administration and Research
Shri Sant Gajanan Maharaj College of Engineering, Shegaon – 444203

Dr. M. A. Dande (Assistant Professor)

1. Introduction

Salvia hispanica L. is the scientific name used to designate the plant with common name, chia. It is a species of the Central and southern parts of Mexico and Guatemala, and it is a part of a family called Lamiaceae. The Chia seed is often mentioned in the literature as a highly nutritious, edible, hydrophilic fruit, and is receiving interest as a pseudo cereal produced to be eaten mainly by people in various countries in western South America, western Mexico and southwestern United States. The species thrives well in tropical and sub tropical climate and is best established at the altitudes of 400 to 2500 meters above sea level, and the areas that are below 200 meters are usually not suitable to cultivating the species. Low temperature is very susceptible of early developmental stages; the crop is very intolerant to freezing and frost during the germination period. Although Salvia hispanica is frost sensitive, it is capable of living through to relatively high altitude, reaching growth heights to about 3,200 ft (=975 m). The plant is adapted to well-drained and light soils, it is responsive to adequate fertilisation and this attribute makes it specifically receptive to organic agro-production systems. The average seed production is about 2,880 kg/acre which is typical and is reported most of the time in the agronomic literature. The harvesting and further processing regimes depend on the size of the farm and geological location; commercial processes normally use the combine harvesters and then process regimes similar to quinoa and wild rice. The size of the seeds depends on the moist environment; hence, the size of the seeds is relatively small, comparatively big in the various packets of crops. The height of the plant can be 3-4cm in dry conditions and ideal environmental conditions can stimulate height to 60 cm. Leaves are thick, wrinkled and darkgreen colored.

1.1 Background and Significance of the Study.

Chia seeds (Salvia hispanica) are a high-value agronomic and nutritional crop due to the abundance of omega-3 fatty acids, antioxidants and dietary fiber. Though most commonly grown in Latin America, a growing demand has been seen in India due to the growing health awareness and the demand of functional foods. The major production areas have now spread to Maharashtra, Karnataka, Tamil Nadu and Madhya Pradesh.

Salvia hispanica L. is a species of Lamiaceae native to mesoamerica, and thousands of years old. According to history, Aztecs and Mayans treated chia as a foodstuff just like maize, beans, and amaranth (Mohd Ali & Yeap, 2012). Chia is named after the Mayan word meaning strength since it is known to give energy to warriors and laborers. Chia has been used as a dietary supplement, medicine andeveninrituals

1.2 Chia seeds: Nutritional weights

Nutritional powerhouse: Chia is a complete protein, high insoluble fiber, omega-3 fatty acid, antioxidant and essential mineral.

Functional food: It is used in recipes to stay hydrated (e.g. chia fresca), in pudding, and as a meal supplement.

Wellness ingredient: Chia has digestive benefits and cardiovascular effects, and the industry is showing an increasing interest in the sustainability of major producing areas.

Fiber (about 9 g/oz or about 14 percent esciolto)

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The dietary intake of the chia seeds significantly boosts the amount of fiber in the body. A 100 gram (two to three tablespoons) portion provides approximately 9.8 gram of dietary fiber, linked to a decreased amount of coronary heart disease, type 2 diabetes, some cancers, and inflammation as well as digestive constipations.

Omega -3 fatty acids (alpha-linolenic acid, ALA), 5 g/oz.

Chia seeds are also a good source of omega 3 fatty acids which are usually contained in fatty fishes, nuts and other seeds. Omega-3s play a crucial role in the functioning of the brain and the heart, as well as anti-inflammatory activity.

Protein

Chia seeds also provide all the essential amino acids, which help in glucose regulation and release of long lasting energy.

1.3 Uses of Chia as a superfood

Cardiac: Chia seeds are anti-inflammatory agents, lipid-regulating agents, and blood-pressure lowering agents, which make them extremely helpful with cardiovascular health.

Anti-Aging: Chia seeds contain anti-oxidants that have proven to suppress up to 70 percent of free radical activity and speed up the process of skin repair, thus preventing premature aging of the skin.

Diabetes Prevention: According to empirical research, chia seeds have the potential to prevent the development of dyslipidemia and insulin resistance, which are the key events in the pathogenesis of diabetes.

Gastrointestinal Tract, Detoxification and Elimination: Chia has a high level of fiber that helps in matters of bowel regularity and forms a gelatinous substance in the stomach, acting as a prebiotic to aid the growth of probiotics in the gastrointestinal tract.

Weight Loss: Chia suppresses appetite and curbs hunger, which is also good to lose weight. Chia is full of fibre which absorbs water and also provides a satiating effect.

Anti-inflammatory Properties: Some arthritis patients have stated that the pain and inflammation diminished in a few weeks following the intake of Chia seeds. The abundance of omega-3 will contribute to the lubrication of the joints and their remaining elasticity.

Antioxidants: Chia seeds are a good source of antioxidants with even high content of antioxidants than fresh blueberries which ensure that oils do not become rancid - which helps in preserving long shelf life.

Brain Power: Eicosapentaenoic Acid (EPAs) and Docosahexaenoic Acid (DHAs) are known to cause the cell membranes to be more pliable thereby allowing the nutrients to be more easily accessible and facilitated nerve transmission.

Regulate blood sugar: The special combination of soluble and insoluble fiber will slow the digestion speed of complex carbohydrates and consequently their absorption by the organism.

Good Source of protein: Chia seeds have approximately 20 percent of protein that is relatively higher than most other grains like wheat and rice. Chia seeds do possess a trace mineral known as strontium that assists in protein absorption and generates high energy.

Prevention of cancer: Not many studies have been carried out; however, studies conducted earlier with animals have indicated that Chia has a possible protective effect against cancer.

1.4 Health Benefits

Weight and Blood Sugar Control: Gel-forming fiber makes one feel full and stabilizes the glucose level. Anti-inflammatory: Omega-3s and antioxidants reduce inflammation. Experts suggest that it should be sort of a gradual process (e.g., one tablespoon a day), it is important to remain hydrated to avoid digestive complications, and it is advised to check with healthcare providers in case of taking medications (blood pressure, anticoagulants, etc.).

1.5 Climatic Change Effect on the Chia Seeds farming in India.

Chia seeds are, however, very vulnerable to weather conditions. The climate change phenomenon, such as warming and unpredictable precipitation and weather extremes, are a great threat to its growth, output, and quality. These are some of the impacts that need to be understood to guarantee sustainable production and profitability

1.6 Market Attractiveness and Tender Trend.

The nutritional image of chia is significantly in line with modern consumer trends, which

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include plant-proteins, gluten-free foods, high-fiber foods, natural sources of energy, and minimally processed foods. Therefore, market demand is naturally seen to be directly created by the natural health benefits of chia with consumers moving towards more and more
functional foods as a way of addressing their health issues that can be related to lifestyle like obesity, diabetes and cardiovascular diseases.

1.7 World Chia Seed Protection and Trade Marks.

Since the beginning of the 2000s, the global market of chia has been growing at a high rate. Chia was first of all cultivated in Mexico and Guatemala, but nowadays the practice is prevalent in various parts of the world due to the growing global demand. The manufacturing areas are concentrated in Latin America and Paraguay, Bolivia and Argentina have contributed over 80 percent of the global output.

1.8 Research Gap

1.8.1 Defined Gaps in the Existing Literature

- Restricted Regional Attention
- Lack of Quantitative Sustainability Studies
- Minimal Knowledge of Farmer Adoption
- Ignorance of Supply Chain and Market dynamics
- Limited Financial and Risk Investigations

1.8.2 Contribution of This Study

- Targeted Identification of Under-Researched Areas
- Detailed Sustainability Analysis
- Theoretical Adoption Analysis
- Supply Chain and Market Insight
- Financial and Risk Evaluation

1.9 Problems Identified

- Inadequate Availability of Quality Seeds
- High capital and credit requirements
- Ignorance concerning the preparation of soil and land
- Pests and diseases vulnerability
- Dependence on rainfall and failure to irrigate
- Ignorance regarding organic/sustainable practices
- The absence of training and technical skills
- Quality/export certification
- Weakened farmers networks and collective marketing arrangements
- Ignorance of value added products
- Absence of government support or subsidies
- Inaccessibility to modern farming tools
- Uncertainties and market price changes
- Absence of local adapted high-yielding chia strains

1.10 Scope of the Study

The study will focus on the youths who are members of agricultural families in the Akola district and will be looking into their perceptions and attitudes regarding the chia seed cultivation. It will examine their know-how and readiness to embrace chia farming rather than using the standard farming practices. It demonstrates the different issues that influence the minds and the inspiration of young people to be involved in farming that includes the issues related to farming techniques, the reliance on the old generations, the technical support, and the market changes.

1.10.Major World Producers and Exporters.

Paraguay
Bolivia
Mexico
Argentina
Nicaragua, Ecuador, Guatemala
Australia

1.11.Indian States Chia is Starting to Cultivate.

- Karnataka (Kalyana Karnataka regions/Mysuru regions).
- Rajasthan (Western/A
- Andhra Pradesh & Telang
- Uttar Pradesh
- Maharashtra (select farmers
- Areas in Gujarat and Punjab (scale: experimental/pilot as prescribed in certain studies).

1.12.Akola district,

Local presence with trade (Akola city/district): Akola has traders and wholesalers who sell chia seeds. In Akola, there are various

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wholesalers, agents that deal with agro and traders of dry fruits in local online directories. It therefore demonstrates that some local market and supply chain is operating within the district. This does not mean that it is produced at the district level.

Akola extension documents: PDKV and ICAR Contingency and extension documents in respect to Akala contain the local cropping systems in the district, which includes cotton and soybean among others as well as sorghum.

It has local business activities and farming such as wholesale and retail business listing, and there are business brochures in Akola addresses.

1.13.Recent developments/news (most relevant ones)

Market reports (2024-2025): The industry analysis that will be acquired in January 2025 and monitored will indicate that there is a rise in export shipments of South America, particularly Paraguay and Bolivia, and other new exporting countries, such as India. Secondly, projects predict that the market demand will prevail through 2025.

Export (2023-24): The analysis of the export business conducted between March 2023 and February 2024 indicates that the level of chia exports and its exporters has increased.

Consumer /safety news: Chia-water and chia mix-drinks related health and consumption news in Indian media have become viral in different online media. It has been reported of the hazards involved in the preparation techniques such as choking and bloating of the seeds because of their being not soaked. This is demonstrated in the article concerning the viral chia-water movement by the Economic Times.

1.14.Field cultivation strategies (The practices that are currently followed by farmers in growing chia in India)

Crop season and time of sowing: Chia is normally planted between mid October and late October during rabi/winter season in arid and semi arid areas. The recommended time of sowing at Jodhpur is between October 15-25. In rainy areas, it is typically carried out during rainy time or during irrigations.

Soil and Climate: It is not particularly sensitive to soil and it can be cultivated in semi-arid areas. Smooth light soils with plenty of water or shallow black soils with excellent and ample water during the flowering and fruiting period can suffice.

Seed rate and spacing: It is reported differently on seed rate and spacing. General recommendations provided on Indian extension literature involve proximity of maximum branches and inflorescences and low seed rates due to the reduction in size of the seed.

Irrigation and fertility: Chia is either a rainfed crop or can be irrigated. Seed production is increased by NPK and regional micro-nutrients. In certain experiments in India yield responses have been obtained as a result of N and spacings. Practices of fungicides / microbial inoculation of seeds.

Pests and diseases: Chia is not mentioned as a high-pest crop species in India, but local pests and diseases differ. Treatment of the seed and frequent observation is recommended.

Harvest and processing: The harvesting should be made after the seeds mature to 80 percent. The drying and cleaning have a great significance in satisfying the export and food grades. The losses may be high in case of poor drying and cleaning.

Economics: According to farmers, gross return value is high in comparison to some common crops, but price is what defines profitability. The farm gate prices of chia seeds are dependent on the demand in the export market

2. Research Methodology

2.1 Research Method

Descriptive type of research since the research is connected with Akola region, and the respondents are working employees; we are going to analyze the information with observation and survey. The research will be associated with a limited territory.

2.2 Sampling Method

The sampling technique will be convenience sampling technique. In this the sample will be drawn in a group that will be available conveniently to take part in the study.

2.3 Sample Size - 100

It will entail a sample of 100 farmers. Among others, the sample size would be selected among various farmers in the agricultural field. Such a sample size of 100 will

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adequately permit the discovery of a significant meaning of chia seeds planting. Although a bigger sample is more generalizable, a sample size of 100 is manageable and practical at the same time in terms of the study scope and available resources.

2.4 Data Collection

Primary Data:

Surveys/Questionnaire: A questionnaire will be given to a group of questionnaires to a sample of youngsters of farmer families residing in Akola district. The questions in the questionnaire will address questions that pertain to:

- Knowledge of chia seeds farming.
- Interest and intention to make use of chia farming.
- Perceived advantages and issues of chia cultivation.
- Current news regarding the current market demand and profitability.
- Family, peer and agricultural extension worker influence.
- Planning, innovation sensitivity.

Secondary Data:

- Research Articles & Journals
- Government Reports
- Agricultural Publications
- Web Resources
- Instruments of data collection - Google forms.

The research is significant in that it will reveal the process of information gathering and its application in ethical decision-making.

2.5 Significance of the research.

- Importance to Young Farmers
- Significance to Farmer Families at Akola District.
- Economic Importance
- Agricultural and Technical Significance.
- Environmental Importance
- Policy Maker and Agricultural Department Importance.
- Significance to Market and Rural Entrepreneurship
- Applicability to Future Studies

2.6 Objectives

- To understand what youngsters think about chia cultivation when compared to the traditional crops they usually grow.
- To find out whether youngsters are willing to try chia cultivation and what motivates or stops them from doing so.
- To identify the key challenges youngsters face-such as lack of guidance, family influence, market risks, or lack of resources.
- To suggest practical steps that could encourage and support the younger generation to experiment with chia farming.

2.7 Study limitations

1. Sample restrictions Limitations related to the Sample.
2. Geographical Boundaries
3. Time-Related Limitations
4. Limitations of Knowledge and Communication.
5. Limitations to the Research Methodology.
6. Economic and Market limitations.
7. Technical Limitations
8. Social and Cultural Restrictions.
9. Limitations in Resources
10. Future Generalization limitations.

2.8 Justification of the study

1. Increasing Demand of Alternative Crops that are more profitable.
2. The young people are losing interest and participation in Agriculture.
3. Lack of awareness of Chia Cultivation in Akola
4. Solution to Agricultural ills of Vidarbha
5. The agricultural family is supposed to be assisted to attain economic stability.
6. Research based guidance is necessary.
7. Pursues Government and Agricultural Development Goals.
8. Promoting Rural Entrepreneurship.
9. Limited Already had researches carried out in the region.

2.9 Data Analysis

Quantitative Analysis

- Appropriate Statistical tools will be used to analyze the responses collected from youngsters of farmer families.
- Descriptive statistics (mean, median, mode) will be used to measure awareness, perception and willingness towards chia seed cultivation.

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- Correlation analysis to understand the relationship between youngsters awareness levels, their educational background and their willingness to adopt chia cultivation.

Survey Analysis

Most farmers have basic to moderate awareness, but there is a clear need for training and education to improve advanced knowledge level. This suggests there is a need to provide training programs to enhance farmers knowledge. For taking chia seeds cultivation there is a need of proper knowledge and techniques to the farmers and need to arrange this type of programmes for them.

Farmers are open to new solutions, that they are willing to adopt new crop varieties that are better suited to them. This indicates a shift toward adaptive new crops. Farmers overwhelmingly recognize climate change as a major threat**,** emphasizing the need for adaptive strategies, financial support, and infrastructure improvements. Farmers are already **adapting**, indicating a **high willingness to modify traditional crops** to survive in changing environmental conditions. Farmers need to take a new crop yields rather than regular crop because it gives more profit and easy to change as per the soil condition. This highlights logistical concerns for agricultural markets.

Conclusion

This study on the chia seeds cultivation – a youngsters from farmers families in Akola has revealed significant insights into the challenges and opportunities faced by the agricultural community in the region. The findings indicate that climate change is influencing farming practices, with farmers in Akola grappling with erratic rainfall, rising temperatures, and unpredictable weather events. These climatic shifts are affecting crop yields, water availability, soil fertility, and pest management, prompting farmers to adapt by modifying traditional farming methods.

In light of these challenges, the study offers recommendations for farmers to embrace adaptive practices, including climate-smart agriculture, crop diversification, and improved irrigation techniques. Furthermore, the empirical analysis of crop rotations underscores the benefits of this practice in mitigating climate change impacts, enhancing soil health, and promoting sustainability. Overall, while climate change presents significant hurdles for agriculture in Akola, the study emphasizes that with informed decision-making, sustainable practices, and proactive adaptation strategies, both farmers and agro-businesses can navigate these changes and secure long-term agricultural sustainability and resilience.

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