ASIAN JOURNAL OF AGRICULTURE
Volume 8, Number 2, December 2024
Pages: 88-94

E-ISSN: 2580-4537
DOI: 10.13057/asianjagric/g080202

Uncovering the constraints and difficulties faced by farmers engaged in *Aloe vera* cultivation in Haryana, India

RUBY MITTAL
School of Business Management & Commerce, MVN University. Palwal-121105, Haryana, India. Tel.: +91-8397979225,
email: ruby.mittal@mvn.edu.in

Manuscript received: 1 May 2024. Revision accepted: 6 August 2024.

Abstract. *Mittal R. 2024. Uncovering the constraints and difficulties faced by farmers engaged in* Aloe vera *cultivation in Haryana, India. Asian J Agric 8: 88-94.* The limitations of growing *Aloe vera* (L.) Burm.f. in Haryana, India are the focus of this study. During this, we look at the production, marketing, social, economic, technological, and infrastructure barriers to *A. vera* cultivation in Haryana. The researcher collected the farmers' data using a multi-purpose sampling technique to attain the study objectives. The five districts taken for the study include Haryana—Palwal, Nuh, Rewari, Jind, and Hisar. The study shows the challenges farmers face while growing *A. vera*. The most common constraints across all districts, according to key findings, are high marketing costs (78.67%), low farmer interest in *A. vera* cultivation (82%), the absence of a government policy setting a fixed price for medicinal plants (84%), higher input costs (79.33%), and insufficient seed or planting material (71.33%). Major challenges were also identified in the survey regarding poor transportation infrastructure (77.33%), overpowering irrigation water costs (77.33%), insufficient agriculture department oversight (77.33%), and a lack of technical awareness (79.3%). A lack of extension services on cultivation issues (65.33%), low product pricing (66%), limited processing units (68.67%), higher labor costs (69.33%), challenges to acquiring agricultural inputs (72%), and inadequate finance facilities (59.33%) are other major obstacles to success. Additional investigation discloses that there are major issues with market distance, inadequate local administration management, a lack of technically skilled workers, inadequate suggested manure dosages, shortages of labor, fear of theft, fear of stray animals, confined irrigation facilities, a poor understanding of post-harvest technology (72%), insufficient marketing channels (68.67%), and a lack of trained workers (67.33%). The outcomes underline the urgent need for focused interventions and legislative changes to address these multiple barriers. Enhancing market infrastructure, access to transportation, funding availability, technical education, and administrative management are essential strategies for raising crop production and sustainability in these geographic regions.

Keywords: *Aloe vera*, constraints, cultivation, farmers, medical plant

INTRODUCTION

Aloe vera (L.) Burm.f. has been utilized as a traditional medicine for many years. It treats ailments, worm infestation, problems with the skin, constipation, and colic in traditional Indian medicine (Heber 2007). The *A. vera* is one of the select natural treatments widely used in Western societies, and it has been utilized extensively in the cosmetics, pharmaceutical, and food industries (Foster et al. 2011). The objective of this study is to thoroughly investigate the challenges and obstacles that farmers in Haryana, India, confront when growing *A. vera*, like technical, infrastructural, economic, social, production, and market constraints. This study comprehensively explains Haryana's *A. vera* growers' challenges. By addressing these challenges, the study aims to assist in developing more realistic plans and initiatives that will enhance the viability and profitability of *A. vera* agricultural activities, thereby improving the livelihood of farmers and the region's agricultural development.

Christopher Columbus (1451-1506) stated, "Four vegetables are indispensable for the well-being of man: wheat, grapes, olives, and aloe. The first nourishes him, the second he refreshes the spirit, the third brings harmony, and the fourth cures him". "*Aloe vera*" originates from the Arabic word “Alloeh”, which means brilliant, bitter stuff. Various medicines are prepared from the leaf's interior section, containing gel and latex substances (Subasree and Murthykumar 2016); Vitamins A, B1, B2, B6, B12, folic acid, and niacine are all present. The *A. vera* was also prepared medications for sunburns and burns and various skin conditions such as acne, psoriasis, eczema, and itch. The main *A. vera* planting regions are Europe, Japan, Australia, the United States, and India. Gujarat, Haryana, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Nagaland, Orissa, Rajasthan, Uttaranchal, and Punjab are among the Indian states that contain it. The *A. vera* is a coarse-observing evergreen recurrent plant that grows slowly. It is a stemless or very short-stemmed moist plant growing up to 80-100 cm tall. Offshoots and root sprouts are scattered, and each plant generally has 12-16 leaves, which, on budding, may weigh up to 2-5 kg. The *A. vera* is grown commercially for its great demand in India's cosmetic industry and medicines (Choudhary and Kumar 2017).

The *A. vera* is supposed to have been initiated in Africa and is a traditional medicinal plant important for the family Liliaceae (Natali et al. 1990). Numerous names, such as Ghritkumari, Kunavr Pathu, and Indian aloe in India, are known as *A. vera*. Australia, the US, and Europe are the

foremost markets of unprocessed and *A. vera* plant extracts. It is also a quality commercial opportunity among the several medicinal plants. Thailand is the world's largest grower of *A. vera* gel, comprising around one-third of the world's total production (Saini et al. 2023). Asia is home to many species of Medicinal and Aromatic Plants (MAPs), and the region has long been a traditional medicine center. For thousands of years, the Chinese and Indians have used medicinal herbs to treat sickness (Muthukumar et al. 2018). The World Health Organization (WHO) states that herbal medicines are crucial to achieving the objective of "Health for All." While the market for herbal remedies is expanding in underdeveloped nations, there are signs that people in wealthy nations are getting weary of modern medical practices and turning to traditional remedies as alternative medicinal.

In India's high level of biodiversity, we are identifying and directing the development of new prospects with significant export potential, such as medicinal plants, hence a substantial concern for all parties involved, including policymakers. Therefore, a comprehensive approach is necessary for the total development of the medicinal plant sector to identify and meet the needs of all the various stakeholders (Singh 2006). The production, collection, preparation, application, and commercialization of medicinal herbs significantly improve the economic health of localities (Sher and Barkworth 2015; Mohâ and Al-Uzaizi 2016).

Due to its bioactive compounds, extracted from the leaves used in industrial preparations for food, cosmetic, and pharmaceutical items, aloe is now attracting much attention in the global market (Cristiano et al. 2016). The wild collection of aloe leaves, which are native to subtropical Africa, is inadequate to meet the demand on a global scale (Van Jaarsveld 1989; Van Wyk and Smith 1996). Kenyan farmers view Aloe output as a way to lower the risks connected with the delicate reliance on spontaneous aloe; this seems to have a higher chance of poverty reduction and sustainable resource management (Belmin et al. 2013).

Aloe grows in the open areas in Kenya, Tanzania, Ethiopia, and Nigeria; its products are transported to Europe and Asia. The *A. vera* was also grown in the Caribbean islands, southern USA, Mexico, Paraguay, China, India, Pakistan, and Israel (Oldfield 2004). It is grown outside in fields and indoors in chilly greenhouses in Mediterranean regions (Spain, Greece, and southern Italy) (De Lucia and Lucini 2013). Farmers in India have various problems in their cultivation, such as lack of rain, low groundwater levels, soil degradation, and technical, infrastructural, economic, social, and market constraints.

Over the past few years, aloe has become a frequently used active ingredient in many skin care products, sunscreens, and cosmetics (Crewe 1939). It is also widely used in Ayurvedic and traditional Chinese medicine. The Chinese characterize aloe's skin and the elements inside its leaves as providing a cool, bitter, downward-draining solution that relieves constipation due to heat accumulation (Biswas et al. 2013).

The aloe industry has established the highest ethics standards for organizations of aloe produced in the USA and Mexico. Consequently, the *A. vera* industries in the United States and Mexico are proving their commitment to providing the world with the best possible aloe and *A. vera* products through the activities of the International Aloe Science Council of America (IASC).

The acceptance of *A. vera* by society and its use in many consumer products show that IASC is progressing well. The IASC professionals are dedicated to fostering and conducting high-quality research that will help *A. vera* grow as a product (Saeed 2003).

MATERIALS AND METHODS

Sample selection and data collection

The state of Haryana was chosen deliberately because of its environment and locality; thus, five districts were selected for investigation. By emphasizing selected districts (Palwal, Nuh, Rewari, Jind, and Hisar), this study is expected to provide a comprehensive picture of *A. vera* production in Haryana, considering various environmental factors, socio-economic background and their implications for policy and market dynamics. By making this intentional choice, the findings of this study are assured to be robust, useful, and widely applicable, thereby supporting the long-term success of the *A. vera* field in the state.

For this research, primary and secondary data were collected. Primary data was collected from *A. vera* cultivators with the help of a structured schedule. The main purpose of this research is to prepare a schedule. After finalization, data was collected from selected *A. vera* farmers through fieldwork and interviews. Researchers have tried to collect data without social or personal bias. This schedule was prepared specifically to discover farmers' obstacles in their cultivation. This study covers various obstacles farmers face: technical, infrastructure, economic, social, production, and market.

RESULTS AND DISCUSSION

The following results have been summarized after the interview and discussion on the schedule with the selected farmers.

Difficulties faced by *Aloe vera* growers

Technical constraints

Table 1 presents the obstacles faced by farmers in cultivating *A. vera*. This includes problems such as lack of technical awareness, lack of local administrative management, lack of skilled technical personnel, and lack of recommended manure doses. From this table, it can be concluded that Nuh Regency has the highest problems regarding lack of technical awareness and lack of the recommended dose of manure, namely 90%. In contrast, the lowest figures are in Rewari District, 60% and 56.7%, respectively. Overall, the status of Rewari is better than in other districts. The "Lack of management of local

administration" frequency appears consistent across all districts, with relatively high frequencies and percentages, indicating a systemic issue that may require coordinated efforts at a regional or state level to address effectively.

Infrastructural constraints

Table 2 shows seven infrastructural problems in the cultivation of *A. vera* for the selected samples. These are lack of adequate supervision by the agricultural department, complications in purchasing agricultural inputs from cooperative societies and markets, lack of inputs during the sowing period, issue of market distance, unavailability of laborers, inefficient transportation system, and limited processing units. The data in the table shows that most of the problems are faced by the Nuh and Hisar districts rather than others. The Rewari and Palwal districts face the fewest infrastructure problems. The highest problem with the infrastructure is facing complications in purchasing agricultural inputs from cooperative societies and markets and an inefficient transportation system. An analysis of agricultural constraints in the Haryana districts of Hisar, Jind, Nuh, Rewari, and Palwal has identified several important challenges. With 80% and 63.33% of farmers impacted, respectively, Hisar and Rewari are the most severely affected by the agricultural department's inadequate oversight. In Jind (86.67%) and Hisar (90%) specific, inefficient transportation infrastructures severely reduce productivity. Purchasing supplies for agriculture presents major difficulties in Nuh (90%) and Palwal (56.67%). Shortage of inputs during the sowing phase is a major issue in Palwal (50%) and Rewari (53.33%). The lack of workers affects Nuh's (83.33%) and Palwal's (63.33%) productivity. Complaints about sufficient processing units exist in Rewari (76.67%) and Hisar (80%). These results highlight the necessity for specific approaches to address these issues effectively and efficiently across districts and regional differences in agricultural constraints.

Enhancing the effectiveness of agricultural departments' oversight and streamlining the procurement procedure can improve input accessibility and efficiency. Therefore, to optimize agricultural productivity, timely input distribution and infrastructure improvements to enhance market access are essential. Moreover, initiatives to attract and retain agricultural workers and the transportation network changes might lessen labor shortages and improve logistics. Finally, adding value to agricultural products with value-addition efforts and encouraging investments in processing facilities will contribute to the agricultural sector's sustainability and economic growth. Through cooperative deployment of these methods, stakeholders may effectively tackle the obstacles and realize the complete potential of agriculture within the region.

Economic constraints

The findings from Table 3 provide fascinating new perspectives on local farming issues. Among the major concerns were, for illustration, insufficient financial facilities, which Nuh ranked as the top limitation (70%), closely followed by Hisar (63.33%). Rewari and Palwal, on the other hand, showed comparatively lower percentages (56.67% and 46.67%, respectively), placing it as the second and fourth restriction. In addition, the increased price of irrigation water was determined to be a major problem, especially in Hisar and Nuh, where it ranked first and received the highest percentages (83.33% and 86.67%, respectively). In contrast, Rewari ranked it the second constraint, with the lowest proportion (70%).

Furthermore, expensive marketing expenses presented significant difficulties, ranking Nuh as the most onerous restriction (93.33%). Other areas, including Palwal and Jind, also underlined its importance. Several suggestions might be made to overcome the shortcomings found in the comparative study. First, farmers' financial limitations might be reduced by expanding their access to loan options, particularly in areas like Nuh and Rewari. It is essential, especially in these locations, to reduce the high cost of irrigation water by investing in infrastructure and adopting water conservation tools. Fostering agricultural development and environmental sustainability across varied regions also requires tackling low product prices, notably in Palwal, and implementing methods to lower high marketing expenses, particularly in Nuh.

Social constraints

Table 4 describes that Palwal has the largest fear of theft (63.33%) of the identified constraints, while Hisar has the lowest fear (46.66%). Rewari has the highest rate of farmer's disinterest in producing *A. vera* (90%), while Nuh ranks it as the second-biggest worry (83.33%). On the other hand, Jind recorded the lowest proportion (76.66%) for this limitation. The level of fear created by stray animals is greatest in Hisar (70%) and smallest in Jind (40%). These results emphasize the importance of effectively addressing regional issues to promote agricultural development and sustainability.

Given the summarized data, several solutions can be made to address the identified restrictions effectively. First, initiatives to improve security, particularly around areas like Palwal, where farmers feel worried about theft, may allay their fears. Second, encouraging farmers to grow *A. vera*, especially in areas like Rewari and Nuh, through education and incentives could support agricultural diversification initiatives. Furthermore, implementing policies to lower stray animals' effects on farms could enhance general agricultural practices and productivity, specifically in areas like Hisar.

Production constraints

Table 5 includes the problems related to inadequate seed or planting material, higher cost of labor, lack of credit availability, higher cost of inputs, scarce irrigation facilities, and insufficient extension service on the cultivation aspects. According to the responses of the sampled farmers in the district of Hisar, there are more challenges faced in *A. vera* cultivation, i.e., an average of 78.3% of all constraints compared to other districts. The lowest average of all constraints is 60% in the Palwal district. The highest rank among all the other constraints is

90% to inadequate seed or planting material and a higher labor cost.

Significant suggestions for efficiently addressing observed limits emerge from the condensed data. Make it a top priority to guarantee a sufficient supply of high-quality seed and planting materials, especially in areas like Palwal and Hisar. To improve economic viability, address the high price of labour, particularly for Palwal and Jind. Expanding access to economic facilities is essential in areas like Hisar and Nuh and has been highlighted as the main impediment. Additionally, increasing irrigation systems and extension services—especially in areas like Hisar and Rewari—and addressing the prohibitive price of inputs, a major issue in all regions, are critical for raising agricultural output and sustainability.

Marketing constraints

Table 6 depicts the constraints related to the government's lack of a fixed price policy for medicinal plants, limited processing industries in localities, inadequate marketing channels, a lack of awareness of post-harvest technology, inadequate transport facilities, and scarcely trained workers. The percentage of the lack of a fixed price policy for medicinal plants due to government constraints in Hisar, Jind, Nuh, Rewari, and Palwal is 90, 76.66, 86.66, 80, and 86.66, respectively. The lowest rank of the inadequate transport facilities constraint in the district of Palwal is 33% among all the ratios. Overall, Hisar is facing more challenges in terms of marketing constraints. The highest rank of the inadequate marketing channel is 80% (Hisar), and the lowest rank is 57% (Rewari). Besides this, other districts face problems marketing the *A. vera* product.

Various suggestions can be made to handle the identified constraints based on the data provided successfully. First, the government should offer farmers security and incentives by introducing a fixed price system for medicinal plants, especially in areas like Hisar, Nuh, and Palwal, where this limitation is most serious. Second, stimulating the growth of regional processing businesses, particularly in Jind and Rewari, may enhance the value of agricultural output and provide farmers with new sources of income. Furthermore, increasing post-harvest technological knowledge and marketing channels—critical in regions like Hisar and Palwal—could boost product quality and availability in the market.

Therefore, to boost overall agricultural output and effectiveness, farmers must address the lack of transportation facilities, particularly around areas like Hisar and the findings of Nuh, and the shortage of skilled labor, common in areas like Rewari and Palwal.

Table 1. Key technical constraints impacting *Aloe vera* cultivation among farmers in Haryana, India

Name of Constraints	Hisar		Jind		Nuh		Rewari		Palwal		Average		Average	
	f	%	f	%	F	%	f	%	f	%	f	rank	%	rank
Lack of technical awareness	25	83.30	26	86.7	27	90.00	18	60.00	23	76.70	24	1	79.30	1
Lack of management of local administration	26	86.70	24	80.00	25	83.30	21	70.00	19	63.30	23	2	76.70	3
Lack of technically skilled persons	24	80.00	23	76.7	24	80.00	18	60.00	19	63.30	22	3	72.00	4
Lack of suggested doses of manures	25	83.30	25	83.3	27	90.00	17	56.70	23	76.70	23	2	78.00	2

Table 2. Key infrastructural constraints hindering *Aloe vera* cultivation among farmers in Haryana, India

Name of Constraints	Hisar		Jind		Nuh		Rewari		Palwal		Average		Average	
	f	%	f	%	F	%	f	%	f	%	f	rank	%	rank
Lack of adequate supervision by the agricultural department	24	80.00	25	83.33	26	86.67	19	63.33	22	73.33	23	1	77.33	1
Complications in purchasing agricultural inputs from cooperative societies and market	26	86.67	22	73.33	27	90.00	16	53.33	17	56.67	22	2	72.00	2
Lack of inputs in the sowing period	21	70.00	17	56.67	21	70.00	16	53.33	15	50.00	18	5	60.00	6
Issue of Market Distance	26	86.67	24	80.00	26	86.67	14	46.67	16	53.33	21	3	70.67	3
Unavailability of labourers	20	66.67	15	50.00	25	83.33	17	56.67	19	63.33	19	4	64.00	5
Inefficient transportation system	27	90.00	26	86.67	25	83.33	21	70.00	17	56.67	23	1	77.33	1
Limited processing units	24	80.00	17	56.67	23	76.67	22	73.33	17	56.67	21	3	68.67	4

Table 3. Key economic constraints faced by farmers in *Aloe vera* cultivation in Haryana, India

Name of Constraints	Hisar		Jind		Nuh		Rewari		Palwal		Average		Average	
	f	%	f	%	F	%	f	%	f	%	f	rank	%	rank
Inadequate credit facilities	19	63.33	18	60.00	21	70.00	17	56.67	14	46.67	18	4	59.33	4
higher cost of irrigation water	25	83.33	22	73.33	26	86.67	21	70.00	22	73.33	23	2	77.33	2
High marketing cost	25	83.33	26	86.67	28	93.33	22	73.33	17	56.67	24	1	78.67	1
Low price of Product	18	60.00	14	46.67	21	70.00	26	86.67	20	66.67	20	3	66.00	3

Table 4. Key social constraints faced by farmers in *Aloe vera* cultivation in Haryana, India

Name of Constraints	Hisar		Jind		Nuh		Rewari		Palwal		Average		Average	
	f	%	f	%	F	%	f	%	f	%	f	rank	%	rank
Fear of being theft	14	46.67	16	53.33	17	56.67	15	50.00	19	63.33	16	3	54.00	3
Lack of farmers' interest in Alove vera cultivation	24	80.00	23	76.67	25	83.33	24	80.00	27	90.00	25	1	82.00	1
Fear caused by stray animals	21	70.00	16	53.33	21	70.00	12	40.00	15	50.00	17	2	56.67	2

Table 5. Key production constraints faced by farmers in *Aloe vera* cultivation in Haryana, India

Name of Constraints	Hisar		Jind		Nuh		Rewari		Palwal		Average		Average	
	f	%	f	%	F	%	f	%	f	%	f	rank	%	rank
Inadequate seed/planting material	27	90.00	21	70.00	24	80.00	19	63.33	16	53.33	21	2	71.33	2
Higher cost of labor	17	56.67	14	46.67	22	73.33	24	80.00	27	90.00	21	2	69.33	3
Lack of credit availability	24	80.00	16	53.33	17	56.67	14	46.67	11	36.67	16	5	54.67	6
Higher cost of inputs	26	86.67	19	63.33	24	80.00	25	83.33	25	83.33	24	1	79.33	1
Scarce irrigation facilities	26	86.67	16	53.33	17	56.67	12	40.00	14	46.67	17	4	56.67	5
Insufficient extension service on the cultivation aspects	21	70.00	24	80.00	21	70.00	17	56.67	15	50.00	20	3	65.33	4

Table 6. Key marketing constraints faced by farmers in *Aloe vera* cultivation in Haryana, India

Name of Constraints	Hisar		Jind		Nuh		Rewari		Palwal		Average		Average	
	f	%	f	%	F	%	f	%	f	%	f	rank	%	rank
Lack of fixed price policy for medicinal plants by the government	27	90	23	76.67	26	86.67	24	80	26	86.67	25	1	84.00	1
Limited processing industries in localities	23	76.67	26	86.67	22	73.33	12	40	21	70	21	3	69.33	3
Inadequate marketing channel	24	80	18	60	23	76.67	17	56.67	21	70	21	3	68.67	4
Lack of awareness of post-harvest technology	17	56.67	24	80	21	70	24	80	22	73.33	22	2	72.00	2
Inadequate transport facilities	25	83.33	19	63.33	25	83.33	13	43.33	10	33.33	18	5	61.33	6
Scarce trained workers	19	63.33	14	46.67	25	83.33	24	80	19	63.33	20	4	67.33	5

The *A. vera*'s anti-inflammatory, antibacterial, and wound-healing properties have led to its historical usage in treating digestive issues and skin ailments such as burns, wounds, insect bites, and eczemas. This medicinal plant's research objective has been to confirm its historical applications, establish its mode of action, and pinpoint the particular elements that give it these properties. The *A. vera* and its active components have also been the subject of the current study, which has focused on the herb's potential applications as a cytotoxic, antitumoral, anticancer, and antidiabetic agent (Lanka 2018; Sánchez et al. 2020).

The *A. vera*, the wonder and miracle herb, has been shown to have a wide range of uses in treating various ailments. Considering the plant's well-known medicinal benefits, controlled clinical trials are necessary to assess and validate its effectiveness (Sanghi 2015; Tsegaye et al. 2017). Even in harsh and semi-arid circumstances, the food, cosmetics, and pharmaceutical industries are increasingly interested in growing aloe cultivation as a

substitute for conventional crops. It requires an integrated approach from pre-cultivation to cultivation and post-cultivation to attain substantial yields in leaves and gel quality (Cristiano et al. 2016). Several physiologically active compounds can be found in *A. vera*, which is advantageous to support the widespread utilization of this therapeutic plant and is more researched (Christaki and Florou-Paneri 2010).

The study found that farmers' main technical restrictions are a) Lack of fixed price policy for medicinal plants by the government, b) Lack of awareness of post-harvest technology, and c) Limited processing industries in localities (84, 72%, and 69%, respectively. In 90% of cases, buying agricultural commodities from cooperative organizations and the market is difficult. Inefficient transportation causes 90% of the problem. Due to inadequate agricultural department oversight and market distance (87%) caused by infrastructure limitations, farmers are not planting *A. vera*. Farmers have economic, social, production, and marketing restraints. High marketing costs account for 93% of overall costs. Irrigation water costs more, too. The product is 83% off. 70% lack of credit, 90% lack of interest among farmers to grow *A. vera*, and 70% fear of stray animals. Insufficient seed or planting material, 90% higher labor costs, and higher input costs. Poor irrigation infrastructure (87%), loan availability, and agriculture extension services (80%). Also, 90% of the population suffers from the government's unstandardized medicinal plant pricing. Local processing companies are scarce, affecting 87% of the population. Additionally, 83% of the population faces poor transportation. The contractor or private agent merely planted seeds. However, these supplies are occasionally unreliable, and the state fails to deliver seedling material. The movement of workers to cities reduces skilled labor. Demand for increased compensation is high. Producers struggled with a lack of distribution outlets, agricultural initiatives, and a government program setting medicinal plant prices. Planners must create markets, processing facilities, and competitive pricing.

In conclusion, farmers' ability to cultivate *A. vera* needs to be strengthened. The *A. vera* cultivation-specific training programs can offer crucial insight into managing pests, maintaining soil, and harvesting methods. Expanding access to markets is essential for farmers to gain additional bargaining power, and the impact of intermediaries can be reduced by forming farmer collectives and improving links to markets. Optimizing market accessibility and post-harvest handling needs investments in infrastructure, such as storage and transportation facilities. Therefore, to support and encourage creativity and further development in the *A. vera* industry, legislation, incentives, and research projects are mandatory. Promoting knowledge-sharing platforms and improving extension services may assist with the spread of information and facilitate peer learning. Increased availability of *A. vera* in Haryana will remain sustainable and inclusive if social restrictions are addressed through community participation and inclusion activities. Implementing these suggestions can help stakeholders help *A. vera* farmers build a supportive environment to improve their livelihoods and local economies.

ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to my colleagues Dr. Saraswati, Ms. Anju and Ms. Aradhana, whose invaluable assistance and support significantly contributed to completing this research paper.

REFERENCES

Belmin R, Mulindo C, Welimo M, Kamau G, Triomphe B. 2013. Building on illegal value chains to achieve sustainable management of natural resources? The case of indigenous aloe exploitation and trade in Baringo, Kenya. Rural Resilience and Vulnerability: The Rural as Locus of Solidarity and Conflict in Times of Crisis. Florence, Italy, July 2013.

Biswas GC, Miah MA, Sohel MMH, Hossain AKMS, Shakil SK, Howlader MS. 2013. Micropropagation of *Aloe indica* L. through shoot tip culture. J Agric Vet Sci 5 (1): 30-35. DOI: 10.9790/2380-0513035.

Choudhary R, Kumar P. 2017. Identification of the constraints faced by the college and the farmers' of the vicinity in the cultivation of Aloe-vera Crop. Intl Res J Agric Econ Stat 8 (2): 310-314. DOI: 10.15740/HAS/IRJAES/8.2/310-314.

Christaki EV, Florou-Paneri PC. 2010. *Aloe vera*: A plant for many uses. J Food Agric Environ 8 (2): 245-249.

Crewe JE. 1939. Aloes in the treatment of burns and scalds. Minnesota Med 22: 538-539.

Cristiano G, Murillo-Amador B, De Lucia B. 2016. Propagation techniques and agronomic requirements for the cultivation of Barbados aloe (*Aloe vera* (L.) Burm. F.)—A review. Front Plant Sci 7: 196036. DOI: 10.3389/fpls.2016.01410.

De Lucia B, Lucini L. 2013. Production, quality and health benefits of Aloe. Ital Hortus 20: 20-26.

Foster M, Hunter D, Samman S. 2011. Evaluation of the Nutritional and Metabolic Effects of *Aloe vera*. Herbal Medicine: Biomolecular and Clinical Aspects. 2nd Edition. Taylor & Francis Group, LLC, UK. DOI: 10.1201/b10787-4.

Heber D. 2007. Physicians' Desk Reference for Herbal Medicines. Thomson Health Care, Montvale.

Lanka S. 2018. A review on *Aloe vera*-the wonder medicinal plant. J. Drug Deliv Ther 8 (5-s): 94-99. DOI: 10.22270/jddt.v8i5-s.1962.

Mohâ L, Al-Uzaizi SF. 2016. Farmers knowledge level and training needs toward the production and conservation of medicinal herbal plants in Jordan. J Med Plants Res 10 (24): 351-359. DOI: 10.5897/JMPR2016.6117.

Muthukumar R, Jayasankar R, Balakrishnan T. 2018. Production and Marketing constraints of medicinal plants cultivation in Tamil Nadu. JETIR 5 (12): 722-729.

Natali L, Sanchez IC, Cavallini A. 1990. In vitro culture of *Aloe barbadensis* Mill.: Micropropagation from vegetative meristems. Plant Cell Tiss Organ Cult 20: 71-74. DOI: 10.1007/BF00034761.

Oldfield SA. 2004. Review of Significant Trade: East African Aloes. 14thMeeting of the CITES Plants Committee, Windhoek.

Saeed MA, Ahmad I, Yaqub U, Akbar S, Waheed A, Saleem M, Din N. 2003. *Aloe vera*: A plant of vital significance. Sci Vis 9 (1-2): 1-13.

Saini H, Kumar S, Rai AK. 2023. Study on marketing and constraints of *Aloe vera* in Jhunjhunu District of Rajasthan. Small 1 (2): 23.

Sánchez M, González-Burgos E, Iglesias I, Gómez-Serranillos MP. 2020. Pharmacological update properties of *Aloe vera* and its major active constituents. Molecules 25 (6): 1324. DOI: 10.3390/molecules25061324.

Sanghi SB. 2015. *Aloe vera*: A medicinal herb. Intl J Res Granthaalayah 3 (11): 32-34. DOI: 10.29121/granthaalayah.v3.i11.2015.2913.

Sher H, Barkworth ME. 2015. Economic development through Medicinal and Aromatic Plants (Maps) cultivation in Hindu Kush Himalaya mountains of District Swat, Pakistan. J Mt Sci 12: 1292-1301. DOI: 10.1007/s11629-014-3247-2.

Singh H. 2006. Prospects and challenges for harnessing opportunities in medicinal plants sector in India. Law Environ Dev J 2 :196.

Subasree S, Murthykumar K. 2016. Effect of *Aloe vera* in oral health-A review. Res J Pharm Technol 9 (5): 609-612. DOI: 10.5958/0974-360X.2016.00116.5.

Tsegaye M, Moges S, Misretaw G. 2017. Review on therapeutic uses of *Aloe vera*. Glob J Pharmacol 11 (2): 14-20. DOI: 10.5829/idosi.gjp.2017.14.20.

Van Jaarsveld E. 1989. The genus *Aloe* in South Africa with special reference to *Aloe hereroensis*. Veld Flora 75: 73-76.

Van Wyk BE, Smith G. 1996. Guide to the Aloes of South Africa. Briza Publications, Pretoria.