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The Applications and Obstacles of Industrial Development of Medicinal Plants: The Case of Boyer-Ahmad County

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ABSTRACT

Due to the growing population and the use of pesticides and chemicals in food production, people's health has received more attention than ever before. The side effects of chemical drugs have led the world community to turn to medicinal herbs and drugs of natural origin. Consequently, interest in herbal remedies has become more prevalent among different societies, earning the 20th century the moniker of the "century of return to nature." Therefore, the present study aimed to identify the applications and barriers to the industrial development of medicinal plants in Boyer-Ahmad County. The statistical population of the study consisted of individuals knowledgeable about medicinal plants in the Boyer-Ahmad region, including specialists, local experts, and sellers of medicinal plants. Purposeful sampling was conducted using the snowball technique. Interviews and a semi-structured open-ended questionnaire were utilized to collect the required data. The results indicated 65 important medicinal plants, including thyme, anchovy, yarrow, and corm, categorized into three types: medicinal, aromatic, and spicy. The findings revealed that barriers to the industrial development of medicinal plants included lack of government support, infrastructure deficiencies, scarcity of wild herbs, shortage of academic experts, reluctance of indigenous farmers to cultivate medicinal plants, and inadequate financial facilities at low interest rates.

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INTRODUCTION

In contemporary times, heightened concerns about public health have emerged due to factors such as population growth and the widespread use of pesticides and chemicals in food production (Hashemi et al., 2016). The importance of maintaining a healthy and robust workforce is paramount for sustained productivity. Despite significant advancements in science and technology, the prevention of diseases remains elusive. Moreover, the chemical compounds present in conventional drugs have been implicated in the emergence of new diseases, underscoring their detrimental effects on human health. While chemical drugs have been instrumental in disease control, their adverse impacts on bodily systems and functions are increasingly evident. Additionally, viral infections have developed resistance to chemical compounds due to their indiscriminate and unplanned use, necessitating the exploration of new antiviral therapies based on herbal remedies in modern medicine (Khosravi Pour et al., 2015). Consequently, there has been a surge in interest in herbal medicines across various societies, leading to the designation of the 20th century as the "century of return to nature" and the "century of herbal medicine" (Zarei, 2014).

The utilization of medicinal plants for treating ailments has been intertwined with the history of humanity. As integral parts of nature, humans have long recognized nature's capacity to provide remedies for various illnesses. Consequently, proximity to nature is believed to correlate with better health outcomes. In ancient times, early humans relied solely on plants to combat disease. Over time, as understanding of their properties deepened, the significance of these natural remedies in human life garnered special attention. In line with global agreements aimed at promoting environmental sustainability and safeguarding health, there is a concerted effort to gradually reduce and ultimately cease the consumption of synthetic essential oils and chemical dyes by the year 2050. Instead, natural essential oils and dyes are poised to replace their synthetic counterparts in the food and cosmetics industries (Niroumand and Rizvandi, 2016).

The use of medicinal plants extends beyond developing countries, as evidenced by the fact that approximately 71 percent of medicines in Germany are derived from plant sources. Similarly, in countries like China and India, where these plants are cultivated, the consumption of medicinal plants exceeds 50 percent. Even in Japan, where traditional medicine holds sway, the usage of medicinal plants stands at around 40 percent. In European and developed nations such as Switzerland, medicinal plants make up 35 percent of all medicines, while in the United Kingdom and the United States, they constitute 25 percent. However, it's noteworthy that in Iran, this figure is strikingly low, hovering around only four percent (Mohebbi, 2013).

The global trade of medicinal plants has witnessed significant growth over the years. In 1996, it amounted to USD 60 million, but by 2010, it had surged to USD 100 billion. Projections by the World Bank suggest that this figure will escalate dramatically to USD 5,000 billion by 2050 (Afkar, 2016). In Iran, the volume of exports of medicinal plants experienced a notable increase of 43 percent, rising from 1657 tons in 2004 to 2370 tons in 2011. Furthermore, their monetary value rose by 1.9 percent, from USD 7 million in 2005 to USD 8.5 million in 2011. Despite these positive trends, Iran holds only a modest 0.5 percent share of the global market, primarily attributed to saffron cultivation. Regrettably, there has been a lack of comprehensive planning regarding the exploitation of the potential of other medicinal plants in Iran (Niroumand and Rizvandi, 2016).

Medicinal plants encompass a diverse array of annual, biennial, and perennial plants, each containing active ingredients in one or more of their organs. These compounds, constituting less than one percent of the plant's dry weight, possess beneficial properties for both humans and animals (Hosseini Evari and Khazaee Fadafan, 2013). Various parts of medicinal plants, whether fresh, dried, or processed, are utilized to treat or prevent diseases. These plants generally fall into three main catego-

ries: medicinal, spices, and essential oils (Niroumand and Rizvandi, 2016).

An intriguing aspect of medicinal plants is their resilience to salinity and drought in the growing medium, rendering them a viable alternative to other crops for cultivation in arid and semi-arid climates. Additionally, the active ingredients in medicinal plants, which represent the most economically valuable component of production, tend to increase under environmental stresses, unlike many other horticultural and agricultural crops (Amiri et al., 2014).

However, natural habitats are not conducive to mass pharmaceutical industry operations. Even if these habitats contain sufficient plant resources, indiscriminate mass collection could jeopardize this natural treasure (Rahimi, 2013). Unfortunately, recent increased interest in utilizing medicinal plants has led to improper collection practices, posing threats to genetic diversity and plant populations (Afkar, 2016). Given that many medicinal plants are rare and possess protective value, it is imperative to identify and conserve them across all regions (Abbasi et al., 2012).

Iran holds the remarkable distinction of being ranked 15th globally in terms of biodiversity, boasting 11 of the 13 climates recognized worldwide. Notably, the country experiences an average of 300 sunny days annually, with temperature differentials ranging from 40°C to 50°C between its coldest and hottest regions, a standout characteristic (Asghari Mirak and Mohammadzadeh Hesari, 2013). Botanists and researchers estimate that Iran is home to over 8,000 plant species, at least twice the number found in continental Europe. Among these, approximately 2,300 species possess medicinal, aromatic, and cosmetic properties. Furthermore, 2,330 species are indigenous to Iran, exclusive to the region and unavailable elsewhere, highlighting Iran's status as a genetic reservoir of these plants (Abbasi et al., 2012).

In recent years, concerted efforts have been made to identify medicinal plants in Iran. These efforts encompass various research endeavors, including delineating plant types and their distribution across the country, identifying optimal ecological conditions for cultivation to maximize yields, exploring medicinal applications, extracting and identifying active compounds, selectively breeding essential species, and domesticating wild plants to enhance productivity. Despite these endeavors, Iran's position in the global arena remains unstable, indicating the need for further policy and research initiatives in the realm of agricultural development (Rahimi, 2013).

Kohgiluyeh and Boyer-Ahmad Province exhibit significant potential for the cultivation and advancement of medicinal plants. Despite covering only one percent of Iran's territory, the province boasts over 10 percent of the country's fresh water resources and encompasses both cold and tropical climates, enabling the cultivation of a diverse range of medicinal plants (Babazekri et al., 2019). Notably, the province stands out for its pristine natural environment, making it comparatively superior to other Iranian provinces and attracting cultivation of medicinal plants from as many as 40 countries worldwide. The Dena protected area alone hosts approximately 470 medicinal plant species out of a total of 1,200 species identified in the region (Rashidi et al., 2012).

The province has dedicated 33.3 hectares to the cultivation of medicinal plants, with primary crops including lemongrass, lovage, thyme, and Hungarian chamomile, yielding 43.6 tons according to recent statistics. Consequently, the development and expansion of medicinal plant cultivation in this province are of paramount importance, given its potential and its status as one of Iran's less-developed regions (Babazekri et al., 2019). However, despite these promising prospects, challenges persist. For instance, the cultivation area of Dena Lemongrass or Zarabi in the Dena highlands has decreased to just two hectares, while the Bilhar plant, an edible species, faces the threat of extinction (Salehpour et al., 2013; Jahan and Rashki, 2017).

Furthermore, weak points and obstacles in the development of medicinal plants in the province include the absence of processing

and packaging facilities, farmers' and producers' limited knowledge about medicinal plants and optimal cultivation methods, and the lack of pharmaceutical industry development centered on medicinal plants (Babazekri et al., 2019). Hence, the research aims to identify both the potential applications and the barriers hindering the industrial development of medicinal plants in Boyer-Ahmad County.

METHODOLOGY

The research population for this study comprised key informants knowledgeable about medicinal plants in Boyer-Ahmad County, encompassing specialists, local experts, sellers, and distributors of medicinal plants. Snowball sampling was selected as the primary purposeful sampling method due to its effectiveness in gathering opinions from key informants. In this method, each initial participant is asked to recommend other informed individuals, creating a chain referral process (Falsafi and Hosseini, 2005). One notable advantage of snowball sampling in qualitative research is its potential for an unlimited number of samples, allowing the researcher to continue the sampling process until theoretical saturation is reached. Theoretical saturation occurs when no new information or insights are obtained, and the responses become repetitive, indicating that further data collection is unlikely to yield additional findings.

In this study, data collection continued until theoretical saturation was achieved, meaning the researcher concluded that the responses regarding the research subject and purpose had become redundant, and no new data could be expected. The final number of participants in the study totaled 23 individuals, comprising medicinal plant sellers, university professors, experts from agricultural departments, and professionals from herbal medicine production units.

The present study utilized an interview method with a semi-structured questionnaire containing open-ended questions to gather the necessary information. The data processing involved several steps. Initially, the collected data were categorized into two main groups: the applications of medicinal plants and the challenges of industrial development of medicinal plants in Boyer-Ahmad County.

Data pertaining to the applications of medicinal plants, including their importance compared to other plants and variations in significance throughout the hot and cold seasons, were provided without the need for coding. On the other hand, data related to the challenges of industrial development were reviewed, and important points were extracted and organized into main and sub-topics, following the guidelines provided by Nouri and Nooripoor (2013) and Khezri et al. (2016). These main and sub-topics were then grouped, and the data were re-read and coded accordingly. The relationship between each group and its corresponding codes was established. Finally, the findings were re-evaluated, and the data were assigned to different codes, preparing them for further analysis. This systematic approach ensured that the collected data were effectively organized and ready for comprehensive analysis.

RESULTS

The results are divided into two parts: identifying the most important medicinal plants used in Boyer-Ahmad County and their applications, and identifying barriers to the industrial development of medicinal plants in Boyer-Ahmad County. Table 1 presents the most important medicinal plants used in Boyer-Ahmad County and their applications.

Table 1
The Most Important Medicinal Plants of Boyer-Ahmad County.

Plant name	Scientific name	Local name	Grouping	The Most important application	Used part
Lovage	*Levisticum officinale* W.D.Kotch	Angion	Medicinal-spicy	Treatment of urinary tract pain	Root
Ferula	*Ferula Assa-foetida* L.	Berizeboonakhash	Medicinal	Treatment of internal infections	Gum

Thymus	*Thymus daenensis* L.	Orishom	Medicinal-spicy	Flu treatment	Leaf and shoot
Burdock	*Arctium lappa* L.		Medicinal	Blood purification	Root
Chamomile	*Anthemis cotula* L.	Babine	Medicinal-spicy	Treatment of nervous disorders	dried Capitol
Dracocephalum	*Dracocephalum moldavica* L.		Medicinal	Relaxation	Leaf (Arial part)
Dracocephalum kotschyi	*Dracocephalum kotschyi* Boiss	Zaroei	Medicinal	Complete cleansing of the body	Leaf (Arial part)
Broadleaf plantain	*Plantago major* L.	Barahang	Medicinal	Flu treatment	Leaf, stem, seed
Mugwort	*Artemisia vulgaris* L.		Medicinal	Treatment of stomach upsets	All parts
Oak	*Quercus brantii* L.	Bali	Medicinal	Strengthen the stomach wall and tissue	bark
Sweet violet	*Viola odorata* L.	Gole Sarbanafshe	Medicinal	Flu treatment	All parts
Pistacia atlantica	*Pistacia atlantica* L.	Berize	Medicinal	Cleansing and disinfecting the body	Gum
Yarrow	*Achillea wilhelmsii* C.Koch		Medicinal	Treatment of stomach upsets	Arial part
Dorema aucheri	*Dorema aucheri* Boiss.	Bilahar	Medicinal	Treatment of hyperlipidemia	Leaf and shoot
Adiantum capillus-veneris	*Adianthum capillus* – veneris L.	Kamar Abriz	Medicinal	Flu treatment	Arial part
Chaste tree	*Vitex agnus _ castus* L.		Spicy	Food flavoring	Fruit
Cheeseweed	*Malva parviflora* L.	Tolah	Medicinal	Flu treatment	All parts
Mentha pulegium	*Mentha mozaffarianii* Jamzad	Pidan	Medicinal-spicy	Treatment of stomach upsets	Arial part
Mentha longifolia	*Mentha longifolia* L.	Pidan	Medicinal	Better digestion of food	leaf
Allium ampeloprasum	*Allium ampeloprasum* L.	Taara	Spicy	Treatment of hemorrhoids	Leaf and allium
Prangos	*Prangos ferulacea* (L.) Lindl	Jashir	Medicinal	Treatment of hyperlipidemia	Rhizome
Stachys lavandulifolia	*Stachys lavandulifolia* Vahl	Pashmouk	Medicinal	Flu treatment	Flower and leaf
Rice bran	*Oryza Sativa* L.	Chaltik	Medicinal	Eliminate obesity	Bran
Ferulago	*Ferulago angulate* (Schlescht.) Boiss. Subsp.angulata	Chevil	Spicy	Fragrance of buttermilk and yogurt	Arial part

Bindii	*Tribulus terrestris* L.	Khartangu	Medicinal	Treatment of urinary tract infection	All parts
Alhagi maurorum	*Alhagi persarum* Boiss.		Medicinal	Treatment of jaundice	All parts
Milk thistle	*Silybum marianum* (L.) Gaertn	Martighal	Medicinal	Treatment of liver disease	All parts
Echinophora spinosa	*Echinophora cinerea* L.		Medicinal-spicy	Treatment of stomach upsets	Arial part
Flixweed	*Descurainia sophia* (L.) Webb & Berth	Khakshir	Medicinal	Eliminate body heat	Seed
Mugworts	*Artemisia persica* Boiss	Darameh	Medicinal	Treatment of stomach upsets	All parts
Field horsetail	*Equisetum arvense* L.		Medicinal	Eliminate kidney stones	Sterile stem
Fennel	*Foeniculum vulgare* Miller	Rajoneh	Medicinal-spicy	Regulation and strengthening of female hormones	Seed
Aruncus	*Ephedra* spp.		Medicinal	Flu treatment	All parts
Rhubarb	*Rheum ribes* L.	Runas	Medicinal	Treatment of hypertension	Rhizome
Crataegus oxyacantha	*Crataegus oxyacantha* L.	Kialak	Medicinal	Treatment of blood concentration	Flower, leaf, fruit, bark
Fraxinus ornus	*Fraxinus ornus* L.	Beniu	Medicinal	Treatment of stuttering	Stem, leaf, fruit, bark
Trachyspermum	*Trachyspermum copticum* (L.) Link	Zenion	Medicinal	Treatment of heartburn	Seed
White goosefoot	*Chenopodium album* L.	Timeri	Medicinal-spicy	Eliminate intestinal worms	Leaf and young shoot
Stachys pilifera	*Stachys pilifera* L.	Olile	Medicinal	Treatment of gynecological infections	Leaf and young shoot
Fumaria officinalis	*Fumaria vaillantii* Loisel		Medicinal	Eliminate body heat	All parts
Trifolium pratense	*Trifolium pratense* L.	Shuvaar	Medicinal	Treatment of pertussis	Leaf
Fenugreek	*Trigonella foenum* – graecum L.	Shambaliah	Spicy	Treatment of stomach upsets	Seed
Dill	*Anethum graveolens* L.	Shevet	Medicinal-spicy	Treatment of stomach upsets	Leaf and shoot
Liquorice	*Glycyrrhiza glabra* L.	Rishe Bal	Medicinal	Treatment of gastric ulcer	Rhizome
Aloe vera	*Aloe vera* L.	Chederva	Medicinal	Skin rejuvenation and regeneration	Gel
Marrubium	*Marrubium vulgare* L.		Medicinal	Treatment of gynecological infections	Arial part
Chicory	*Cichorium intybus* L.	Kashni	Medicinal	Eliminate body heat	Root and leaf
Ziziphora	*Ziziphora clinopodioides* Lam		Medicinal	Treatment of liver diseases	Arial part

Celeriac	*Apium graveolens* L.	Karafs	Medicinal-spicy	Treatment of stomach upsets	Seed, leaf, stem
Spear Thistle	*Gundelia tournefortii* L.	Kangar	Medicinal	Treatment of fatty liver	Stem
Common Nettle	*Urtica dioica* L.	Gazgazo	Medicinal	Treatment of hyperlipidemia	Leaf, flowered shoot, stem
Coriander	*Bifora testiculata* (L.) Spreng	Geshniz	Medicinal	Treatment of female cysts	Stem, leaf, seed
Hollyhocks	*Alcea* L.		Medicinal	Flu treatment	Root, flower, leaf
Perforate St John's-wort	*Hypericum perforatum* L.	Dava Simi	Medicinal	Relaxation	Arial part
Calla lily	*Arum* L.	Kardeh	Medicinal-spicy	Treatment of bloating	Root
Viper's-buglosses	*Anchusa italica* L.	Gole Gereh Zon	Medicinal	Relaxation	Flower
Damask rose	*Rosa damascena* Mill	Gole Bosouni	Medicinal-spicy	Constipation treatment	Petal
Fritillaries	*Fritillaria imperialis* L.	Gole Negin	Medicinal	Treatment of heartburn	Flower and allium
Allium jesdianum	*Allium jesdianum* Boiss. & Buhse	Bon Sorkh	Medicinal-spicy	Eliminate kidney stones	Leaf and allium
Marjoram	*Origanum vulgare* L.		Medicinal	Relieve menstrual cramps	Flowered shoot
Common sage	*Salvia sclarea* L.	Marvereshk	Medicinal	Menstrual regulation	Leaf and flowered shoot
Germanders	*Teucrium polium* L.	Arpe	Medicinal	Treatment of stomach upsets	flowered shoot
Oliveria decumbens	*Olieria decumbent* L.		Medicinal	Treatment of gastric infection	Leaf and shoot
Marveh	*Artemisia absinthium* L, wormwood	Molke Ardak	Medicinal	Treatment of severe cough	Leaf and flowered shoot
Cohosh	*Cimicifuga racemose*		Spicy	Flavor of buttermilk and yogurt	Root

In the second part of the research, focused on identifying barriers to the industrial development of medicinal plants in Boyer-Ahmad County, the interviews underwent open coding and were subsequently grouped into 26 initial categories (concepts), as classified in Table 2.

Table 2
Conceptualizing Data (Open Coding of Barriers to the Industrial Development of Medicinal Plants in Boyer-Ahmad County).

Code	Concepts	Abundance
1	The existence of ethnic relations and occasions	12
2	Lack of management in transferring the industry to the province.	4
3	Violation of laws in government offices	16
4	Absence of standards aligned with Iran's conditions.	3
5	Infrastructure problems	20
6	Lack of support for top production units and exporters	5
7	Lack of government support in land grants	12
8	The wildness of medicinal plants	21

9	Low resistance of medicinal plants to weeds	19
10	Lack of academic experts	21
11	Ignorance of seed reactions	18
12	Lack of agricultural machinery and equipment for cultivating medicinal plants	19
13	Reluctance of medical doctors to prescribe industrial herbal medicines.	22
14	Restriction on the dispensing of herbal medicines by herbal medicine vendors.	20
15	People's inclination towards purchasing traditional herbal medicines.	22
16	Lack of people's information about industrial herbal medicines	21
17	People's distrust of industrial herbal medicines	19
18	The procurement of medicinal plants from farmers in different provinces.	21
19	Inadequate weather and regional conditions for certain medicinal plants.	13
20	Lack of control over fertilizers and pesticides used in neighboring farms.	14
21	No guaranteed purchase	17
22	Lack of farmers' awareness regarding the supply and demand of the product.	18
23	Lack of low-rate financial facilities	16
24	Lack of product insurance	11
25	Lack of experienced labor	21
26	Higher losses compared to other agricultural products.	17

Following the coding process, the initial 26 concepts resulting from open coding were categorized into 14 families, thereby reducing their theoretical coding to 9 axial categories. These axial categories were further organized into five sectors based on their nature: the public sector, the university sector, the farmers sector, the health ministry sector, and the manufacturing sector. Within each sector, the axial categories comprise several subcategories, serving as focal points between categories and facilitating interactions among them.

CONCLUSIONS AND DISCUSSION

Table 3 illustrates two core categories within the public sector, each briefly described along with their respective subcategories:

Weakness of monitoring devices:

A) Favoritism: This aspect concerns the relationship between individuals and high-level managers in Boyer-Ahmad County. Transfers of high-level managers to different offices often result in changes in human resources positions, regardless of promotion or demotion. This practice significantly impacts the province's development, causing delays in production plans for herbal medicine factories. Managers of these factories struggle with this issue in various ways due to the ethnic ties influencing resource allocation and permit issuance.

B) Law: Under Law 92 Direct Taxes, pharmaceutical products are exempt from taxes, and pharmaceutical companies are prohibited from collecting taxes from consumers. However, one herbal medicine factory in Boyer-Ahmad County received fines from the tax office for failing to pay taxes, affecting the country's budget. Additionally, the Food and Drug Administration issues licenses for domestically produced products based on the US FDA standard, which poses challenges due to discrepancies in technological capabilities between the US and Iran. Industry executives question the fairness of this comparison and advocate for the establishment of internal standards for these products.

1. Ignorance of the capabilities and deprivation of the province: There is a notable oversight within this central class: Ignorance of structural capabilities and obstacles. Unfortunately, provincial managers and officials pay scant attention to the capabilities of Kohgi-

luyeh and Boyer-Ahmad Province, instead seeking to transfer industries such as petrochemicals, batteries, and rubber to the province for political reasons. The construction of these factories in the province would be environmentally damaging and pose a significant problem for herbal medicine factories. Another practical challenge faced by manufacturing plants in Kohgiluyeh and Boyer-Ahmad Province, particularly in Boyer-Ahmad County, is the prevalent weaknesses in the main infrastructure, including roads, water, electricity, and telephone systems. Since the production factories are situated in the most remote parts of the county, they lack proper road access and encounter difficulties in transporting their products. Moreover, manufacturing facilities are the first to experience interruptions whenever Boyer-Ahmad County encounters water and electricity shortages.

Herbal medicine factories urgently require reliable and high-speed internet access due to online orders from both domestic and international markets. Nevertheless, they encounter numerous obstacles in placing orders and sending products due to weaknesses in the telecommunications and internet systems of Boyer-Ahmad County.

Table 3
Conceptualization of Data, Public Sector Domain.

Concepts	Family group	Axial codes
The existence of ethnic relations and occasions	Favoritism	
Violation of laws by government departments	Law	Weak monitoring devices
Lack of standards in accordance with the conditions of Iran		
Lack of management in transferring industry to the province	Ignoring the capabilities and structural barriers	
Infrastructure problems		Ignorance of the capabilities and deprivation of the province
Lack of support for top production units and exporters	Isolation of the province by the government	
Lack of support in land grants		

As depicted in Table 4, the academic sector comprises two crucial classes, each briefly outlined along with its subcategories:

Technology and knowledge development:

A) *Lack of technological progress:* In developed countries, only a small fraction of medicinal plants have been domesticated, with the majority still growing wild. The insufficient attention from plant breeding professors and researchers to this sector has resulted in inadequate production and a failure to keep pace with development initiatives. Additionally, despite advancements in designing and manufacturing medical equipment, technologists have regrettably shown minimal interest in the agricultural sector, leading to the utilization of outdated machinery. In the realm of medicinal plants, there is a scarcity of machinery for planting, harvesting, and extracting the product. Consequently, the majority of medicinal plants are exported abroad in raw form, fetching low prices.

B) *Lack of knowledge:* While most studies on medicinal plants have focused on identifying their properties and applications in

various industries, limited research has been conducted on seed responses to varying climatic conditions and soils. There has been little exploration into seed resistance against weeds under field conditions. These gaps in knowledge contribute to the reluctance of most farmers to cultivate medicinal plants. Furthermore, there is insufficient knowledge and information regarding the domestication of these plants.

Lack of attention from the Ministry of Science:

Professors' indifference to medicinal plants: A small number of university professors and those in agricultural-related fields have prioritized research on medicinal plants. This neglect of medicinal plants by university faculties has hindered progress in the development of medicinal plant cultivation.

Table 4
Conceptualization of Data, Academic Sector.

Concepts	Family group	Axial codes
The wildness of medicinal plants	Lack of technological progress	Technology and knowledge development
Lack of agricultural machinery and equipment for cultivating medicinal plants		
Low resistance of medicinal plants to weeds	Lack of knowledge	
Ignorance of seed responses		
Lack of academic experts	Professors' negligence of medicinal plants	Lack of attention from the Ministry of Science

According to Table 5, the field of farmers encompasses three central classes, each briefly *described along with its subclasses:*

Lack of appropriate environment:

Lack of environmental conditions: Medicinal plants, like other crops, require specific environmental conditions. Some medicinal plants, such as marshmallow or rosemary, can thrive in locations like Yasuj, whereas others like Zaroie can only grow in the high altitudes of Mount Dena. Consequently, farmers face constraints in cultivating medicinal plants.

Development of financial services:

Market instability: Unlike crops such as wheat, which benefit from government purchase guarantees, medicinal plants lack this assurance, exposing farmers to the risk of bankruptcy. Moreover, the traditional market for medicinal plants is volatile, leading to uncertainty in supply and demand. If production exceeds market needs, farmers face bankruptcy risks.

Financial support: Since medicinal plants are not covered by crop insurance, any crop damage results in losses solely borne by the farmer. Additionally, accessing financial support for setting up and initiating medicinal plant production entails high costs. Consequently, few individuals are willing to undertake this risk and seek financial assistance, often struggling to repay the loans.

Lack of education:

Human resources: With no specialized machinery for harvesting medicinal plants, farmers resort to manual labor for harvesting, sorting, and packaging. However, inexperienced laborers may inadvertently damage plants, leading to crop destruction. Moreover, reliance on manual labor increases costs and reduces farmers' profits.

Table 5
Data Conceptualization, Farmers Sector.

Concepts	Family group	Axial floor
Lack of suitable weather and regional conditions for some Medicinal Plants	Lack of environmental conditions	Lack of suitable environment
Lack of control of fertilizers and pesticides used in neighboring farms		

No guaranteed purchase		
Lack of farmers' information about crop supply and demand	Market instability	Development of financial services
Lack of crop insurance	Financial support	
Lack of low-rate financial facilities		
Lack of experienced labor	Human resources	Lack of training

As depicted in Table 6, within the realm of the Ministry of Health, a central axis exists focusing on the development of traditional medicine alongside modern medicine. This axis is *briefly described along with its subcategories:*

Development of traditional medicine along *with modern medicine:*

Exclusivism: Within the medical community, there is a tendency to dismiss traditional medicine in favor of modern medical practices, leading to the reluctance of doctors to prescribe herbal remedies to patients. Additionally, the Ministry of Health has enforced a circular prohibiting all medicinal plant sellers from recommending herbal medicines to their clients.

Table 6
Data Conceptualization, Department of the Ministry of Health.

Concepts	Family group	Axial floor
Doctors' reluctance to prescribe herbal medicines	Monopolization	Development of traditional medicine along with modern medicine
Prohibition of prescribing herbal medicines by medicinal plant sellers		

According to Table 7, within the field of manufacturing factories, there exists a pivotal class focusing on marketing and training, which is briefly described along with its subclasses:

Marketing and training:

A) *Advertising:* There is a lack of awareness among many individuals regarding industrially produced herbal medicines, or they harbor complete distrust toward these medicines. This lack of awareness stems from inadequate advertising by manufacturers or misinformation spread by traditional market brokers.

B) *Cultivation:* The majority of individuals who use herbal medicines do so based on recommendations from elders, leading them to prefer traditionally dried and supplied herbal medicines. Indigenous farmers are also resistant to cultivating herbal medicines, prompting factory managers to source raw materials from other provinces. Addressing these challenges requires ongoing education and cultural interventions.

Table 7
Conceptualization of Data, Manufacturing Plants.

Concepts	Family group	Axial floor
Lack of information on industrial herbal medicines	Advertising	Marketing and training
People's distrust of industrial herbal medicines		
People's desire to purchase traditional herbal medicines	Culturalizing	
The purchase of medicinal plants from farmers in other provinces		

Finally, according to the concepts obtained from the interviews, the paradigm model is derived as displayed in Figure 1.

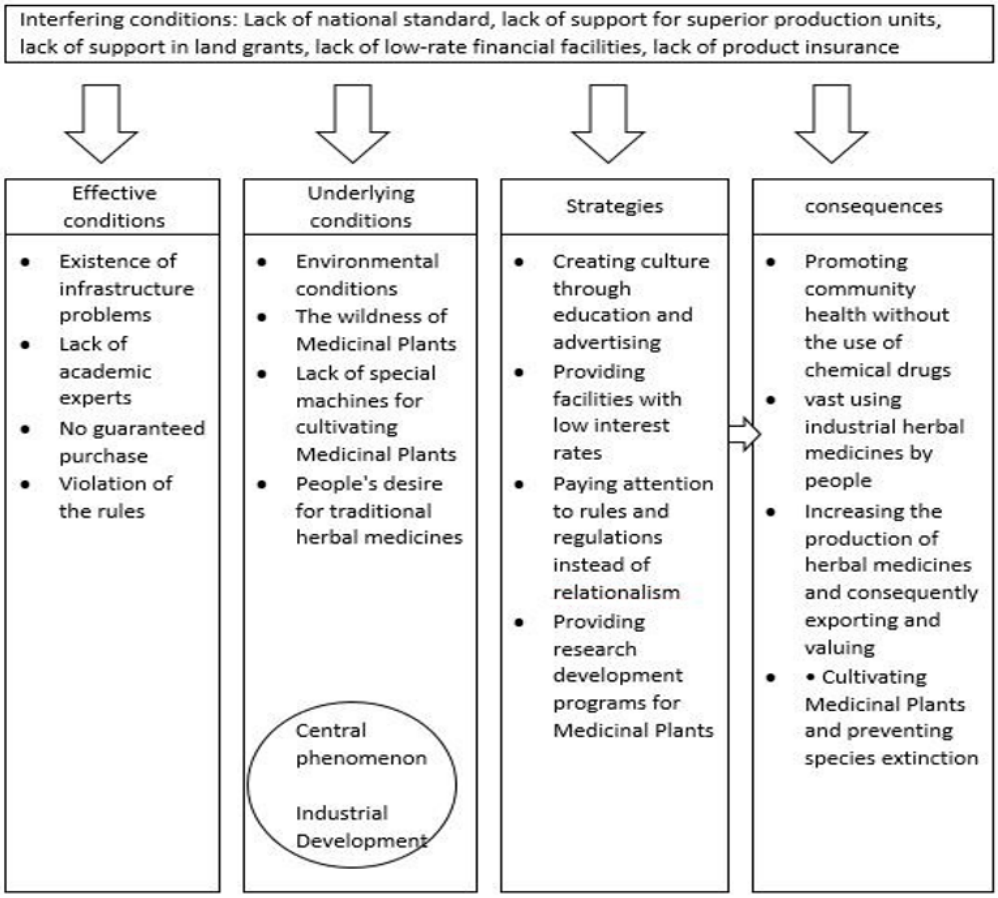

Figure 1. Paradigm pattern

Based on the results obtained, the following suggestions are recommended:

Training for Traditional Sellers: The Department of Agriculture, in collaboration with universities, should organize training sessions to educate traditional sellers about medicinal plants and their properties, aiming to provide consistent and accurate information.

Certification for Vendors: The Health Department should conduct periodic exams for shop assistants and salespeople selling medicinal plants, issuing official certifications upon passing. Inspections should also be carried out to prevent the operation of unlicensed sellers.

Conservation of Medicinal Plants: To prevent the extinction of medicinal plants like Zaroei and Bilahar, it is recommended to spread and cultivate their seeds in natural and protected environments. Limited licenses should be granted to control the supply to the market. Strict penalties should be imposed on illegal plant collectors.

Promotion of Industrially Produced Herbal Medicines: Mass media platforms such as television and radio networks should be utilized to introduce industrially produced herbal medicines to consumers, aiming to increase confidence in these products.

Physician Training on Herbal Medicines: The Ministry of Health should encourage doctors to prescribe herbal medicines by organizing open training courses to enhance their knowledge about these medicines.

Cultivation of Ornamental Medicinal Plants: Municipal administrations should cultivate ornamental medicinal plants like Rosa damascene Mill and Alcee L. in parks and recreational areas. Placards should be placed to inform people about their medicinal properties.

Establishment of Medicinal Plant Garden: The agricultural department, in collaboration with Yasouj University, should establish a medicinal plant garden in Boyer-Ahmad County to capitalize on its capability in this field.

Creation of a Gene Pool and Propagation Cen-

ter: Yasouj University should establish a gene pool of medicinal plants to prevent the extinction of rare species. Additionally, a plant propagation center can facilitate research on domesticating medicinal plants.

Educational Programs on Medicinal Plants: Yasouj University should initiate educational programs focusing on medicinal plants to address the shortage of experts and specialists in this field.

Development of Comprehensive Programs: New policies and programs should be developed in Iran to address the weaknesses in the field of medicinal plants comprehensively.

Collection of Indigenous Knowledge: Initiatives should be launched to collect and record indigenous and traditional knowledge about medicinal plants to preserve this valuable information.

Research on domestication: Students and faculty members should conduct extensive studies and experiments on the domestication of wild medicinal plants to enhance their cultivation and utilization.

These recommendations aim to address various aspects of the medicinal plant industry, from education and conservation to promotion and research, ultimately fostering its growth and sustainability.

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Conflict of Interest

The authors declare that there is no conflict of interest.

Authors' Contributions

MM: Conceptualization, Methodology, Field data collection, data analysis, writing the first draft. MN: Supervision of all the stages. ZS: Editing the first draft to prepare the final accepted and printed manuscript.

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