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Developing Optimal Mechanisms for Rural Women's Participation in Medicinal Plant Businesses with an Entrepreneurial Approach in Ilam Province

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ABSTRACT

Ilam Province, with its rich natural resources and diverse vegetation, has a high potential for developing entrepreneurial businesses in the field of medicinal plants. Rural women, particularly household heads, play a crucial role in utilizing these resources and can become key economic drivers in the region through an entrepreneurial approach. Developing optimal mechanisms for their participation can foster social empowerment, reduce unemployment, and promote sustainable livelihoods. This research was conducted to identify obstacles and design entrepreneurial solutions to enhance women's participation in medicinal plant businesses in Ilam Province. A qualitative approach using the grounded theory paradigm was employed to identify effective entrepreneurial mechanisms. The primary data collection tool was semi-structured interviews, conducted with 19 participants until theoretical saturation was achieved. The results revealed that the most significant challenges faced by rural women included: the adverse effects of sanctions on business (such as the multiple increases in the prices of seeds and inputs), lack of support from government institutions for rural women's enterprises, limited access to higher education and career advancement, opposition from family and relatives to starting a business, difficulties commuting from villages to cities during different seasons, prioritization of wheat cultivation limiting space for medicinal plants, physical health risks due to the pressures of heavy labor, absence of guaranteed purchase policies for medicinal plants, and challenges in accessing government loans and credits. To address these obstacles, nine mechanisms were identified and categorized within the Strauss and Corbin model: economic mechanisms, social mechanisms, cultural-scientific mechanisms, personal-psychological mechanisms, legal-legal mechanisms, policy-making mechanisms, support mechanisms, equipment mechanisms, and environmental-geographical mechanisms. These mechanisms provide a structured framework for promoting women's participation and advancing medicinal plant entrepreneurship in the region.

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Introduction

The rural economy today faces fundamental challenges, including heavy dependence on agricultural products, vulnerability to economic fluctuations, limited entrepreneurial activity, restrictions on job creation, rising production costs, reduced income, unemployment, and depletion of essential production resources (Jafari et al., 2017). Rural women, in particular, face greater difficulties than men and urban women, and economic crises tend to impact them more severely. Studies indicate that women are more exposed to poverty and gender discrimination because they often lack the necessary capabilities and resources to enhance their empowerment (Tarassi et al., 2010). Rural women have limited access to employment, education, and assets (Koolwal, 2021), making them the most disadvantaged segment of the rural population. Consequently, they are constantly struggling to sustain their livelihoods, especially in the context of challenges such as climate change, declining cash crop prices, reduced access to land, and shrinking employment opportunities in the agricultural sector (Hajdu et al., 2020). Common issues in rural communities—such as limited access to information, low skill levels, lack of an entrepreneurial culture, and ethnic or tribal inequalities—further exacerbate these vulnerabilities, highlighting the need to expand employment opportunities and optimize resource utilization (Su et al., 2019). Thus, one of the key factors contributing to the vulnerability of rural women is their precarious economic condition (Chia et al., 2023).

To overcome these obstacles and promote a sustainable livelihood, the inherent resources of local communities must be effectively utilized. Achieving sustainable rural development, therefore, requires livelihood patterns that align with the needs of contemporary rural populations (Savari & Amghani, 2022; Saki et al., 2013). However, in the design and implementation of comprehensive rural and agricultural development policies, the capacities of rural women to contribute to the sustainability of household livelihoods have not been fully leveraged (Waleling et al., 2017). Rural women often engage in multiple livelihood activities to meet growing household needs and alleviate poverty and hunger (Maramura et al., 2021). Consequently, their employment and active participation in the economic life of rural communities are essential for overall rural development (Salehi et al., 2017). Evidence indicates that women's employment in both agricultural and non-agricultural sectors can significantly enhance the sustainability of rural livelihoods (Arthur-Holmes et al., 2023).

Various strategies can be employed to address the challenges facing rural communities, one of which is the development of medicinal plants. Cultivating medicinal plants and engaging in related economic activities can help stabilize the rural economy and provide a foundation for sustainable livelihoods (Najafi, 2014). Studies on women's participation in such economic activities indicate that rural women play a crucial role in the production of medicinal plants, drawing on their local knowledge and experience (Ingutia et al., 2020). Activating rural women in economic activities, particularly in the medicinal plants sector, can therefore enhance the sustainability of household livelihoods and guide the rural economy toward long-term resilience (Peng et al., 2017). Moreover, leveraging the potential of rural women in this sector presents a significant opportunity, as shifts in consumer preferences from

synthetic to natural products have spurred renewed interest in medicinal plants, especially in developing countries (Razão et al., 2024). Additionally, among agricultural products, medicinal plants are economically significant, contributing substantially to non-oil income generation (Arthur-Holmes et al., 2023).

It should be noted that more than four billion people—approximately 80% of the world's population—living in developing countries rely on plant products, particularly medicinal plants, as their primary source of healthcare (Ekor, 2014). Iran is home to over 7,900 plant species, of which 13% are medicinal plants (Qahroman, 2004). This remarkable biodiversity has historically underpinned the use of medicinal plants and plant-based remedies in Iranian medicine (Grami, 2017). Medicinal plants continue to gain importance as essential natural resources for meeting healthcare needs and providing livelihoods in many low-income communities (Ndhlovu et al., 2023). Medicinal plants hold significant economic value in local and national markets (Ndhlovu et al., 2023) and play important roles across the economic, social, cultural, and environmental spheres of communities worldwide. Their applications extend beyond pharmaceuticals to include perfumery, cosmetics, toothpaste, soap, beverages, and food industries (Razão et al., 2024). Demand for medicinal plants is rising in developing countries, while consumers in industrialized nations are increasingly turning to herbal remedies. In Iran, both wild and cultivated plant species—including their fruits and leaves—are critical for addressing health concerns and food insecurity (Dalir et al., 2024). Despite general agreement on the importance of medicinal plants and their by-products for poverty alleviation, their role in improving livelihoods is not yet fully understood (Ndhlovu et al., 2023). Many people in Iran increasingly rely on plants for health security due to population growth and limited access to modern medicine. Today, medicinal plant products constitute a significant portion of the livelihoods and incomes of rural villagers (Dalir et al., 2024).

Therefore, it is essential to harness the capabilities of rural women in the field of medicinal plants to strengthen both rural and national economy. This study, accordingly, examines the participation of rural women in medicinal plant businesses from an entrepreneurial perspective in Ilam Province. Notably, 87% of the province consists of natural resources areas. Located in the foothills of the Zagros Mountains, these areas benefit from favorable climatic conditions and are rich in forests, pastures, and diverse vegetation. As a result, Ilam is considered one of the most important habitats for a wide variety of wild plants in Iran and is recognized as a key reserve for medicinal plants, particularly in the western part of the country. This unique feature has earned Ilam the epithet "the bride of the Zagros." Expanding cultivation and developing medicinal plant enterprises in the province, in addition to generating substantial income, can play a significant role in economic development and reducing unemployment among rural women.

Research Background

Several studies have been conducted in Iran and other countries on women's participation in economic activities and the role of medicinal plants, the results of which are summarized below. Some studies in South Asia have emphasized that economic empowerment serves as a gateway to the overall empowerment of women,

particularly when women are organized under a common platform. For instance, Chia et al. (2023) examined the impact of women's participation in income-generating activities on household income and found that it contributed to greater household sustainability. In Pakistan, Islam et al. (2022) identified various socio-economic and demographic factors influencing the decision of educated married women to participate in the labor market.

Research on medicinal plants has highlighted their economic significance and environmental challenges. Asigbaase et al. (2023) reported that, on average, medicinal plants accounted for 64% of the gross annual income of study subjects; however, 33 species of medicinal plants are threatened due to overharvesting, agricultural expansion, mining, deforestation, and climate change. Chia et al. (2023) found that, in global markets, factors such as the lack of mapping of medicinal plant coverage, insufficient management incentives and support for user groups in forests, and weak institutionalization of community-based organizations have limited the contribution of medicinal and aromatic plants to the livelihoods of rural communities in developing countries.

In Ghana, Pretzsch et al. (2019) concluded that medicinal plants and native vegetation can serve as a strategy for reversing environmental degradation and improving food security. In Iran, Heydari et al. (2018) studied programs and strategies to increase the cultivation of medicinal plants in Kurdistan Province and identified key challenges, including limited government financial support, lack of modern irrigation systems, international economic and banking sanctions, weaknesses in commercialization and processing industries, and insufficient promotion of medicinal plants. Similarly, Safarizadeh et al. (2022), in a study on economic factors affecting the acceptance of medicinal plants, found that insurance coverage, satisfaction, and education were the most influential factors. Mahboubi et al. (2020), in Golestan Province, identified major barriers to the distribution of medicinal plant products and by-products, including lack of government support for workers and activists in the sector, limited acceptance of medicinal plants by physicians, and high production and product costs.

Research Method

This research is a qualitative study in terms of its applied purpose and paradigm. To provide a clear understanding of the challenges faced by rural women in participating in the medicinal plant sector and, importantly, to develop a model grounded in real conditions, the researchers employed the grounded theory method (Razmavar & Savari, 2018a). Grounded theory is a qualitative research approach aimed at generating theory directly from data rather than testing pre-existing theories (Naderi et al., 2025; Connor et al., 2024; Susanto et al., 2024). It enables researchers to explore participants' experiences and understand how they perceive and interpret their actions (Connor et al., 2024). This method is particularly suitable for investigating phenomena that are not well understood or theorized, allowing researchers to construct theoretical frameworks closely linked to empirical evidence (Du et al., 2025).

Grounded theory involves an iterative process of data collection, coding, and

analysis to identify concepts, categories, and relationships. Researchers employ continuous comparison to develop a theory that systematically explains the phenomenon under study. It is especially useful when existing theories fail to capture a phenomenon or when exploring new research areas (Susanto et al., 2024). Key qualitative principles, such as non-numerical data collection, inductive reasoning, contextualization, researcher-participant interaction, and methodological flexibility, are central to grounded theory, enabling deep understanding and valuable contributions to knowledge (Susanto et al., 2024; Du et al., 2025). In this study, the Strauss and Corbin approach was used for analysis and theory development. Data processing involved multi-stage coding with continuous comparison of events, concepts, and their relationships, allowing abstraction of the main concepts and categories. Straussian grounded theory divides coding into three stages:

1. Open coding: Transforming raw data into concepts and categorizing them. Each statement from participants is coded, and initial concepts are identified and grouped into categories (Tajerimoghdam et al., 2011).
2. Axial coding (concept formation): Examining relationships between categories, refining codes from open coding, and linking concepts to identify central phenomena (Tajerimoghdam et al., 2011).
3. Selective coding: Integrating and refining categories to form a theoretical model that addresses the research problem, ensuring that only concepts relevant to theory development are included (Tjahjono & Heikal, 2024).

Finally, the theory formation stage aims to explain the phenomenon by connecting the emergent model with existing studies and theories (Tjahjono & Heikal, 2024). In grounded theory, data collection and analysis occur simultaneously, which allows emerging insights to guide further inquiry. Interviews are particularly suitable for this approach. Strauss and Corbin (1992) emphasize that grounded theory requires flexible, open-ended questions to explore the phenomenon, making semi-structured or unstructured interviews an effective tool for discovering participant experiences (Zeinolabedini et al., 2021). In this study, the Straussian approach was applied throughout data collection and analysis to develop a model of rural women's participation in medicinal plant entrepreneurship.

According to Strauss and Corbin's grounded theory, a model typically includes several dimensions, which are described as follows:

a) Causal conditions: Events or circumstances that lead to the occurrence or development of the main phenomenon (Razmavar & Savari, 2018b).
b) Central phenomenon (main axis): The primary phenomenon under study, which serves as the central idea or focus of the research. It may be an event, action, or process toward which actions and reactions are directed. The central category forms the basis of the theoretical framework and must be abstract enough to connect with other categories (Razmavar & Savari, 2018a).
c) Contextual conditions (governing context): Specific circumstances or variables that influence strategies. These include concepts, categories, or contextual factors that shape the phenomenon (Razmavar & Savari, 2018b).
d) Intervening conditions: Factors that facilitate or constrain the implementation of strategies (Razmavar & Savari, 2018a).

e) Strategies: Purposeful behaviors, interactions, or processes undertaken in response to the main phenomenon, influenced by contextual and intervening conditions (Razmavar & Savari, 2018b).

f) Consequences: The outcomes or results that arise from the implementation of strategies, reflecting the effects of actions and reactions (Razmavar & Savari, 2018a).

The statistical population of this study consisted of rural women active in the medicinal plant sector in Ilam Province. Purposeful sampling was conducted using the snowball technique and continued until data saturation was reached. Data saturation occurred at the 13th interview, when no new codes emerged and responses became repetitive; however, data collection continued until the 19th interview to enhance the reliability and depth of the findings. To comprehensively identify the challenges faced by rural women, participants engaged in in-depth, semi-structured interviews, allowing them to freely express their perspectives. Interviews lasted 50 to 90 minutes and were conducted both in person and virtually. Informed consent was obtained from all participants, and confidentiality and anonymity were strictly maintained. All interviews were recorded with participants' consent and fully transcribed for analysis. After data collection, the transcripts and notes were carefully reviewed multiple times to extract meaningful codes and assign appropriate labels. For systematic data management and analysis, the MaxQDA software was employed to assist in organizing codes, categories, and emerging themes.

Results

Descriptive Statistics of Participants

Based on the results of descriptive statistics, all female respondents were between the ages of 26 and 59. Their education ranged from fifth grade to postgraduate, with eight of them single and 11 married.

Results of the Grounded Theory

At the first stage of coding (open coding), the researchers extracted 95 concepts related to the challenges faced by rural women in the medicinal plant sector (Table 1). Based on the frequency and emphasis in the interviews, the most recurrent codes were considered the primary obstacles. The key challenges identified by the participants included:

- The adverse impact of sanctions on business, resulting in multiple increases in the prices of seeds and inputs.
- Lack of support from government institutions and relevant departments for rural women's enterprises.
- Opposition from family and relatives to starting a business.
- Limited opportunities for higher education and advancement to higher positions.
- Prioritization of wheat cultivation, leaving insufficient space for medicinal plant farming.
- Difficulties commuting between villages and cities across different seasons.
- Physical health risks arising from the pressure and hardship of heavy labor.
- Absence of policies guaranteeing the purchase of medicinal plants.
- Difficulty accessing government loans and credit facilities.

These findings highlight the multifaceted challenges—economic, social,

educational, infrastructural, and health-related—that constrain rural women's participation in the medicinal plant industry.

Table 1. Open coding of obstacles to rural women's business in the field of medicinal plants

Code	Basic codes (concepts)	Categories (classification of barriers)	Number
A1	Lack of job diversity	Economic barriers	5
A2	Lack of capital to start a business		6
A3	Lack of financial capacity to have savings and investments from earning income in the field of medicinal plants		8
A4	The existence of intermediaries and buying products cheaply		4
A5	Difficulty in accessing government loans and credits		10
A6	Low loan amount		3
A7	Lack of access to high-paying jobs		6
A8	A lot of hard work and low income in agricultural jobs		4
A9	Lack of a stable source of income and difficulty in paying off loans		4
A10	Seasonality of agricultural jobs		4
A11	Product retail		7
A12	The difficult economic situation prevailing in society and the fact that all family members are forced to earn money, even at a young age.		3
A13	Rising prices of inputs, fertilizers, and pesticides		3
A14	Rising seed prices		5
A15	Lack of a specific sales market for products		7
A16	Uncertainty about long-term job stability		8
A17	Seasonality of medicinal plant cultivation and their lack of sustainability throughout all seasons of the year		6
A18	Lack of customers in the village		7
A19	Borrowing products		2
A20	High licensing fees		3
A21	High rent for shops		4
A22	Lack of access to planting, harvesting, and harvesting machines due to their high cost for agricultural operations		2
A23	Opposition from family and relatives to starting a business	Social barriers	14
A24	Women's excessive responsibilities at home		6
A25	Being dependent on the opinion of the spouse or family		6
A26	Needing permission from the spouse or parents to leave the house		2
A27	Envy of relatives and acquaintances and negative comments about starting a business		7
A28	Giving priority to men's decision-making in many issues		7
A29	Full-time agricultural work and lack of vacations		2
A30	Top-down view of the majority of society towards agricultural jobs		2
A31	The patriarchal nature of society in the past, which took away women's self-confidence and lack of self-esteem to develop their talents		3
A32	Parents' incompetence and children's excessive workload and lack of opportunity for growth and development		2
A33	Not leaving home alone due to social pressures and having to answer questions from relatives and neighbors		4
A34	High workload for women (housekeeping and working outside the home) and receiving lower wages		7
A35	Lack of support from friends and relatives		2

Code	Basic codes (concepts)	Categories (classification of barriers)	Number
A36	Lack of awareness of product packaging at the beginning of the business	Cultural-academic barriers	2
A37	Lack of higher education opportunities and failure to achieve higher status and ranks		14
A38	Lack of formal and informal training related to medicinal plants in the village		6
A39	Lack of educational classes related to medicinal plants		2
A40	Lack of awareness of the sales market when starting a business		3
A41	Limited rural environment for growth and development		3
A42	Lack of sufficient skills to attract customers		2
A43	Fear of increasing prices of inputs and production resources	Personal-psychological barriers	2
A44	Fear and anxiety about not being able to meet family needs		3
A45	Belief in bad luck		5
A46	Short-term mental and physical fatigue		4
A47	Damage to physical health due to excessive pressure and difficulty of work		12
A48	Fear and worry about failure at work		8
A49	Losing the breadwinner and being forced to do hard work		6
A50	Lack of risk-taking spirit		2
A51	Fear of not having a sales market		8
A52	Lack of motivation for bulk production due to lack of a reliable sales market		5
A53	Weakening of morale due to lack of sales		3
A54	Fear and apprehension of damage to products		5
A55	Facing bureaucratic red tape and obstacles to obtaining permits to start a business on a large scale	Legal barriers	4
A56	The lack of follow-up by government agencies to resolve issues related to them		2
A57	The lack of a brand and failure to widely supply products and export them		6
A58	The obstruction of government institutions and agencies and the imposition of heavy guarantees to prevent them from giving loans to rural women		3
A59	The prevention of the Agricultural Jihad Organization from cultivating new plant species such as saffron in the region		2
A60	Partisanship by some organizations		2
A61	Discrimination between men and women in providing facilities		3
A62	The adverse impact of sanctions on business (multiple increase in the price of seeds and inputs used)	Policy-making barriers	16
A63	Encouraging rural women to do business by the president in speeches		6
A64	Non-compensation of crop damage by insurance		2
A65	Cost of being covered by insurance		4
A66	Non-approval of specific sales market by the government		9
A67	Non-designation of policies for guaranteed purchase of medicinal plants		11
A68	Lack of support from government institutions and departments for rural women's businesses	Supportive barriers	15
A69	Lack of attention from the county's Agricultural Jihad Organization to the damage caused to crops		3
A70	Lack of guarantees from relatives and acquaintances for receiving loans due to poor financial capacity		2
A71	Lack of government support for exemplary farmers		3

Code	Basic codes (concepts)	Categories (classification of barriers)	Number
A72	Resistance by officials to prevent the cultivation of a new species in the region		2
A73	Lack of sufficient information from agricultural engineers about the cultivation of new plants in the region		2
A74	Prioritization of wheat cultivation and lack of cultivation of medicinal plants in the region		13
A75	Lack of support from friends and acquaintances		4
A76	Lack of access to large areas of land for cultivation	Equipment and production resource barriers	7
A77	Lack of access to land		3
A78	Lack of access to sufficient water for irrigation		6
A79	Lack of access to subsidies, inputs, and fertilizers and pesticides		4
A80	Lack of flat land		2
A81	Lack of easy access to agricultural machinery		2
A82	Lack of access to processing industries in the region		4
A83	Lack of shops to sell products in the city		2
A84	Land ownership is communal and not individual ownership		2
A85	Lack of packaging machines to package products		3
A86	Changing the land under saffron cultivation after about 10 to 12 years		2
A87	Lack of inferior equipment used and their costliness		2
A88	Lack of access to production resources (including seeds, etc.) in the village		6
A89	Lack of access to high-speed internet in the village for ordering and selling inputs and products equipment (barriers)	Environmental-geographical barriers	5
A90	Emergency travel problems from the village to the city in different seasons		13
A91	Limited rural environment and lack of customers		9
A92	Higher postage costs for sending products to the city		3
A93	Higher transportation costs for purchasing raw materials and selling products from the village to the city		6
A94	Emergency weather conditions and damage to products in different seasons		3
A95	Saffron plant is sensitive to adverse weather conditions		3

Axial Coding

In the second stage of coding, known as axial coding, similar codes were compared, reviewed, and grouped into broader categories, forming conceptual codes (Table 2). During this stage, the initial 95 concepts were organized into 24 conceptual codes, reflecting key challenges faced by rural women in medicinal plant entrepreneurship. These conceptual codes included:

- Financial weakness
- Rising production costs
- Problems in the sales market
- Prejudice against women
- Presence of a patriarchal mindset
- Multiple household and occupational duties of women
- Restrictions within the village
- Limited awareness of cultivating new plant species
- Restrictions on access to educational opportunities

- Work fatigue
- Lack of self-confidence
- Physical injuries
- Fear of failure
- Weaknesses in legal frameworks
- Inequality of rights between men and women
- Insufficient allocation of facilities
- Economic sanctions
- Lack of insurance coverage
- Lack of government support
- Limited acceptance by officials of cultivating new species
- Lack of access to production resources
- Limited access to equipment
- Distance and commuting challenges between village and city
- Water scarcity

These conceptual codes were further organized into nine subcategories of obstacles, which are described below, along with illustrative quotations from participating rural women. This axial coding process helped to systematically identify relationships among concepts, providing a clearer understanding of the factors constraining women's participation in medicinal plant enterprises.

Table 2. Secondary coding and formation of conceptual classes and categories

Subclasses	Conceptual codes
Economic barriers	Financial weakness Rising costs Market problems
Social barriers	Prejudice against women Existence of patriarchal spirit Excessive responsibilities for women Limitations in the village
Cultural-academic barriers	Lack of awareness regarding the cultivation of new plants Limited educational opportunities
Personal-psychological barriers	Work fatigue Lack of self-confidence Physical injuries Fear of failure
Legal barriers	Weakness of the law Inequality of rights between men and women
Policy-making barriers	Lack of allocation of facilities Sanctions Lack of insurance commitment
Supportive barriers	Lack of government support Officials' lack of acceptance of new species cultivation
Equipment barriers	Lack of access to production resources Lack of access to equipment
Environmental-geographical barriers	Problems of distance between village and city Climate problems

Selective Coding

The final stage of coding in the Strauss and Corbin model is selective coding, which represents the primary phase of theory development based on the results of open and axial coding. In this stage, researchers systematically relate the axial

categories to other categories and present these relationships within a paradigmatic framework as outlined by Strauss and Corbin. Researchers may choose to present the categories as they are or to orient the model toward practical solutions. Given the main objective of this study, the researchers opted to present the selective codes positively, directing the analysis toward overcoming the obstacles faced by rural women in medicinal plant entrepreneurship. This approach allows the development of mechanisms and strategies to facilitate women's participation and improve their livelihoods (Table 4).

Economic Mechanisms

The economic mechanisms influencing rural women's participation in medicinal plant development are shaped by various structural and contextual factors, including the financial responsibilities of female household heads, limited rural sales markets, insufficient support infrastructure, and administrative barriers. Many women active in this sector are unable to save or invest due to family economic burdens and the costs of children's education, often allocating all income to daily needs. Furthermore, the local abundance of medicinal plants has reduced market demand and confined sales primarily to the routes used by travelers. Additional challenges include inadequate storage and shelter, harsh weather conditions, and limited access to urban markets. Governmental inattention to requests for permits or financial support, coupled with the absence of official branding and licensing to supply products directly to domestic and international markets, forces women to rely on intermediaries, thereby reducing their economic profits. These factors indicate that enhancing rural women's economic participation in medicinal plants requires policy reforms, market infrastructure development, and streamlined legal processes.

Social Mechanisms

The social mechanisms affecting rural women's participation are largely shaped by patriarchal cultural norms and customary practices rooted in the social history of these communities. Many women report that male cultural dominance and distrust of women's abilities reduce their self-esteem and self-confidence, limiting opportunities for social and economic engagement. These issues are particularly pronounced in rural areas with lower literacy levels, where women must make extra efforts to demonstrate their capabilities. Customary restrictions, such as prohibitions on women's independent presence in natural spaces or family opposition to employment, remain common obstacles. Economic fluctuations, including those caused by sanctions and rising exchange rates, further increase production costs and reduce the purchasing power of women producers. At an individual level, concerns about product quality, lack of customers, and the physical strain of heavy work negatively affect women's mental and physical well-being, undermining the sustainability of their participation. These factors suggest that strengthening women's social participation in medicinal plant development requires cultural reforms, family support, and improved economic and psychological infrastructure.

Cultural and Knowledge Mechanisms

In the realm of cultural and knowledge mechanisms, rural women's participation in medicinal plant development faces several challenges rooted in limited specialized training, cultural restrictions, and weak knowledge infrastructure. Many women reported that they have received little or no formal or informal training in the cultivation and processing of medicinal plants, often having only participated in traditional courses such as carpet and kilim weaving. Economic hardships have also compelled some women to enter the labor market at a young age, resulting in missed educational opportunities. Prevailing rural customs often reserve specialized occupations for men, restricting women's access to certain fields, although such restrictions are less pronounced in urban areas. Additionally, government institutions have largely neglected training for new crops such as saffron, and even local agricultural experts often lack adequate knowledge in this domain. Insufficient training in packaging and processing further diminishes product quality and undermines market potential. These factors indicate that promoting women's participation in medicinal plant entrepreneurship requires educational policy reforms, removal of cultural barriers, and the development of knowledge infrastructure in rural areas.

Personal and Psychological Mechanisms

Personal and psychological mechanisms relate to factors such as talent development, self-confidence, reduction of work pressures, and enhancement of motivation and morale. Participation in production activities allows many women to recognize their capabilities and to gain a greater sense of value within their families and communities. However, physical strain from heavy work, concerns about product quality, and limited access to markets contribute to anxiety, fatigue, and reduced mental well-being. In this context, psychological support, motivational training, and safe spaces for creativity and experimentation can sustain women's engagement and increase satisfaction with economic activities. These mechanisms not only enhance individual performance but also promote long-term sustainable development in rural communities.

Legal and Regulatory Mechanisms

In the area of legal and regulatory mechanisms, rural women's participation in medicinal plant development requires the establishment of a clear legal framework and supportive regulations. Such frameworks can enhance women's status in production and trade while promoting gender justice in access to resources and opportunities. Many women face legal gaps related to ownership, production and sales licenses, and government support, which restrict their ability to expand economic activities. The absence of specific laws governing the cultivation, processing, and marketing of medicinal plants—particularly in rural areas—limits women's official and independent participation in domestic and international markets. Additionally, persistent legal inequalities between men and women in access to resources, education, and government support undermine sustainable participation. Therefore, the development and enforcement of comprehensive laws for medicinal plants, coupled with gender-equity policies, are essential for

empowering rural women and achieving sustainable development in this sector.

Policy-Making Mechanisms

Policy-making mechanisms focus on the creation and implementation of targeted, supportive policies to reduce structural and economic barriers, thereby promoting the sustainability of women's production activities. Allocating appropriate financial facilities—such as low-interest loans and micro-investments—can empower women and expand medicinal plant businesses. Improving international trade relations and creating export platforms for plant-based products are also crucial, especially under conditions of sanctions and currency fluctuations, as they strengthen the economic resilience of women producers. Additionally, designing and implementing a comprehensive insurance system to cover production risks, physical injuries, and market volatility is essential. These policy mechanisms enhance economic security, support sustainable livelihoods, and contribute to justice-oriented development in the agricultural and natural resource sectors.

Support Mechanisms

In terms of support mechanisms, rural women require effective assistance from government and executive institutions, particularly when cultivating new species, which demands risk-taking, specialized knowledge, and basic infrastructure. Many women highlight the importance of government support through provision of inputs, practical training, and facilitation of access to markets. Official recognition and acceptance of innovative practices in cultivation and processing can increase women's motivation, foster sustainable development, and diversify agricultural products. Such support not only reduces barriers to market entry but also promotes food security, conservation of natural resources, and economic empowerment of rural communities.

Resource and Equipment Mechanisms

In the area of resource and equipment mechanisms, rural women face several challenges when starting a business in medicinal plants. Key obstacles include the lack of an independent brand, limited access to production resources, absence of processing industries, and institutional barriers. Despite efforts to develop their businesses and obtain support from government institutions such as the Agricultural Jihad Organization, many women have been unable to launch personal brands or sell products directly. Dependence on family-owned agricultural land, rather than independent land ownership, limits long-term planning and the cultivation of diverse crops. The absence of local processing and packaging infrastructure delays product sales and complicates timely repayment of loans. Administrative restrictions on seed procurement, particularly for crops like saffron, and bans on transferring seeds from origin provinces further hinder the development of new crops. Additionally, the limited lifespan of saffron cultivation plots, which require land replacement every few years, adds pressure on production resources. These challenges highlight the fact that promoting rural women's participation in medicinal plant businesses requires structural reforms in resource procurement policies, improved access to equipment, and support for

independent ownership and branding.

Environmental and Geographical Mechanisms

In the realm of environmental and geographical mechanisms, rural women face obstacles such as weak transportation infrastructure, poor road conditions, and climatic instability. Many rural areas lack reliable routes for transporting products to urban markets, which increases transportation costs, reduces product quality, and limits access to consumers. Additionally, insufficient shelter at points of sale or processing forces women to work under harsh weather conditions—including extreme heat, cold, or rainfall—negatively affecting their physical health and morale. Strengthening resilience in this area requires improving geographical infrastructure, developing rural transportation networks, and creating safe, standardized spaces for women's productive and commercial activities. Implementing such environmental measures can enhance productivity, reduce physical strain, and promote the sustainable participation of women in the medicinal plant economy.

Table 4. Main mechanisms of theory construction

Mechanisms	Classes
Economic	Improving financial situation Reducing costs Sustaining sales market
Social	Women's independence Sharing of duties between men and women Rural development
Cultural-scientific	Raising awareness about new plant cultivation Creating educational opportunities
Personal-psychological	Developing talents and building self-confidence Reducing work pressure Creating motivation and positive spirit
Legal	Formulating the necessary laws and regulations in the field of medicinal plants Equal rights for men and women
Policy-making	Allocation of facilities Improving international relations or resilience against sanctions Appropriate and committed insurance coverage
Supportive	Government support Officials welcome cultivation of new varieties
Equipment	Access to production resources Access to equipment
Environmental-geographical	Solving road and transportation problems Resilience to climate problems

The researchers aimed to address the challenge under study by synthesizing the findings from the three stages of coding. If appropriately supported, the outcomes of this research can facilitate the achievement of the primary goal, i.e., enhancing women's participation in medicinal plant businesses. According to Strauss and Corbin's theory, the categories in a paradigmatic model are organized into several components, including causal conditions, focal phenomena, background conditions, intervening conditions, strategies, and consequences, which together form the final research model (Figure 2). The following section explains how the different mechanisms identified in this study are mapped to the corresponding

components of the Strauss and Corbin model.

Causal Conditions

In grounded theory, causal conditions refer to a set of events, contexts, and factors that contribute to the emergence of a phenomenon, explaining why and how it occurs. In this study, the central category was the *non-participation of rural women in the development of medicinal plants*, which is influenced by multiple causal conditions. Interview data highlighted several key factors, including financial difficulties, policymakers' inattention to the agricultural sector, and lack of professional skills. For instance, one female household head explained:

"Because I am the head of the household, I spend my income on my children, who are students, and my thoughts and prayers are focused on providing for their expenses. I am under a lot of pressure."

Such narratives demonstrate that causal conditions not only create the circumstances for non-participation but also provide a deeper understanding of the structural and individual barriers faced by rural women.

Intervening Conditions

In grounded theory, intervening conditions refer to general and pervasive factors—such as culture, social structures, institutional frameworks, and physical environments—that can either facilitate or hinder the implementation of strategies. In this study, intervening conditions influence the effectiveness of mechanisms designed to overcome barriers to rural women's participation in medicinal plant businesses. These mechanisms are categorized into three axes: cultural-knowledge, personal-psychological, and resource-equipment. Patriarchal cultural norms, restricted social mobility, and lack of technical and educational infrastructure can delay or impede the implementation of supportive strategies. Conversely, shifts in social attitudes, increased literacy and awareness, and improved access to resources and equipment serve as facilitating factors, enhancing the effectiveness of strategies and accelerating women's participation. A precise understanding of these intervening conditions is therefore essential for designing and implementing effective policies aimed at empowering rural women and promoting sustainable development in the medicinal plant sector.

Governing Context

In grounded theory, the governing context refers to the conditions within which strategies and actions are developed to manage the phenomenon under study. In this research, the governing context focuses on barriers to rural women's participation in medicinal plant businesses and comprises four main axes: economic, support, policy-making, and legal-regulatory mechanisms.

- Economic mechanisms include challenges such as lack of sustainable income, limited market access, and insufficient dedicated financial resources for women.
- Support mechanisms emphasize the role of government and non-government institutions in facilitating the cultivation of new species, providing advisory services, and easing production and marketing processes.
- Policy-making mechanisms highlight the need for targeted policies that enhance resilience against sanctions, improve international trade relations, and provide

appropriate insurance coverage.

- Legal-regulatory mechanisms address the importance of equal rights for women, access to official licenses, and legal protections in production and trade.

These structural conditions shape the direction of strategies and significantly influence the success or failure of their implementation.

Strategies

In grounded theory, strategies refer to specific actions or interactions designed in response to a central phenomenon, guiding the development of a theoretical model. In this study, the central phenomenon—non-participation of rural women in medicinal plant businesses—led to the identification of two primary strategy categories: social mechanisms and environmental-geographic mechanisms.

- Social mechanisms involve efforts to change patriarchal attitudes, enhance women's self-esteem and confidence, and create cultural acceptance of women's active roles in economic activities. These strategies aim to reduce customary restrictions and increase women's social capital within rural communities.
- Environmental-geographic mechanisms focus on improving physical infrastructure, such as transportation networks, road access, and creating suitable shelters for production and sales. These strategies also aim to increase resilience to harsh climatic conditions and environmental instability.

Implementing these two categories of strategies as operational measures provides a practical pathway to enhance women's participation in medicinal plant businesses and to overcome structural, cultural, and environmental barriers.

Implications

In grounded theory, implications refer to the outcomes and effects of strategies and actions taken in response to the central phenomenon. The participation of rural women in medicinal plant development has produced multifaceted impacts, which can be analyzed across three main dimensions:

1. Economic Prosperity: Women's involvement in medicinal plant production and processing has increased household income, diversified village-level financial resources, and strengthened the local economic cycle. This participation has significantly contributed to reducing poverty and economic dependence, particularly in disadvantaged areas.
2. Women's Empowerment: Engagement in medicinal plant activities has fostered talent development, enhanced self-confidence, improved professional skills, and strengthened women's social status. This process has enabled women to move beyond traditional roles and to become active agents of development.
3. Rural Development: Women's participation has promoted improvements in production infrastructure, expanded social interactions, and encouraged a culture of entrepreneurship in villages. Additionally, it has supported the preservation of natural resources and advanced sustainable agricultural practices.

These findings demonstrate that targeted support for rural women in medicinal plant businesses not only improves individual outcomes but also contributes to the sustainable and balanced development of rural communities.

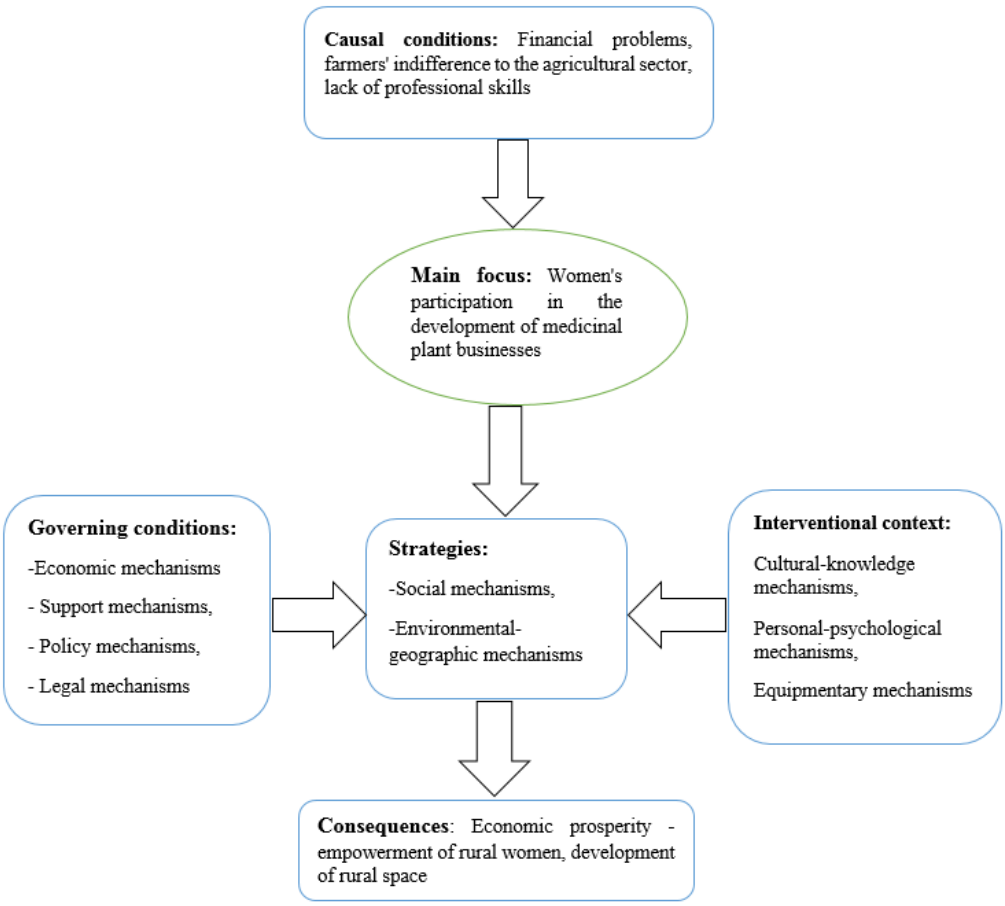

Figure 1. Model for developing women's participation in medicinal plant businesses.

Discussion and conclusions

The findings of this study in Ilam Province indicate that the lack of participation of rural women in medicinal plant businesses results from a set of multidimensional barriers which were classified into nine main categories: economic, social, cultural-knowledge, personal-psychological, legal-regulatory, policy-making, support, resource-equipment, and environmental-geographical barriers. These results align with studies conducted in other countries and regions, though some contextual differences are observed. For instance, Chia et al. (2023) showed that women's participation in income-generating activities directly increases household income. This finding is consistent with the present study, as women in Ilam also strive to support their families' livelihoods through medicinal plant activities despite economic pressures. However, unlike some regions in South Asia, where organized women's platforms have strengthened empowerment (Islam et al., 2022), such support structures are largely absent in Ilam, and women mainly operate individually without institutional backing. In the economic domain, Asigbaase et al. (2023) reported that medicinal plants contribute significantly to household income, but environmental threats and human pressures reduce species diversity. Similarly, in Ilam, the prioritization of wheat cultivation and limited establishment of medicinal plant farms have constrained plant diversity and reduced women's motivation to participate in this sector. Du et al. (2025) emphasized weak institutionalization of community-based organizations and lack of management incentives, which echoes the present study's

findings regarding the lack of government support, absence of guaranteed purchase policies, and insufficient attention to cultivating new species.

Moreover, Pretzsch et al. (2019) highlighted the fact that medicinal plants can support environmental protection and food security. In Ilam, this potential exists due to favorable climatic conditions, but it remains largely underutilized because of inadequate policy support. Domestic studies corroborate these findings: Heydari et al. (2018) and Savari et al. (2025) identified weaknesses in commercialization, limited financial support, and the impacts of sanctions—factors mirrored in Ilam as economic and policy barriers. Safarizadeh et al. (2022) highlighted education, satisfaction, and insurance coverage as critical to adopting medicinal plants; in Ilam, however, low educational opportunities and distrust in insurance hinder women's participation. Similarly, Mahboubi et al. (2020) emphasized lack of government support, low acceptance of herbal products by physicians, and high costs as challenges, all of which are reflected in Ilam, particularly regarding the sale and processing of medicinal products. Overall, comparing the present findings with previous studies indicates that the barriers to women's participation in medicinal plant businesses are multi-layered and interdisciplinary, requiring comprehensive interventions across policy, cultural, educational, and infrastructure domains. To enhance the participation of rural women in Ilam Province, the following recommendations are proposed:

- Create support platforms and women's cooperative networks for the production and sale of medicinal plant products.
- Formulate guaranteed purchase policies and promote cultivation of native and emerging species.
- Provide specialized training in cultivation, processing, packaging, and marketing.
- Modify cultural and customary attitudes in rural communities to recognize and support women's economic roles.
- Facilitate access to production resources, equipment, and financial facilities with a gender-justice approach.

Implementing these recommendations can foster women's empowerment, strengthen rural economic development, and promote the sustainable conservation of plant resources in Ilam Province.

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Conflicts of Interests

The authors declare no conflict of interest.

Generative AI statement

The authors declare that AI is not used in this study.

Data availability statement

The datasets generated during and/or analyzed during the current study are available from the

corresponding author on reasonable request.

Ethical Considerations

The authors avoided data fabrication, falsification and plagiarism, and any form of misconduct.

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