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*Article*

# Cultivating Health: Advancing Medicinal Plant Management Strategies in Iraq

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**Abstract:** From ancient Mesopotamia, medicinal plants have been important to human health. Their use in Iraq is traced back to early cuneiform tablets and relies on local flora for health advantages. Despite its rich history, Iraq confronts environmental deterioration, socio-political instability, and insufficient research resources that threaten plant sustainability. Modern medicine employs Iraqi and worldwide plants. Illegal business and weak policies hinder resource management. Medical plants, a \$5 billion worldwide business, offer Iraq economic promise. Land and water management and value-added product development may boost the economy. The assessment recommends better market analysis and policymaking to promote sustainability and economic growth. Traditional healers, academics, and governments must work together to conserve Iraq's medicinal plant history and improve health. Research and community engagement will preserve these resources by integrating traditional and modern science.

**Keywords:** traditional medicine; Mesopotamian civilization; biodiversity; Ethno botany; environmental challenges; herbal remedies; plant compounds; international trade

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## Introduction

Mesopotamian times According to Sumerian and Babylonian cuneiform tablets, the "Cradle of Civilization," used local flora for medicine. These early references show Iraqis' deep connection to their natural environment, where medicinal plants were essential to healthcare [1].

Throughout history, medicinal plants have been used to heal humans. Traditional medicine worldwide uses these medicinal plants to treat ailments, improve health, and boost well-being [2]. World pharmaceutical companies employ various plant components to manufacture current medications [3]. The mix of traditional and modern research underscores medicinal plants' value in healthcare and pharmacology.

Old Iraqi medicine employs medicinal herbs. Humans used indigenous plants for medicine in ancient Mesopotamia. Sumerian and Babylonian cuneiform records reveal that plants were essential to healthcare and treated numerous maladies [4]. Historic use shows Iraqis' love of nature..

Using thyme (*Thymus vulgaris*) and aloe vera (*Aloe barbadensis*) for health benefits is rooted in factual observation and cultural significance [5]. Iraqi medicinal plant usage is affected by ancient practices, cultural interactions, and geography. The country's varied biodiversity includes medicinal species. Environmental degradation, socio-political instability, and limited research and development resources make these plants hard to preserve and exploit [6]. The position of medicinal plants in Iraq must be examined from both traditional and modern perspectives.

Many current drugs stem from traditional remedies, and studying medicinal plants can lead to new treatments [7]. Second, Iraq's environmentally stressed regions need sustainable management to maintain plant species and ecosystems [8]. Finally, competent management can promote culturally relevant health and well-being by combining traditional wisdom with modern science.

Loss of habitat, climate change, and pollution endanger medicinal plant biodiversity [9]. Poor infrastructure and poverty make sustainable plant growing and maintenance challenging [10]. Lack of policy and regulatory support for research and conservation can also delay progress..

Phytochemical analysis and biotechnology enable medicinal plant research and use [11]. Traditional knowledge combined with modern science can improve medicinal plant efficacy and sustainability. International cooperation and funding might aid research and conservation activities, overcoming difficulties [12]. The study intends to analyze issues, explore management techniques, and suggest future development. This review draws on a variety of sources and case studies to enlighten and inspire medicinal plant management activities in Iraq, improving health outcomes and sustainable practice.

**Medicinal Plant Management**

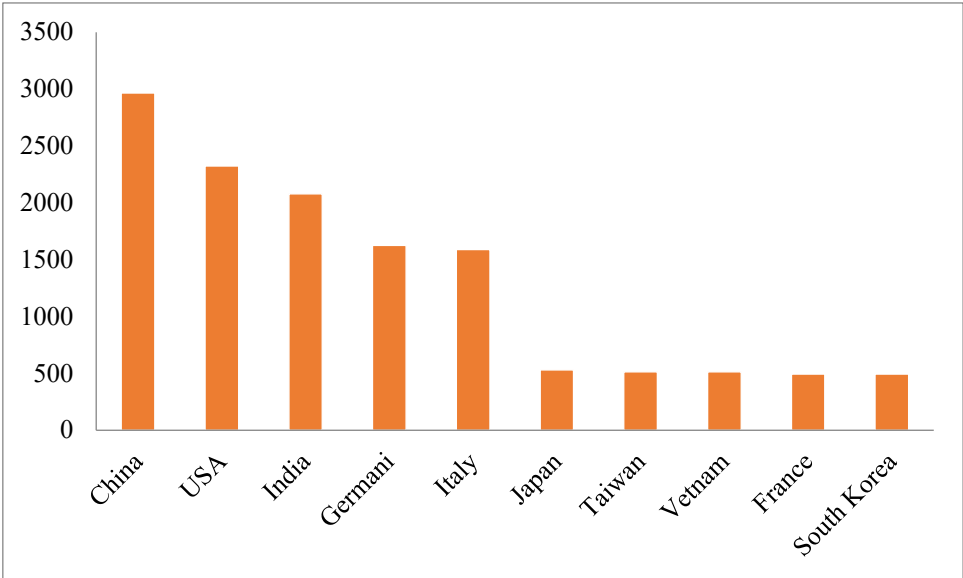
plant species are utilized ethnobotanically in Iraq. Around 360 of these plants are medicinal, offering rural healthcare. Their benefits go beyond health to the economy [13]. Sustainable methods can maximize medicinal plant potential and improve lives [14]. Ecosystem management and preservation are essential for their use and a better future [15].

**Economic prospects and market trends**

Iraq’s herbal medicine expertise increases plant demand. [16]Quality control requires diagnostic tools Standardized processes and scientific validation are important. GCC countries are top importers of herbal drugs, UAE imports 95% of medicinal drugs, with growth projected, Kuwait also has high demand [17].

**Domestic and International Market Analysis**

MAPs and their byproducts are globally traded for their bioactive compounds [18]. The medicinal plant trade is valued at \$5 billion annually, dominated by European and American markets [19]. Research on Iraqi MAPs, production, and trade is limited, SWOT analyses are recommended to evaluate and identify trade opportunities [20]. This report recommends land and water management to maintain MAP market supply [21]. Many businesses employ aromatic plant products [22]. Valueable aromatic plants are underused [23]. Trade policy requires species diversity, quantity, and value baselines [24]. Products trade data is available. Marketing stresses value-added processes Aromatic plants have valuable chemicals [25].



**Figure 1.** The Most Important Medicinal Plants Countries in the World in 2016 (Billion Dollars).

**Recent Applications**

Medical plants are employed in ancient and modern medicine. Thyme and mint are common respiratory and gastrointestinal remedies [26]. Pomegranate (*Punica granatum*) is becoming known for its antioxidant and cardiovascular effects [27]. Additionally, immune-boosting *Nigella sativa* is being studied for its ability to treat many health issues [28]. Integrating medicinal herbs with contemporary Fenugreek and rosemary (*Rosmarinus officinalis*) are utilized in supplements and alternative treatments [29]. This integration shows that modern health practices are increasingly using these plants as therapeutics.

**Table 1.** Examples of Medicinal plants to be used in traditional practices from Iraq.

Plant Name	Scientific Name	Traditional Uses
Garlic	Allium sativum	Antibacterial, antifungal, cardiovascular health, immune boost.
Thyme	Thymus vulgaris	Respiratory conditions, digestive issues, antiseptic.
White Wormwood	Artemisia herba-alba	Anti-parasitic, anti-inflammatory, gastrointestinal disorders.
Licorice Root	Glycyrrhiza glabra	Anti-inflammatory, expectorant, soothing sore throats, coughs.
Jujube	Ziziphus jujuba	Sedative, anti-anxiety, digestive issues.
Mastic Gum	Pistacia lentiscus	Anti-inflammatory, antimicrobial, gastrointestinal health.
Sage	Salvia officinalis	Antimicrobial, astringent, sore throats, digestive issues.
Rosemary	Rosmarinus officinalis	Memory enhancement, respiratory health, digestive aid.
Mint	Mentha spp.	Digestive issues, respiratory conditions, antispasmodic.
Juniper	Juniperus communis	Diuretic, antiseptic, digestive aid.
Cumin	Cuminum cyminum	Digestive aid, carminative, anti-inflammatory.
Fennel	Foeniculum vulgare	Digestive issues, anti-inflammatory, antimicrobial.
Coriander	Coriandrum sativum	Digestive health, anti-inflammatory, antimicrobial.
Nigella	Nigella sativa	Immune support, anti-inflammatory, respiratory health.
Pomegranate	Punica granatum	Antioxidant, anti-inflammatory, cardiovascular health.
Aloe Vera	Aloe barbadensis	Skin healing, digestive health, anti-inflammatory.
Ginger	Zingiber officinale	Digestive issues, anti-nausea, anti-inflammatory.
Turmeric	Curcuma longa	Anti-inflammatory, antioxidant, digestive health.
Dandelion	Taraxacum officinale	Diuretic, liver health, digestive aid.
Chamomile	Matricaria chamomilla	Sedative, digestive issues, anti-inflammatory.
Valerian	Valeriana officinalis	Sedative, anxiety relief, sleep aid.
Hawthorn	Crataegus monogyna	Cardiovascular health, anti-inflammatory, antioxidant.
Eucalyptus	Eucalyptus globulus	Respiratory health, antiseptic, anti-inflammatory.
Lavender	Lavandula angustifolia	Relaxation, sleep aid, skin health.
Parsley	Petroselinum crispum	Digestive health, diuretic, anti-inflammatory.
Lemon Balm	Melissa officinalis	Anxiety relief, digestive aid, sleep aid.
Dill	Anethum graveolens	Digestive issues, antimicrobial, anti-inflammatory.
Caraway	Carum carvi	Digestive aid, carminative, antimicrobial.

Elecampane	Inula helenium	Respiratory conditions, anti-inflammatory, expectorant.
Mallow	Malva sylvestris	Soothing for mucous membranes, anti-inflammatory.
Milk Thistle	Silybum marianum	Liver health, antioxidant, detoxification.
Burdock	Arctium lappa	Detoxification, skin health, anti-inflammatory.
Yarrow	Achillea millefolium	Wound healing, anti-inflammatory, digestive aid.
Feverfew	Tanacetum parthenium	Migraine relief, anti-inflammatory, digestive aid.
Plantain	Plantago lanceolata	Wound healing, respiratory health, digestive aid.
Astragalus	Astragalus membranaceus	Immune support, anti-inflammatory, antioxidant.
Ginseng	Panax ginseng	Immune support, energy boost, stress relief.
Echinacea	Echinacea purpurea	Immune support, anti-inflammatory, respiratory health.
Schisandra	Schisandra chinensis	Adaptogen, liver health, stress relief.
Gotu Kola	Centella asiatica	Cognitive function, skin health, wound healing.
Horsetail	Equisetum arvense	Diuretic, urinary health, skin health.
Nettle	Urtica dioica	Anti-inflammatory, diuretic, allergy relief.
Red Clover	Trifolium pratense	Hormonal balance, skin health, detoxification.
Raspberry Leaf	Rubus idaeus	Women's health, menstrual support, digestive aid.
Willow Bark	Salix alba	Pain relief, anti-inflammatory, fever reduction.
Licorice Root	Glycyrrhiza glabra	Anti-inflammatory, expectorant, soothing sore throats, coughs.
Avena Sativa	Avena sativa	Nervous system support, skin health, digestive aid.
Blueberry	Vaccinium corymbosum	Antioxidant, cardiovascular health, urinary tract health.
Ginkgo Biloba	Ginkgo biloba	Cognitive function, circulation, antioxidant.
Rhodiola	Rhodiola rosea	Adaptogen, stress relief, cognitive function.
Elderberry	Sambucus nigra	Immune support, antiviral, respiratory health.
Prickly Pear	Opuntia ficus-indica	Digestive health, anti-inflammatory, antioxidant.
Olive Leaf	Olea europaea	Antimicrobial, cardiovascular health, antioxidant.
Poppy	Papaver somniferum	Pain relief, sleep aid, anxiolytic.
Lobelia	Lobelia inflata	Respiratory health, anti-asthmatic, expectorant
Catnip	Nepeta cataria	Relaxation, digestive aid, mild sedative.
Clove	Syzygium aromaticum	Analgesic, antimicrobial, digestive aid.
Cinnamon	Cinnamomum verum	Digestive health, anti-inflammatory, antimicrobial.
Hawthorn	Crataegus monogyna	Cardiovascular health, antioxidant, anti-inflammatory.
Alfalfa	Medicago sativa	Nutrient-rich, digestive aid, anti-inflammatory.
Anise	Pimpinella anisum	Digestive aid, carminative, antimicrobial.
Grape Seed	Vitis vinifera	Antioxidant, cardiovascular health, anti-inflammatory.
Angelica	Angelica archangelica	Digestive aid, respiratory health, anti-inflammatory.
Asafoetida	Ferula assa-foetida	Digestive aid, anti-inflammatory, antimicrobial.
Marshmallow Root	Althaea officinalis	Soothing mucous membranes, digestive aid, anti-inflammatory.



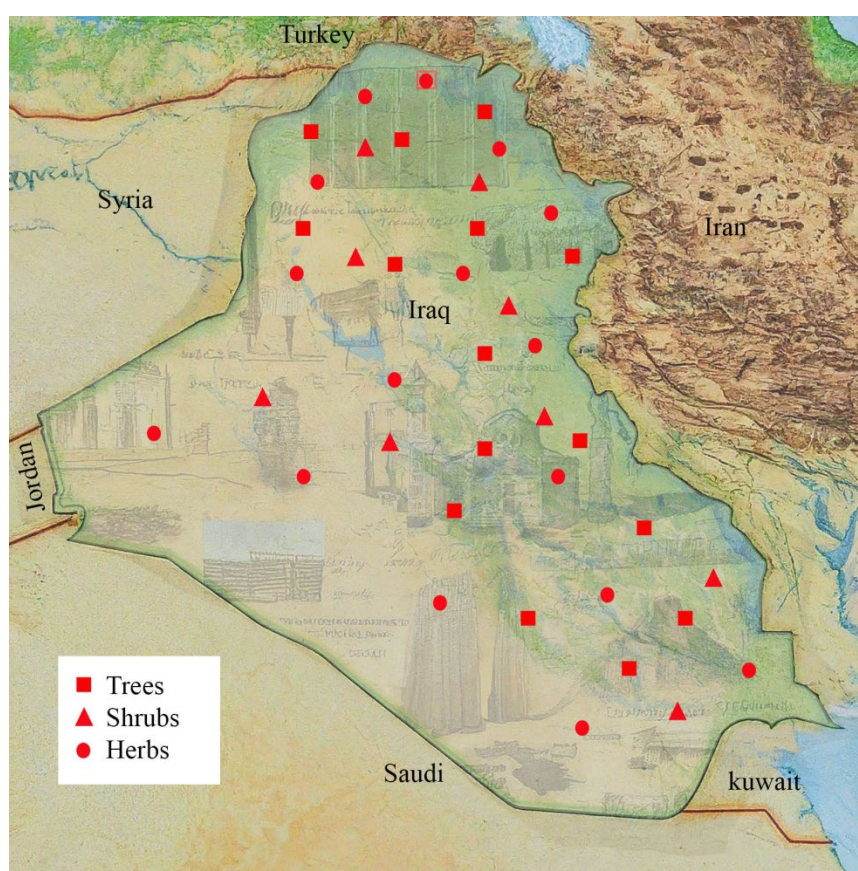
Devil's Claw	Harpagophytum procumbens	Pain relief, anti-inflammatory, joint health.
Red Clover	Trifolium pratense	Hormonal balance, detoxification, skin health.
Ephedra	Ephedra sinica	Respiratory health, stimulant, anti-asthmatic.
Bitter Melon	Momordica charantia	Blood sugar regulation, digestive health, antimicrobial.
Moringa	Moringa oleifera	Nutrient-rich, anti-inflammatory, antioxidant.
Sarsaparilla	Smilax officinalis	Detoxification, skin health, anti-inflammatory.
Yarrow	Achillea millefolium	Wound healing, anti-inflammatory, digestive aid.
Damiana	Turnera diffusa	Libido enhancement, mood support, digestive aid.
Plantain	Plantago major	Wound healing, respiratory health, digestive aid.
Chaga	Inonotus obliquus	Immune support, antioxidant, anti-inflammatory.
Baikal Skullcap	Scutellaria baicalensis	Anti-inflammatory, antioxidant, liver health.
Horny Goat Weed	Epimedium spp.	Libido enhancement, bone health, anti-inflammatory.
Shatavari	Asparagus racemosus	Women's health, reproductive support, adaptogen.
Jatamansi	Nardostachys jatamansi	Stress relief, cognitive function, sleep aid.
Holy Basil	Ocimum sanctum	Stress relief, immune support, anti-inflammatory.
Betony	Stachys officinalis	Nervous system support, digestive aid, anti-inflammatory.
Oregano	Origanum vulgare	Antimicrobial, digestive health, respiratory aid.
Golden Seal	Hydrastis canadensis	Immune support, antimicrobial, digestive aid.
Eleuthero	Eleutherococcus senticosus	Adaptogen, immune support, stress relief.
Red Clover	Trifolium pratense	Hormonal balance, detoxification, skin health.
Indian Ginseng	Withania somnifera	Adaptogen, stress relief, cognitive function.
Kudzu	Pueraria lobata	Alcohol withdrawal, digestive health, anti-inflammatory.
Licorice Root	Glycyrrhiza glabra	Anti-inflammatory, expectorant, soothing sore throats, coughs.
Wild Cherry Bark	Prunus serotina	Cough suppressant, respiratory health, anti-inflammatory.
Wormwood	Artemisia absinthium	Digestive aid, anti-parasitic, antimicrobial.
Dandelion	Taraxacum officinale	Liver health, diuretic, digestive aid.
Anise	Pimpinella anisum	Digestive aid, carminative, antimicrobial.
Coriander	Coriandrum sativum	Digestive health, anti-inflammatory, antimicrobial.
Celery Seed	Apium graveolens	Diuretic, anti-inflammatory, digestive aid.
Chervil	Anthriscus cerefolium	Digestive health, detoxification, anti-inflammatory.
Black Cohosh	Cimicifuga racemosa	Hormonal balance, menstrual support, menopausal symptoms.
Mistletoe	Viscum album	Immune support, cardiovascular health, anti-inflammatory.
Andrographis	Andrographis paniculata	Immune support, anti-inflammatory, digestive aid.

## Challenges and Preservation

Modern medical and environmental developments threaten conventional knowledge [30]. This information is being documented and preserved through ethno botanical surveys and community engagement. The Iraq Medicinal Plant Database catalogs and protects traditional knowledge while fostering sustainability [31].

## Medicinal plant species threats

Deforestation and climate change threaten species. Agriculture, industry, energy extraction, forestry, residential growth, and urban expansion cause these concerns [32]. Intensive farming and agribusiness with synthetic chemicals threaten forests and biodiversity due to population growth this leads to loss of traditional ecological knowledge and practices, including deforestation and limited plant usage [33]. In Iraq, land use changes have caused biodiversity loss and decline in traditional knowledge [34].



**Figure 2.** Plants (Trees, Shrubs and medicine Herb) Distribution in Iraq.

## Policy Gaps

In Iraq, legislative gaps exist regarding medicinal plant resources. Policies at national and sub-national levels are needed to address management [35]. Conservation efforts are necessary to protect these plants from destructive activities. Iraq has a diverse range of medicinal plant species, but lacks formal legislation and regulation for their preservation [36]. Traditional medicinal plant cultivation on animal farms is viable [37,38]. Illegally selling rare medicinal plants threatens biodiversity, conservation, and ecosystems [49].

## Sustainable Harvesting

Policymaking and enforcement of wild medicinal plant protections need collaboration between governments, NGOs, and local populations [40]. Iraq has many medicinal plant species, but

unsustainable collection causes loss Sustainable management is essential Agroforestry conserves medicinal plants, promotes sustainable development, and provides jobs [41]. The conventional approach to community management, A great number of medicinal plants are sold over international borders, which makes it challenging to keep restrictions in place Wild populations are often harvested for medicinal plants, destroying ecosystems, biodiversity, and natural resources [42]. Rapid medical plant collection can cause species extinction, ecological disruption, and a decline in environmental resources for other species [43]. Large-scale agriculture may degrade soil, deplete water supplies, and consume chemical fertilizers and pesticides, which harms the ecosystem. Monoculture farming, which is common in medicinal plant agriculture, reduces biodiversity and makes crops more susceptible to diseases and pests [44].

### Alternatives

These include growing medicinal plants under controlled settings, using synthetic or semi-synthetic counterparts, and exploring new natural resources that do not harm the environment [45]. Sustainable agricultural practices can reduce medicinal plant farming's environmental impact. These include agroforestry, organic farming, and indigenous wisdom. Methods improve biodiversity, soil health, and pollution reduction [46]. Synthetic alternatives can protect natural populations and provide a steady supply of medical substances [47]. Plant management is improved by digital technology that capture occurrences, evaluate treatment success, and enable adaptive reactions. They include basic data entry keyboards to advanced satellite sensing [48]. Prioritizing digital interfacing and knowledge transfer is key for better medicinal plant management [49].

### Research and Development

Researchers are documenting wild medicinal plant management in rural Iraq using social science [50]. We explore harvesting reasons amid communIn 2017, we managed medicinal plants in rural Diyala, Nineveh, and Salah al-Din, Iraq. By 2019, we returned to consult key informants in other provinces, engaging with ecotourists, landowners, herders, and communities to explore their practices and cultural influences.al land ownership and weak regulations [51]. Similarly, investigations into the anti-inflammatory properties of aloe vera (*Aloe barbadensis*) are ongoing [52]. Traditional uses of *Ziziphus spina-christi* (Christ's thorn) include analgesia and anti-inflammatory effects [53].

### Conservation and Future Plans

Overharvesting, habitat degradation, and climate change threaten medicinal plant species [51]. Conserving medicinal plants requires habitat protection and sustainable collection [54]. More collaboration between traditional healers and scholars can help conserve and investigate these resources [55].

### Conclusion

Finally, Iraqi medicinal plants show old and modern medicine. Essential to ancient Mesopotamia, rural healing, and worldwide pharmacology. Environmental deterioration, socio-political instability, and inadequate regulations hinder natural resource utilization in Iraq. Iraqi land and water management, value-added processing, and market efficiency might boost medicinal plant commerce locally and worldwide. Preserving these resources needs harvesting, cultivation, scientific investigation, and international cooperation. Traditional knowledge and modern science must be combined, rules established, and research funded to protect Iraqi medicinal plants. Iraq can preserve its ethnobotanical tradition and profit from medicinal plants.

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