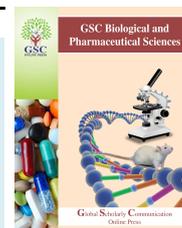


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## Traditional Chinese medicine and agriculture; organic life and sustainability for future

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### Abstract

Sustainability is a long-term and wide-ranging concept that requires producers to look to the future as well as the present, and consider both global and local situations. Cultivation of Chinese medicinal herbs and usage of traditional Chinese medicine significantly helps to promote sustainable agricultural development via growing demand for organic and herbal products in different regions. Chinese medicinal plants, both endemic and widespread, must be preserved since these plants could be renewable source for new drugs. Some advantages of organic farming of medicinal plants are to produce material in optimal quality and sufficient quantity, to protect medicinal plants against pests and disease, to maintain the genetic diversity of medicinal plants, the enhance the biosynthesis of efficacious substances, to increase growth rate and biomass yield of medicinal plants. On the basis of economic prospects, organic farming may lead to increase more market opportunity, to maintain high market price, to achieve optimal quality and economic returns and to secure economic growth and social stability. Traditional Chinese medicine plays an important role in sustainable agriculture and food systems, it also offers a holistic approach to prevent diseases while making appropriate use of organic and herbal products especially growth by small-scale family farmers.

**Keywords:** Traditional Chinese Medicine; Organic Life; Sustainability

### 1. Introduction

It has been reported that China is the native home to a greater diversity of the world's herbal plants than any other regions in the world. China is a major country and source of valuable medicinal plants, herbs, crops and of course ornamental species [1-2-3-4-5-6-7-8-9-10-11-12]. Chinese agriculture started during Neolithic period and this farming culture has persisted for many years; in spite the fact that, China is still at a critical point of agricultural transformation from traditional to modern methods [13]. China has historical relationship with medicinal plant for more than 2000 years, and it was demonstrated by medicinal herbs which have been found in the Mawangdui tombs of Hinan province that is related to 186 B.C. The herbal apothecary in China grew from hundred herbs recorded in the oldest version of Shen Nong Ben Cao Jing by Tao Hongjing to almost 1,900 substances in Li Shizhen's monumental encyclopedic research, the Bencao Gangmu published a few years after his death in the late Ming dynasty, 1596 AD. TCM theory has the character of holism, and is told mainly by concepts related to Chinese philosophy and culture. The classic canons of Chinese culture, such as The Book of Changes and Laozi or Taodejing, have their deep relationships with Neijing that lays a foundation of TCM theory. These books acknowledge of that everything in the world is movable and changeable, so do the health and disease of a man. TCM theory mainly emphasizes on the self-healing power of man for curing disease and keeping fitness, and many of its therapies are employed for enhancing this power. TCM includes herbal medicine, acupuncture, moxibustion, massage, food therapy and physical exercise. According to the principle of TCM, the herbal formulae include four elements: the monarch (Jun), minister (Chen), assistant (Zuo), and servant (Shi). In

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TCM formulae, monarch aims at the cardinal pathological symptom of a disease. Minister assists monarch to treat other secondary symptoms. Assistant and servant mainly coordinate the formulae, facilitate performances of monarch and minister, and decrease their side effects. They work together harmoniously to achieve an ideal therapeutic outcome [14]. Both TCM and modern medicine contain different ways of prevention, treatment and rehabilitation as well as health care due to their individual theories. Chinese Pharmacopeia were changed for what part of the herb or species could be use from wild-gathered herbs. For example, for Xi Xin (*AsariHerba*) and Lu Gen (*Phragmitis rhizoma*) the whole plant was used rather than just the root, and the *Aristolochia fangchi* species began to be used for Fang Ji (Called Guang Fang Ji) [15]. Cultivation of medicinal herbs in both Asia, Europe and of course North America is the appropriate alternative to use wild medicinal herbs. Agronomic management like crop rotation, organic growing methods and using plants propagated from sprouted seeds could be use also for Chinese medicinal herbs. Due to rapid grows of global market for medicinal herbs, new agricultural technology such as cultivation techniques such as plant propagation is one of the introduced option of this technique. While many companies and farmers choose to spend time and higher price for organic food production, the appropriate management of pesticide and herbicide use can be practiced in China and other regions. Unlike the some traditional beliefs that emphasize on the importance of growing herbs in their traditional environments, Chinese medicinal herbs can introduce to new regions. But, in all situations, sustainable practices from cultivation to final harvest should be part of agronomical management of traditional Chinese medicine. The goal of organic farming of medicinal plants include producing material with both better quality and high productivity, and ensuring the conservation and sustainable utilization of these important plants. The simple definition of sustainability is a perfect strategy for living that uses its finite resources without exhausting nor destroying them. It does not necessarily mean that do not consider maximum yield and profits, but it simply means considering maximum yield and fastest growth as much as thinking about the health of the entire ecosystem. Besides, the developing and production of traditional Chinese herbs should be at a speed that does not destroy the system's balancing mechanisms. Also, all drug discovery programs, synthetic or natural, should be the concept of sustainability [16]. It is essential to understand the ecology of a species to assess how it should be harvested and how much can safely be taken each time without causing decline in its population or having negative influence on the environment. In sustainable agriculture, it is also important to keep a balance between production and demand; a rapid rise in demand for a medicinal herb maybe a threat to its sustainability. Various researches have been compiled regarding their conservation, including the establishment of systems for species inventorying and status monitoring, and the need for coordinated conservation practices bases on both in site and ext site strategies [17]. Good agricultural practices for medicinal plants have been formulated to regulate production, ensure quality and facilitate the standardization of herbal drugs [18-19-20-21-22]. An appropriate agricultural practices approach ensures high quality, safe and pollution-free herbal drugs by applying available knowledge to address various problems [23]. Some advantages of organic farming of medicinal plants are to produce material in optimal quality and sufficient quantity, to protect medicinal plants against pests and disease, to maintain the genetic diversity of medicinal plants, the enhance the biosynthesis of efficacious substances, to increase growth rate and biomass yield of medicinal plants. On the basis of economic prospects, organic farming may lead to increase more market opportunity, to maintain high market price, to achieve optimal quality and economic returns and to secure economic growth and social stability. Zhao-Seiler [15] has concluded that the demand for Chinese medicinal herbs has grown rapidly and significantly over past decades, and practitioners are starting to be concerned not only about the quality of the herbs they use, but also about their sustainability. Zhao-Seiler [15] had noticed that the biggest challenge to sustainability of sensitive medicinal herbs is increasing demands, and this demand is found in both in the world-wide TCM community, and in the international cosmetics and food industries. Wang et al. [24] reported that from the perspective of traditional Chinese medicine (TCM) constitution theory, the TCM constitution focuses on the life process in a continuous evolution based on individual development at different phases or stages from infancy to senility. They have also mentioned that the development of traditional Chinese medicine constitution is beneficial in accumulating the theoretical and practical experience for promoting the application of TCM constitution health service into the full life cycle and providing theory, technique and method for TCM health service in the full cycle. Sun et al. [25] concluded that traditional Chinese medicine constitution (TCMC), is one of the most important parts of Chinese medicine theory, which attracted the attention of more researchers during past several decades. Liu [26] indicated that the traditional Chinese medicine (TCM) perspective is based on energy; so, extending research on the human energy system may lead to the establishment of a modern TCM research field that is firmly grounded in the principles of TCM. Dong et al. [27] mentioned the importance of harmony between the heart and kidney in traditional Chinese medicine which is important in patients with insomnia, anxiety disorder and menopausal syndrome. Chen et al. [28] showed that both conservation strategies (e.g. in situ and ex situ conservation and cultivation practices) and resource management (e.g. good agricultural practices and sustainable use solutions) should be adequately taken into account for the sustainable use of medicinal plant resources. Health management interaction based on traditional Chinese medicine has a positive influence on improving people's attention to their health, encouraging them to participate in health management activities and develop the habit caring about their health over long term [29-30].

**Table 1** Main Chinese material medica under cultivation [31]

Chinese material medica	Main producing area	Area (km <sup>2</sup> )
Dangshen	Linchuan	3.3
Danshen	Shangluo, Fangcheng, Zhongjiang, Linqi	51
Panaxpseudoginseng	Wenshan	67
Banlangen	Fuyang, Daqing	40
American ginseng	Jingyu	10
Panax ginseng	Jingyu, Fusong, Jian	10
Coptis	Shizhu, Zhenping, Enshi city	45
Huajuhong	Huazhou	10
Xuanshen	Zhenping	7
Changzhou	Luotian	2
Touhualiao	Shibing	20
Ginkgo	Chongming, Pizhou	24
Jinyinhua	Pingyi, Fengqiu	12
Tiepishihu	Wuyi, Tiantai, Xinshuangbannan	6
Chuanxiong	Pengzhou	67
Dihuang	Wushe	200
Fuzi	Jiangyou	2
Shanmaidong	Quanzhou	5
Chuanxinlian	Qingyuan	3
Dengzhanhua	Luxi	7
Chuanbei	Sonpan and Mao County	2
Shanzhuyu	Xixia county	147
Yanhusuo	Fuzhou in Jiangxi province	24
Kushen	Changzhi	67
Longdan	Qingyuan	13

## 2. Conclusion

TCM, which is an essential part of the health care system in most Asian countries, relies on natural products and has been playing a very important role in health protection and disease control for many years. When it comes to sustainable production of traditional Chinese herbs, considering the quality of grown or harvested should not endanger the future survival of the plants or adverse influence on the environment. Like other crops, sustainable production of traditional Chinese herbs depend on innovations in various agricultural fields, such as genetics, breeding, agronomy, crop physiology, germplasm resources, grain chemistry, grain storage and final processing, crop biotechnology, crop management practices and biomathematics. Some advantages of organic farming of medicinal plants are to produce material in optimal quality and sufficient quantity, to protect medicinal plants against pests and disease, to maintain the genetic diversity of medicinal plants, the enhance the biosynthesis of efficacious substances, to increase growth rate and biomass yield of medicinal plants. On the basis of economic prospects, organic farming may lead to increase more market opportunity, to maintain high market price, to achieve optimal quality and economic returns and to secure economic growth and social stability. There are various factors that may need to take into account in assessing sustainability, such as ecological, social, cultural and economic variables. Traditional Chinese medicine plays an

important role in sustainable agriculture and food systems, it also offers a holistic approach to prevent diseases while making appropriate use of organic and herbal products especially growth by small-scale family farmers. Integrative use of modern agriculture and science of traditional Chinese herbs with novel technologies will secure production of medicinal herbs in China and other parts of the world.

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## Compliance with ethical standards

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### Disclosure of conflict of interest

We have no conflicts of interest to disclose.

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