Sustainable collection of traditional Chinese medicinal plant species in Yunnan Province

BACKGROUND Traditional Chinese Medicine (TCM) is one of the oldest traditional medical systems globally. The majority of plant species used in TCM is still derived from the wild, which has put many species at risk of being overharvested, particularly from destructive collection of roots. This case study aimed to test the sustainability of the wild-collection practices in Xishuangbanna, Dai Autonomous Prefecture in the south of Yunnan Province, P.R. China as well as the impact of collection on local livelihoods. The focus of the study was on five medicinal plant species, which are frequently harvested around five selected villages in Xishuangbanna. The FairWild Standard Principles were used for sustainable wild collection and equitable trade as the framework by which sustainability was assessed. The sustainability was assessed through calculating the amount of plants in the forest and the harvest volumes as well as calculating the time of sustainable harvest. Fieldwork was carried out in 2010.

TARGET SPECIES The selected species were Asparagus filicinus Buch-Ham., Asparagus subscandens F. T. Wang & S. C. Chen, Paris polyphylla Smith, Stemona tuberosa Loureiro and Tacca chantrieri André.

Both Asparagus species are treated as an ethnospecies, meaning local people don’t discriminate between them. They possess tuberous roots which are peeled, boiled and dried and are used medicinally to treat fever, sore throat and menstrual problems. They are traded as "Asparagi Radix". A. filicinus which is distributed in the wider Himalayan region whereas A. subscandens is endemic to Yunnan and listed as threatened in the Red List book of China. Both species are abundant in the region. Paris polyphylla is one of the most potent plants in Chinese traditional medicine. It possesses rhizomes which are cooked and dried before being traded as “Rhizoma Parisii”. It is used to treat pain, bleeding, snake as well as insect bites and tumours. It is listed as vulnerable in the IUCN Red List. Stemona tuberosa is known in TCM as “Stemonae Radix". It has tuberous roots which are also cooked and dried before being traded. It is used as an insecticide, against cough and against parasitic worms. Tacca chantrieri possesses tuberous roots which are cut, boiled and dried before being traded on a local scale. It is used to treat stomach ache, high blood pressure, diarrhoea and pneumonia. It is listed as vulnerable in the Red List book of China. Theoretically plants with rhizomes (Paris polyphylla and Tacca chantrieri) are able to regenerate if only some parts of the rhizomes are excavated, but this has not been tested yet.

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Wild collection and conservation requirements Of the selected species only subterranean parts are being harvested. The method typically used is lethal to the plants and puts the plant species at risk of overexploitation. A lot of work has been done concerning the analysis of the chemical properties of the species, but more knowledge on the ecology of the plants is still urgently needed (such as identifying pollinators and possible regeneration rates), especially since TCM is becoming more popular and the demand is increasing, both in China and overseas such as in Germany. To increase the potential for sustainable harvesting it is necessary to adapt the collection practices: when rhizomes are harvested, some parts must be left in the soil to allow regeneration. Most species are harvested when full flowering occurs – meaning that the reproduction is not completed.

* a barren or desolate area of land, not or no longer used for cultivation or building, Human Geography (http://www.thefreedictionary.com/wasteland)
In addition, the restriction of the harvest to certain months or areas (which could also be rotated in defined intervals) to limit the overall volume being collected could be beneficial for the sustainable collection. For the collection of plants from wild stands proper monitoring and knowledge on the plants is essential.

**Legal and ethical requirements** Since harvest of the selected medicinal plants takes place irregularly and is locally scattered, and only a few collectors are involved in the activities, field control is difficult. In general, there is no proper management of the harvest and the legal framework remains unclear. Harvesting takes place in community-based forests and there is not a specially appointed person who is responsible for harvesting activities. The harvest is mostly carried out by adult farmers on their way to and from the fields which are often distributed in wide areas around the villages. Children are also involved in farming and harvesting activities.

**Social and fair trade requirements** At present there is no contractual relationship between a company and partner or organization which is taking care of the collection of medicinal plants. There is very little transparency along the chain; the total collected amount is also hard to assess or to estimate since there are a lot of people involved in the whole process. The non-existence of such an organized institution not only makes the control and therefore the sustainable harvest impossible, but also leads to a major increase in prices along the trade chain. If the trade chain could be shortened, the share of their income remaining in the villages could be increased which would be beneficial in this rural area.

**CONCLUSION** It was found that the current harvest practices are not sustainable and local farmers have already reported declining plant availability. Further tests on the ecology, especially the regeneration of the species, needs to be conducted. For the trading of *Asparagus subscandens* and *Asparagus filicinus* as ethnospecies more chemical analysis of pharmaceutically active compounds should be done since most studies were conducted on *A. filicinus*. More research should be done concerning the possible cultivation of those plants in plantations (which is already done for *Paris polyphylla* in the north of Yunnan and for *Tacca chantrieri* in greenhouses as ornamental plants), since wild collection is bound to be unsustainable as the current collection methods are lethal to plant individuals and populations are reported to be declining. The harvest impacts clearly reflect the inhabitants’ economic situation (lower income leads to more collection of NTFPs) and the price differential between the villages and the local and global markets is very high. Therefore the creation of village cooperatives, which can organize – and control – the collection and trade and shorten the trade chains, is advisable and beneficial for the farmers.

In general, FairWild Standard Principles seem to be essential for the sustainable harvest of wild plants in Yunnan province. Regarding the commercial side, there is an interest from German traders in sustainably and fairly sourced materials. Therefore, FairWild certification can add value to the harvested plant products and thus increase the income generation potential for the villagers involved in sustainable collection practices. The long-term relationship between buyers and collectors is very important for changing collection methods and strengthening people’s awareness.

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