

Development of Market Supply chain for *Picrorhiza kurrooa* and *Saussurea costus* in the district Chamoli of the Uttarakhand state, India: a case study

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Abstract: In recent years the demand for medicinal and aromatic plants has been grown rapidly because of accelerated local, national and international interest on herbal products. Due to continued unsustainable collection and increasing market demand, numerous plant species are on verge of the extinction. High risks, transaction costs and lack of trust among chain outworker prevent producers from taking up cultivation of medicinal plants. Present study explained the steps followed by the “ANKUR” a non government organisation (NGO), which played a key role in coordinating and mobilizing the Government Department and other Institutions in the Chamoli District to help privileged farmers link up with reliable markets for raw material and market high-value medicinal and aromatic plants (MAPs). *Picrorhiza kurrooa* Royle ex Benth. and *Saussurea costus* L., the high value medicinal plants, was the focus of the case study. As a result of such activity, the farmers substantially interested in promotion and cultivation of these MAPs, and hence, improving their livelihood. Therefore, this case study is a step-by-step explanation how this NGO helped farmers to overcome these constraints and how the supply chain for *P. kurrooa* and *S. costus* were established in the Ghat block of the District Chamoli, Uttarakhand.

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Key Words: *Picrorhiza kurrooa*, *Saussurea costus*, supply chain, medicinal plants, Ghat

1. Introduction

Medicinal and aromatic plants (MAPs) are playing an ever more important role in the subsistence economy of rural people during the last decade in India. It is estimated that there are over 9500 herbal drug manufacturing units in India, with the consumption of about 319500 M tonnes raw material in the year 2005-06 (Ved and Garaya, 2008). Interestingly, in the exploitation of medicinal and aromatic plants as pharmaceuticals, herbal remedies, flavourings, perfumes and cosmetics and other natural products has greatly increased in the recent past (Salleh et al., 1997; Kumar et al., 2000).

Uttarakhand Himalayan region has been known to be rich repository of medicinal plants. The forests in Himalayas have rich biodiversity where MAPs makes up a large part. These natural resources are largely collected as raw materials for manufacturing of drugs products. Unfortunately, much of the traditional knowledge and many valuable plants are being on the verge of extinction at an alarming rate. With the rapid depletion of forests, impairing the availability of raw drugs, Ayurveda, like other systems of herbal medicines has reached a very critical phase. *The Red Data Book of India* has 427 entries of endangered species of which 28 are considered extinct, 124 endangered, 81 vulnerable, 100 rare and 34 insufficiently known species (Thomas, 1997). *Picrorhiza kurrooa* Royle ex Benth. (Kutki) and

Saussurea costus L. (Kuth) are endangered valuable medicinal plants among the list of *Red Data Book of India* and also listed in CITES-Appendix II.

Recognizing the threat to these species, the Herbal Research and Development Institute (HRDI) has formulated a series of policies for the overall development of this sector in the state. The Indian government have also launched “National Mission on Medicinal Plants” to promote the large-scale cultivation of MAPs. Cultivation is important because it provides an additional income besides alternative source of supply and reduces over burden on natural habitat. Though, these species mostly grown in higher Himalayan regions, few people are aware of the importance of these plants. Studies have shown that Kutki contain more than 50 secondary metabolites viz. iridoid glycosides, cucurbitacins and phenolic compounds (Bhandari et al., 2010) similarly, sesquiterpenes, sesquiterpene lactones, triterpenes, alkaloids, lignans and tannins have been reported from *Saussurea costus* (Matsuda et al., 2003; Choi et al., 2008; Choi et al., 2009). Locally, the roots of *Picrorhiza kurrooa* are used to treat certain types of kidney ailments, liver disorders, asthma, acute fever, jaundice and as a blood purifier (Bhandari et al., 2010). It is also useful in gastrointestinal and urinary problems, antidote to snake bite and scorpion sting and as anti-inflammatory (Bhandari et al., 2008). Likewise the roots of *Saussurea costus* used to treat

inflammation related diseases, rheumatoid arthritis, chronic gastritis, skin ailments, asthma, and bronchitis in traditional medicine (Jain, 1968) and in abdominal pain, distension, lack of appetite, anorexia, nausea and vomiting (Zhu, 1998). These species are in great demand by the pharmaceutical industry due to their chemical content. The production, value addition and marketing of these have the potential to significantly contribute to the cash income of the rural poor people or family. This study is a step-by-step explanation of establishment of sustainable supply chains of *Picrorhiza kurrooa* and *Saussurea costus* from the Ghat block of Chamoli District of Uttarakhand state, India to abroad European country. Such collaboration can provide a promising mechanism for establishing the conditions for the establishment of supply chains in the initial stages of development.

2. Material and Methods

Study area

Uttarakhand state carved out from Uttar Pradesh (28°53'24" and 31°27'50" N latitudes and 77°34'27" and 81°02'22" E longitude) covers an area of 53,483 Km² and situated in the Central Himalayan region. The state comprises of 13 district including Chamoli. Chamoli district lies in the north-eastern part of Uttarakhand state carved out from district Pauri Garhwal on 24 February, 1960. It is bounded by North Latitude 29°55'37" to 31°27'3" and 78°54'3" to 80°2'3" E longitude. The geographical area of the district is 7820 Sq. Km. Entire area of the district is mountainous with agrarian economy. 58.38% forests covers are the main land use. The total population, of the district, is 3, 70,359 out of 1, 83,745 male and 1, 86,614, female respectively (Census, 2001). The population density is 42 persons Sq. Km and the male, female sex ratio is 1000:1017. About 80% of the state's working population depends on agriculture as its main source for their livelihood (Mountain Technology 2004). The overall literacy rate is 76.23%. District Chamoli comprises of 9 developmental blocks including Dasholi, Dewal, Gairsain, Ghat, Joshimath, Karanprayag, Narayanbagar, Pokhari and Tharali. Ghat block having 88 revenue villages has an area of 133.66 Sq. Km.

Habit and Habitat

Picrorhiza kurrooa Royle ex Benth.

Vern. *Katuki*, *Kadwi* Sans. *Katurohini*.

Perennial, herbs with creeping leafy stems and stout rootstock. Leaves elliptic lanceolate, coarsely toothed, margins serrate. Flowers pale blue or purplish blue in dense cylindrical head. Capsules cylindrical, seeds minute brownish. Rare; 3300 – 4500 m. asl. on hilly

slopes of alpine meadows of Garhwal Himalaya. GUH 19576.

Fl. & Fr.; Jun. – Aug.

Saussurea costus L.

Vern. *Kuth* Sans. *Kusth*.

Erect, perennial, pubescent herbs with thick rootstock. Basal leaves pinnately lobed; winged leaf-stalk; upper leaves smaller, cordate, ovate. Stem clasping, glabrous. Flower heads purple in dense rounded terminal cluster. Rare; 3500m. asl. Cultivated on hilly slopes of alpine of Garhwal Himalaya. GUH 19278.

Fl. & Fr.: Aug.-Sep.

Surveys

Farmers in study area have a tradition of practicing mixed farming systems having the primary cash crop are potato, pea and pulses including some important MAPs such as *Allium stracheyi*, *Carum carvi*, *Rheum emodi* and *Rheum moorcroftianum*. However, the production of traditional crops was declining in and around due to falling prices, harsh climate, poor soil conditions, small average plot size, inadequate technology and market availability (Maikhuri et al., 2001; Alam, 2003). Therefore, the cultivation of MAPs such as *Picrorhiza kurrooa* and *Saussurea costus* has substantial scope. The advantages of these species include better utilisation of resources; however, it was very difficult to introduce any new cropping systems and this requires an improved agro-technique including availability of planting material, post-harvest techniques, value addition and marketing (Alam and Peppelenbos, 2009). To help farmers escape this vicious debt trap, the "ANKUR" pursued a market-driven, farmer-centred and environmentally friendly approach to agricultural diversification that includes selection of crop, low-cost agro-techniques and continuing market demand.

The identification and selection of crop based on local environmental conditions and where there was a stable and growing market for the product. However, most farmers were unaware of the commercial importance of these crops, making it necessary to conduct extension activities, such as exposure visits, to create farmer awareness about these potential economic opportunities. Exposure visit and training to the farmers of selected villages were made possible with the help of Herbal Research and Development Institute (HRDI), Mandal, Gopeshwar and High Altitude Plant Physiology Research Centre (HAPPRC), HNB Garhwal University, Srinagar, Garhwal. Technical publications were prepared with the help of HRDI that explained cultivation practices using organic methods. In the process, farmers were informed about the economic importance of these

crops as a viable alternative to the traditional food crops being produced in the district.

To find genuine buyers all known reputed companies working in the herbal and medicinal crops sector were contacted through e-mail, telephone and personal meetings in an attempt to identify their current requirements for these crops. Since the majority of companies and buyers were located elsewhere in the country, they were not eager to enter into any type of formal agreement with an unknown group of producers. Therefore, "ANKUR" shifted to find local buyers and finally the company that were short-listed were found to be receptive to the idea of forming a partnership between the growers. The firms identified were: Dehradun based "Himalaya Organic India". The newly-established SHGs were invited for an open discussion with this company in order to address any questions these SHGs might have. The pricing was based on average market price for the material in the Delhi market. "Himalaya Organic India" further proceeds to Bangalore based "Natural Remedies" for processing and export of the processed material to the Netherland based "Ayurveda Herbs" for formulation of medicine from these plants. Ayurveda Herbs has been importing medicinal herbs from "Himalaya Organic India" and then distributes these to chemist, pharmacies, therapists and other in the Europe.

3. Results and Discussion

When this activity was launched in 2006, there were only one village Ramni with a combined membership of about 19 farmers who began with the cultivation of *Picrorhiza kurrooa* and *Saussurea costus* in Chamoli district. This group of farmers produces 300 Kg of Kutki which was supplied to Ayurveda herbs by "ANKUR" in 2008. However, this is little cultivation due to some constraints which limited it to small scale such as technical difficulties, availability of planting material, lack of market facility, poor inputs and complex regulations. But these constraints were removed through the help and services of HRDI and HAPPRC such as availability of planting material, technical inputs, registration of growers etc. due to these activities, within five year, 6 more villages with 215 farmers had organized and were started the cultivation of these species. The number of new villages and SHGs in this network is expected to increase rapidly as more and more farmers become interested in medicinal plant cultivation. These villages include Lwani, Sutol, Kanol, Charbang, Pagna and Durmi-pagna. A total of 13 SHGs were made comprises of 215 farmers from the selected village of the Ghat developmental block. All the cultivators have also facilitated the registration as growers of these crops with the HRDI. At present

these SHGs has 800,000 of Kutki plants and 160,000 of Kuth plants. These groups were now producing 12 tonne of Kutki and 16 tonne of Kuth annually from the year 2009.

As a result of these extension activities, farmers soon became receptive to the idea of cultivating these species. Finally, inputs such as seeds and organic manures were obtained through "ANKUR" on a cost sharing basis. The seedlings of *Picrorhiza kurrooa* and seeds of *Saussurea costus* were procured and made available from High Altitude Plant Physiology Research Centre, HNB Garhwal University, Srinagar Garhwal. Finally "ANKUR" began by assessing the production potential of *Picrorhiza kurrooa* and *Saussurea costus* in the district while, at the same time, beginning to organize farmers into Farmers Self help groups or SHGs. The typical SHG had between 10 and 15 farmers. The key in setting up these producer groups at the village level was to create the framework that could produce a substantial quantity of MAPs on a sustainable basis, thus making it economically viable for the company to continuing sourcing the material from the same groups of farmers. Initially, only one village Ramni of the developmental block with the SHG of 19 people was taken with only 55000 plants of Kutki and 12000 plants of Kuth. The village is situated at an altitude of 2800 m. Later on with the time several other SHGs of the Ramni and other villages were also incorporated.

4. Conclusion

This paper described the action taken by "ANKUR" to promote cultivation of *Picrorhiza kurrooa* and *Saussurea costus*. The step pursued by "ANKUR" to promote cultivation and development of sustainable market supply chain has achieved the goal by making large scale cultivation possible and most of the farmers agree to continue with cultivation of these crops. This model of development has important lessons to enhance the cultivation of medicinal plants in the state of Uttarakhand. As the medicinal-plants trade based on cultivated material is new in the state, various linkages are essential for trade which are not yet well developed. In the current system the risks of economic coordination opportunism are high. New approaches are needed to be strengthening the networks of the stakeholders involved in the medicinal plants chain by thorough assessment of the economical viability and technical feasibility of the supply chain to be developed. The present study to be best example for other interested people and selection of economical viable species for promotion of their livelihood.

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