Cultivation of Medicinal Plants in Uttarakhand

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Due to excessive extraction of medicinal plant species in high altitude areas, Uttarakhand has seen a serious depletion of its biological resources. The state government has introduced policies to promote the conservation of these species and encourage farmers to cultivate them and supplement their incomes. This paper examines the impact of the Uttarakhand government's promotional policies and also looks at a project that has built a supply chain to cultivate these plants for export to Europe.

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The mountainous state of Uttarakhand is endowed with a rich variety of medicinal plants, many of which are in great demand in the domestic and export markets (Government of India 2000). A large proportion of this demand is met by collection from the wild. This is particularly true for plants found in high altitude areas, which are generally characterised by fragile ecosystems. As a result of intensive extraction many species of medicinal plants are now seriously depleted. For example, according to collectors in the Johar Valley in Pithoragarh district known for its rich biodiversity, the average dry weight of *atish* (aconitum heterophyllum) collected by them in one day declined from 200 grams to 70 to 100 grams during 1998 and 2002 (Alam and Belt 2004).

1 Introduction

Recognising the threat to a number of species of medicinal plants, the Uttarakhand government has formulated a series of policies for their conservation. These policies have two main components: regulation of the collection of medicinal plants from the wild to protect biodiversity, and promotion of cultivation to meet demand and provide farmers with new income opportunities (Government of Uttaranchal 2002). The policy to promote the domestication and cultivation of medicinal plants has met with very limited success. In the following paragraphs we review this policy and examine the constraints faced in its implementation. We then describe a project set-up in the Uttarkashi district to support the cultivation by small farmers, and remove many of these constraints through collaboration between the public and private sectors. Third, we analyse the socio-economic conditions of the farmers involved in the project and examine how the cultivation of medicinal plants fits into their farming systems and livelihood strategies. Finally, we discuss the insights, lessons and policy recommendations derived from the project.

2 Policies and Constraints

The cultivation of medicinal plants is considered to be of great importance for the safeguarding of biodiversity and contribution to rural livelihoods in Uttarakhand. It is hoped that cultivated medicinal plant material will provide an alternative source of supply to the market, and thereby reduce the need for collection of these plants from the wild. Cultivation will also provide an additional source of income for the state's rural poor. This is especially important as 80% of Uttarakhand's working population depends on agriculture, but poor land quality and the small size of landholdings lead to low rural incomes. For example, half of the farming households own less than two acres, and only 5% own more than five acres (Maikhuri, Rao and Semwal 2001). Farming is mainly subsistence-oriented and market access is

restricted due to poor roads and communication infrastructure. As returns from traditional crops decline, the cultivation of medicinal plants is seen by many as an important source of farm income. Compared to bulky and perishable agricultural commodities, medicinal plants have a higher value per unit volume, which makes them particularly attractive for remote, mountainous areas with transport limitations.

The state government's enabling policies include (a) popularising the idea of cultivation of medicinal plants among farmers; (b) providing technical support and training; (c) establishing nurseries to propagate and supply planting material; and (d) streamlining the process of registering farmers as growers of medicinal plants.

These policies have been in place for the last five years. However, our research shows their impact has been small and little cultivation is actually taking place in the state (Alam and Belt 2004). Some of the reasons for the limited success of the policies are:

(a) Technological constraints: The domestication of high altitude medicinal plants has proven to be difficult, as it requires a specific kind of soil, climate and moisture conditions and interaction with other species. Various research institutes in Uttarakhand are working on identifying suitable planting material, efficient cultivation practices and post-harvest management techniques. However, the small technological and financial resources of these institutes are inadequate for the fulfilment of these goals. Weak linkages with farmers and the industry have further limited the outreach and impact of their work.

(b) Regulative constraints: Understandably, the state government is keen to ensure that plants collected from the wild are not sold as cultivated material; growers and traders, therefore, need a permit from the state government for the cultivation and/or trade of protected species. In the past, this used to be a cumbersome procedure, as a number of government agencies were involved with the registration process, leading to considerable delays and difficulties. The procedures have been streamlined during the last two years, and the number of farmers registered as growers of medicinal plants has increased. Currently more than 6,000 farmers are registered in the state as growers of medicinal plants. The procedural complexities and delays are no longer important constraints.

(c) Economic constraints: Long gestation periods, low yields and low prices are important economic constraints in the cultivation of medicinal plants. Most farmers are poor and therefore reluctant to take the risk of investing in unfamiliar crops. Further, many medicinal plants can be harvested only after three years or more, particularly at high altitude. For poor farmers it is a great sacrifice to wait this long for returns. The tendency is either to convert a small area or to use distant plots (which are often neglected) for growing medicinal plants. The size of plots on which medicinal plants are cultivated ranges between 0.05 and 0.10 acre. As the expected benefits of growing medicinal plants on a small area are limited, the farmers lack the motivation to look after the plantation.

(d) Supply chain constraints: The informal nature of the medicinal plant sector is one of the central problems faced by farmers wishing to cultivate these plants. The domestic industry sources the material through a myriad of wholesalers and traders, many of whom belong to the informal sector. The companies choose their suppliers merely on the basis of price and attach no value to traceability or sustainability within their procurement policies. Furthermore, the low cost of collection from the wild, both legal and illegal, puts a downward pressure on market prices. Moreover, in many wholesale markets there are only a handful of traders, and evidence suggests that they collude to fix low prices (Virdi 2004). The farmers feel that the prices do not compensate for the difficulties and uncertainties of cultivation.

Considering these constraints, it is clear that the cultivation of medicinal plants requires a multifaceted approach. The following section of the paper describes how this is being attempted in a project to promote the cultivation and export of *kutki* (picrorhiza kurrooa) by small-scale farmers in Uttarkashi district. Through close collaboration between actors from public, private and civil society sectors, the farmers are being provided with a secure market outlet, attractive prices, and technical and regulatory support to establish a sustainable supply chain.

3 Sustainable Supply Chain

Kutki is a high altitude perennial herb that grows between 2,500 and 4,600 metres. Its many medicinal uses include treatment of influenza, diarrhoea, jaundice and cirrhosis. It is also considered to be a valuable bitter tonic. The selection of kutki as a pilot crop was made for a number of reasons. First, it can be cultivated on poor quality land where other crops do not grow. This would enable farmers to increase their income without unduly affecting their existing crops. Second, there is a significant market demand for kutki from producers of both allopathic and traditional medicine. India is the main supplier on the global market, exporting around 100 MT/year, while domestic consumption is around 300 MT/year. Finally, kutki is listed in CITES-Appendix II (Convention on International Trade in Endangered Species of Wild Fauna and Flora) and the Indian Red List of endangered species. This puts serious restrictions on the trade of non-cultivated and non-traceable kutki obtained from the wild. It is therefore likely that fully traceable, officially registered, cultivated kutki would fetch a large price premium, especially in developed countries where restrictions on the trade of listed species are strictly adhered to. In fact, it is largely this factor that has attracted a Dutch firm to support the project and commit itself to purchase the kutki at a premium price for a minimum of five years.

The project involves 50 farmers in two villages, Sukhi Top and Jaspur, located at an altitude of 2,700 metres, at about 200 km distance from the state capital Dehradun (an 11-hour drive along the Ganges river). Sukhi Top, located on the main road, has 136 inhabitants in 23 households. Jaspur has 77 inhabitants in 14 households, and is located at a distance of one kilometre from the main road. The socio-economic profile of the villagers and their livelihood strategies are examined later in the paper.

The project involves a number of actors. These include the farmers – represented by two growers' groups – the buyer Ayurveda Health (The Netherlands); KIT Royal Tropical Institute (Amsterdam) and Centre for Sustainable Development (Mussoorie). Ayurvedic

Health is a Dutch company that has been importing ayurvedic herbs from southern India for a number of years. It distributes these in Europe to chemists, pharmacies, health shops and therapists. Through the project the company intends to broaden its supply base to northern India, where conditions for growing high altitude medicinal plant species are favourable. Ayurveda Health is particularly interested in procuring CITES-listed medicinal plants that are cultivated and traded in a fully traceable supply chain. This is reflected in the attractive conditions with which the company has agreed to purchase kutki (and other species at a later stage) from farmers. These include: a purchase guarantee for all kutki produced during the first five years; a farm gate price which is almost twice the domestic farm gate price and an additional 20% price premium to set up a community fund for social projects in the villages. The company can afford to pay these prices because it expects to gain an important advantage in the European market, as it will be the only supplier of traceable kutki. Furthermore, as the cost of raw material accounts for only 2% of the cost price of the end product, the high price paid by the company will not affect its returns significantly.

The Centre for Sustainable Development (CSD) and KIT are responsible for designing and monitoring the kutki supply chain. They jointly facilitated the business partnership and mobilised the required inputs and services, such as planting materials, technical assistance and certification from the Herbal Research Development Institute and the forest department. Furthermore, they provide research inputs and examine the impact of the project on various actors, particularly the farmers. They also hope to contribute to poverty alleviation and sustainable development and generate knowledge about the workings of public-private partnerships.

The expected benefits of the project include:

(a) Fifty farmers in Jaspur and Sukhi Top villages will have a secure and profitable market for their kutki; this will encourage other farmers to grow kutki and other medicinal plant species;

(b) The two village communities will benefit from the social fund;

(c) The villagers will be less inclined to collect kutki from the wild, leading to its conservation;

(d) The buyer, Ayurveda Health, will have a secure supply of high quality cultivated kutki from a fully traceable source;

(e) The exporter, Himalayan Organics, has a secure export market enabling it to operate as a socially and environmentally responsible enterprise;

The next section describes the socio-economic condition of the two villages, and the relevance of kutki cultivation for the farming systems and livelihood strategies of farmers in these villages. This section is largely based on a survey conducted by the authors during 2006.

4 Five Decades of Change

The inhabitants of Jaspur and Sukhi Top have gone through profound changes in their livelihood situation during the last five decades. Until the late 1960s a majority of the villagers were agro-pastoralists. While the men looked after livestock, which was the main source of income, women farmed to supplement their household incomes. During the summer men would pasture their goats and sheep on the meadows and in the forests, and in the winter migrate to grazing areas in the foothills. The women stayed in the villages for the most part of the year, cultivating food crops and taking care of the children and aged. A significant number of families were also engaged in trade with Tibet, selling grain, clothes and metal goods in return for salt and wool.

Table 1: Size of Landholding (% of households)

Village	Up to 1 Acre	1.1 to 2.5 Acre	More than 2.5 Acre
Jaspur	14	50	36
Sukhi	13	61	26
Total	14	56	30

Source: Village survey by the authors in 2006.

The trade with Tibet ceased after the 1962 Indo-China war. Moreover, the forest department began to impose serious restrictions on grazing of livestock, due to concerns about rapid deforestation in the mountain areas. Access to forest pastures could still be obtained through permits, but the number of permits was restricted. This forced the villagers to look for new sources of income beyond animal husbandry.

Agriculture and horticulture are increasingly playing a major role in bridging the income gap caused by the declining importance of animal husbandry and trade. As is common in mountainous areas, farming is carried out on small terraced fields, most of which are scattered over large distances. The majority of the villagers are small landholders. The average landholding is 2.3 acres; only 30% of the households own more than 2.5 acres (Table 1). The area has no irrigation facilities, and rain-fed farming is practised by all farmers.

Agriculture accounts for 38% of total income in the villages (Table 2). Farming is particularly important in Jaspur where it accounts for half of the total household income. This is followed by horticulture (apple orchards) which provides 31% of the total income. The third most important source of income is "daily wages" earned by villagers by working for each other or for public agencies such as the forest and public works departments. Livestock accounts for only 5% of the total income.

Table 2: Importance of Income Sources (% of Average Household Income)

Village	Agriculture	Horticulture	Wages	Business	Livestock	Other
Jaspur	51	10	20	11	8	0
Sukhi Top	33	41	13	10	3	0
Total	38	31	15	10	5	0

Source: Village survey by the authors in 2006.

Table 3:Importance of Crops (% of Cultivated Land)

Village	Apple	Potato	Rajma	Chaulai	Vegetables for Market	Medicinal Plants
Jaspur	21	34	28	13	1	3
Sukhi	44	30	15	10	0	0
Total	36	32	20	11	1	1

Source: Village survey by the authors in 2006.

Table 4: Importance of Cash Crops (% of total sales)

Village	Potato	Apple	Rajma	Chaulai	Vegetables	Medicinal Plants
Jaspur	45	14	31	2	9	1
Sukhi	30	56	13	1	0	0
Total	34	45	18	1	2	0

Source: Village survey by the authors in 2006.

Agriculture in both villages is focused on cash crops, notably potatoes, *rajma* (red kidney beans), *chaulai* (amaranthus) and apple (Tables 3 and 4). Grains and other staple food crops are purchased from markets in the foothills, especially in Rishikesh.

Remarkably, the villagers continue to maintain strong links with the markets and depend on them for most of their food supplies and other needs. This is clearly a continuation of the times when the inhabitants were largely traders and pastoralists and bought their food and other provisions from the markets in the plain. While the village economy changed radically in a few decades, substituting farm production for trade and livestock, the farming system did not go through a stage of food self-sufficiency. The villagers continue to maintain market integration as an underlying livelihood strategy, producing cash crops to sell in the markets and buying staple foodstuffs in return.

Table 5: Most Profitable Crops (Net profit)

Crops	Rupees/Acre
Apple	1,17,942
Vegetables	53,526
Rajma	36,586
Potato	28,050

Source: Village survey by the authors in 2006.

Table 6: Distribution of Households According to Number of Apple Trees (%)

Village	None	1 to 50	51 to 100	More than 100
Jaspur	36	7	36	21
Sukhi Top	0	17	35	48
Total	13	14	35	38

Source: Village survey by the authors in 2006.

Table 7: Age of the Apple Orchards (% of Trees)

Village	Before 1991	1991-95	1996-2000	2001-05	2006
Jaspur	25	3	48	24	0
Sukhi Top	27	16	11	43	4
Total	26	13	20	38	3

Source: Village survey by the authors in 2006.

Table 8:Distribution of Households According to Yearly Income (in %, Rs 1,000)

Village	10 or Less	10.1-25	25.1-50	More than 50
Jaspur	21	50	21	7
Sukhi	0	35	43	22
Total	8	41	35	16

Source: Village survey by the authors in 2006.

As shown in Table 5, apple is the most important and profitable cash crop in the two villages. Taken together, 87% of all households have apple orchards, covering 36% of the cultivated land. It is particularly important in Sukhi Top where all the households have these orchards. Their role is less important in Jaspur, where more than one-third of the villagers (36%) do not have apple orchards (Table 6). Also, the average size of apple orchards is larger in Sukhi Top than in Jaspur: 0.90 acre (146 trees) compared to 0.54 acre (74 trees). The importance of apple production as a source of income is likely to increase in the near future. This is because many of the apple orchards are of recent origin and have yet to bear fruit. As shown in Table 7, 41% of the apple trees were planted after 2000 and will begin full production in about 2010. Once these trees start giving fruit fully, the importance of apple as a source of income will increase considerably. This is particularly true for Sukhi Top, where almost half the trees were planted after 2000. Also, considering the relatively high profitability of apple orchards, it is likely that the average income in these villages will increase significantly in the near future.

As the livelihood strategies of both villages are market oriented, it is not surprising that, in spite of the long distances and poor roads and communication infrastructure, the system to market farm produce is relatively well developed. The farming system caters to market demand, and villagers have the well developed skills required to operate in markets. These skills include: acquiring market information; grading of the product; acquiring working capital; hiring trucks for transport; direct selling in the wholesale market. The villagers say that they have no serious marketing problems.

To illustrate the above, we discuss the marketing practices for the main cash crops, potatoes and apples. Potatoes are sold largely in wholesale markets in Uttarkashi, Dehradun and Delhi. The villagers normally sell around 80% of the potatoes they produce, keeping the remainder for themselves. Usually a group of four to five farmers hire a truck to transport potatoes and sell collectively. They grade the potatoes before loading the truck. One farmer goes with the truck to sell in the wholesale market through a commission agent who charges around 4% . Often the commission agent provides an advance payment to cover expenses for weddings, sickness, the purchase of seed and the hire of trucks. While there is no legal obligation on the part of the farmers to sell through the same agent, the general tendency is to maintain a long-term relationship with one dealer/commission agent as this facilitates access to credit. Also, as all commission agents charge the same rate of commission, there is no economic incentive to change agents.

Apples are sold in two ways. Poorer farmers with small orchards sell to contractors from towns in the plains, such as Saharanpur. The larger farmers with bigger orchards prefer to sell directly in wholesale markets through commission agents. They grade and pack the apples and also organise transportation. The capital needed for packaging and transport is often provided by the commission agent on interest. The average annual income in the two villages is slightly more than Rs 47,000 (Table 9). However, there are important differences between households: 41% of households survive on less than half of the average income. Only six households (16%) had a yearly income of more than Rs 50,000 and five of these were in Sukhi Top (Table 8). The average income in Jaspur is almost 25% lower than in Sukhi Top. Considering the average household size of 5.7 persons, the daily budget per person in the two villages is around Rs 23 (approximately 60 US cents). Taking into account the monetary value of products saved for household consumption, we estimate that the daily budget per person is around Rs 40 (about 95 US cents).

A large number of households reported that their income was not adequate to cover their expenditure. The gap between income and expenditure was particularly wide in Sukhi Top:

Table 9: Income/Expenditure Balance (Rupees/year)

Village	Total			Average		
	Income	Expenditure	Balance	Income	Expenditure	Balance
Jaspur	4,98,150	5,16,185	-18,035	35,582	36,870	-1,288
Sukhi Top	10,90,125	12,62,190	-172,065	47,397	54,878	-7,481
Jaspur and Sukhi	15,88,275	17,78,375	-190,100	42,926	48,064	-5,138

the average household expenditure was Rs 54,878 against an average income of Rs 47,397 which implies an annual income-expenditure gap of 16% (Table 9). As a consequence many households take loans to meet their expenditure: 62% of the households in these villages were in debt (Table 10). The proportion of indebted households was especially high in Jaspur with 79%, though the loans they take are only one-fifth of the average loans in Sukhi Top. The average loan taken by households in the two villages together was slightly more than Rs 50,000.

Table 10: Degree of Indebtedness

Village	Total Amount of Loan (Rs)	% of Villagers with Loans	Average Amount of Loan (Rs)
Jaspur	1,77,000	79	16,091
Sukhi	9,75,000	52	81,250
Total	11,52,000	62	50,087

The intensity of debt is particularly high in Sukhi Top where loans amount to 170% of the yearly incomes of households. The comparative figure for Jaspur was 45%.

5 The Niche for Kutki

The income/expenditure data clearly show that the villagers need to increase their income to balance the household budget. At present one of the main ways this is done is through the collection of medicinal plants from the wild. As it is illegal, this source of income is not disclosed by villagers and is not included in our survey. However, informal conversations with them suggest that at least one-quarter of the households, notably the poorest, are engaged in the collection of medicinal plants from the wild. Informants say that during one harvest season an experienced collector can gather up to 150 kg of kutki and five kg of atish. Considering that local traders pay about Rs 150 and Rs 2,000 per kg of kutki and atish respectively, the collectors can earn a sizeable income from the collection of medicinal plants. This represents about one-quarter of the total income of the poorer households in these villages.

It is hoped that the cultivation of medicinal plants will provide villagers with a more sustainable way to bridge the income gap. As kutki is being cultivated either on fallow land or inter-cropped with apple, the income from it is seen by farmers as an addition to their current farm income. For this reason they are prepared to accept relatively low returns from kutki. According to our study, farmers expect an average income of Rs 19,094/acre, which is equivalent to 68% of their income from potatoes or 16% of their earnings from one acre of apple. This suggests that if the cultivation of kutki as an intercrop or on neglected land is successful, farmers will accept it in spite of comparatively low returns. It is, however, important to note that given the complex and comparatively limited market for herbs, the cultivation of kutki cannot be expected to become a large-scale activity and compete with other crops. Furthermore, as income from apple increases, the farmers' interest in cultivating kutki is likely to decline.

6 Performance of the Project

The project started in 2002 with preliminary research by KIT and CSD and initial contacts with the Dutch buyer. In 2005 the farmers were selected, buying contracts between the farmers groups, Himalayan Organics and Ayurvedic Health were signed, and kutki was planted. It was expected that the crop would be harvested during 2007, but for a number of reasons the first harvest was delayed. Only after the technical and commercial feasibility of kutki cultivation is fully established will the project be up-scaled to include more farmers and be diversified to include more products. The main reason for the delay in obtaining the first harvest is the high mortality suffered during the first two years of the project. The following reasons have been responsible for this:

– Poor quality of planting material. In spite of the state government's claim to the contrary, it is difficult to obtain good quality planting material in Uttarakhand. The project procured kutki cuttings from two sources: a research institute, reputed to have expertise in the propagation and cultivation of kutki, and the state forest department, which has a number of nurseries set up to propagate planting material of important species of medicinal plants. The planting material supplied by both these sources was of poor quality and led to high mortality during the first year. This caused a certain degree of disappointment and loss of motivation among the farmers.

– Small size of cultivation. The average size of the kutki plantation is less than 150 square metres. This reduces incentive among the farmers to look after the plants.

– Lack of irrigation.

– Farmers are more interested in receiving subsidies and other benefits from external agencies such as the state government and its departments and non-governmental organisations (NGOs). Some of the farmers planted kutki hoping to receive additional benefits from the project. They were not seriously interested in the cultivation of kutki and other medicinal plants.

Learning from the experience, a special effort has been made to procure better quality planting material. This has led to a considerable decline in the mortality rate, leading to increased motivation among the farmers. Furthermore, pipes have been provided to farmers (at 50% of the cost) to irrigate the kutki fields. This is expected to reduce mortality further.

It is expected that with the benefit of experience gained during the last three years, the performance of the project will improve considerably.

7 Conclusions

The study shows that the cultivation of medicinal plants can play an important role in the livelihood strategies of the villagers in Jaspur and Sukhi Top (and many other high altitude villages in Uttarakhand). As all households in the area have farm land, the cultivation of kutki can benefit most households in these villages. Further, as many of the villagers are engaged in illegal extraction of kutki, its cultivation can contribute directly to the conservation of biodiversity. At the same time, it is clear that the success of cultivation will largely depend on the returns from kutki, compared to other crops. The situation is complex, as the comparative returns from various crops can change over time, and alter the incentives. In fact, this is already happening in these villages as the income from apple orchards is increasing fast. However, for poor farmers who do not have the option of increasing their income through apple orchards the cultivation of kutki and other medicinal plants can still be an effective strategy. Our data confirms that cultivation of medicinal plants is a viable option to improve the livelihoods of poor farmers and thereby curtail the incentives to collect from the wild.

It must, however, be pointed out that, compared to other agricultural products, the global market for most medicinal plants (including kutki) is small and could be saturated by the production of a small number of farmers. The potential of the cultivation of kutki and other medicinal plants as a widespread source of livelihood may therefore not be as high as usually assumed.

The study shows that, in order to be successful, efforts to cultivate medicinal plants depend on a number of factors. The most important of these are:

(1) Choice of medicinal plants with a large market potential: It is important to promote the cultivation of those medicinal plants

which can receive a premium in the market. The species which are listed in CITES are an obvious choice for this reason. As things stand, by and large it is the consumers in developed countries who are prepared to pay a premium for products which are environmentally friendly and not associated with depletion of scarce bio-resources from the wild. At the same time these markets require documented traceability, i e, information about the product's origin and the conditions under which it is produced. Efforts to support the cultivation of medicinal plants should take these requirements into account from the outset. At present these conditions do not apply to the Indian domestic market. Nevertheless, considering a rapidly rising purchasing power and increasing concerns for health and sustainability, efforts should be made to identify consumer segments in the domestic market with a demand for traceable, certified products.

(2) Choice of a suitable area with favourable agro-ecological conditions and relatively low levels of economic development: For successful domestication medicinal plants require specific microclimatic and ecological conditions, which are often difficult to duplicate in farmers' fields. Failure to create these conditions makes it difficult for farmers to cultivate medicinal plants. Research needs to be carried out to understand and replicate favourable agro-ecological conditions conducive to the cultivation of important medicinal plants.

As medicinal plants compete with other crops (and other sources of income), their cultivation is more likely to be successful in areas where incomes are low. As economic activities and incomes can change over a period of time, it is important that a long-term and dynamic view of economic activities is taken when an area is chosen for the promotion of medicinal plants. The importance of this is clearly shown by the emergence of apple orchards as an important source of income in the villages under consideration. This has lowered the attraction of kutki as a source of income.

(3) Identifying a buyer who can guarantee to purchase the whole production at a premium for at least the entire gestation period: The cultivation of medicinal plants is a risky activity, returns from which can only be expected after at least three years. In fact, our experience shows that it can take even longer than three years before the first harvest is obtained. The farmers will be willing to take this risk only if they are certain of a guaranteed market at a price which will provide higher profit than other crops.

(4) A consistent, long-term commitment from supporting agencies to support the farmers through the entire gestation period and the first years of marketing.

(5) Coordination with public agencies to ensure access to high-quality planting material and official registration as growers of medicinal plants.

The role of the partnership facilitator is often neglected in public policies. There are few policy instruments that support the work of the facilitator in selecting appropriate business partners, bringing them together in a business agreement and assisting them in the pilot stage of chain development (which in our case has taken five years). Rather than providing production subsidies, which distort the market, government policy should focus on supporting the pilot stages of chain development, so that private parties can find each other and set up viable business ventures. Such an approach will be likely to reconcile business interests with environmental protection and pro-poor growth.

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