SCANDINAVIAN FOREST ECONOMICS
No. 41, 2006

Proceedings
of the Biennial Meeting of the
Scandinavian Society of Forest Economics
Uppsala, Sweden, 8th-11th May, 2006

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Uppsala

Preliminary analysis of South Asian medicinal plant markets: can you talk to actors and use their own-reported data to estimate net marketing margins?

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Abstract

There is a huge trade in medicinal plants in South Asia. This paper investigates whether it is possible to talk to medicinal plant harvesters and traders involved in the medicinal plant market in Nepal and India in order to be able to conduct a net marketing margin analysis. Using a marketing chain approach, data was collected through open-ended questionnaires administered to harvesters (n = 639) and traders (n = 166) in 15 districts in Nepal, central wholesalers (n = 90) throughout the country, and regional wholesalers (n = 53) in India. Basic distributional statistics indicate that actors' own-reported data is consistent and thus useful for further analysis. Net marketing margin analysis indicated pricing inefficiency in the market, with local traders operating with very low net margins.

Keywords: Non-timber forest products, trade, validity, Nepal, Himalaya

1. Introduction

Medicinal plants are plants used for maintaining health and/or treating specific ailments and diseases – they may constitute the most common human use of biodiversity (Hamilton 2004). Most work on medicinal plant trade has focused on biological rather than economic aspects. Despite the scale and importance of medicinal plant trade, there are few studies on medicinal plant markets that go beyond mere analysis of what species are traded. However, from studies of the trade in medicinal plants from Nepal to India, we know that: simple technology is required for harvesting, drying, storing and transporting raw materials (Olsen 1998); all products are air-dried and non-perishable (Edwards 1996; Olsen 1998) and thus can be subjected to rough handling, transport and long-term storage; there is a low threshold to entry for harvesters - no formal training of harvesters is required and capital requirements are insignificant (Olsen and Helles 1997a; Olsen 1998); men, women and children are all involved in harvest (Pandit and Thapa 2003; Olsen and Bhattarai 2005) while traders and wholesalers are men only (Olsen and Bhattarai 2005); returns to labour in wild harvesting are highly variable depending on season, location, harvesting strategy (opportunistic vs. dedicated), available male labour, physical strength and experience (Olsen 1998; Olsen and Larsen 2003); collection is considered an arduous and low prestige activity (Larsen and Smith 2004); access to resources ranges from open to private depending on product and location (Larsen and Olsen in press); there is a standard marketing chain with standard actors (Olsen and Bhattarai 2005); the market is mature with simple product specifications and private treaty trading (Olsen and Helles 1997a; Olsen 1998); there are usually simple relations between actors – though these are dynamic and may also be complex, e.g. involving social networks and procedures such as advance payment, e.g. Daniggellis (1997); lack of marketing information up the marketing chain (Olsen and Helles 1997a; Rawal and Poudyal 1999); and high threshold to entry at trader and wholesaler levels due to capital requirements and marketing networks (Olsen and Helles 1997a). Furthermore, the general volume and value of medicinal plant trade at the national level have been estimated (Olsen 2005a, b) and 93% is estimated to be exported unprocessed, i.e. just air-dried, to India (Olsen 2005b).

Medicinal plant harvest and trade in Nepal is heavily regulated (Forest Regulations 1995): some species are banned from harvest, others may not be exported unprocessed, all

harvesters need collection permits, transport permits are needed for transport out of district of origin, police and forest staff have rights of inspection, etc. This means that almost all harvest is illegal (Larsen et al. 2005) as is most of the trade (Olsen 2005a) and that rent-seeking is wide-spread (Edwards 1996; CECI 1999; Olsen and Helles 1997b). Is it, in such circumstances, possible to obtain valid and reliable data from the involved economic agents? This question has not been explicitly analysed or answered in the literature, except for a brief analysis by Olsen (2005c) who found that actors' own-reported prices for two products were useful and consistent.

The purpose of the present study is to investigate whether it is possible to talk to medicinal plant harvesters and traders involved in the medicinal plant market in South Asia in order to be able to conduct a net marketing margin analysis. As seen above, available literature allows a first understanding of the physical, exchange and facilitating functions of marketing as well as marketing efficiency and market performance. Building on this, we would expect to find:

Hypothesis 1. That it is possible to interview economic agents in the medicinal plant trade and collect valid and reliable data.

Hypothesis 2. Pricing inefficiency expressed as skewed distribution of net marketing margins along the marketing chain.

2. Methodology

2.1 Study area
The study was conducted at the national-level – from harvest across Nepal to the wholesaler markets in India. Nepal was chosen as it was known to have high and regular levels of medicinal plant extraction; while India is known to be a major medicinal plant consumption country. This paper uses the actor terminology provided by Olsen and Bhattarai (2005) – harvesters, local traders, central wholesalers and regional wholesalers. Harvesters collect medicinal plants, mainly in the wild, and sell them to local traders who consolidate large numbers of small sales into large lots for sale to central wholesalers (bulking up). These then sell to regional wholesalers in India who sell to intermediaries, such as producers of traditional medicine, or retailers mainly in India (bulk breaking).

2.2 Data collection
To most effectively explore the market, we adopted a marketing chain approach. We followed the medicinal plant products from harvesters to regional wholesalers and determined the number and nature of each actor along the chain. The emphasis was on estimating marketing costs and margins, for each product and main actor group involved in the trade. To investigate the trade at the national level in Nepal, we first stratified the country into 15 cells using the three main physiographic zones and five development regions as proxies for north-south altitude and east-west climatic variations. In each cell, a district was randomly chosen. During field work in the districts, all encountered harvesters (n = 639) and all traders (n = 149; some were encountered in more than one location so total number of trader interviews is n = 166) were interviewed. All central medicinal plant wholesalers (n = 90), regardless of their location in Nepal, were interviewed as were regional wholesalers (n = 53) in the main importing cities in India. Wholesalers were identified through existing lists (such as ANSAB 1997) and interviews with traders and other wholesalers. All actors were interviewed face-to-face using standardised open-ended questionnaires. General annual data as well as data for the case year 1997-98 were collected; field work was conducted from

August 1998 to September 1999. Medicinal plant species that are banned from collection were not included in the survey.

2.3 Data analysis

An overview of the national level annual volume and value of commercial medicinal plant trade in Nepal is provided in Olsen (2005a). It was found that the top four products made up almost 44% of the total value of trade in 1997-98 (with each remaining product having a share of the total value of trade of 0 – 6%); this paper focuses on the top four products. The validity and reliability of the trade data rely on harvesters, traders and wholesalers own-estimates of amounts and values. It may be that these are incorrect, e.g. if traders feel obliged to answer questions but do not wish to disclose information. In order to further verify data and the accuracy of reporting, basic distributional statistics for selected prices and costs, such as storage costs and rent-seeking, were analysed. If responses are invalid, a high degree of randomness in responses would be expected. Then, for each of the four species, marketing margin analysis was done.

3. Results

3.1 Validity and reliability of own-reported data

The basic distributional statistics for actors' own-reported data (Table 1) indicate that such data is consistent: standard derivation is small compared to the mean, and the mean and median values are close as are the modal and median values. The only exception is local traders' storage rent with large standard deviation; this can be explained by the variation in local trader trade volume (Olsen and Bhattarai 2005). This indicates close clustering around the mean and little skewness – not to be expected if actors answered randomly. The reason that rent-seeking values are consistent is that rent-seeking is institutionalised with standard rates that vary little.

Table 1 - Basic distributional statistics for actors' own-reported key data

Actor and factor	n	Unit	Mean	s.d.	Median	Mode	Min	Max
Harvester								
Price for *S. chirayita*	45	Nr/kg	62.2	14.6	65	60	40	85
Price for *S. mukorossi*	56	Nr/kg	10.2	2.6	10	10	7	15
Price for *A. racemosus*	147	Nr/kg	79.2	6.9	80	80	60	90
Price for *N. scrophulariiflora*	127	Nr/kg	77.4	12.1	80	80	60	105
Rent-seeking[1]	511	Nr/load	8.5	3.4	10	10	0	25
Local trader								
Buying price *S. chirayita*	56	Nr/kg	71.7	16.5	75.5	90	40	100
Buying price *S. mukorossi*	102	Nr/kg	10.9	2.5	11	8	8	16
Storage rent[2]	162	Nr/month	1867	1918	1200	1500	100	8000
Av. storage time	165	Months	2.8	0.8	3	3	1	5
Storage weight loss	160	%	2.9	1.2	3	2	1.25	8
Packaging	164	Nr/sack	20.4	2.9	20	20	5	30
Handling/loading truck	132	Nr/truck	168	74	150	150	80	600

Truck transport[3]	136	Nr/truck	3869	1016	3900	3500	1500	8500
Taxes	22	Nr/truck	500	0	500	500	500	500
Rent-seeking by forest staff	138	Nr/truck	299	133	300	300	100	1000
Rent-seeking by police	138	Nr/truck	239	90	200	200	100	600
Central wholesaler								
Buying price *S. chirayita*	45	Nr/kg	93.4	14.5	100	100	50	105
Buying price *S. mukorossi*	43	Nr/kg	13.3	2.7	15	15	9	18
Storage rent	90	Nr/month	4154	2927	3500	1500	800	18000
Av. storage time	90	Months	2.7	0.9	3	3	1	5
Storage weight loss	90	%	2.7	1.1	2.5	2.0	1.3	10
Packaging	90	Nr/sack	20.0	1.6	20.0	20.0	16.0	25.0
Handling/loading	88	Nr/truck	136	56	110	100	60	300
Truck transport	90	Nr/truck	9006	2047	10000	10000	4000	12000
Taxes	6	Nr/truck	500	0.0	500	500	500	500
Rent-seeking: Nepali custom officials	90	Nr/truck	1198	404	1200	1000	200	2000
Rent-seeking: Nepali forest staff	89	Nr/truck	839	179	800	1000	500	1200
Rent-seeking: Indian custom officials	90	Nr/truck	3461	537	3500	3500	1750	4500
Rent-seeking: Indian police	89	Nr/truck	1816	517	1800	2000	1000	3500

[1] Rent-seeking primarily by forest guards (69% of cases) but local government staff also involved (9%) as is police personnel.

[2] All entries not mentioning a particular species are calculated across all species.

[3] Rent of truck, gasoline, and driver. Weight loss during transport was only mentioned by seven local traders (loss of 4.6±2.1%) and is assumed zero.

To investigate if answers were systematically biased, the harvester selling price and local trader buying price, which should be equal, were compared for all four products using one-way analysis of variance (ANOVA). Except for S. mukorossi ($F_{1,155} = 2.0$, $p = 0.157$), all prices are significantly different ($p < 0.002$) with harvester reported prices being lower than local trader reported prices. This indicates that harvesters may be systematically under-reporting selling prices and/or that local traders are over-reporting buying prices.

Furthermore, for valid data, we would expect the sales price to significantly increase with each actor along the marketing chain for each of the four products. Using one-way ANOVA and post hoc LSD tests, we found significant price increase at each link along the marketing chain ($p < 0.001$ for each product) regardless of whether we used harvester selling prices or local trader buying prices for the first transaction.

3.2 Net marketing margin analysis

The national-level price breakdown along the medicinal plant marketing chain is provided in Table 2. Using species specific agent data on shrinkage (e.g. local traders reported loss during storage of 3.8 (±1.7) % for S. chirayita, n = 55), conversion factors (e.g. (1/(1-0.38) = 1.04 for S. chirayita) are used to express all costs and margins in terms of 1 kg of the final product

(e.g. the average harvester selling price of 62.22 is multiplied by 1.04 to get the local trader buying price for S. chirayita).

Table 2 - National level average marketing margins for trade in the top-four medicinal plant products traded from Nepal to India

Factor	n	S. chirayita Nr/kg	% of India wh price	n	S. mukorossi Nr/kg	% of India wh price	n	A. racemosus Nr/kg	% of India wh price	n	N. scrophulariiflora Nr/kg	% of India wh price
Harvester												
Selling price	45	62,22	39,4	56	10,24	34,4	147	79,24	55,5	112	77,4	40,4
Rent-seeking	511	0,13		511	0,13		511	0,13		511	0,13	
Net margin		62,09	39,4		10,11	33,9		79,11	55,4		77,27	40,4
India wholesale price	26	157,7		27	29,81		26	142,8		32	191,5	
Local trader												
Selling price	45	96,11		43	11,24		32	92,07		30	119,5	
Buying price	45	64,71		56	10,55		147	82,41		112	78,95	
Gross margin		31,40	19,9		0,69	2,3		9,66	6,8		40,56	21,2
Storage space												
Rent	166	1,52		166	1,50		166	1,52		166	1,49	
Interest charge	55	2,10		100	0,43		78	2,91		47	2,45	
Transport												
Packaging	52	0,50		99	0,41		78	0,42		43	0,44	
Handling/loading	132	0,05		132	0,05		132	0,05		132	0,05	
Truck	136	1,09		136	1,07		136	1,08		136	1,13	
Royalties		3,00			2,00			5,00			10,00	
Rent-seeking	138	0,16		138	0,14		138	0,15		138	0,15	
Net margin		22,98	14,6		-4,92	-16,5		-1,47	-1,0		24,85	13,0
Central wholesaler												
Selling price	26	157,7		27	29,81		26	142,8		32	191,5	
Buying price	45	98,99		43	11,58		32	95,75		30	121,90	
Gross margin		58,73	37,2		18,23	61,2		47,02	32,9		69,55	36,3
Storage space												
Rent	90	0,79		90	0,79		90	0,80		90	0,785	
Interest charge	45	2,59		43	0,65		32	3,88		30	4,712	
Transport												
Packaging	45	0,41		43	0,42		32	0,41		30	0,408	
Handling/loading	88	0,04		88	0,04		88	0,04		88	0,041	
Truck	90	2,78		90	2,63		90	2,79		90	2,591	
Custom duty		0,49			0,06			0,48			0,61	
Rent-seeking	89	0,82		89	0,77		89	0,82		89	0,765	
Net margin		50,80	32,2		12,87	43,2		37,80	26,5		59,64	31,2

There is very little species specific variation in cost factors; differences in cost levels between species are due to differences in raw material prices. In fact, raw material purchasing price is the absolute dominant cost factor with no other cost above 5 Nr/kg with the exception of the royalty rate for N. scrophulariiflora. In total, costs of storage, transport, royalties, duties and rent-seeking constitute 15% or less of costs for local traders and central wholesalers; the exception is the low value product from S. mukorossi where raw material cost makes up from 62 – 64% of total costs. For this product, central wholesaler transport costs (14%) and local trader royalty payment (12%) become important. In general, the cost structure and cost level are similar for local traders and central wholesalers, with the exception that local traders carry the cost of royalty payment. Regarding margins, it is seen that harvesters operate with net margins from 33 – 56% of the India wholesale price. Local traders operate with negative net margins for two products; as the calculations are done based on average prices, and not a negative scenario, this indicates that this group is under pressure. In all cases, their average net margins, ranging from -17 to 15%, are well below the net margins of the central wholesalers at 26 – 43%.

4. Discussion

4.1 Validity and reliability

There appears to be a belief among social scientists that traders (incl. wholesalers) are very difficult to talk to (Harriss 1992); researchers working with non-timber forest products have also expressed concerns that NTFP traders are difficult to interview (e.g. Padoch 1992, te Velde et al. in press). As the value of the presently investigated trade is 25 times higher than the officially recorded value of the herb trade (Olsen 2005a), interviewing traders is obviously sensitive yet indispensable as official data is so inaccurate that it is almost useless. Building on the South Asian experiences with trader interviews reported by Harriss (1992), we emphasised the following when planning and implementing interviews: that we were independent of national and local governments; that the purpose was to uncover the contribution of trade to the national economy and ensure sustainable supplies; flexibility in setting up interviews in order to minimise traders' opportunity costs; minimisation of environmental error by using only one older highly qualified Nepalese researcher, with in-depth understanding of medicinal plant utilisation and markets, as interviewer; conducting interviews in private and guaranteeing anonymity; providing small special gifts such as Elaeocarpus sphaericus necklaces from the famous Hindu pilgrimage site of Pashupatinath in Kathmandu; and taking time to allow traders to ask us questions and always try to be helpful, e.g. in facilitating contact to potential buyers. The analysis of basic distributional statistics for traders' own-reported data shows that this approach results in consistent answers. It does not, however, eliminate systematic bias and there is a pronounced tendency for all actors to underestimate their own incomes through their price reporting. This does not, at least in the present case, distort the general findings, e.g. it is clear that local traders' net margins are very low. Regarding Hypothesis 1, it is concluded that the presented findings are robust and that it is possible to interview economic agents in the medicinal trade and obtain valid and reliable data.

4.2 Net marketing margins

The consistently high net marketing margins captured by central wholesalers and the very low ditto for local traders indicate an exploitative relationship between these two groups. It may be, as previously argued by Olsen and Helles (1997a), that central wholesalers act as a passive oligopsony: they are few and their position in the marketing chain combined with the services they provide, not least Indian networks and their ability to negotiate prices, allow them set low buying prices. Furthermore, almost 78% of central wholesalers provided credit to local traders – this may be contributing to establishing control of local traders by limiting their number of sales points. It should, however, also be noted that functions of good governance (Veeman 2002) are not present in the market: rules and regulations regarding harvest and trade of medicinal plants can be locally interpreted and implemented (Larsen et al. 2005), prices for some products may change rapidly over short periods of time (Olsen and Bhattarai 2000), and rent-seeking at all levels is common. This means that central wholesalers carry financial risks that are not presently included in their net margins (risk bearing costs). But the same set of factors also implies risk bearing costs for local traders; costs that can not be covered within the present low levels of net margins. It could be that local trader net margins vary significantly from year to year and that the present case year just constitutes a bad year for local traders. However, previous local level studies of net margins (Sharma 1995; Olsen and Helles 1997a; Olsen and Bhattarai 2000) confirm the findings in the present paper; and no case study has ever reported high local trader net margins and low central wholesaler margins for the same product in the same trading season. Regarding

Hypothesis 2, it is concluded that net marketing margin analysis indicates pricing inefficiency in the South Asian medicinal plant market.

5. Conclusion

A large number of actors were interviewed along the marketing chain, from the harvesters in remote areas of Nepal to large wholesalers in India. Analysis of basic distributional statistics for actors' own-reported data indicated that such data is consistent, even though there may be a systematic bias in price data, and thus useful for market analysis. An analysis of net marketing margins along the marketing chain further indicated that the there is pricing inefficiency in the South Asian medicinal plant market; while harvesters and central wholesalers operate with acceptable margins, local traders realise very low net margins even when not including risk bearing costs. This paper is a contribution to the painting of a comprehensive picture of the economics of wild herb trade from the Himalayas – further detailed studies are required in order to understand market performance.

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