Commercialisation of non-timber forest products: first steps in analysing the factors influencing success

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SUMMARY

Although trade in non-timber forest products (NTFPs) has been widely promoted as an approach to rural development, recent research has indicated that NTFP commercialisation is often not successful. Analysis of the factors influencing success of NTFP commercialisation has been hindered by the lack of an appropriate analytical approach for comparison of case studies. We tested and further developed a methodology recently developed by CIFOR, by examining 16 NTFP case studies in two workshops held in Mexico and Bolivia involving a variety of stakeholders involved in NTFP commercialisation. Workshop participants identified a wide range of measures by which the success of NTFP commercialisation can be defined, which included improvements in social justice, community organisation and local culture, as well as economic status. Participants then considered the factors influencing the processes involved in NTFP commercialisation: production, collection, processing, storage, transport, marketing and sale. In total 45 factors were identified that significantly limit one of the commercialisation processes. Generally product marketing and sale were found to be those processes most constraining overall success. These results illustrate how participatory methods can be of value in analysing the success of NTFP commercialisation, and how a process-based approach can provide an analytical framework for comparison of NTFP case studies.

Keywords: commercialisation, stakeholders, multivariate statistical approach, NFTPs, case studies

INTRODUCTION

The past decade has witnessed a rapid growth of interest in non-timber forest products (NTFPs) among conservation and development organisations (Arnold and Ruiz Pérez 1998, Wollenberg and Ingles 1998, Ruiz Pérez and Arnold 1996, Neumann and Hirsch 2000). This can be attributed to increasing recognition of the contribution that NTFPs make to the livelihoods of large numbers of people in developing countries (Arnold and Ruiz Pérez 1998), and the suggestion that NTFPs can be harvested with relatively little impact on the forest environment (Neumann and Hirsch 2000). Research has focused on exploring the contribution that NTFPs can make to sustainable development by increasing financial income to rural communities and by increasing the value of forest resources, thereby providing an incentive for conservation (Richards 1993, Wollenberg and Ingles 1999, Ruiz Pérez and Arnold 1996, Neumann and Hirsch 2000). As a result commercialisation of NTFPs is widely considered to offer a mechanism by which conservation and development goals can be achieved concurrently (Plotkin and Famolare 1992, Counsell and Rice 1992).

However, recent reviews of the literature relating to NTFPs have highlighted the fact that commercialisation of NTFPs is often not successful, either in alleviating poverty or in providing benefits to conservation. For example, Neumann and Hirsch (2000) describe a number of case studies indicating that sale of NTFPs often tends to provide a basic level of income for the poorest section of communities, rather than providing a method of socio-economic advancement. The level of cash income received by those involved in NTFP collection is often very low; in some situations, dependency on income from sale of NTFPs may apparently perpetuate poverty rather than alleviate it (Neumann and Hirsch 2000). Similarly, in a review of the ecological impacts of commercial NTFP harvesting, Peters (1996) concluded that many NTFP resources are harvested destructively, or on an unsustainable basis.

If NTFPs sometimes fail to make a positive contribution to sustainable development, as such findings suggest, then there is a need to analyse the ecological, socio-economic and cultural factors that determine the success of NTFP commercialisation. Such analyses could enable those NTFPs of high potential for successful commercialisation, or those at high risk of failure, to be identified prior to major investment decisions being made. Although a great deal of research has been undertaken on NTFPs, much of this has been highly specific in nature, relating to individual case studies. Differences in the objectives and methods of different studies, and wide

variation in the ecological and socio-economic characteristics of NTFPs, have restricted the development of analytical frameworks that might enable the results of different investigations to be integrated or compared (Arnold and Ruiz Pérez 1996, Neumann and Hirsch 2000). The lack of such comparative analyses has hindered the development of generalisations about the factors influencing success of commercialisation. Although some important attempts have been made to develop models and theories relating to NTFP commercialisation (Godoy and Bawa 1993, Homma 1996, Godoy *et al.* 1995), to date, these efforts have largely been qualitative in nature, and their practical applicability has been limited.

ANALYSING THE SUCCESS OF NTFP COMMERCIALISATION

Analysis of the factors influencing the success of NTFP commercialisation has rarely been undertaken in previous research. One approach recently described by researchers at CIFOR focused on the classification of NTFP case studies, using multivariate statistical approaches (Ruiz Pérez and Byron 1999). The CIFOR method is based on the identification of variables that describe key attributes of different products, which can be measured with standard criteria and units, thereby permitting comparative analysis. This approach was also used to define those variables most closely correlated with overall success of NTFP commercialisation. Results indicated that key factors influencing the outcome of NTFP development include the nature of government involvement, distribution of property rights, the ability of local people to claim and enforce such rights, market transparency, and pressure on the resource (Ruiz Pérez and Byron 1999).

The method described by Ruiz Pérez and Byron (1999) represents a novel quantitative approach to assessing the relative influence of different factors on determining the success of NTFP commercialisation. However, there are a number of limitations of the methodology described. For example, the assessments of different factors were entirely undertaken by external 'experts'; no attempt was made to gauge the opinions and values of the communities involved in the collection and marketing of the NTFPs. The criterion of 'success' adopted was also limited, and was again not based on any assessment of local community perceptions. Each case was scored for 'ecological sustainability, contribution to household economy and political empowerment', based on a survey of published literature (Ruiz Pérez and Byron 1999). Concepts such as ecological sustainability and political empowerment are difficult to measure in any meaningful way, and therefore these assessments of success are inevitably imprecise. In addition, the number of case studies considered was very small (9), which limits the generality of the results. [1]

In this paper, we aim to further develop the methodology for comparative analysis of NTFP case studies described by Ruiz Pérez and Byron (1999). This was achieved through participatory analysis of a variety of NTFP case studies undertaken through two workshops held in Mexico and Bolivia. The aims of the workshops were first to examine how success of NTFP commercialisation might be defined or measured, based on the perceptions of local communities and others involved in NTFP trade. The factors influencing success were then analysed with reference to individual NTFP case studies, by separately considering each process involved in NTFP commercialisation.

NTFP workshops for analysis of case studies

To provide information on NTFP case studies, workshops were held in both Mexico and Bolivia during 2001. These workshops were held to initiate the research project 'Commercialisation of non-timber forest products: factors influencing success' (CEPFOR), funded by the Forestry Research Programme of the UK Department of International Development. This was a collaborative venture between researchers in the UK, Mexico and Bolivia. The workshops were attended by 56 and 64 participants respectively, drawn from the conservation, development and research communities within each country, as well as representatives of local communities and private enterprise focusing on those organisations with direct experience of the commercialisation of NTFPs. The participants were selected following an initial visit to both countries, where stakeholders were identified in NTFP commercialisation in the localities where the projects were to be undertaken. Our aim was to ensure sectoral representation within the stakeholder group (community representatives, governmental and non-governmental research institutions, and private enterprise).

Details of the NTFPs considered in each of these workshops, and the participants involved, are presented on Table 1. All participants were stakeholders in some aspect of the NTFP trade, and in each case the products concerned were produced and traded by local communities. Each participating organisation was asked to consider the NTFP item with which they were most familiar. Some organisations were represented by more than one participant. In Mexico 21% of participants were female, in Bolivia this figure was 20%. All NTFPs considered are traded nationally and regionally, for four of the products most of the trade is international (incense, fungi, camedor palm leaves and Brazil nut). All of the products are traded commercially in the sense that the products are transferred from the community of origin to an external market, through a financial transaction (although some are also used for subsistence purposes). The only exception to this definition was cacao, which is traded through a barter economy.

[1] The CIFOR team is currently further developing their original methodology in their international comparison of cases of forest product development, which compares 61 case studies across Asia, Africa and Latin America.

At the workshops, we first identified a variety of different ways in which the success of NTFP commercialisation may be defined. This was achieved by referring to key literature on NTFP commercialisation (Arnold and Ruiz Pérez 1998, Ruiz Pérez and Arnold 1996, Neumann and Hirsch 2000). Workshop participants were invited to suggest additional criteria by which the success of NTFP commercialisation might be evaluated, based on their own experience or perspectives. Participants were then asked to score how successful commercialisation had been for specific NTFP case studies with which they were familiar. Scores were assigned through a process of discussion by small groups of participants, focusing on individual products with which they were directly familiar, on a scale of one to four: 1 = Total failure, 2 = Moderate failure, 3 = Moderate success, 4 = Total success. The mean score for each criterion of success was then calculated.

Participants were then invited to consider and define the main constraints to successful NTFP commercialisation faced by communities in these regions. This was achieved by considering the processes involved in the commercialisation of an NTFP, and the factors that constrain the success of each process. Through discussion, a consensus was reached on a generic structure of the commercialisation process likely to be common to most NTFPs, which included the following distinct processes: production, collection, processing, storage, transport, marketing (i.e. promotion of product), and sale**.** It was recognised that the relative importance of these processes might differ between NTFPs, and that the processes do not necessarily occur sequentially. In addition, it was recognised

TABLE 1a *Details of workshop participants and NTFPs included in the Mexican workshop*

Participating organisation	NTFP	Principal use in case study	Species	Location
† NGO	Soyate palm	Plaited and used for weaving and basketry	*Brahea dulcis*	Guerrero State, Mexico
Research Institute	Sasparilla bark	Bark has analgesic and homeostatic properties	*Smilax aspera*	Costa Rica
† Community producer	* Wild edible fungi	Traded for consumption	*Boletus edulis, Amanita caesarea, Cantharellus cibarius*	Oaxaca State, Mexico
Community rep/ producer	Palm inflorescence	Traded for consumption	*Chamaedorea tepejelote*	Oaxaca State, Mexico
Community rep/ producer	Pepper	Traded for consumption	*Piper* sp.	Campeche State, Mexico
† Community rep/ producer	Water	Bottled and sold as mineral drinking water	N/a	Oaxaca State, Mexico
NGO	Weaving cane	Small furniture	*Desmonicus* sp.	Oaxaca State, Mexico
NGO	* Camedor palm	Leaves used for floristry	*Chamaedorea elegans,* etc.	Oaxaca State, Mexico
Technical adviser	Ixtle / Pita fibre	Processed into fine strong thread and used in leatherwork stitching	*Aechmea magdalenae*	Veracruz / Oaxaca States, Mexico
NGO	Alebrije wood	Carving traditional handicrafts	*Bursera* sp.	Veracruz / Oaxaca States, Mexico
NGO	Wild cocoa	Consumed	*Theobroma cacao*	Chiapas State, Mexico
NGO	Weaving cane	Rustic furniture	*Cordia alba*	Oaxaca State, Mexico
Community rep/ producer	Honey	Traded for consumption	*N/a*	Campeche State, Mexico
NGO	Natural rubber	Former "Chicle" industry presynthetics, now used in chewing gum	*Manilkara zapota*	Campeche / Quintana Roo States, Mexico
Community rep/ producer	Resin	Incense and local Industry	*Pinus* sp.	Oaxaca State, Mexico
NGO	Bamboo	Furniture	Subfamily Bambusoideae.	Oaxaca State, Mexico
Community rep/ producer	* Wild edible fungi	Traded for consumption	*Boletus* sp., *Amanita* sp.	Oaxaca State, Mexico
Community rep/ producer	Resin	Incense and local Industry	*Pinus* sp.	Oaxaca State, Mexico
† NGO	Wild edible fungi	Traded for consumption	*Boletus* sp., *Amanita* sp.	Oaxaca State, Mexico

† - Female participant * Product traded internationally

TABLE 1b *Details of workshop participants and NTFPs included in the Bolivian workshop*

Participating organisation	NTFP	Principal use in case study	Species	Location
NGO	Wild Rubber	Waterproof clothing and bags used in mining industry	*Hevea brasiliensis*	Guanay, Madidi, Dept La Paz, Bolivia
Community rep/ producer	Incense *	Religious ceremonies	*Clusia* and *Hymenaea* sp.	Apolo, Madidi, Dept La Paz, Bolivia
Community rep/ producer	Wild vanilla	Traded for consumption	*Vanilla planifolia*	San Buenaventura, Dept La Paz, Bolivia
Community rep/ producer	Wild vanilla	Traded for consumption	*Vanilla planifolia*	San Buenaventura, Dept La Paz, Bolivia
Academic/ research institute	Jipi Japa palm	Weaving handicrafts, hats and roofing	*Carludovica palmata*	Amboro Buffer zone, Dept Santa Cruz, Bolivia
Technical adviser	Tropical wild fruits	Traded for consumption	Various	Chaco and Santa Cruz, Eastern Bolivia
† Private enterprise	Palm heart	Traded for consumption	Arecaceae,	Rurrenabaque, Dept of Beni, Bolivia
NGO	Bamboo	Rustic furniture	*Bambusa* sp.	Dept of Santa Cruz, Bolivia
Government technical adviser	Brazil nut *(castaña)	Traded for consumption	*Bertholletia excelsa*	Riberalta, Dept of Beni, Bolivia
NGO	Jipi Japa palm	Weaving handicrafts, hats and roofing	*Carludovica palmata*	Amboro Buffer zone, Dept Santa Cruz, Bolivia
† Academic/ research institute	Natural plant fibre (Garabata)	Weaving bags	*Bromelia hieronymii*	Dept Santa Cruz, Bolivia
NGO	Lianas	Rustic furniture	Unknown	Amboro Buffer zone, Dept Santa Cruz, Bolivia
Research institute	Jipi Japa palm	Weaving handicrafts, hats and roofing	*Carludovica palmata*	Dept of Santa Cruz, Bolivia
NGO	Organic coffee	Traded for consumption	*Coffea arabica*	Dept of La Paz, Bolivia
† NGO	Natural handicrafts	Artesan goods	Various	Dept of Beni, Bolivia

† - Female participant * Product traded internationally

that some of these processes may be repeated or omitted for specific products.

Participants in the first workshop in Mexico were invited to identify the principal obstacles which rural poor producers, traders and processors faced, through discussion in small working groups focusing on individual commercialisation processes. Some additions and refinements were made during discussion in plenary before consensus was reached, and some factors constraining success were identified as common to more than one process. In Bolivia, this format was presented to working groups and some of the constraints identified at the Mexican workshop were further refined. Participants agreed to evaluate their case studies according to the original format developed in Mexico. Participants in both workshops were then invited to score the importance of each factor for each process with respect to the NTFP with which they were most familiar, through discussion in small groups. Scores were made on a scale of 1 (not a constraint), to 4 (a very significant constraint), referring to the degree to which a given factor was considered to be constraining success, considering each of the seven processes separately.

To examine whether there were identifiable groupings or typologies of NTFPs based on the factors constraining commercialisation, as proposed by Ruiz Pérez and Byron (1999), the scores generated by the workshop participants were analysed using Principal Components Analysis (PCA), using MINITAB v. 13. PCA is a multivariate statistical technique that enables the most important sources of variation to be identified, within complex data sets (Johnson and Wichern 1992). The relationship between constraining factors and the overall assessment of success was then examined by regression, using MINITAB v. 13. Total scores for combined success variables were regressed against the scores for the first principal component derived from the PCA, following Ruiz Pérez and Byron (1999).

ANALYSIS OF NTFP CASE STUDIES

A total of 34 NTFP case studies were profiled at the two workshops, 19 from Mexico and 15 from Bolivia (Table 1). Data from all participants contributed to the criteria of success, but only data from participants 1–16 in Mexico

and 1–13 in Bolivia contributed to the analysis of commercialisation constraints, owing to the limited time available at the workshop. With the exception of the unusual case of water (bottled for sale), all NTFPs considered in this study were derived from plants or fungi. In all of the cases apart from one, the products were collected either exclusively from the wild, or from a combination of wild and domesticated sources. The only product that was derived exclusively from domesticated / cultivated sources was *Bactris gasipaes* ('palmito'). Some of the NTFPs were represented more than once among different case studies, but we chose to consider the contribution of each of these to the data set as a distinct "product and location" combination.

In total, eight different criteria of success were identified in a search of the literature undertaken at the outset of the investigation. An additional five criteria of success were identified during each of the two workshops in Mexico and Bolivia, giving a total of 18 (Table 2). Most of the different success criteria referred to improvements in the socio-economic status of the communities involved in NTFP production, including specific sections within such communities such as women, families, or the poorest individuals. Success was however not solely defined in economic terms; reference was also made to improvements in social justice, community organisation, local capacity, local culture, and a variety of measures of human well-being. Benefits to groups other than local communities were also mentioned, including the consumers, governments and the private sector.

In Mexico, the case study NTFPs were considered to have been most successful in terms of improving the conservation of forest resources, whereas in Bolivia, NTFPs were judged to have been most successful in terms of improving the economic status of women within communities. In both countries, NTFPs scored relatively highly in terms of strengthening local culture and increasing income to families. In Mexico, NTFPs had been least successful with respect to improving social justice and improving the economic status of the poorest members of the community. The least successful measure in Bolivia referred to the role of NTFP commercialisation in strengthening markets (Table 2).

In total 106 factors constraining success of NTFP commercialisation (from production through to sale) were identified in the two workshops, 45 of these received a mean score of 3 or more in one or other of the two workshops, indicating that these factors are generally considered to be significantly limiting NTFP commercialisation (Table 3). Of these 15 factors received a mean score of > 3 in both workshops. In Mexico, the most constraining factors were lack of instruments to provide financial support, particularly for the processes of production and marketing; and a lack of market valorisation of environmental goods and services. In Bolivia, the highest mean score was recorded for lack of management capacity for marketing. Other factors that were a significant constraint included low product price at market, and lack of road and transport infrastructure. Lack of access to market information was identified as a particularly significant constraint in both Mexico and Bolivia (Table 3).

When the NTFPs were analysed by PCA in the case of the Mexican data, 25.9% and 10.9% of the variation was explained by principal components 1 and 2 respectively (these being the main axis of variation). In the case of data from the Bolivian NTFPs, 27.7% and 12.3% of the variation was explained by principal components 1 and 2 respectively. These results indicate that in both data sets, a

TABLE 2 *Crtieria of success of NTFP commercialisation proposed by workshop participants in Mexico and Bolivia, together with mean scores of success for 16 NTFP case studies considered in each workshop. Scores were assigned on a scale of 1–4, where 1 = Total failure, 2 = Moderate failure, 3 = Moderate success, 4 = Total success. For details of methods, see text.*

Criteria of success	Origin of criterion	Mexico	Bolivia
Increasing family income within the community	Literature	3.2	3.1
Improving the economic status of women within communities	Literature	3.1	3.2
Strengthening local culture	Literature	3.2	3.0
Improving the conservation of forest resources	Literature	3.4	2.8
Improving local capacity	Literature	3.3	2.9
Improving the control and ownership of forest resources within the community	Literature	3.3	2.8
Improving consumer well being	Literature	3.1	2.9
Increasing the proportion of community members with paid work	Literature	2.8	2.9
Strengthening community organisation	Mexico	3.1	2.6
Improving well-being – education, health, diet etc, within communities	Mexico	2.9	2.7
Improving the economic status of the poorest members of the community	Mexico	2.6	2.8
Improving social justice – transparency and equitable distribution	Mexico	2.5	2.8
Strengthening markets	Mexico	2.9	2.1
Increased ability to meet consumer preferences	Bolivia		2.8
Increasing value added locally	Bolivia		2.7
Increasing income generated to businesses	Bolivia		2.7
Increasing income generated to governments	Bolivia		2.6
Ability to adhere to international norms	Bolivia		2.3

TABLE 3 *Relative importance of factors limiting success of NTFP commercialisation Data presented are mean scores based on assessments of 16 NTFPs in each of the workshops in Mexico and Bolivia. Only those factors with a mean score ≥ 3 in either one of the workshops are included. Scores were assigned on a scale of 1 (not a constraint) to 4 (a very significant constraint) referring to the degree to which a given factor was considered to be constraining success (for details see text).*

Factor limiting success	Mean score	
	Mexico	Bolivia
Process: Production		
Lack of technical support	2.9	3.0
Lack of a favourable normative context	3.1	1.8
Lack of financial instruments	3.5	3.1
High opportunity cost of production	3.2	2.3
Lack of adequate quality control	2.7	3.0
Process: Collection		
Lack of financial instruments	3.1	2.9
Lack of technical support	3.0	2.6
Lack of community organisation	3.1	2.6
Process: Processing		
Lack of processing skills	2.8	3.0
Lack of infrastructure and equipment (for processing)	3.2	2.8
Lack of financial instruments	3.3	3.1
Lack of technical support	3.0	3.3
Lack of community organisation	3.2	2.8
Lack of adequate technology	3.0	-
Lack of adequate quality control	2.9	-
Lack of knowledge and use of appropriate technologies	-	3.2
Lack of access to information and exchange of experiences	-	3.3
Process: Storage		
Lack of financial instruments	3.2	-
Process: Transport		
High unit cost of transport	3.2	3.2
Long distances from point of sale	3.4	3.3
Lack of road and transport infrastructure	3.4	3.4
Lack of financial instruments	3.3	3.2
Lack of community organisation	2.9	3.2

Factor limiting success	Mean score	
	Mexico	Bolivia
Process: Marketing (Identification of the market and product promotion)		
High cost of product promotion	2.9	3.2
High availability of substitutes	2.5	3.0
Lack of access to market information	3.5	3.5
Lack of contact with final consumers	3.1	2.9
Lack of financial instruments	3.6	2.8
Lack of technical support	3.1	3.2
Lack of community organisation	3.0	3.3
Lack of market valorisation of environmental goods and services	3.1	2.9
Lack of adequate quality control	3.0	3.1
Lack of attractive product presentation	2.9	3.2
Lack of management capacity	-	3.8
Lack of knowledge pertaining to consumer demands and needs	-	3.0
Process: Sale		
Low product price	3.3	3.5
Low returns to producers	2.7	3.1
Lack of market valorisation of environmental goods and services	3.6	3.1
High producer dependency on market intermediaries	2.8	3.1
High numbers of market intermediaries	3.4	2.8
Lack of financial instruments	2.5	3.2
Lack of technical support	2.7	3.3
Lack of community organisation	2.5	3.3
Lack of a favourable normative context	3.1	2.2
Poor relationship between final product price and production cost	2.8	3.0

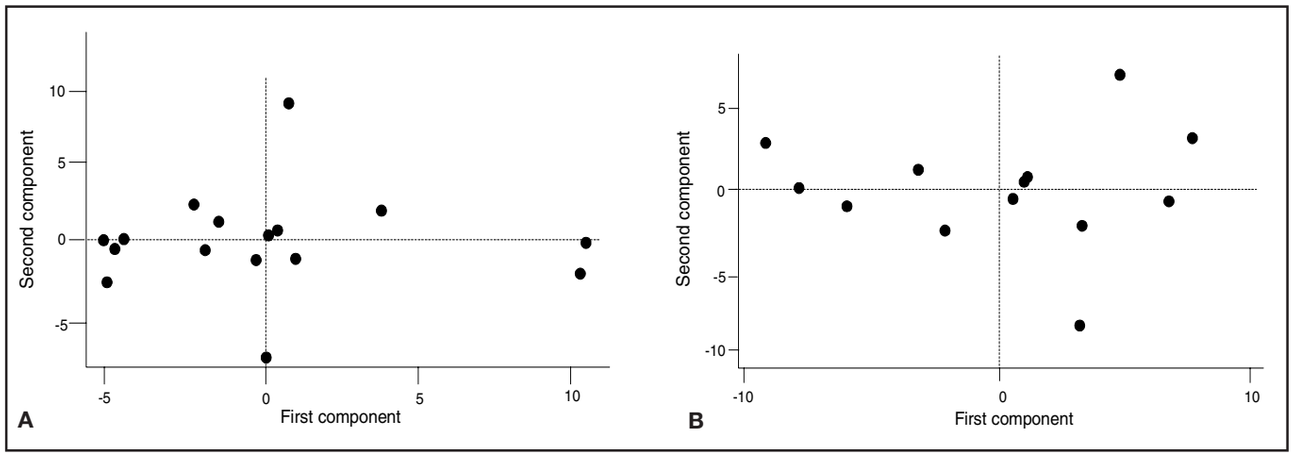

FIGURE 1 *Principal Components Analysis (PCA) of the characteristics of NTFPs, based on analysis of factors constraining success in workshops held in (A) Mexico and (B) Bolivia.*

TABLE 4 *Relative importance of processes limiting success of NTFP commercialisation. Data presented are mean scores based on assessments of 16 NTFPs in each of the workshops in Mexico and Bolivia, averaged across scores recorded for all factors constraining each process. Scores were made on a scale of 1 (not a constraint) to 4 (a very significant constraint) referring to the degree to which a given factor was considered to be constraining success (see text).*

	Mean score	
Process	Mexico	Bolivia
Marketing	3.0	2.9
Sale	3.0	2.9
Processing	2.6	2.6
Transport	2.5	2.7
Production	2.5	2.7
Collecting / Harvesting	2.5	2.5
Storage	2.3	2.4

high proportion of the variation was unexplained by the variables included in the analysis, using this technique. In other words, NTFPs tended to differ from one another in highly individual ways, rather than displaying a similar pattern of variation according to particular factors. Neither PCA plot produced a distinctive pattern of clustering; rather, points were distributed in a continuous scatter (Figure 1). When the different processes were compared, by averaging scores for all factors constraining each process, marketing and sale were identified as the processes most constraining NTFP commercialisation, in both Mexico and Bolivia (Table 4). When PCA scores were regressed against overall success score, no significant relationship was found in either case ($P = 0.503$ and $P = 0.488$ for Mexico and Bolivia respectively).

DISCUSSION

Defining the success of NTFP commercialisation

The workshops described here clearly indicate that commercialisation of NTFPs can provide multiple benefits to community members. Apart from increasing financial income, it has been suggested that NTFP sale can also strengthen community organisation and improve social justice, presumably by increasing the involvement of disadvantaged members of the community in economic activity. Trade in NTFPs can also benefit a broader community of traders and consumers, who should therefore be considered in any comprehensive assessment of the impacts of NTFP commercialisation.

These results demonstrate the value of participatory approaches in assessing how the success of NTFP commercialisation is perceived by different stakeholders. Participants engaged enthusiastically in the workshops, and participated in a thorough discussion of the relative success of the NTFP case studies with which they were familiar. Such participatory approaches inevitably produce a richer assessment than can be achieved by researchers acting alone, as indicated by the large number (18) of different success criteria identified.

Participatory methods could therefore be used to develop a wide range of different measures of commercialisation success, and thereby strengthen the CIFOR methodology for analysing NTFP case studies. However, meaningful and tractable measures of different success criteria will often be difficult to develop. For example, in the current study, criteria of success such as 'strengthening local culture' and 'improving social justice', which were identified by workshop participants, are complex and difficult issues to measure. There may be no alternative than to adopt some form of 'expert judgement', using a simple scoring approach, as in the CIFOR study. However, such judgements will often be subjective and qualitative, and associated with an unknown degree of error. Most importantly, the opinion of organisations or individuals working with local communities may fail to reflect the actual opinions of community members. This is perhaps the greatest weakness of the workshop approach described here, and can only be addressed through a process of socio-economic research within the communities involved.

The CEPFOR project is currently working on refining this approach for use at community level to help build capacity within communities, to monitor and evaluate the socio-economic impacts of NTFP commercialisation. If communities are to be involved in NTFP commercialisation, they need to define the objectives they want to achieve at the outset and identify ways of monitoring progress towards these objectives. Defining the criteria for success of NTFP commercialisation can therefore be seen as a first step towards defining indicators appropriate for community-based monitoring and evaluation of NTFP projects. Although the value of such community-based approaches is increasingly being recognised (Fisher and Dechaineux 1998; Hartanto, Lorenzo and Frio 2002), efforts at developing appropriate indicators are at an early stage (Colfer 1999).

Analysing the factors influencing success

In the CIFOR methodology, a series of factors were identified that 'characterise the relationship between people and forests', based on a literature review of theories and models relating to the use and harvesting of NTFPs (Ruiz Pérez and Byron 1999). Once these key factors had been identified, they were further defined by a list of attributes, again developed from a literature review. The NTFPs were then scored with respect to these attributes, according to a three-point scale ('low', 'medium' and high'), by a process of expert judgement (Ruiz Pérez and Byron 1999).

The list of factors identified in the CIFOR study covered a range of themes, from people's organisation, state involvement and social attitude, to market features and nature of the product, among others. While each of these factors may have a significant bearing on the

commercialisation success of a particular product, they bear little relation to the *process* of commercialisation. For this reason, it is difficult to assess the relative importance of different factors in any meaningful way.

In the current investigation a different approach was adopted, focusing on the factors influencing the process of commercialisation. Through workshop discussion the following sub-processes were identified as forming part of the overall process of commercialisation: production, collection, processing, storage, transport, marketing, and sale. The definition of these processes then enabled individual factors to be identified, which could constrain or limit a particular process. A key advantage of this approach is that it focuses attention on the activities in which people are engaged, and facilitates identification of those barriers or constraints to commercialisation. We suggest that the commercialisation of any NTFP will involve each of these processes, to a greater or lesser extent. A focus on processes therefore provides a unifying framework for the analysis of NTFP case studies, something that has been lacking in previous research.

In the CIFOR study, multivariate statistical approaches were used to identify different gradients of variation between case studies, providing a basis for identifying groupings, or 'typologies' of similar NTFPs (Ruiz Pérez and Byron 1999). Such groupings may be useful for developing generalisations concerning the relative potential of different NTFPs for commercialisation. A similar approach was adopted in the current investigation, using multivariate analysis to assess the relationship between key sources of variation, and overall success. In contrast to the results obtained by Ruiz Pérez and Byron (1999), no significant relationship was recorded here between the success of NTFP commercialisation and the principal sources of variation detected in the multivariate analysis. This indicates that this relationship may not be generally applicable, and highlights the fact that in the current investigation, NTFPs tended to differ significantly from one another, rather than forming discrete classes or groups. The workshop approach adopted here enabled a far larger number of case studies to be evaluated than was possible in the CIFOR study, which should have increased the generality of the results. On the other hand, it is notable that none of the case studies considered here was judged by the workshop participants to have been a serious failure. While it is possible that all the NTFPs considered here have been commercialised with at least a degree of success, it is also possible that those involved in NTFP commercialisation may be reluctant to admit to failure. This is a potential weakness of the method presented here, and may account for the lack of a significant regression. Future research might usefully incorporate examples of explicit failures, to provide a broader range of outcomes. In addition, consideration of commercial or industrial perspectives of success would further strengthen such analyses.

Of deeper concern is the use of multivariate approaches to analysis such as PCA. These highlight correlations, which are however no proof of causes. Many attributes of NTFPs may be correlated with each other, hindering identification of key relationships. The main advantage of the process-based approach adopted here, is that it focuses attention on the causal relationships between factors and the processes that they influence. This therefore offers a more direct method of identifying constraints to commercialisation. Relationships that are postulated based on expert knowledge, as presented here, could subsequently be tested rigorously with appropriate field data. Such explicit hypothesis testing has rarely been a feature of previous NTFP research (Neumann and Hirsch 2000). A process-based approach also enables appropriate factors to be identified readily, as illustrated by the experience of the workshops. With the CIFOR approach, where any attribute of an NTFP could conceivably be included in the analysis, the potential number of variables for assessment is very large.

The most striking feature of the current results was the fact that workshops in both Mexico and Bolivia identified marketing and sale as the main processes constraining successful commercialisation. These results therefore contrast with those obtained by Ruiz Pérez and Byron (1999). The importance of marketing and trading has generally been neglected in previous NTFP research, which has generally focused on production aspects (Neumann and Hirsch 2000). However the need to develop strategies to promote better NTFP marketing information at community level has repeatedly been identified by previous researchers (Padoch 1992, Banana 1998, Verheij and Reindeers 1997, Tomich 1998).

Participants in both workshops highlighted the problem of transporting the products successfully to market, resulting from long distances to the point of sale, or poorly developed transport infrastructure. A lack of financial instruments, such as loans or credit, was also regularly cited as a significant constraint. Lack of access to market information was also identified as a significant constraint in both Mexico and Bolivia. Such results highlight the need for business planning, marketing development and market analysis as key requirements for successful commercialisation of NTFP resources, as has been indicated in previous research (Lecup *et al.* 1998).

CONCLUSIONS

Although interest in the commercialisation of NTFPs as a rural development option continues to grow, initial enthusiasm is increasingly being tempered by a growing realisation that many attempts at NTFP commercialisation have failed to deliver the expected benefits. There is a growing need for information and tools to support the decisions being made by a wide range of stakeholders, including not only the local communities considering launching a commercial enterprise, but also the development agencies, government agencies and NGOs that work with them, and the private sector institutions involved in trading and marketing forest products. Information is

needed to guide the selection of NTFPs for development, and how and where investments should be targeted.

Despite the large research effort that has focused on NTFPs, there is still a lack of general guidance in this area. This may simply be an intrinsic feature of NTFPs because they are such a diverse group of products, differing in so many ways, generalisations of practical value may forever appear elusive. It may be that highly detailed, site-specific studies may provide the only useful way forward, with progress occurring only on a case-by-case basis. Alternatively, the absence of a generally applicable theory, and the ability to predict the potential for commercialisation of a given product in a particular situation, may reflect shortcomings in the research that has been undertaken to date. Research on NTFPs is therefore characterised by a tension between the need for in-depth local studies and the need to generalise across products and regions. What is required is an analytical framework, which enables results from different case studies to be integrated and compared.

We suggest that such a framework can be provided by considering the processes involved in NTFP commercialisation: production, collection, processing, storage, transport, marketing and sale. The factors limiting each process can then be considered individually. The analysis of such factors can provide a diagnostic tool for identifying the causes of actual or potential failure in commercialisation of NTFPs, and assist the decision-making process of different stakeholders.

The approach presented here highlights the feasibility and value of involving stakeholders in the definition and analysis of the success of NTFP commercialisation. Workshop results illustrated the wide variety of perceptions that exist among stakeholder groups, which should be captured in any decision-making process. However, such participatory methods should be complemented by more intensive local-scale analysis, to ensure that the information presented in such fora is both accurate and representative. The current research project is in the process of undertaking a study into the commercialisation chain of ten case study NTFPs, among producers, processors and traders in Mexico and Bolivia. Results will be used to define the factors influencing the success of NTFP commercialisation according to a variety of different social and economic criteria of success, including those defined at the community level.

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