

**University  
of  
Göttingen**

## **International Small Business Series 22**

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**Jörg Hartmann**

### **Criteria for Selecting Natural Resources in Conservation-Cum-Development Projects**

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edited by:  
International Department  
Institute of Small Business  
Director: Prof. Dr. Wolfgang König

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## **Contents**

	Page
<b>Introduction</b>	<b>1</b>
<b>Condition for Success 1: Sufficient Demand</b>	<b>2</b>
<b>Condition for Success 2: Competitiveness</b>	<b>5</b>
<b>Condition for Success 3: Intensity of Utilization</b>	<b>9</b>
<b>Condition for Success 4: Preservation of Resource Habitats</b>	<b>12</b>
<b>The Practical Role of the Four "Conditions for Success"</b>	<b>14</b>
<b>It May Work in the Forest - But is it Transferable?</b>	<b>16</b>
<b>Conclusions</b>	<b>18</b>
<b>References</b>	<b>20</b>

## Introduction

Many valuable ecosystems are being lost because rural populations in developing countries are expanding the agricultural frontier into former wildlands.<sup>1</sup> Typical developed country-models of conservation are rarely applicable because the state is unable to provide protection for endangered areas<sup>2</sup> and the population is unwilling to accept limits or bans on the utilization of natural resources.

Increasingly, these people in marginal areas are becoming target groups for conservation efforts. As they belong to the poorest segments of society, simply forcing them to give up one of their traditional bases of livelihood cannot make sense. Instead, positive incentives to protect the ecosystems they live in are needed. They have to be convinced that it is in their own best interest to treat natural resources sustainably.

The most direct link between economic incentives and the conservation of nature is given when economic activities depend on local natural resources. The future incomes of a villages' fishermen may depend on today's decision not to use dynamite and not to destroy hatching grounds such as mangroves and coral reefs. Hunting yields will be higher if close seasons are respected. The time requirements for fuelwood collection can be limited if the village manages to reserve one close-by forest area for this purpose.

In most rural regions plant and animal resources play an important and often underestimated role for both subsistence and market-oriented activities. On average, one third of all non-farm jobs - mostly in informal micro-enterprises - are based on them. Employment and incomes of these people are the incentives that are to be used in new-style conservation efforts. When resource-based sectors are growing, local and national interest in preserving the resources and their habitats should also grow. This paper will argue that under certain conditions, small-scale enterprise (SME) development can indeed contribute to the preservation of our natural heritage by changing incentive structures towards conservation and sustainable utilization of resources.

The causation is circular, though: conservation is also a precondition for small-scale business development. Incentives can only take effect if the natural resource-based sector develops successfully. We therefore need to understand what conditions make for successful development. The following survey of these conditions is a summary of empirical analyses of eight such

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<sup>1</sup> Agriculture is responsible for about 94% of the losses of tropical rain forests, cf. Amelung and Diehl (1992).

<sup>2</sup> In Zaire, every Forest Service worker is - on average - responsible for 1,250 km<sup>2</sup> of forest area, see Johnson and Cabarle (1993).

small-scale industries in tropical rainforest areas.<sup>3</sup> Whether these results will be useful for practical work in conservation-cum-development projects depends primarily on whether they are transferable to other resources, regions, and ecosystems. Some ideas on their applicability in tropical coastal fisheries are therefore added as an example before conclusions are drawn.

## Condition for Success 1: Sufficient Demand

Local, national, or international sales orientation of the natural resource-based sectors imply very diverse structures of demand. Often, local sales are limited by the small purchasing power. Local markets, however, can more easily be understood and offer the possibility of selling directly to the final purchasers while eliminating the influence of intermediate traders.

For the use of natural resources by SMEs, production linkages with local farmers only play a minor role (in exceptional cases, backward linkages of agriculture, i.e. supply of inputs for agricultural production, have some effect: for fences, barns, etc locally produced wood is sometimes used). Therefore, mutual stimulation of agricultural units and forest-based SMEs is almost only possible via consumption linkages, i.e. rising incomes in one sector that result in increasing demand for consumption goods produced by the other sector.

Growing supra-regional and particularly international markets for some forest products imply a higher purchasing power of buyers. This, however, rarely translates into increased growth rates and higher income for the individual SME. Instead, new firms enter the markets that are characterized by low entry barriers. Still, this means that positive regional employment effects can be realized.

Especially regarding the collecting economies of scarcely populated areas, the importance of production for export from the region is relatively high. Many such products have international markets, and some are not used in the country of origin at all. Thus, the collectors often do not know, to what purpose their product is finally being used. Some of the wood production in tropical rain forest areas is also export-oriented. Another locally important form of export is the production of art and craft goods for foreign tourists.

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<sup>3</sup> *Rattan* in South-East Asia, *xate* (two palm species whose leaves are exported) and *chicle* (a latex and traditional chewing gum base) in the Petén of Guatemala, *aguaje* (an edible tree fruit) in eastern Peru, *babaçu* (oil-rich palm fruit kernels) in Brazil's southern Amazon basin and sawnwood in northern Guatemala, eastern Ecuador and Dominica. Four of these industries were investigated during field studies of the author in 1994 that were supported by GTZ; the four other cases are well documented in the literature. For the complete empirical material, see Hartmann (1996).

A disadvantage for export producers is their limited market overview. Ups and downs of international demand, caused by many different factors, can neither be understood nor predicted so that there is a lack of planning security. Therefore, they have to diversify their economic activities which in turn means that they can hardly realize any economies of scale.

Particularly the discovery of new ways of use, changing fashions, the development in other supply areas, and the introduction or exhaustion of natural and synthetic substitutes contribute to market fluctuations. Most forest products can easily be substituted because the same species exist also in other regions or another species respectively a new synthetic product serves the same purpose. Although the typical boom-and-bust-cycles for forest products can often be traced back to fluctuations of international demand, in general local markets are not necessarily more stable. The rapid population growth in some areas alone hinders investment planning.

Over the past years, another sales factor has developed that will certainly become more important in the future: the environmental conscience of customers from industrialized countries. So far, this factor mostly had an effect on demand for tropical hardwood; it is partly boycotted and many wood traders do not offer it anymore. Unfortunately, the resulting difficulties and price reductions impact negatively on those producers that offer precious wood from sustainably managed forests at higher costs. Therefore, they have a particular interest in lifting indiscriminate boycotts and creating international systems that credibly prove their sustainable production to the customers.

High expectations on sustainable modes of production have been raised in recent years and spread around the western public<sup>4</sup>. Mostly, the focus is on non-wood products, the use of which is regarded as an alternative to destructive wood extraction and as a source of income for endangered indigenous groups. Due to these considerations, some customer groups from industrial countries are ready to pay relatively high prices. At the same time, some of these products are becoming increasingly popular in industrial countries because they are regarded as exotic or particularly healthy. This development has resulted in new market niches as well as in an improvement of the market conditions for already long existing products, but the long-term market potential cannot be estimated at this time.

The markets for forest resources produced by SMEs are also influenced in many ways by the respective governments. Direct export, e.g., is prevented by some governments in order to stimulate local processing. Some sectors are protected by import restrictions for competing products. Other governments

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<sup>4</sup> See e.g. Hellmer (1992) and Herold (1992).

set up their own authorities to organize trade with forest products. Apart from these - often dubiously planned and insufficiently implemented - restrictions and regulations of foreign trade, various interventions in local markets can be observed. Some governments obviously lack a complete overview of the economic and ecological side-effects caused by these measures.

Up to now, the discussion was limited to the determinants of demand. The individual enterprise appeared to be passively exposed to these developments; the management function of marketing was not taken into account. But only an adequate consideration of marketing measures can enable the firms to exploit and maybe even to enlarge the demand potential.

Active marketing measures are rarely found in many industries. Many collectors of non-wood products rely on intermediate traders for further sales of their products. In remote areas, monopsonistic demand structures can often be found that reduce the gains from collecting activities. Bypassing local monopsonists may not be possible due to great distances and bad transportation. Also, the perishableness of some non-wood products makes selling harder.

Small-scale wood producing and wood processing enterprises are mostly engaged in direct selling. As their marketing efforts are also hindered by high transportation costs, they mostly depend on the limited local purchasing power. Again, they are only integrated into the supra-regional economy through intermediate traders or as suppliers to larger firms. Even when transportation costs can be overcome in relatively small countries, unskilled marketing efforts by SME producers are often their weak spot and the cause for loss of market shares. It is well known that SMEs everywhere concentrate on production at the expense of other entrepreneurial functions such as marketing and financing.

Even external support for the SME sector may not be able to alleviate this failure. Such support mostly comes from governmental institutions, from the forestry or environmental sector; or from external development agencies, whose employees often have technical or scientific training but show little understanding of the importance and problems of active marketing.

One also has to bear in mind that successful marketing efforts at the individual enterprise or even at the community level do not always make economic sense. Increasing the share of a limited market may not be overly difficult, especially when supported by the financial resources of an external agency, but may amount to little more than redistribution of sales and employment away from other, less lucky villages where the same good is produced: *"This constraint*



*may not be readily perceived at the micro-project level, where the problem of demand generation is reduced virtually to a marketing issue."*<sup>5</sup>

Development efforts have often attempted to identify promising species and to intensify their use, sometimes through cultivation, without much influence and participation of the forest dwellers themselves. Only recently some land-rights and social movements - such as the "National Council of Rubber Producers" and the "Union of Indian Nations" in Brazil - have become publicly active, which may also serve as mediators for economic promotion: *"Both these grassroots organizations are committed to the improvement of transport, processing and marketing of [non-wood forest products] under local management."*<sup>6</sup> As a result of their political pressure, exclusive areas for collecting economies (*extractive reserves*) were established.

These cooperative efforts often need external support in order to be successful politically and also on the markets, if production is to be increased without driving prices down. At least on the markets of the industrialized countries sustainably produced goods may increasingly yield higher prices, if the origin can be credibly proven to the environmentally conscious customer. In such a case, external support can usefully take the form of establishing contacts with purchasers and proving sustainable production.

## **Condition for Success 2: Competitiveness**

The cost situation and profitability of individual small enterprises cannot be reliably observed by an outside researcher without many difficulties, whereas indirect data on market shares and employment can be obtained relatively easily and reliably. If one accepts the basis assumption of economic rationality of small business entrepreneurs, then rising market shares and increasing employment can be regarded as an expression of improved competitiveness. They reflect a relatively advantageous cost situation compared to other enterprises and compared to alternative economic activities among which the small business entrepreneur can choose.

In many conservation-oriented case studies, a high profitability of a sustainable forest utilization is optimistically being pointed out. This, however, often reflects wishful thinking. From a theoretical perspective it seems rather unlikely that a significantly increased factor productivity would be observed in one sector. This could indeed be possible temporarily, before other suppliers also discover the chance and, by supplying more of the same goods, lower

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<sup>5</sup> Saith (1992, 45).

<sup>6</sup> May (1991, 10).

profitability again towards a normal level. It could also reflect market entry barriers (like, e.g., high financial needs in the context of an incomplete capital market) that impede this balancing process. In most small-scale forest-based sectors, however, there are no considerable market entry barriers. Therefore, claims that collecting forest products is much more productive than working as a day laborer in agriculture, should be treated with much caution.

Empirically, many constellations can be found. In one region, for example, small wood producers face rising wood imports and are being pushed increasingly into a market niche, whereas as an employment alternative, the sector still becomes more and more important. While local SMEs cannot compete with the cost structure of external competitors, they nevertheless offer a better income than farm labor in a stagnant economy. The above mentioned causal connection was particularly obvious here: the flood of new sawyers resulted in a fragmentation of the sector and lowered profitability of wood production towards that of comparable activities - comparable in terms of required skills, capital needs, strain etc. In another region this process has not yet progressed as far, so that sawnwood production still yields a net daily income that is four times as high as the wages for a comparable activity. Here too, however, capacity utilization is already considerably reduced (down to one day a week) because new sawyers enter the market.

The technologies used - particularly in the non-wood sectors - are mostly rather simple and demand little investment even in local terms. Therefore, fixed costs are relatively low, and even at times of low capacity utilization, there is little danger that the profitability of an enterprise is reduced so far that it is forced out of business. Thus, it appears to be no particular problem that some producers only use a small amount of their working time on the extraction of the resource or that some resources are available only seasonally. The "mushrooming" of producers in these sectors, however, leads to a more urgent problem: a reduction of density of plants and animals, which increases the time required per unit to be collected and thus the opportunity costs of collecting activities. Small sawnwood producers are also affected by this problem because they are forced to utilize trees that are located ever further away from traffic routes.

The poor traffic connections of many rain forest areas represent an important competitive advantage for those SMEs that produce for a local market and are thus able to save transportation costs. This can be observed, e.g., for cabinet-makers in remote areas. In the case of exports outside the region, high transportation costs can also induce some preliminary local processing because products that are reduced in weight and less unwieldy can be transported more easily. Thus forest products are sorted, preserved, or peeled on the spot. The direct processing of trunks into boards by sawyers can also be interpreted as an

expression of high transportation costs. It seems uneconomical first to build the roads necessary for transport to the sawmill. The small-scale sawyers can save this part of transportation costs and transport the boards without motor vehicles.

Competitiveness of an enterprise is usually defined as the ability to win new customers by charging lower prices or offering high-quality and diverse products. Regarding the topic of this paper, another consideration is of equal importance. The enterprise must enable its owner to yield a suitable income - relative to other employment alternatives. Only then forest-based SME activity is started, abstaining from alternative sources of income that in this context usually require a conversion of the forest to farm land.

The extraction of forest resources is often not a particularly attractive activity. Especially in wood cutting hard physical labor is required that is also prone to injuries. Extraction of non-wood products is described as badly paid, lonely, and isolated work.<sup>7</sup> In cases of injuries, diseases, or snake bites the collectors are far from any medical help. In many areas the social reality of collecting economies is characterized by a strong dependency from landowners and/or intermediate traders for their products.

One of the most important cost factors of forest utilization is the density of a commercially interesting species. In homogeneous ecosystems less time is usually needed for the extraction of a given amount. Therefore, a resource user assesses biodiversity totally different than a conservationist. However, not all tropical rain forests are characterized by such an extreme diversity. Even the Amazon area has forests with only a few dominating species.

Some natural products would not be economically attractive without subsidies. In Brazil, for example, rubber extraction has been subsidized for a long time and was only recently exposed to competition from South-East Asian rubber plantations after subsidies had been cut.<sup>8</sup> As might be expected, as a consequence many collectors shifted towards other activities and have expanded agricultural production in their extractive reserves.<sup>9</sup> A similar development should be expected if import restrictions on competing products were lifted. Very low fees for utilizing resources from public lands might also be considered a form of subsidy.

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<sup>7</sup> See Richards (1993, 25); see Schwartzman (1989, 155 ff.) for a more positive assessment.

<sup>8</sup> See Fearnside (1989, 390 f.).

<sup>9</sup> This shows that demands for establishing extractive reserves are primarily social demands, that have sometimes been misunderstood as ecologically motivated. See also Silva (1994).

In some cases such subsidies can be justifiable. This depends, for example, on the extent to which subsidies are granted for competing ways of land utilization such as cattle farming.<sup>10</sup> An across-the-board cut of subsidies would, however, result in a less intensive overall utilization of the ecosystem. Considering the budgetary problems of most countries with tropical rain forests, a sector that works under the constant threat of losing subsidies can hardly be called economically sustainable.

In the final analyses, the competitiveness of and the income from natural resource-based SMEs depend on cost advantages as compared to potential competitors. These are, among others, larger local firms, firms from other regions, and suppliers of natural or synthetic substitutes. All rural SMEs draw their most important cost advantages from their special relation between enterprise and private household. Family businesses are flexible and have to bear comparably lower labor costs. In a narrower financial perspective, cost advantages of smaller enterprises utilizing forest resources can be observed in the following cases:<sup>11</sup>

- widely spread raw materials that have to be collected and centrally processed or sold,
- narrow product markets,
- high transportation costs,
- diseconomies of scale in some sectors, e.g. in arts and crafts,
- higher efficiency of subcontracting compared to vertical integration of the production process, if that is technically feasible,
- availability of technologies that are divisible or otherwise adjustable,
- no particular need for standardized products, and
- no particular need for regular supply of large amounts.

If some of these factors are given, then SME will prevail against other firm-size classes. At the same time, the list of determinants gives an idea of possible developments that might endanger their cost advantages. If a forest product is, for example, increasingly cultivated and does not need to be collected any more, or if markets widen or transportation costs decrease due to the construction of roads, then cost advantages and therefore market shares of the SME-sector will decrease.

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<sup>10</sup> *"The rubber subsidy seems a small price to pay to avoid the high social and environmental costs of alternative land uses which inevitably destroy ecosystems and indeed cultures."* (Richards 1993, 26), similar Schwartzman (1989, 158 ff.).

<sup>11</sup> See Arnold et al. (1987, 12), Contreras-Hermosilla and Gregersen (1991).

The same holds for developments in the area of technologies used. In the case of one palm fruit, for example, efforts are being made to substitute manual taking out of kernels with respective machines. As soon as the technical difficulties have been solved, one processing step can be saved that formerly had been conducted by SME collectors. Technological improvements or the diffusion of known technologies, however, may also be positive for SMEs. This can be most clearly observed in the case of sawnwood production. The manual saws that were used until a few years ago in almost all regions of the developing world could no longer compete with sawmill-based production. However, the increasing use of chain saws has brought cutting wood again within the reach of SMEs. At least with chain saws equipped with a guiding frame, they can produce the same quality as comparably expensive stationary sawmills.

Finally, it has to be mentioned that competitiveness compared to other suppliers may sometimes only be sustained when SME owners accept very low incomes. Low labor costs may be the decisive cost advantage, but they can endanger the competitiveness of the sector as a source of income for individuals.

### **Conditions for Success 3: Intensity of Utilization**

The intensity of utilization of natural resources by local communities varies between extreme over-exploitation and modest utilization that does not endanger the given stock. This does not only depend on the total amount of extraction but also on how careful harvest methods are (from some trees fruits are collected from the ground, other are felled) and how wide the resource basis is.

Usually, utilization results in a considerable decline of the density of a resource. Nevertheless, also resources that have been exploited over a long period still prevail. Obviously, then, intensity of utilization has not been as high as to endanger the capability of regeneration of the species and the functioning of the ecosystem. Physical scarcity or even extinction of a resource is indeed rare because before this point is reached, there will arise an "economic scarcity" that limits the intensity of utilization. As discussed in the previous section, with decreasing density of stock or rising distances from traffic routes extraction costs will also increase. Unfortunately, this economic mechanism cannot limit the intensity of utilization in cases where

- resources are easily accessible (for example, because they belong to river ecosystems) and/or

- the main ecological problem connected with resource use does not arise on the level of the individual species but on the level of the entire ecosystem. Sometimes, little is left of a forest even if only one Mahogany tree per hectare is actually used by timber crews. In the wake of ruthless harvesting methods and the settlement of forests that follow, many other species are endangered.

A different economic mechanism that may prevent over-exploitation of natural resources is the start of cultivation. This is not without its own problems, however. Some natural ecosystems may have to yield to plantation areas. Already endangered stocks will be utilized at least for a few more years until the plantations are ready to supply. Many producers that cannot afford the investments necessary for cultivation may still depend on the natural stock of resources. Finally, it is obvious that, in case of a rise in prices, even cultivated stocks can be endangered by short-sighted increases of the intensity of utilization.<sup>12</sup>

A third economic mechanism is based on the differentiation between primary, secondary, and tertiary activities. The intensity of utilization can be diminished or a sector can adapt to a smaller resource basis by combining basic extraction with processing and marketing of the products. This solution may, however, collide with the effort to create modern SMEs that can be characterized as those that give up some household activities, concentrate on certain production steps, and increase market-based exchange.

Assessing the capacity for regeneration of a resource (and thus, of a responsible intensity of utilization) is made more difficult by the interaction between different species: *"Ecological processes are never static and any management intervention in an ecosystem will impose stress. Thus, any action taken to ensure the sustained production of a particularly forest product will inevitably affect other biota."*<sup>13</sup> On the level of the entire ecosystem, the nutrient balance is often seen to be a decisive factor for the sustainability of economic utilization. Since the greater share of nutrient in tropical rain forests is stored in the biomass and not in the soil, an extraction of organic material - especially of trees - can lead to a considerable loss of nutrients.

In the framework of strategies for economic utilization some measures are possible that directly aim at ecological limitations and that alleviate the effects of a given intensity of utilization. Here, the following options can be mentioned:<sup>14</sup>

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<sup>12</sup> See e.g. Weinstock (1984).

<sup>13</sup> Wickens (1991, 7).

<sup>14</sup> See e.g. Salafsky et al. (1993, 48) and the literature mentioned there.



- Low rates of stock density in a forest can be increased in the case of plants by enrichment planting and in the case of animals by setting free bred specimen. On the one hand, this contributes to a higher initial stock level that avoids over-exploitation, on the other hand, it decreases the time needed for locating individual specimen, thus increasing the productivity of human utilization.
- If there are any seasonal employment gaps, either genetic variations of known species or of new species can be introduced that offer employment during this time. Utilization of a wider spectrum of species could reduce utilization pressure on each individual species.
- Different methods aiming at securing reproduction, such as respecting the close season for hunted animals, can be suggested to local people.
- Nutrient loss caused by extracting natural resources can be lessened by taking the first processing steps in the forest itself. Examples would be the peeling of fruits, of which only the kernel is used, or wood processing by sawyers directly at the stem.

Until today, however, extraction amounts and methods are primarily determined by economic factors, and project planners need to be aware of these economic mechanisms. A problematic intensity of utilization that lowers the stock of a resource below a certain critical minimum threshold happens most likely, if property rights for resources are not clearly defined, so that there is a situation of open access (or “first-come-first-serve”), and harvesting costs are low compared to the price of the resource. A formal analysis of the problem shows that in an open access equilibrium all resource rents will be completely dissipated and that all users only achieve normal profits, the level of which is indicated by the profitability of alternative activities.<sup>15</sup> In this case, the stock of resources is smaller and harvest costs per resource unit are higher than in a situation of profit maximization by a single owner or by a well-organized user group. The central message here is that open access situations are inferior both ecologically and economically.

From this perspective, the cultivation of endangered resources can be regarded as an attempt to establish stocks with clearly defined, private rights to utilization, that require short-term investments but promise a higher return in the long run. Another possible solution would be the cooperative or common property approach. This is often necessary because the utilization of certain resources is, due to economies of scale, only profitable in a group. Thus, a certain degree of cooperation among the users is required so that rules for utilization and for the exclusion of non-members can to be agreed upon and

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<sup>15</sup> See Pearce and Turner (1990, 248 ff.).

implemented. *"This is achieved by institutions which perform the function of reducing the uncertainty of users by defining and stabilizing their expectations. Breakdown of common property resource management is usually due to institutional breakdown."*<sup>16</sup> Vice versa, establishing stable and influential institutions on the village level can be the most important factor for preserving natural resources.<sup>17</sup>

A decisive question - especially with regard to promotion programs - concerns the effects of price changes on the supply behaviour of resource users and thus on the intensity of utilization of single resources. Direct resource users usually first perceive changes in business conditions as price changes.

In principle, a rising intensity of utilization could result from decreasing prices: producers could try to ward off the income loss by offering higher quantities. In general, however, a normal supply reaction can be expected: the amount of natural resources extracted from the ecosystem rises in line with their prices. The most important reason for this behaviour is that forest dwellers can choose among various economic activities and will increasingly shift towards the relatively more profitable activities. The price elasticity of supply can usually only be roughly estimated because only in a few cases cross-section data for certain sectors can be obtained and the influence of price changes can be rarely isolated from other factors.

Thus, all institutions intending to promote SME utilization face a dilemma. On the one hand, these activities shall be made attractive for the forest inhabitants, which in general implies - at least indirectly - a price rise. On the other hand, the amount extracted should not exceed certain ecological limits. If it is expected that a price rise will result in increasing the intensity of utilization of a resource, that has already reached the limits of its "capacity", then promotion measures have to be abstained from.

## **Conditions for Success 4: Preservation of Resource Habitats**

An absolutely necessary precondition for SME activities is the availability of those habitats from which natural resources can be extracted. In many cases, a decreasing resource basis is not a consequence of resource utilization but is caused by the loss of habitats. Often there is only little public interest in protecting habitats against competing means of land utilization, i.e. usually fast colonization.

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<sup>16</sup> Arnold (1993, 159).

<sup>17</sup> See McNeely (1988, 74).



Habitats of resources are less endangered in three types of situations:

1. Some forests are not suited for agricultural use, or local farming is hardly profitable and population pressure is low. Some forest areas in the tropics are still too remote as to be interesting for colonization.
2. Habitats are not only lost but new ones are also created. Secondary forests are a source of many interesting resources.
3. Some forests are protected from conversion and - more importantly - protection is really enforced.

The protection of forests can in principle also be accompanied by a limitation of the extraction of forest products, thus equaling a loss of the forests for the SME users. How restrictive human utilization is handled, depends, however, on the protection measures implemented in each individual case. The importance of such limitations in reality is limited for the following reasons:

- Globally, the share of protected areas of the developing countries' land surface is very small.
- Many protected areas in these countries are not adequately guarded. Illegal extraction can hardly be prevented if there is a local economic interest.
- Furthermore, types of protected areas that consciously abstain from strict limitations on utilization are increasingly favoured: *"In the coming decades, progress in conservation will primarily result from the implementation of improved management strategies in those protected areas that allow or even promote human utilization."*<sup>18</sup>
- Strictly protected areas are also increasingly surrounded by buffer zones, where resource utilization of a limited intensity is promoted in order to divert utilization pressure from particularly valuable core areas.<sup>19</sup>

The availability of habitats and thus of resources can therefore be restricted either legally, through strict environmental protection, or physically, by converting them to other land uses. If one defines sustainability of development according to a combination of ecological and economic criteria, a strategy of strict environmental protection obviously violates the economic criteria of an appropriate standard of living for the local population, and the strategy of conversion violates the ecological criteria of sustaining the capacity of regeneration of ecosystems and those parts of it used as resources. Only a strategy of sustained utilization can offer adequate conditions for the development of resource-based local economic activities.

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<sup>18</sup> McNeely (1990, 122).

<sup>19</sup> Sayer (1991).

## **The Practical Role of the Four "Conditions for Success"**

A successful sectoral development requires that the four preconditions outlined in the above sections are being met: the sectors a) have to encounter sufficient demand for their products, b) be competitive on the product markets, c) must not overexploit their resource basis, and d) need to have sufficient forest areas at their disposal. Each precondition that cannot be met is a limitational factor that impedes successful development.

These four conditions are not isolated from each other but are tied together via different mechanisms. With a declining forest area, for example, constant demand can only be satisfied by an increasing intensity of utilization of the remaining areas, which in turn reduces the stock density and increases extraction costs, while competitiveness declines. A decreasing demand or the rise of new competitors can reduce the profitability of forest utilization as a form of land use, which leads to a conversion of the forest into agricultural areas by the forest inhabitants and thus to a loss of habitats. Other causal chains can be easily constructed.

An understanding of these success factors facilitates the selection of sectors that are capable of sustained development. Indirectly, it also enables project planners to identify forest areas that are suitable for sustained utilization. These will be such areas where one or more of the required resources can be found. The question arises whether sensible rules regarding suitable types of forests can be set up.

Pendelton (1992, 258 ff.), for example, has tried in a very pragmatic way to set up general rules for forest areas that would be suitable for sustainable utilization. Less suited appear to be

- forests with a particularly high biodiversity where ecological losses can be very high even if careful business methods are used, and where heterogeneity of the ecosystem makes for uneconomical extraction of forest resources,
- uncolonized forests where a start of utilization could possibly not be controlled, and
- forests particularly suited for agricultural production, such as in nutrient-rich flooding zones, that could lessen the utilization pressure on neighboring forests. Browder (1992, 176) has also put forth the argument that collecting economies with their high land needs are hardly suited for densely populated regions. In such forests, he argues, a more intensive form of utilization such as agro-forestry would be a better solution.

In contrast to this, Pendelton (1992) regards the following types of forests as suitable for sustainable small-scale development:

- fringe areas of forests where sustainable utilization - usually as a secondary source of income - would prevent farmers from proceeding deeper into the forest,
- buffer zones around protected areas where resource users follow their own interest by controlling competing illegal extraction activities,
- already colonized forests where the intensity of agricultural use can be limited by the development of a complementary utilization of forest resources, and
- watersheds and other forest areas important for sustaining ecological inter-relations. Here, preventing conversion to agricultural utilization is so important that sustainable utilization as an alternative should even be subsidized if necessary.

These rules sound immediately plausible if read from a conservation-oriented perspective. It is remarkable though that the development opportunities of individual SMEs only play a minor role. It is obviously assumed that SME resource users establish themselves in suitable areas almost automatically or that some organization will take care of that.

Identifying such areas where SME development is desirable or not desirable is only a first step, however. If and how these aims may be realized, can only be answered with the help of careful sectoral analyses, that have to examine for each resource as detailed as possible its markets, competitiveness, intensity of utilization, and land use developments. If the results show any limitational factors, also external promotion measures could be sensible in order to strengthen the sectors and thus the incentive effect for conservation. The approach presented here allows to systematically search for causes of weaknesses and to target recognized limitational factors.

In addition, it has to be considered that many problems can be solved either by support on the level of the individual enterprise or by influencing the general framework conditions. If, for example, the intensity of utilization is found to be too high so that it endangers the stock of resources and thus the whole sector in the long run, two approaches are possible: either individual resource users can be convinced to handle the resource more carefully, e.g., by observing close seasons when hunting, or their interest in sustaining the resource can be increased by providing a legal framework that ensures property rights in the area of land titles and utilization rights.

## **It May Work in the Forest - But is it Transferable?**

Many different valuable ecosystems exist in developing countries. The real tropical rain forests - i.e. evergreen lowland forests - only have a share of about 15 % of the total land area of the tropical belt countries. It would thus be of particular interest, if the methodology presented here (and mainly derived from empirical analyses of rain forest resources) could also be used for other natural areas and their resources. Examples for such areas would be the dry forests and steppes in Southern and Eastern Africa with their stocks of game, mangrove forests on shallow coasts, large wetlands like the Brazilian Pantanal or the Okavango-delta in Botswana, or tropical coastal areas.

Taking coastal regions as an example, the utilization of their resources, particularly fish stocks, in principle appears to be governed by similar conditions as the ones described so far. For fish resources, not only an indirect impairment of their habitats but also direct overfishing of the stock could pose a contradiction to sustainable utilization. From a global perspective, sustainable fisheries are the exception rather than the rule. In spite of fleet enlargements, catches have decreased since 1989. According to the FAO 70 % of fisheries are overexploited; if regeneration of stocks were allowed, long run profits of the global fishing industry would increase by an estimated US\$ 15-30 billion p.a.<sup>20</sup> In coastal waters of the Philippines, for example, stocks have been reduced to about 30 % of their level in the 1940s.<sup>21</sup>

Against this background, the role of fishing by SMEs can be examined. Different aspects, that have been analyzed in connection with the four determinants of development of SMEs based on forest resources, are also important here.

Fish sales by SMEs are usually limited to local markets. As an important source of protein for increasing populations, fish is sought after and demand on local markets is rising. Supply to population centers within the country and to international markets, however, is almost exclusively conducted by larger companies.

*"The economics of the fishery is determined to a large part by the technology in the catching sector."*<sup>22</sup> The following table provides some very general data that allow a first comparison of the different technologies used by different firm-size classes:

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<sup>20</sup> Cited in Economist (1994, 21 f.; 1995, 52).

<sup>21</sup> See Byron and Waugh (1988, 64).

<sup>22</sup> Byron and Waugh (1988, 65).

Global Data for Large- and Small-Scale Fisheries <sup>23</sup>		
	Large Enterprises	Small Enterprises
Share of world production	ca 2/3	ca 1/3
Employment	0.5 m	12 m
Employment per US\$ 1 m investment	10 - 1.000	1.000 - 10.000
Production per 1 ton of fuel	2-5 t	10-20 t

Small enterprises obviously handle a large share of world production (and an even larger share of developing countries' production). Most interesting are those data that allow to draw conclusions on the economic suitability of the technologies used. It is obvious that, considering the factor intensity of production, small-scale fishery is better suited for developing countries. Cost advantages should also speak on behalf of small enterprises. Particularly in remote areas with relatively small markets, SMEs have comparative advantages.

Regarding the already mentioned over-exploitation of fish stocks, the role of firm-size for the intensity of utilization is also of great interest. Here, a preliminary literature study yields no definite results. It is known that both large fishing vessels on the open sea and SME fishers sometimes behave rather ruthlessly. The latter conduct, for example, over-exploitation by using dynamite or cyanide or proceed with their small boats into shallow, often ecologically particularly sensitive waters where some species reproduce. However, also large fishing vessels endanger reproduction by using, for example, large close-meshed nets.

Due to decreasing catches and rising prices, there is an increasing incentive in fishery to cultivate resources. Similar to enrichment planting in forest areas, fish stocks in certain areas can be increased by offering artificial reefs. A further step is the establishment of aqua-cultures that are structurally similar to plantations of forest plants. Also in this case, one advantage is that property rights of the resources are clearly defined. As known from forest areas, cultivation of resources can replace natural ecosystems, thus prompting ecological problems.<sup>24</sup>

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<sup>23</sup> According to Lawson (1984), Byron and Waugh (1988, 66).

<sup>24</sup> See, e.g. for shrimp aqua-cultures on the Ecuadorian coast, Southgate and Whitaker (1992).

So far, the loss of resource habitats, plays only a minor role - compared to over-intensive utilization - for the fishery business. Pollution of the sea and the development of coastal regions have reduced productivity to a smaller degree than over-fishing.<sup>25</sup> This should be an essential difference to the situation of forest resources. For individual groups of fishers, however, the loss of habitats indeed poses a problem. There are diverse conflicts over fish stocks between SME and large, as well as between local and foreign fishers. Similar to concessions in forestry, governments distribute catching rights and thus have - if they are able to control these rights - a large influence on the structure of the sector.

Therefore, for SME fisheries the same four central development determinants are obviously relevant, that have been identified for forest utilizing sectors. Thus, also conclusions for influencing and promoting sectoral development should be similar. The methodology appears to be - at least in its basic structure - applicable to other nature areas.

## Conclusions

The basic orientation towards supporting local small-scale economic initiatives, that is also being promoted in this paper, has not remained without criticism. Dove (1993, 17), for example, accuses these micro-economically oriented efforts to support forest dwellers of diverting attention away from the broader political and economic reasons of deforestation, thus obfuscating the necessity of a fundamental change - *"a need which outweighs any potential economic benefits that the approach offers to forest dwellers."*

The necessity for fundamental political and economic adaptations can hardly be denied: In the last consequence, poor colonists themselves do not bear the responsibility for the destruction of the rain forests but the social structures that cause their poverty. This criticism postulates, however, only the urgency of a change without giving hints for practical action. Its ineffectiveness is thus assured. The proponents of micro-economic solutions also realize, of course, that a single approach such as SME promotion, is not a universal remedy for each situation. Exactly for this reason, criteria for selecting and targeting areas for external support have been elaborated in this paper.

If such criticism is more specifically aimed at previous experiences with the discussed micro-economic approach, then it really has some justification. Indeed, a majority of conservation-cum-development projects has had relatively

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<sup>25</sup> See Economist (1994, 21).

little success due to its "*minimal rural development expertise*".<sup>26</sup> There is, however, no reason to assume that project approaches will not be improved in the future. This requires conservationists to take note of and make use of the experiences of some decades of rural development promotion in general - and that of SME promotion in rural areas in particular. These experiences have shown, for example, how futile projects oriented at individual SMEs can be when general framework conditions are hostile, and that it is important and possible to influence these conditions.

Therefore, there is some common ground with Doves' (1993) call for "*fundamental changes*": new attempts to accomplish people-centred conservation of natural areas should not accept framework conditions that inhibit local development, nor should they just leave the area and look somewhere else for easier project conditions. They should attempt to actively change those conditions in order to give rural people a chance to improve their lives without destroying the resource basis for the next generation.

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<sup>26</sup> Brandon and Wells (1992, 562).



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