

University of Montana

ScholarWorks at University of Montana

Ecosystem and Conservation Sciences Faculty
Publications

Ecosystem and Conservation Sciences

2002

Livelihood Security and Protected Area Management

Stephen F. Siebert

University of Montana - Missoula, steve.siebert@umontana.edu

Jill M. Belsky

Follow this and additional works at: https://scholarworks.umt.edu/decs_pubs



Part of the [Ecology and Evolutionary Biology Commons](#)

Let us know how access to this document benefits you.

Recommended Citation

Siebert, Stephen F. and Belsky, Jill M., "Livelihood Security and Protected Area Management" (2002).

Ecosystem and Conservation Sciences Faculty Publications. 30.

https://scholarworks.umt.edu/decs_pubs/30

This Article is brought to you for free and open access by the Ecosystem and Conservation Sciences at ScholarWorks at University of Montana. It has been accepted for inclusion in Ecosystem and Conservation Sciences Faculty Publications by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

Logging could be replaced by ecotourism as an engine of local development. The BPF has great tourism potential for the local communities to develop as gateways to the BPF, especially if it becomes more of a national park. According to a recent informal survey, the majority of the estimated 100,000 visitors each year come to the BPF either to see the natural forest or a woodland bison. The gateway communities could provide unique opportunities to show both the cultural and environmental uniqueness of the area through information and interpretation programs. According to the conservationists' discussion on the BPF region, it should host a permanent international center for studies on natural forest ecosystems, both for higher education and for cooperation between scientists studying natural forest areas.

The vision of extending the BNP into the entire BPF is the one way to meet urgent conservation needs and to boost social and economic development in the region—two compatible and complementary elements of this unique European region. After 10 years of an

intense national campaign, it seems that a concerted and strong international assistance could help save what Poland has contributed to the European biological heritage through centuries of protection from the royal forest to the modern-day BPF and BNP. ❧

REFERENCES

- Bobiec, A. 2002. Living stands and dead wood in the Białowieża forest: Suggestions for restoration management. *Forest Ecology and Management* 165: 121–136.
- Bobiec, A., H. Van der Burgt, K. Meijer, C. Zuyderduyn, J. Haga, and B. Vlaanderen. 2000. Rich deciduous forests in Białowieża as a dynamic mosaic of developmental phases: premises for nature conservation and restoration management. *Forest Ecology and Management* 130: 159–175.
- Falinski, J. B. 1986. Vegetation dynamics in temperate lowland primeval forests: Ecological studies in Białowieża Forest. In J. B. Falinski, ed., *Geobotany*. Dordrecht, Netherlands: Dr W. Junk Publishers: 39–111.
- Gutowski, J. M., W. Jedrzejewski, A. Bobiec, J. B. Falinski, C. Okolów, J. Popiel, B. Jedrzejewska, B. Brzeziecki, and A. Korczyk. 2000. Principles of the Białowieża National Park functioning after its extension onto the entire Polish side of the Białowieża Primeval Forest (Proposition). Białowieża, Poland: Białowieski Park Narodowy. (In Polish with English translation).
- Jedrzejewska, B., and W. Jedrzejewski. 1998.



Woodland bison in the Białowieża Primeval Forest. Photo by Andrzej Bobiec.

- Predation in vertebrate communities: The Białowieża Primeval Forest as a case study. *Ecological Studies*. Berlin: Springer: 135.
- Tomialojc, L. 1991. Characteristics of old growth in the Białowieża Forest, Poland. *Natural Areas Journal* 11: 7–18.

ANDRZEJ BOBIEC is the chair of the Society for the Protection of the Białowieża Primeval Forest of Poland, and he wrote this article while a visiting scholar at the State University of New York College of Environmental Science and Forestry in Syracuse under funding from The Kociuszko Foundation. He can be reached at andrzej.bobiec@wp.pl.

Advertising in *IJW*

The *International Journal of Wilderness* accepts display ads that are appropriate to the wilderness topics and issues typically reported in the journal and that would be of interest to its readership. The printed copy in an article must be submitted electronically as a Microsoft Word file, and any artwork or illustrations must be submitted in hard copy as a black-and-white image. Advertising rates per issue for black-and-white ads are:

| Space | Size | Rate |
|-------------------|---|-------|
| Full Page | 7 x 9 ⁵ / ₈ | \$800 |
| 2/3 Page | 4 ¹ / ₂ x 9 ⁵ / ₈ | \$600 |
| Horiz. 1/2 Page | 7 x 4 ³ / ₄ | \$450 |
| Island 1/2 Page | 4 ¹ / ₂ x 7 | \$450 |
| Vertical 1/3 Page | 2 ¹ / ₄ x 9 ⁵ / ₈ | \$375 |
| 1/4 Page | 3 ¹ / ₂ x 4 ³ / ₄ | \$300 |
| 1/6 Page | 2 ¹ / ₄ x 4 ⁵ / ₈ | \$200 |

Contact the *IJW* managing editor,
Chad Dawson at
Phone: 315-470-6567 • Fax: 315-470-6956
E-mail: cpdawson@esf.edu
about an advertising submission or to ask about
availability of space. Make check payable to
International Journal of Wilderness.

Livelihood Security and Protected Area Management

BY STEPHEN F. SIEBERT and JILL M. BELSKY

Introduction

Livelihood security, the extent to which individuals and households have an adequate and reliable means of meeting food and income needs, is widely recognized as an important component of development efforts (Food and Agriculture Organization of the United Nations 1989). Livelihood security and economic well-being also directly affect forestland use practices and biodiversity conservation (Bruner et al. 2001, Geist; and Lambin 2002).

Conflicts between resident people and protected area managers, particularly over property rights and livelihood activities occurring within areas now designated as parks, have been widespread (West and Brechin 1991). Over the past decade, many protected area management efforts have attempted to address local economic development in the context of biodiversity conservation, most commonly through Integrated Conservation and Development Projects (ICDP) (MacKinnon and Wardjojo 2001). Critics of ICDPs assert that the projects have not achieved their objectives, that development and conservation are incompatible, and that conservation requires more vigorous enforcement efforts (Struhsaker 1998; Terborgh 1999). ICDP proponents argue for fostering local economic development and conservation, and conclude that unless local livelihood security concerns are addressed, conflicts between resident people and protected areas will continue, social inequities and injustices will increase, and protected areas will remain threatened (Wilshusen et al. 2002).

Livelihood security has become an increasingly unattainable goal for many rural people. Timber harvesting, conversion of forests to export cash crops, road development, migration of nonresident populations into previously remote regions, increasing socioeconomic differentiation, and the establishment of protected areas have transformed both the environment and livelihood practices of millions of

households throughout the tropics (Geist and Lambin 2002; Li 2001; Putz et al. 2001). While most rural people have historically been engaged to some extent in the market economy, a major implication associated with these changes is an increase in household dependence on the cash economy to purchase staple foods (Collier et al. 1994).

This article discusses the role of local food production in livelihood security and reasons why protected area managers need to recognize local food production issues. We draw on research conducted in a remote forest village (72 households) adjacent to Lore Lindu National Park (LLNP) in Sulawesi, Indonesia, from 1996 to 2000. LLNP is a 231,000-hectare (570,570 acre) preserve that contains one of the largest remaining primary forests in Sulawesi and a large proportion of that island's endemic flora and fauna. The park was established by Indonesian government decree in 1982 specifically to conserve the region's rich biological diversity and to protect the upper watersheds of several rivers crucial to lowland irrigated rice production and hydroelectric energy generation. While Indonesian government officials and international conservationists consider the area to be wilderness, it has been inhabited and profoundly influenced by humans for thousands of years. In fact, Neolithic sculpture remains are a major LLNP tourist attraction.



Article authors Stephen F. Siebert and Jill M. Belsky.

Four distinct ethno-linguistic/cultural groups reside in and around LLNP. Like forest-dwelling people throughout Indonesia and other tropical regions, traditional livelihood strategies include small-scale shifting cultivation, irrigated rice farming, forest gathering, and hunting. LLNP is encircled by several dozen villages and includes two enclaves where people have lived for centuries. When LLNP was established, all traditional forest livelihood practices, including farming, gathering, and hunting, were prohibited. The assumption that traditional livelihood practices are incompatible with biodiversity conservation and their subsequent prohibition is typical in Indonesia and in most tropical protected area management efforts, despite the fact that these activities have occurred in tropical forests in association with biological diversity for centuries.

We surveyed a random sample of 25% of village households in 1996 and resurveyed the same households again in 1999 to explore changes in household food security, livelihood practices, and forest use. We also conducted in-depth interviews with community members and village leaders on an annual basis over the five-year period from 1996 to 2000.

Forest Use, Livelihood Strategies and Protected Area Management

Until recent decades, village households relied on long-fallow shifting cultivation, hunting, forest-product collecting, and the sale of cash crops to secure food and other livelihood needs. Farmers began cultivating coffee (*Coffea canephora*) under mature trees (i.e., shade grown) and established irrigated rice fields in the valleys in the early 1960s. Rattan, a long-climbing palm,

which has been used for binding and basketry for generations, became a source of cash income in the 1980s with the emergence of a market for canes used in furniture manufacturing. Farmers throughout the region began to cultivate cacao (*Theobroma cacao*) in the early 1990s. Government officials began vigorous park enforcement efforts in the 1990s, and by 1995 villagers reported that they had ceased all cultivation within LLNP.

The establishment of LLNP and the emergence of commercial rattan gathering and cash crop cultivation (outside the park) significantly affected local land use practices and household food security. Prior to the establishment of LLNP, most households met annual food needs by cultivating rice and other foods through shifting cultivation, hunting and the collection of wild fruits and vegetables. By 1996, only three households were able to meet their entire rice needs through cultivation (all through irrigated rice farming). All other households depended upon the sale of rattan and/or cash crops to purchase rice and other food staples.

Our household surveys and interviews reveal that average household food production is very low (see Table 1). In

1996, cultivation provided an average of eight months of rice self-sufficiency per household, and that declined to less than four months in 1999 (due in part to severe drought). Ninety percent of households gathered rattan from LLNP for cash income to purchase food. Farmers reported that the productivity of upland farming was declining due to the inability to shift fields and observe long forest fallows to regenerate soil fertility and reduce weed populations. Villagers attributed this to LLNP regulations. Cacao was increasingly being planted in former shifting cultivation fields, further reducing household food production. Finally, all households interviewed in 1996 supported construction of a proposed trans-Sulawesi highway along the southern LLNP boundary in the hope that it would reduce the cost of transporting rattan, coffee, and cacao to market, and lower imported staple food prices.

Prior to 1980 there was little commercial harvesting of rattan in the region. However, as rattan supplies were exhausted in other areas of Southeast Asia, exploitation shifted to Sulawesi. The emergence of commercial rattan harvesting coincided with the establishment of LLNP and cessation of shifting cultivation. While government

Table 1—Household (n = 20) Livelihood Activities in 1996 and 1999 in an Indonesian Forest Village.

| Household Livelihood Activity | 1996 | 1999 |
|---|------------|------------|
| Rice | | |
| Cultivating irrigated rice as owner or tenant | 70% | 85% |
| Household rice self-sufficiency (mean no. months) | 7.9 months | 3.4 months |
| Perennial Crops | | |
| Cacao planted | 75% | 100% |
| Cacao producing | 20% | 55% |
| Coffee planted | 85% | 85% |
| Coffee producing | 70% | 80% |
| Collect Rattan | 90% | 95% |

Our central point is that there is an important role for agriculture, particularly food crop production, in tropical protected area management efforts.

regulations prohibit both rattan collecting and shifting cultivation, the diffuse and nomadic nature of rattan gathering and small number of forest guards makes it difficult to regulate cane harvesting. Thus, shifting cultivation in LLNP was effectively stopped, but rattan harvesting emerged as a crucial source of cash income to purchase staple foods.

The cultivation of cacao is also a recent activity. In the 1970s, cacao was not cultivated in the community. However by 1999, 100% of village households had at least one parcel planted to the crop. Cacao cultivation expanded throughout Sulawesi in the 1990s in response to growing market demand, high prices, desire by farmers to establish private property rights, and land purchases by local elites and migrants with capital and political connections (Li 2001).

During the 1990s, household food security and general economic well-being became more dependent upon the price of rattan, coffee, and cacao. Coffee and cacao exhibited extreme price volatility between 1996 and 2000 (see Table 2), while the cost of rice and other household necessities (e.g., cooking oil, sugar, fish, clothing, etc.) increased. Over the five-year study period, the dollar equivalent prices of

rattan, coffee, and cacao declined, even without adjusting for inflation.

Informal interviews with 20 villagers in 2000 suggest that household economic conditions deteriorated over the five-year period. In 1998, households and village leaders expressed particular concern over declining food security and growing conflicts in nearby areas between migrants and long-term residents, conflicts that overlapped with ethnic and religious identities. Several experienced farmers were also concerned about the sustainability of cacao grown under full-sun conditions in former shifting cultivation fields. Finally, villagers expected social and economic conditions to worsen.

The Search for Food Security and Its Implications for Forest Conservation

By the late 1990s, households lacked access to sufficient forest and land resources to provide basic household food and livelihoods. Reports on conditions elsewhere in Sulawesi reveal similar patterns: food production decreased both relatively and absolutely as small holders converted former shifting cultivation land to commercial tree crops (Li 2001). Religious and

ethnic violence were increasing in nearby areas, while national economic and political conditions were deteriorating. Shifting cultivation and food security were distant memories for most households.

Concerns over local livelihood security stimulated much discussion throughout the village, and in 1999 community leaders organized the community to act. Specifically, they encouraged households to return to shifting cultivation of upland rice in an area now within LLNP, but which they had cultivated in 1980 and 1960 prior to park establishment. While farming this site is now illegal, villagers concluded that their socioeconomic condition necessitated action and that park guards had limited capacity to enforce regulations (national governmental authority declined at the local level following the resignation of Suharto in 1998).

In reopening the shifting cultivation site, households agreed to several conditions: (1) the approximately 40 ha. site would be cleared and prepared collectively, (2) individual households would plant and cultivate rice based on their particular requirements, and (3) all rice produced was to be consumed locally (i.e., it would not be sold or traded). The site was cleared in the summer of 1999, burned before the onset of rains in October, immediately planted to upland rice, and harvested in late spring 2000 (see Figure 1). By August 2000, the site was reverting to fallow; stumps had resprouted and secondary forest vegetation was well established. Through this effort, households secured a one-to three-year supply of rice and no longer needed to raise income to purchase it (see Figure 2). The timeliness of the undertaking was dramatic since Central Sulawesi erupted in widespread ethnic and religious violence in June 2000.

Table 2—Market Prices of Coffee, Cacao and Rattan in Palu, Sulawesi (in U.S. Dollars per kg).

| Commodity | July 1996 | July 1998 | July 2000 |
|----------------------------|-----------|-----------|-----------|
| Coffee | \$1.67 | \$0.90 | \$0.59 |
| Cacao | \$1.19 | \$1.27 | \$0.64 |
| Rattan (30—35 mm diameter) | \$1.31 | \$0.22 | \$0.27 |

Economic, political, and social forces and the ways in which villagers respond to them are complex, fluid, and calculated on both community and individual household conditions and capabilities. Rather than being static, unwilling to face risk, market-averse, and unconcerned about environmental conditions (as some stereotypes of remote rural farmers maintain), the efforts and calculations of villagers attest to their creativity and readiness to embrace opportunities when they arise. In the case-study village, all households responded to the high price of cacao by planting it in upland farms and all those interviewed in 2000 ($n = 20$) had reversed their previous view and opposed construction of the trans-Sulawesi highway, fearing that it would increase the risk of in-migration, conflict and undesirable economic and social influences.

“Illegal” rice cultivation provided households with food and livelihood security and reduced rattan collecting inside LLNP. Importantly, cultivation of rice for one to two years, followed by 20 years of fallow without the use of petrochemical inputs is sustainable even on extremely infertile sites. Furthermore, it does little to alter the wild character of the area—an area that has been inhabited and subject to small-scale hunting and shifting cultivation for centuries.

In 1999, community leaders applied to the provincial government for permission to develop permanent irrigated rice fields on forestland outside LLNP. The Indonesian government has supported establishment of irrigated rice around timber concessions under the HPH Pembina Desa Program (Logging Concessions Community Development Program). The attention to food production and livelihood security is an approach that could be utilized around national parks. However, as of August 2000,

villagers had not received a response from the government.

Conclusion

The conservation of biodiversity and long-term viability of LLNP and other tropical protected areas will likely be determined, in part, by the extent to which resident people achieve secure livelihoods (Bruner et al. 2001; Wilshusen et al. 2002). Other major unaddressed threats to tropical protected areas include commercial logging, forest conversion to plantation agriculture, road building, and migration (Putz et al. 2001). While issues of power and politics constrain attempts to control these latter factors, international conservation efforts have emphasized a wide variety of income-generating activities among resident people in and around protected areas (MacKinnon and Wardoyo 2001). In Central Sulawesi, for example, both the Integrated Area Development and Conservation Project, funded by the Asian Development Bank, and The Nature Conservancy support perennial cash crop cultivation in buffer zones. However, comparable efforts to increase the productivity and sustainability of food crop cultivation are lacking.

Our central point is that there is an important role for agriculture, particularly food crop production, in tropical protected area management efforts. While improving food security should be a goal in and of itself, it can also serve the interests of forest conservation. Furthermore, working to assist rural people to secure a diverse and stable economy fosters a type of environmentalism that supports, rather than subverts, social justice principles. In so doing, we suggest that protected area management is likely to have a greater chance of being not only effective, but sustainable over the long run.



Figure 1—Milling rice with shifting cultivation field.

Acknowledgment


We are grateful to the friendship and assistance provided by those with whom we worked in Sulawesi. Funding was provided by grants from the USAID Program in Science and Technology Cooperation and The Nature Conservancy, Program Indonesia. 



Figure 2—Traditional rice storage container.

Conflicts between resident people and protected area managers, particularly over property rights and livelihood activities occurring within areas now designated as parks, have been widespread.

REFERENCES

- Bruner, A., R. Gullison, R. Rice, and G. da Fonseca. 2001. Effectiveness of parks in protecting tropical biodiversity. *Science* 291: 125–128.
- Collier, G., D. Mountjoy, R. Nigh. 1994. Peasant agriculture and global change. *BioScience* 44: 398–407.
- Food and Agriculture Organization of the United Nations, 1989. *Household Food Security: An Analysis of Socio-economic Issues*. Rome: FAO.
- Geist, H., and E. Lambin. 2002. Proximate causes and underlying driving forces of tropical deforestation. *BioScience* 52: 143–150.
- Li, T. 2001. Agrarian differentiation and the limits of natural resource management in upland Southeast Asia. *IDS Bulletin* 32(4): 88–94.
- MacKinnon, K., and W. Wardajo. 2001. ICDPs: imperfect solutions for imperiled forests in South-East Asia. *Parks* 11(2): 50–59.
- Putz, F., G. Blate, K. Redford, R. Fimbel, and J. Robinson. 2001. Tropical forest management and conservation of biodiversity: An overview. *Conservation Biology* 15: 7–20.
- Struhsaker, T. 1998. A biologist's perspective on the role of sustainable harvest in conservation. *Conservation Biology* 12: 930–932.
- Terborgh, J. 1999. *Requiem for Nature*. Washington, D.C.: Island Press.
- West, P. and S. Brechin, eds. 1991. *Resident Peoples and National Parks*. Tucson: University of Arizona Press.
- Wilshusen, P., S. Brechin, C. Fortwangler, and P. West. 2002. Reinventing a square wheel: Critique of a resurgent "protection paradigm" in international biodiversity conservation. *Society and Natural Resources* 15: 17–40.

STEPHEN SIEBERT and JILL BELSKY are professors in the School of Forestry at the University of Montana. Stephe welcomes correspondence at School of Forestry, University of Montana, Missoula, MT 59812, USA. Phone: 406-243-4661; e-mail: siebert@forestry.umt.edu.

From BOOK REVIEWS on page 47

In very much the style of Barry Lopez's *Arctic Dreams*, Mulvaney has compared and contrasted the stories of the poles into the separate stories of particular animals, peoples, and industries. Beginning with an introduction to the poles in human psyche and the fact that "penguins live in the Antarctic; polar bears live in the Arctic" (p. 19), the author provides historical interpretation of the bowhead whale (chapter 2), sealing (chapter 3), whaling and controversy within the International Whaling Commission (chapter 4), politics and activism (chapter 5), and oil exploration (chapter 6).

The major theme running through the entire book is that of the polar regions as the "last wilderness," and how the polar wilderness has been exploited, how nations and companies

have fought and resolved to protect such wilderness and how nongovernmental organizations, namely Greenpeace, have assisted in the process. The final chapter of the book (chapter 7), apart from summarizing, illustrates the significance of this last wilderness: it is important as an indicator of global health and more widespread environmental problems, but also as a place demonstrating the value of conservation to humanity. The appropriateness of tourism as the primary way in which growing numbers of people now experience the polar wilderness is left as a question for the reader to ponder and form their own opinion about.

Overall, *At the Ends of the Earth: A History of the Polar Regions* is a joy to read and an important contribution to

appreciating the wider context of interconnections occurring all over the Earth. Mulvaney's writing style is a combination of personal experience, touches of humor and irony, and in-depth, concise research. Mulvaney expertly conveys the fact that "for eons the Polar Regions existed through stasis and change, without any hint of involvement ... but as the world grows smaller, the ends of the Earth are no longer out of reach ... more accessible, and potentially more vulnerable than ever before" (p. 245). If this is true for the poles, then the same can definitely be said for all wilderness.

Reviewed by PATRICK MAHER, Ph.D. candidate at Lincoln University, New Zealand, who is examining the tourist experiences and outcomes in Antarctica. E-mail: maherp@lincoln.ac.nz.