In this chapter, we present data from research conducted in 1996 in and around the Danau Sentarum Wildlife Reserve (DSWR) in West Kalimantan, Indonesia. Our initial purpose was to contribute to the development of principles, criteria, and indicators for sustainable forest management. The particular topic investigated here is intergenerational access to resources in sustainable forest management.

After describing our methods, we provide the case materials that form our results, within the organizational framework provided by Center for International Forestry Research (CIFOR) criteria and indicators (C&I) relating to the security of intergenerational access to forest resources. Our purpose was to determine why, and by what means, intergenerational access to resources is important for sustainable forest management. In other words, what are the causal links—as evident in one forest-rich location—between these issues and sustainable forest management?

We conclude with a discussion of our scoring of the qualitative cases pertaining to each indicator (for a fuller treatment of this scoring system designed for users, see Salim and others 1999). Besides contributing to our understanding of how security of access relates to sustainable forest management, this method allows quantification of our C&I assessments and helps us

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This chapter is a revised and shortened version of a Center for International Forestry Research working paper (Colfer and others 1997b).
decide on the sustainability of the management of a particular forest, including its peoples’ access to resources.

**Theoretical Context**

The fundamental impetus to the research reported here was a widely recognized need to be able to assess intergenerational access to resources simply, inexpensively, and reliably. As we worked on developing methods, we realized that there was a more fundamental question: why, and by what means, is security of intergenerational access to resources important for sustainable forest management?

The importance of local people’s security of intergenerational access to resources was consistently identified in CIFOR’s various field tests of C&I for sustainable forest management (Prabhu and others 1996, 1998; see also Colfer and others 1995). The issue also has been debated in numerous other scholarly studies (for example, Fortmann and Bruce 1988; Ostrom 1990; Lynch and Alcorn 1994; Rose 1994; Besley 1995; Grigsby 1995; Lueck 1995; see also the introduction to Section 3). Yet real dissatisfaction with our ability to effectively assess the CIFOR C&I remained, along with uncertainty about the causal links between such access and sustainable forest management. Access to resources seemed too difficult to determine reliably in the short amount of time typically available. Here we suggest some ways to address these issues.

**Definitions**

What do we mean by security of intergenerational access to resources? The most common examples cited by research teams included security of land tenure, use rights to forest products, and fair distribution of forest benefits. The meaning of intergenerational is quite clear in the Indonesian context; the resources in question are for the benefit of both the present and subsequent generations (see Becker 1997 for a brief philosophical discussion of this issue). Security refers to a reasonable certainty that the future will not involve a significant reduction in people’s access.

Access implies three qualities: that the resource remains (sufficient quantity and quality); that the people can use it, as needed or to the same extent as in the past; and that “fairness,” or equity, exists in regulations governing its use and distribution. By resources, we mean natural resources—forests and their products, streams, lakes, agricultural lands, fisheries—anything in nature that has or could have a productive potential and/or provide ecological or cultural services in forested landscapes.

**Research Site**

A preliminary step in the pursuit of understanding causal links involved a test of three access-related methods in and around the DSWR in West Kaliman—
This research site was chosen for several reasons. Three of the authors have spent a total of six years conducting ethnographic research in the area (1992–1997), and we had access to more than 130 reports from a Conservation Project in the reserve, along with results of our own studies. The area represented various purported managers, including local people, conservation managers, and timber concessionaires. Finally, we anticipated considerable variation in local people’s security of access on the basis of their different resource use, different lengths of residence in their communities, and different potential conflicts with other stakeholders.

The primary forest actors in this area include Muslim Melayu fisherfolk, who live in the seasonally flooded core of the reserve; Christian and animist Iban swidden cultivators, who live in the surrounding hills; and to a much lesser degree, forest workers. The two main groups inhabit ecologically very different habitats and have distinct natural resource management systems. Other important stakeholders include residents of the larger Melayu “mother villages” along the Kapuas River, traders, timber concession holders, timber workers, the Conservation Project, and local government. We were also cognizant of the potentially different concerns of men versus women, old versus young, rich versus poor, and newcomers versus old-timers (Colfer and others 1999b; or Nurse and others 1995).

We decided to focus on four communities: the Melayu communities of Nanga Kedebu’ and Danau Seluang, and the Iban communities of Wong Garai and Bemban. Because of logistical problems in Bemban, we added the Iban community of Kelayang as a partial replacement (see description in Chapter 5).

**Methods**

We selected two methods and developed a third to test: a history form, participatory mapping, and the iterative continuum method (ICM). The first two are described in the following paragraphs; the third, in the Introduction. The order in which the methods are presented reflects the increasing expertise needed by the assessor.

**History Form**

Tainter (1995) and Vayda (1996), among others, argue for the important role that history must play in any attempt to address sustainability issues. Sustainability, by definition, has a temporal component. Similarly, intergenerational access has a built-in time frame. By using the history form, we wanted to gain some sense of the sweep of history within the area; we hoped that look-
Figure 8-1. Map of the DSWR Showing Traditional Territories
ing backward might be helpful to us in the much more difficult task of looking forward. We also hoped that looking at the current situation with some understanding of past events would help us to understand some of the “causes” behind the present situation (Vayda 1996). Finally, we hoped that the history form would serve as a catalyst to discussions, which in turn would clarify the dynamics of factors affecting people’s access to resources.

The method involved filling out a form with dates, starting in 1920 (see also time lines described in the Participatory Rural Appraisal Handbook 1990). We then asked individuals and groups in the study villages to tell us important events in the community’s history. As we learned more, we were able to prompt people with known dates and to help them estimate unknown dates, because the use of dates is not common in this area. The results, recorded on the form, provided a historical perspective on natural disasters, warfare, the arrival of significant outsiders (such as the timber concessionaires and the Conservation Project), adoption or development of important new technology, and so forth.

The form served as a catalyst to discussion, and it provided useful dates, such as that of the timber companies’ arrival. However, people’s inexperience in dealing with dates was a significant constraint to its utility. Trend lines, as described in the Participatory Rural Appraisal Handbook (1990), were subsequently tested and found more useful for this purpose.8

Participatory Mapping

We selected participatory mapping as a research method because we sensed that residents were more likely to be forthcoming about boundaries, regulations, sanctions, and conflicts—often sensitive topics—when confronted with a visual image than they might be when asked direct questions. We hoped to be able to elicit this kind of information over informal discussions about the maps and in walks through the area with local residents.

An important activity within the U.K. Department for International Development (DfID) Conservation Project was the participatory mapping of traditional use zones in and around the DSWR (Dennis and others 1997b; see also Chapter 16), but these maps proved too complex for our purposes. We simplified and combined them with sketch maps, hand-drawn in collaboration with local people (see also Sirait and others 1994 or Momberg and others 1996).

We first asked people to identify locations where they gathered forest products. In the course of the discussions, information about indigenous management practices, access and use rights, historical trends, and conflicts emerged as well. We used the maps in various contexts, with different users and stakeholders. Local people were interested in our simplified base maps (partly in finding errors!) and in many cases enjoyed pointing out areas with different uses, different histories, conflicting claims, and so forth. Both the
maps and the accompanying excursions into community territories to see the resources about which access was to be assessed contributed to the cases we present below.

In Danau Seluang, for instance, we got a fairly clear view (Figure 8–2) of logged and burned areas, areas where rattan grew abundantly, and areas of comparatively “good” forest (including locally protected areas). Excursions into the forest to check the maps prompted discussions of conflicts among adjacent villages, different perceptions of boundaries, and the bases of historical claims to land and other resources. Indeed, the inclusion by Danau Seluang residents of the bamboo and protected areas to the east in their territory reflects differing perceptions (without apparent conflict) by this community and the adjacent Iban community.

In Nanga Kedebu’, we focused on nontimber forest products (NTFPs). In Danau Seluang, we had found only rattan mentioned consistently as an important NTFP. Three outings in search of other important NTFPs convinced us that the Melayu were not using many other NTFPs. This conclusion is consistent with 1992–1993 household record-keeping data from there (Colfer and others 2000a).

In Bemban, we elicited historical data on the settlement of the community, locations of timber camps and logging activities, and local land use (Figure 8–3) as well as discussion of conflicts between the community and various outsiders (plantation owners, other villages, and timber concessionaires).
The people of Kelayang, sparked by Conservation Project interest, had made their own map, on which we were able to build. Again, the mapping exercise elicited areas of resource use and conflict as well as different land uses and histories.

In Wong Garai, because of Wadley’s long experience there, we were able to elicit more detailed information on the extent of the traditional use area and the present area of the longhouse’s effective control (Figure 8-4). In reviewing the list of specially preserved forest and old longhouse sites originally collected (see the box on page 198), he unearthed 103 named plants from 46 forest reserves and 26 old longhouse sites. These plants included food, construction materials, and medicine.9

For the other communities we studied, we had access to satellite imagery and the cooperation of a remote sensing specialist (see Chapter 16). Using satellite maps (such as those used by Dennis in Chapter 16), we were able to...
surmise that little or no dramatic forest loss had occurred between 1973 and 1994 in the three study villages.

For Wong Garai, we used an indirect method for assessing sustainability of land use, based on farming information collected during Wadley’s initial research. Four years of farming data were selected (1979, 1983, 1988, and 1993) to show forest types being farmed, field sizes, and the length of fallow used—all practices that have implications for forest cover (see also Table 8-1). The longhouse increased in size from 7 households in 1979 to 14 households in 1993. The data show a consequent increase in the number of fields and an uneven increase in the total area farmed. No decline in fallow length (indirectly...
SECURITY OF INTERGENERATIONAL ACCESS TO RESOURCES

Iban Management

Wadley’s research clearly shows the contrast between plants reported in two forested indigenous land use types: tembawai (old longhouse sites) and pulau (preserved forest areas). Although both categories of sites show similar counts containing fruit trees (domesticated, semidomesticated, and wild), 11 pulau have trees used for lumber, but only 3 tembawai do. Whereas 65% of the tembawai contain useful fruit trees, only 46.8% of pulau do. This difference illustrates the different nature of management for these two categories: even tembawai more than one hundred years old contain many fruit trees because people plant fruit nearby while they occupy a longhouse; after the people move on to another nearby longhouse, they promote the succession of saplings from the original trees, thus producing a forest patch dominated by fruit trees. Pulau, in contrast, are patches of forest that have been preserved from felling for various reasons—as sacred sites, as places to collect rattan or wild latex, and as places to cut lumber for longhouse construction. The succession of useful tree species is also promoted in these sites (see, for example, Sather 1990; Padoch and Peters 1993; Wadley and others 1996).

cating land shortage) or increase in fallow length (indicating the opening of old growth forest) is apparent. What these data reveal is the annual cycling of fallowed forest—in some years, young fallow; in other years, older fallow—with an average fallow length of 22.7 years. Forest cover, as in the other communities where satellite maps were available, has remained fairly stable over the years. Subsequent and more detailed analyses of the Wong Garai situation support these findings (Wadley 1999b).

The Iterative Continuum Method

The ICM is described in the Introduction to this book and in the box on page 200. The ICM provided a rich source of case material for analysis.

Principles, Criteria, and Indicators for Assessing Security of Intergenerational Access to Resources

The goal of developing clear and relevant principles, criteria, and indicators for assessing sustainable forest management has been hotly pursued in recent years (see Upton and Bass 1995 for an overview). No element in this process has been more controversial or more difficult to attain than the development of good social C&I. But the potential gains are significant if successful: the
existence of simple assessment tools, the potential of influencing forest managers to attend meaningfully to resident communities (in all their variety), a greater share of the forest’s products and a greater “voice” for those currently disadvantaged, improved understanding of the causal links between human behavior and beliefs and sustainable forest management, and improved management of resources through better information, to name a few.

We described our involvement in the testing of C&I in the Introduction. The C&I pertaining to security of intergenerational access to resources are shown in Annex 1 (see the Introduction to this book). They represent modest progress toward answering the questions posed at the beginning of this chapter: why, and by what means, is secure access to resources important for sustainable forest management?

In the subsequent pages, we try to make these links clearer, using case studies from the DSWR area. Our hope is that these case studies can spur other researchers to add to our growing fund of case materials pertaining to this topic. We also suggest a simple scoring technique (elaborated in Salim and others 1999). We hope that, if our attempt to develop more quantifiable methods fails, we will have made some progress in outlining relevant qualitative features.

**Commentary**

One prerequisite for forest people achieving intergenerational access to forest resources is the maintenance of the forest resources. That is, if the forests and

<table>
<thead>
<tr>
<th>Forest type</th>
<th>Year</th>
<th>1979</th>
<th>1983</th>
<th>1988</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young fallow</td>
<td>No. of fields</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Area (hectares)</td>
<td>19.28</td>
<td>14.77</td>
<td>15.39</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Avg fallow length (years)</td>
<td>7</td>
<td>5.25</td>
<td>8.6</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Young secondary</td>
<td>No. of fields</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Area (hectares)</td>
<td>2.87</td>
<td>9.45</td>
<td>16</td>
<td>32.79</td>
<td></td>
</tr>
<tr>
<td>Avg fallow length (years)</td>
<td>30</td>
<td>13.5</td>
<td>19</td>
<td>20.8</td>
<td></td>
</tr>
<tr>
<td>Old secondary</td>
<td>No. of fields</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Area (hectares)</td>
<td>0</td>
<td>20.53</td>
<td>11.09</td>
<td>14.41</td>
<td></td>
</tr>
<tr>
<td>Avg fallow length (years)</td>
<td>0</td>
<td>45</td>
<td>39.5</td>
<td>38.75</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>No. of fields</td>
<td>7</td>
<td>10</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Area (hectares)</td>
<td>22.15</td>
<td>44.75</td>
<td>42.48</td>
<td>47.2</td>
<td></td>
</tr>
<tr>
<td>Avg fallow length (years)</td>
<td>10.3</td>
<td>22.8</td>
<td>18.2</td>
<td>25.9</td>
<td></td>
</tr>
</tbody>
</table>
Using the Iterative Continuum Method: An Example

When Colfer began the 1996 research, she was uncertain about people’s feelings of security about their tenure and use rights in the area. On her first visit, in 1992, a group of villagers had explained that they had no rights to the land on Bukit Kedebu’, that they were “really” residents of Selimbau, a larger town on the Kapuas River. Based on this assertion, Colfer and her husband proceeded with their plan to build the Danau Sentarum Wildlife Reserve (DSWR) Field Center there. Much to their surprise, the local governmental triad (police, military, and district government) called a meeting at which a man from yet another village asserted most aggressively that he and 14 other people “owned” Bukit Kedebu’. Although this disagreement was resolved eventually to everyone’s apparent satisfaction, Colfer concluded over the next 15 months that there was a very confusing mélange of ownership and use rights in the area.

How could she better understand the importance of such use rights to sustainable forest management? One important issue identified in the literature seemed to be the presence and operation of regulations. She began looking for further evidence of regulations. She knew they existed for fisheries, but what about for forests? She found evidence that the Melayu considered rattan harvesting to be subject to regulation by local communities and that permission had to be asked before one could harvest it. She found regulations among the Iban about collecting forest foods. Did these rules seem to be regularly applied? Were there sanctions? One question led to another, always keeping in mind the link to the state of the forests in the area and the likelihood and direction of change.

Mechanisms for conflict resolution represented another feature that previous research had identified as important for sustainable forest management. Colfer began listening for stories of conflicts and trying to understand how people resolved them. In conflicts between timber companies and local communities, some were resolved by negotiation, others by violence. Neighboring communities clashed over appropriate fishing gear, boundaries, and regulations; the various methods of resolution were duly noted.

The iterative continuum method (ICM) process requires the researcher to stay alert and to be open to many kinds of evidence—because of the huge variety in human uses of forests. One observation leads to others, following the connections among human values and behavior on one hand, and sustainable forest management on the other. Experience in participant observation techniques is helpful in this process.
their resources have been depleted or destroyed, it is impossible for the current or next generation to have access to them. This concern results in the first criterion (Criterion 3.1: “Local management is effective in controlling maintenance of and access to the resource”) and its indicators, the development of which has been influenced by Ostrom’s work (1990, 1994; Wollenberg and Colfer 1996). Clearly, we ignore a host of complementary ecological C&I here.

The C&I discussed here overlap with other social C&I. For instance, Indicator 3.1.1 (“ownership and use rights to resources … are clear and respect preexisting claims”) has implications for the question of voice in forest management or co-management. Without a firm economic base, forest actors may remain comparatively silent and powerless (see Gatuslao 1988 and Canuday 1996 for some counter examples).

The distinction between Criterion 3.1 and Criterion 3.2 (“Forest actors have a reasonable share in the economic benefits derived from forest use”) has been confusing to some biological scientists. It may help to think in terms of input and output variables, with Criterion 3.1 as an input (the basis on which access to resources rests) and Criterion 3.2 as an output (the products that come from that resource base).

Finally, our work has been influenced by a perhaps unwarranted assumption that C&I can be organized into hierarchies. We have made considerable progress toward improving our definitions of principles, criteria, indicators, and verifiers (Prabhu 1995; Lammerts van Bueren and Blom 1997), but we have become more skeptical that these hierarchical connections are as immutable as they appear on paper. An indicator in one context can, in our view, function as a criterion in another—and vice versa. Income levels, for instance, may be considered (and phrased as) an indicator for a criterion on the state of people’s health, or conversely, adequate incomes could be conceived as a criterion for human well-being, with human health as an indicator.

The hierarchical approach has its appeal, but we wonder also if there may be more hierarchical levels applicable for social phenomena, as Young (1992, 144) implies. Young quotes Thoreau (1957, 197), who said “the imagination, give it the least license, dives deeper and soars higher than Nature does.” Is it possible that human systems, more directly affected by human imagination, may require more levels than we are allowing in Lammerts van Bueren and Blom’s interesting formulation? Or, must we ultimately recognize a certain arbitrariness in our hierarchies? We cannot answer these questions with certainty here. However, we do view the use of the hierarchical formulation as a means rather than an end. We initially thought it had utility insofar as it could further our understanding of these problems; we now think it has utility insofar as it can further our ability to communicate significant human and environmental issues to others. We are moving away from the static approach implied by the C&I framework, even though we recognize its utility as a communication device and an assessment tool.
Illustrative Evidence Relating to Security of Access

In the following section, we supply illustrative cases, or evidence, that we found useful in assessing conditions at the DSWR. Although we do not discuss all the cases, we did use them all in an attempt to quantify the qualitative; each author made a comparatively independent assessment of all the cases in Table 8-2. For each criterion or indicator, a qualitatively determined score between 1 and 10 was assigned, where 10 represents the most sustainable value. All three field researchers shared common “anchoring” points on the continuum (used in the ICM method) when they filled in their forms, but scoring was a personal judgement based on the evidence presented under each indicator. The final column in Table 8-2 provides the average scores for each criterion or indicator.

The numbering that we use is the same as that used in CIFOR’s Generic C&I Template. Each indicator is numbered consecutively within each criterion. Numbered cases are presented under each indicator. Colfer, Wadley, and Harwell separately scored each case with regard to its significance for security of access over time. These scores (“Col,” “Wad,” and “Har,” respectively) were then averaged, as presented in Table 8-2.

Criterion 3.1: Local management is effective in controlling maintenance of, and access to, the resource.

Indicator 3.1.1: Ownership and use rights to resources (inter- and intragenerational) are clear and respect preexisting claims.12
1. Residents of Nanga Kedebu’, Bukit Rancong, and Danau Seluang have permission to reside in the lakes area from their respective “mother villages” on the Kapuas River. No village has been permanently inhabited for more than a few decades, and many residents of these three communities are seasonal. On the other hand, each community has a clearly, albeit extralegally, defined territory (as shown in Figure 8-1).
   \[ C = 7; \ W = 7 \] (Melayu)

2. In 1989, Wong Garai saved a significant tract of old growth forest from being logged. Wong Garai territory falls within the P.T. Militer concession, but the people appealed to district and regional governments and received important help from one of their own who was a member of the regency legislature at the time. The forest was declared a protected area by the regency head (see Chapter 12). (The box on page 203 is a case study with a less positive outcome.)
   \[ C = 7; \ W = 7 \] (Iban)

Indicator 3.1.2: Rules and norms of resource use are monitored and successfully enforced.13
1. Nanga Kedebu’ residents expressed “righteous anger” at other nearby
Communities and Loggers in Competition

In April 1996, the Melayu of Bakakak burned down a logging base camp in territory they considered theirs, where P.T. Hutan Hebat had begun logging. The people claimed this area as a “protected area” from which they expected to harvest wood for their current and future building needs. The Regional Forestry Office in Pontianak had given Hutan Hebat special permission to cut in this area (which was, in fact, outside the company’s current annual work area). In discussion between the company and the community, the community had requested company contributions that the company felt were excessive. Estimates of the requests ranged from 10 million to 30 million rupiah (Rp; US$4,300–12,800). The community had not yet agreed to Hutan Hebat’s cutting when the company began its logging operation. The burning appeared to be a spontaneous, villagewide reaction that reflected people’s feelings that Hutan Hebat was infringing on their legitimate rights.

An investigation involved the police, the military, and the regional government as well as the company and the community; Hutan Hebat stopped cutting temporarily. However, our last understanding was that the Regional Forestry Office had stuck by its original permission and that the other governmental agencies were supporting Hutan Hebat. Hutan Hebat agreed to improve the boardwalks and to build a religious school in the community. A local Forestry Department official said this action was not a requirement but a “token of good will.” The people, it appeared, had lost their rights to the area they had been managing for their own future use.

[This case was assigned a 2 by Colfer and Wadley, for the Melayu management.]

1. In the late 1980s, Wong Garai had a land dispute with a neighboring longhouse. In years past, Wong Garai had allowed members of the other longhouse to farm land within its territory, which the other longhouse communities whose members came and collected rattan or caught fish in their territory, contrary to Nanga Kedebu’ regulations.
   C = 7; W = 7 (Melayu)

2. A group of Bemban children and young women went out to a previous longhouse site to collect ferns for supper. They explained that only people from the community could collect ferns in this area. A young girl took the jackfruit Colfer was carrying, saying that Colfer might be fined for taking the fruit, whereas she was allowed to do so (see Sandin 1980).
   C = 8; W = 8 (Iban)

**Indicator 3.1.3: Means of conflict resolution function without violence.**

1. In the late 1980s, Wong Garai had a land dispute with a neighboring longhouse. In years past, Wong Garai had allowed members of the other longhouse to farm land within its territory, which the other longhouse
Table 8-2. Authors’ Scoring of “Security of Intergenerational Access to Resources” Cases in DSWR and Environs, West Kalimantan, Indonesia (June 1996 Conditions)

<table>
<thead>
<tr>
<th>Case/evidence</th>
<th>Iban</th>
<th>Melayu</th>
<th>DSWR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criterion 3.1: Local management is effective in controlling maintenance of, and access to, the resource.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator 3.1.1: Ownership and use rights to resources (inter- and intragenerational) are clear and respect preexisting claims.</td>
<td>5.6</td>
<td>5.3</td>
<td>8.0</td>
</tr>
<tr>
<td>Indicator 3.1.2: Rules and norms of resource use are monitored and successfully enforced.</td>
<td>6.5</td>
<td>6.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Indicator 3.1.3: Means of conflict resolution function without violence.</td>
<td>6.0</td>
<td>6.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Indicator 3.1.4: Access to forest resources is perceived locally to be fair.</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Indicator 3.1.5: Local people feel secure about access to resources.</td>
<td>5.3</td>
<td>5.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Criterion 3.2: Forest actors have a reasonable share in the economic benefits derived from forest use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicator 3.2.1: Mechanisms for sharing benefits are seen as fair by local communities.</td>
<td>4.0</td>
<td>4.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Indicator 3.2.2: Opportunities exist for local and forest-dependent people to receive employment and training from forest companies.</td>
<td>3.0</td>
<td>3.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Indicator 3.2.3: Wages and other benefits conform to national and/or International Labor Organization (ILO) standards.</td>
<td>2.0</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Indicator 3.2.4: Damages are compensated in a fair manner.</td>
<td>3.5</td>
<td>3.5</td>
<td>3.0</td>
</tr>
</tbody>
</table>
**Criterion 3.3: People link their and their children’s future with management of forest resources.**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3.1</td>
<td>People invest in their surroundings (that is, time, effort, and money).</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.7</td>
<td>4.0</td>
<td>6.9</td>
</tr>
<tr>
<td>3.3.3</td>
<td>People recognize the need to balance number of people with natural resource use.</td>
<td>6.3</td>
<td>6.3</td>
<td>7.0</td>
<td>6.5</td>
<td>5.0</td>
<td>5.0</td>
<td>2.5</td>
</tr>
<tr>
<td>3.3.4</td>
<td>Children are educated (formally and informally) about natural resource management.</td>
<td>5.7</td>
<td>6.0</td>
<td>4.0</td>
<td>5.2</td>
<td></td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>3.3.5</td>
<td>Destruction of natural resources by local communities is rare.</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
<td>4.3</td>
<td>4.0</td>
<td>4.0</td>
<td>5.0</td>
</tr>
<tr>
<td>3.3.6</td>
<td>People maintain spiritual or emotional links to the land.</td>
<td>8.7</td>
<td>8.7</td>
<td>9.0</td>
<td>8.8</td>
<td>5.0</td>
<td>5.0</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Grand mean</strong></td>
<td></td>
<td>5.3</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** Col = Colfer; Wad = Wadley; Har = Harwell. Indicator 3.3.2 was not evaluated.

* Based on average scores (Colfer and Wadley) for six cases.
* Based on average scores (Colfer and Wadley) for five cases.
* Based on average scores (Colfer and Wadley) for four cases.
* Based on average scores (Colfer and Wadley) for three cases.
* Based on average scores (Colfer and Wadley) for one case.
* Based on average scores (Colfer and Wadley) for two cases.
then claimed as their own. They brought the case before the temenggong (traditional law leader) for a hearing, and the temenggong decided that the two disputants should divide the land. Wong Garai refused to accept the decision (locally agreed to be their right), arguing that the other longhouse has no tembawai (old longhouse sites) on Wong Garai territory that would mark their claim to the land.

C = 8; W = 8 (Iban)

2. Nanga Kedebu’ residents frequently disagreed with P.T. Hutan Hebat, a timber company that regularly towed log rafts through Nanga Kedebu’ territory. One community member served as a tugboat pilot for the company and as an informal mediator in resolving these disputes. Despite grumbling with regard to levels of compensation for damage to local fishing gear, there was acceptance of this system both by the community and the company.

C = 8; W = 8 (Melayu)

**Indicator 3.1.4: Access to forest resources is perceived locally to be fair.**

1. In Nanga Kedebu’, logs had recently been quietly removed from passing P.T. Hutan Hebat log rafts. The logs were to be sawn into lumber and used to build a mosque. This action was agreed to by community members and justified with reference to the profits being gained by timber companies, vis-à-vis local benefits from local resources.

C = 2; W = 2 (Melayu)

2. Forest fires occurred extensively in 1992 (the last really dry year prior to the 1996 fieldwork reported here) in Danau Seluang’s territory. They significantly reduced the availability of rattan and timber and destroyed about 500 wooden tikung (artificial bees’ nests). Burning was variously described as purposeful and related to outsiders’ envy or anger because they were denied permission to harvest, or entirely due to carelessness.

C = 3; W = 3 (Melayu)

**Indicator 3.1.5: Local people feel secure about access to resources.**

1. Wong Garai shares access to some forest and riverine land with another longhouse. There is some concern that this increase in use is leading to overexploitation, particularly of fish. People are also concerned about their future ability to collect fish in the lakes area during the dry season—something they have been doing for at least 150 years and to which they make traditional use claims—given the increasing presence of Melayu in traditional Iban use areas and the possibility that the government will begin to enforce its own very different boundaries in the future.

C = 5; W = 5 (Iban)

2. Throughout the DSWR area, concern is expressed that others (for example, timber companies, other ethnic groups, and transmigrants) are encroaching on their areas of traditional use, threatening their ability to
use those resources in the future. For the Iban, the concern focuses on forest resources; for the Melayu, fisheries.

C = 4; W = 4 (Iban; Melayu)

Criterion 3.2: Forest actors have a reasonable share in the economic benefits derived from forest use.

Indicator 3.2.1: Mechanisms for sharing benefits are seen as fair by local communities.
1. In Nanga Kedebu’ and Bukit Rancong, people felt that funds made available to the Conservation Project from ecotourists and payment of salaries and other in-kind help from the project were unfairly distributed.
C = 2; W = 2 (Melayu)
2. Payment of royalties to local communities, in recognition of their prior rights, has been suggested as a mechanism for sharing benefits more fairly. No royalties are paid to DSWR communities or to those in the surrounding area. Various taxes are paid by companies to the Kapuas-based forestry agent, but they go to Pontianak (and to Jakarta; see Ascher 1993).
C = 2; W = 2 (Melayu)

Indicator 3.2.2: Opportunities exist for local and forest-dependent people to receive employment and training from forest companies.
1. Very few residents within and around the DSWR work for the timber concessions. Kelayang is in the P.T. Panggau Libau concession, partially owned by Iban from the Lubok Rian area, some of whom are related to Kelayang residents. Although Kelayang economic involvement with this company is greater than that found between other companies (such as P.T. Militer or P.T. Hutan Hebat) and local communities, conflicts still arise (see Chapter 12). Conflicts have resulted from employment opportunities that were perceived to be inadequate, promised but unpaid rent on land, requests for rattan that was then not bought, and unfair recompense when a community member was killed by a company speedboat.
C = 3; W = 3 (Iban)
2. In Nanga Kedebu’, only one person is considered to have had a long-term relationship with the timber company. Young men occasionally work for a while with timber companies, but some people perceive that when fishing is good, the young men will leave the company. This perception may mean that incomes from fishing (and related economic endeavors) are better than incomes from the company.
C = 2; W = 2 (Melayu)

Indicator 3.2.3: Wages and other benefits conform to national and/or International Labor Organization (ILO) standards.
1. The workers Colfer spoke with—a mix of locals and newcomers—considered themselves to be adequately paid, with reasonable benefits, working
conditions, and safety standards. On the other hand, Wadley found that Iban who have worked for Indonesian logging companies generally complain about the low wages locally (compared with what they could earn for comparable work in Malaysia), dangerous conditions, and poor equipment. Quite a few Wong Garai residents who had worked for P.T. Panggau Libau said they had never been paid and would never work there again.

\[ C = 2; W = 2 \] (Iban)

**Indicator 3.2.4: Damages are compensated in a fair manner.**

1. In 1992, a subcontractor with P.T. Militer/P.T. Hutan Hebat paid the community of Bemban one portable, 500-W generator for the right to harvest an unknown number of hectares in Bemban’s traditional area. (The situation outlined in the box on page 209 describes another example.) Local people are becoming more savvy, though they often lack power and voice in demanding justice.

\[ C = 2; W = 2 \] (Iban)

**Criterion 3.3: People link their and their children’s futures with management of forest resources.**

**Indicator 3.3.1: People invest in their surroundings (that is, time, effort, money).**

1. For the Melayu, enforcement of local regulations to protect resources involves protecting special areas as fish nurseries, prohibiting small mesh sizes and the harvesting of fish under a certain size, restricting access to rattan and valuable wood, and outlawing burning. For the Iban, it involves maintaining special forest preserves (pulau) and old longhouse sites (tembawai) and prohibiting farming the peaks of mountains to allow for the forest regeneration of swiddens (see Wadley and others 1996).

\[ C = 10; W = 10 \] (Iban); \[ C = 8 \] (Melayu)

2. Increasing educational levels (with significant sacrifice and investment by both parents and children) have recognized and profound negative consequences, such as loss of traditional ecological and ritual knowledge, devaluation of traditional work and knowledge, and increased consumerism.

\[ C = 6; W = 6 \] (Iban; Melayu)

**Indicator 3.3.2: Out-migration levels are low.**

1. People—primarily relatives who live along the Kapuas River—migrate into the reserve seasonally. Close economic and kinship ties between DSWR communities and their “mother villages” along the Kapuas would make control of this seasonal influx difficult. Many people who started as seasonal fishers in the reserve have settled and built permanent homes there. Many also express a commitment to staying and making the community better for their children.

\[ C = 5; W = 5 \] (Melayu)
Compensation Paid to Communities

In early 1996, an irrigation project was started on Wong Garai land that would feed downriver into the fields of other communities and a planned transmigration project. Wong Garai had successfully lobbied to get the main irrigation dam built within its territory, but when the site was surveyed and work started, project workers did not notify the longhouse. Banana trees and cassava plants in one garden at the site were cut down, and some graves in an old forest cemetery were disturbed with digging and tree felling.

Several Wong Garai women were first to see the work. They directly challenged the workers, forcing them to stop. After holding a traditional dispute hearing at the longhouse, the construction company was fined more than Rp 500,000 (US$212), which was divided with two other longhouses that had ancestors buried in the disturbed cemetery. The company also was required to pay for local rock and sand used in the dam and canal construction.

[This case was assigned a 5 by Colfer and Wadley, for Iban management.]

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2. Iban men are regular circular migrants to Malaysia, where they work for higher wages. They normally return home, bringing welcome booty with them, at harvest time.

C = 5; W = 5 (Iban)

Indicator 3.3.3: People recognize the need to balance numbers of people with natural resource use.

1. Birth control has been widely accepted, often linked to resource use issues. Iban women, however—recognizing that families are better able to provide for fewer children, that they are freed from the real risk of death in pregnancy and childbirth, and that they can be more economically productive—worry that low or stable fertility levels among indigenous people...
like themselves may provide an excuse to move transmigrants into the area who may overwhelm them numerically.

C = 7; W = 7 (Iban)

2. Migration into the reserve appears to be considerable, with no effort or means to control it. Indeed, the ethic of hospitality makes such control difficult without outside support.

C = 3; W = 3 (Melayu)

**Indicator 3.3.4: Children are educated (formally and informally) about natural resource management.**

1. We met several young people who had been selected by their parents to pursue various disciplines (within one family) and then return home to share their knowledge with the family and community.

C = 5; W = 5 (Iban)

2. The Iban have a still functioning system of land tenure and tree ownership rules and practice (see Wadley 1996) and maintain many rituals connected to farming. But they fear these “old ways”—the ritual chants, the rich ceremonial language, and farming and forest knowledge—are being lost to the youth. Competition from national education and television is constant. In June 1996, for example, a set of important longhouse rituals (making of offerings, chanting of invocations to ancestor gods) was being performed at 1 A.M. At the same time, the young people had set up a stereo system to play Indonesian pop music at high volume, to which they danced at the other end of the longhouse. The resources of cultural and ecological knowledge (integral to sustainable management), which their immediate and distant ancestors had acquired, were being lost (see also Chapter 5).

C = 4; W = 5 (Iban)

**Indicator 3.3.5: Destruction of natural resources by local communities is rare.**

1. Recurrent poisoning of fish with commercial pesticides—largely by a minority of Iban merchants, but also by some Melayu—was reported.

C = 4; W = 4 (Iban; Melayu)

2. Current supplies of timber species available to local people are significantly reduced (*tembesu’, kawi, kelansau, medang, menyawai*). There is a widespread perception of overharvesting of swamp forest (*kawa*) by local people. (Those used by the Melayu are mostly swamp species.)

C = 5; W = 5 (Melayu)

**Indicator 3.3.6: People maintain spiritual or emotional links to the land.**

1. During Colfer’s four-day stay in Kelayang, three resource-related religious ceremonies were observed, all of which included the active involvement of the young (one to “feed” a crocodile spirit in the river whose hunger had been revealed in a dream to constitute a threat to a community mem-
ber, one to “feed” the soil before beginning to clear a rice field, and one to “feed” the soil in preparation for planting).

C = 10; W = 10 (Iban)

2. Iban refer to the forest as seput menoa, “the breath of the land,” and recognize the hydrological consequences of too much forest cutting—for example, drying up of water sources16 (see Wadley and others 1996).

C = 8; W = 8 (Iban)

The fact that the forests in and around the DSWR are in relatively healthy shape suggests that these scores may be high on a global scale. The low average score (2.5) for Criterion 3.2 suggests a possible flash point; indeed, feelings of unfairness about local people’s shares in forest benefits that they felt should be their own were both a recurring complaint and a rationale for examples of violent confrontation.17 Our comparatively high assessments of the strength of people’s feelings of security about access to resources (7) and their clear conceptual link between their own and their children’s well-being and the forests (5.4) seem likely to contribute to sustainability by confirming their “stake” in the forest and by providing motivation for protecting it against potentially destructive new endeavors in the area.

Conclusions

In this chapter, we have described illustrative results obtained from using three methods designed to assess security of intergenerational access to resources quickly, inexpensively, and reliably. We used the principles, criteria, and indicators identified in CIFOR’s C&I process as a framework, and we presented and scored cases that provide evidence of causal links between such access and sustainable forest management. We see this case material as contributing to an illustrative “library” of cases from different contexts, building ultimately to a fuller understanding of the causal links between people’s access and sustainable forest management.

Our attempt to understand the causal links between access to resources and sustainable forest management is a long-term goal, of which this study formed a small part. Evidence from one forest-rich site cannot prove that maintenance of fair intergenerational access to resources and economic benefits is always important for sustainable forest management. However, the evidence (in the form of cases) we accumulated for the DSWR has given us a better understanding of the kinds of links between the social C&I (or the conditions they reflect) and sustainable forest management more generally. The kinds of links we have identified support the conclusion that best practices in forest management—whether by local people or by timber concessionaires—will require that
• resources be maintained if people now and in the future are to continue to have access to them (Criterion 3.1),
• local people must share in the economic benefits from forest use (Criterion 3.2), and
• people (in this case, also managers) link their own and their children’s futures with good management of the resource (Criterion 3.3).

Endnotes

1. See Colfer and others 1997b, 1999a, and 1999b for more complete descriptions of these methods.
2. In this chapter, we shorten security of intergenerational access to resources to access to resources or even access.
3. We are cognizant of the pertinence of Becker’s (1997, 32) criticism of scoring systems. She says, “The problem with scoring systems is that they pretend objectivity and uniformity, whereas the choice of components and their assigned weights is highly subjective, and the aggregation of different spatial, temporal and sectoral dimensions is often not meaningful.”
4. The issue is complicated by the many interpretations of fairness that reflect real differences in people’s perceptions and understandings (for fuller discussions, see Farmer and Tiefenthaler 1995; Prakash and Thompson 1994).
5. The meaning of intergenerational has proved more complicated in Cameroon, where competition is rather dramatic, even antagonistic, between generations—something rare or understated in the Indonesian context.
6. One could argue that this issue can be left to the ecologists. However, our own perspective is that local people are likely to have important responsibilities in maintaining that resource. Where people have developed mechanisms for maintaining a resource, its condition is likely to be better.
7. As with many criteria and indicators, there are potential conflicts here. If the population has grown drastically, for instance, the same resource base may no longer support previous levels of use. This change in turn will affect the first quality of access, resource availability. It is also a red flag relating to sustainability. This element of access also ignores the important issue of changing aspirations among local populations, who may no longer want a particular resource.
8. This type of method is described in Bruce 1989, Carter 1996, Momberg and others 1996, and Panday and others 1997, among others. The Asia Forest Network also has put out a series of cases, many of which have excellent examples of the uses of this kind of map (for example, Chatterji and others 1996; Poffenberger and McGean 1993a, 1993b; Poffenberger and others 1995, 1996). See Lightfoot and others 1991 for other approaches with similar goals.
9. Hanne Christiansen (not dated) has documented an Iban lexicon of some 2,000 plant species and reports that in one longhouse, at least 127 families of plants are known and regularly used (see also Bernstein and others not dated).
10. We felt comfortable following Lammerts van Bueren and Blom’s (1997) requirements for principles and criteria, but the indicators we have developed join their indicators and norms and are, in the case of this principle, almost exclusively qualitative.
11. Colfer and Wadley were in communication by e-mail, but Harwell was in the field when these estimates were made. Our communication problems resulted in her assessing only the criteria.

12. Our emphasis here is on local ownership and use rights, but there is considerable difference of opinion about actual rights to resources. Local people feel that the resources belong to them, and the government considers the resources to belong to the nation.

13. Again, our emphasis is on local rules and regulations. But a host of rules and regulations from different parts of the Ministry of Forestry are not normally monitored or enforced (for example, the government forester who knew neither the regulations on timber harvesting nor who was supposed to enforce them, and Conservation Project personnel who manage the wildlife reserve but regularly ignore purple herons and storm’s storks tied to Melayu rafts and macaques and small birds kept as pets by the Iban).

14. As with the perception of security of tenure, the perceptions of local workers may be different from those of outside assessors. Local working conditions would not, for instance, comply with those proposed by previous Center for International Forestry Research teams or with International Labor Organization standards.

15. Other criteria and indicators deal with destruction by other stakeholders (for example, the harvesting of timber by concessionaires without regard to regulations, the transmigration of large numbers of families into already occupied forest areas, and the conversion of natural forest areas to industrial timber estates or oil palm or rubber plantations).

16. This hydrological knowledge has a spiritual component; the Iban contend that if they do not take care of the land both ecologically and ritually, it and they will be threatened with supernatural “heat” (angat) that manifests itself in people’s poor health and in social disruption.

17. In early 1997, in another area of West Kalimantan, a confrontation occurred that was so violent that many people were killed, and the military intervened. Although its causes are widely debated (often attributed to ethnic or religious conflict), we feel with some confidence that inequitable access to resources and benefits played a significant role in this sad occurrence. Similar problems recurred in 1999 in the same and other provinces of Indonesia (partially also related to other political issues). See Harwell 2000a for an indepth analysis.

18. The role local people play in management in and around the Danau Sentarum Wildlife Reserve is examined in Chapter 12.