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Assessing People's Perceptions of Forests in Danau Sentarum Wildlife Reserve

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Carol J. Pierce Colfer, Joseph Woelfel, Reed L. Wadley and Emily Harwell ¹

Summary

Previous research identified three important issues of relevance to forest people's roles in sustainable forest management which we address here: the presence of a "conservation ethic", a feeling of closeness to the forest, and a significant forest-culture link. In this paper we examine a method (the Galileo), recently pre-tested for this purpose in West Kalimantan, which we hope can help us to assess such issues quickly, reliably and in a quantitative manner amenable to use by would-be assessors of various educational and experiential levels. We describe the method, suggest improvements for future tests, and present some of our findings from West Kalimantan. We conclude with questions that emerged during our pre-test, and others that remain for subsequent research.

Introduction and Context

To what degree do people who live in forests have a "conservation ethic"? How can we quickly and reliably assess how close people feel to the forest? How closely integrated are the lives of forest people with their environment? These are some of the questions that recurred in the context of a series of interdisciplinary, multi-locational tests on criteria and indicators for sustainable forest management, conducted by CIFOR in 1994-95.²

In this paper we report a pre-test recently conducted in four villages, among two ethnic groups in and around the Danau Sentarum Wildlife Reserve (DSWR) in West Kalimantan. We evaluate a method which we hope can help us to assess such issues more easily and reliably. After describing the method, we provide examples of the many kinds of analyses that can be made on the results. In the concluding section, we discuss questions and problems that remain for further research.

Method Used and Suggested

In the pre-test described here, we conducted a conventional Galileo™ study³ (Woelfel & Fink, 1980) as a possible means to assess three conditions identified in previous research as relevant in establishing people's roles in sustainable forest management: The presence or absence of a "conservation ethic", a feeling of close-

ness to the forest, and an intimate link between local culture and the forest.

The Galileo study begins with the identification of locally appropriate concepts pertaining to the domain of study (in this case, people-forest interactions). Because of our familiarity with the area, we knew the relevant concepts. We also included several others which we thought could help us in particular analytical questions we had. **Fish, wood, rattan, honey, garden, animal, food, earth/land/soil, water, I** (the respondent), male, female, village/home, and money fall into the first category. **Price/value, good, future, spirit, and fire** fall into the second.

Such locally relevant concepts can be obtained in an unfamiliar area by content analysis of open ended interviews on the topic of interest.⁴ These concepts are then paired in a questionnaire format in the local language (see Appendix A for an English translation of the form used in this study).

DSWR respondents were asked to use the distance between "black" and "white" (as they saw it in their own minds) as a measuring stick, in comparing each of the study concepts (paired on the form). Literate villagers filled in the forms themselves, once they understood what they were to do; illiterates were interviewed and asked each measurement. The process, with 20 concepts, typically took 20-30 minutes.

At DSWR, we selected four communities, two Iban and two Melayu, because of the differing systems of resource use we knew them to have. We

also tried to interview roughly equal numbers of male and female respondents in order to assess the magnitude of gender differences in perceptions of natural resources. Because of the small size of the communities, our goal was to interview every teenager and adult. There were very few refusals.

We used local people to conduct the interviews, under our supervision. Though both researchers and respondents found the task challenging, there seemed reasonably good satisfaction that the people understood what they were doing. Besides explaining the measurement concept (which was easier for the Melayu than for the Iban), it was necessary to reassure people in all communities that there was no "right" answer, that their own perceptions were the important thing. Many actually enjoyed the intellectual challenge of the task.

The data were entered by a locally hired research assistant, using the Galileo program⁵, during the fieldwork. Analysis took place in Bogor under the guidance of Woelfel (the principal developer of the software; Woelfel and Fink 1980; TerraVision 1995; Foldy & Woelfel 1992), but if the other authors had known how to use the program before going to the field, it would have been easy to do it there.

The results of this procedure made it possible to represent the respondents' attitudes and beliefs in a three dimensional graph or space. This space provides a precise and holistic picture of the respondents' beliefs and attitudes about forests. Concepts which go together are close together in this space, while those that don't go together are far apart. If people think the forest is good, for example, **forest** will lie close to **good** in the Galileo space. One advantage of this model is that dozens or even hundreds of attitudes and beliefs can be pictured simultaneously in a single picture, which makes it possible to see the interrelationships among the beliefs and attitudes. This in turn is important since changing one attitude or belief often changes others. If forest managers are more aware of such indirect consequences, their management of forests (insofar as this relates to human involvement in the forest) may be improved.

We discuss some of the results of this study below. In essence we are pleased with the method. People (both assessors and local people) seem able to do it, with reasonable amounts of effort. The results generally confirm our previous knowledge of people's views in the area. Data entry and analysis are not onerous.

In recent years, Terra has been developing several relevant new programs built on the idea of "neural networks" (e.g., CatPacTM, OresmeTM). These represent a type of artificial intelligence, which may allow us to get some of this same information more simply.

One program, called CatPac, can analyze text, in much the same way that the previously mentioned open-ended interviews could be analyzed, to identify frequencies and clustering of concepts which recur within that text. The important difference is that CatPac can do this (once the text is entered) in seconds, whereas the previous methods took days or weeks. With OresmeTM, we can ask it to tell us which concepts are "activated" (as a neuron in our brains would be) when a concept of interest is activated. This allows for an analysis of the way concepts are linked to each other in peoples' minds. OresmeTM can predict what other concepts will be brought to mind by the mention of any one or more concepts in the study.

A final component in this bundle of software which is of more general interest (beyond assessment *per se*) is the ASGTM (Automatic Strategy Generator) and its predecessor, the AMGTM (Automatic Message Generator). These identify which concepts should be emphasized, in an effort at planned change (such as encouraging a "conservation ethic" or encouraging people to consider forests in a more positive light). These concepts can then be used in extension or "advertising" to affect people's views of the forest. Insofar as their views reflect their behavior (Cary and Holmes 1982; Woelfel and Danes 1980; Woelfel *et al.* 1988a,b; Barnett & Woelfel forthcoming), such changes could have important impacts on forests.

In our upcoming Cameroon field test, we hope to do brief, open-ended interviews with various stakeholders, and then subject these interviews to CatPac (1991, 1995, Oresme 1991) and ASG (Woelfel 1992) analyses. At the same time, we will be preparing to conduct the Galileo process (described for Kalimantan). We hope then to compare the short (CatPac) version and the longer, more accurate, Galileo version, to see if there are important differences, from the standpoint of assessment. If the CatPac results are as good, or nearly as good as the full fledged Galileo, this approach would be simpler, cheaper, and therefore preferable.

We said at the beginning that we wanted to make assessments of three kinds of conditions (a "conservation ethic", a feeling of proximity to the forest, and a forest-culture link). Although these have been identified as related to sustainable forest management, the exact causal links are not entirely clear. Nor are the values that would indicate the degree to which these conditions apply. One of our goals, as we try these methods in a variety of contexts, is to gain a better understanding of the range of *variation* (in people's feelings of closeness to the forest, for instance) and how this correlates with forest conditions and forest sustainability. At this point, because we only have a very few cases to compare, we cannot say much about

specifics like threshold values; but we hope that as we apply these methods in various locales, we can build up a knowledge base which will simplify future assessment tasks.

Results from West Kalimantan

The most fundamental output of a Galileo is what is called a means matrix. In the means matrix, the mean response (from all the respondents) is computed for every pair of concepts. Put another way, the means matrix reflects the mean distance perceived by the community in question. The program provides extensive descriptive and inferential statistics, including standard deviations, standard errors, indices of skewness and kurtosis, sample size, maximum and minimum values, and other, more global statistics; but for our purposes here, we are satisfied with fairly simple analyses. For these purposes it will suffice to note that the statistical precision of the measures in this study was excellent, with mean distances ranging from about 5% for the full sample (277 cases⁶) to about 6-9% within gender segments (about 100 females and 170 males), and from about 10-15% within each village (roughly 70 cases per village).

One of the strengths of the Galileo is the multitude of ways in which one can look at the data produced. We have selected three ways of analyzing the data.

First we provide perceptual maps or plots for each community, through a gender lens. We then look at the ethnic differences in perception; and we conclude with a discussion of three concepts we view as related to sustainability (**good**, **future**, and **forest**).

Cognitive Maps in Four Communities and for DSWR as a Whole

Figures 1-5 present the Galileo plots⁷ showing a cognitive map for the total dataset (DSWR, Figure 1), and four maps disaggregated by gender (Figures 2 and 3) and by ethnic group (Figures 4 and 5). Although the plots can only represent three of the 20 dimensions in this multidimensional space (much as a photograph only presents us with two of the three dimensions our eyes normally see)⁸, they do provide an appealing visual representation of the (approximate) thinking of a group of people about forests and other natural resources.

Looking at Figure 1, we see the concepts of **spirit** and **fire** as rather peripheral. Our reason for including **spirit** in the list of concepts was not because it came to our minds as a locally appropriate concept in this cognitive domain, but rather because we wanted to examine the DSWR situation (a comparatively sustainable one) in light of the considerable literature on the

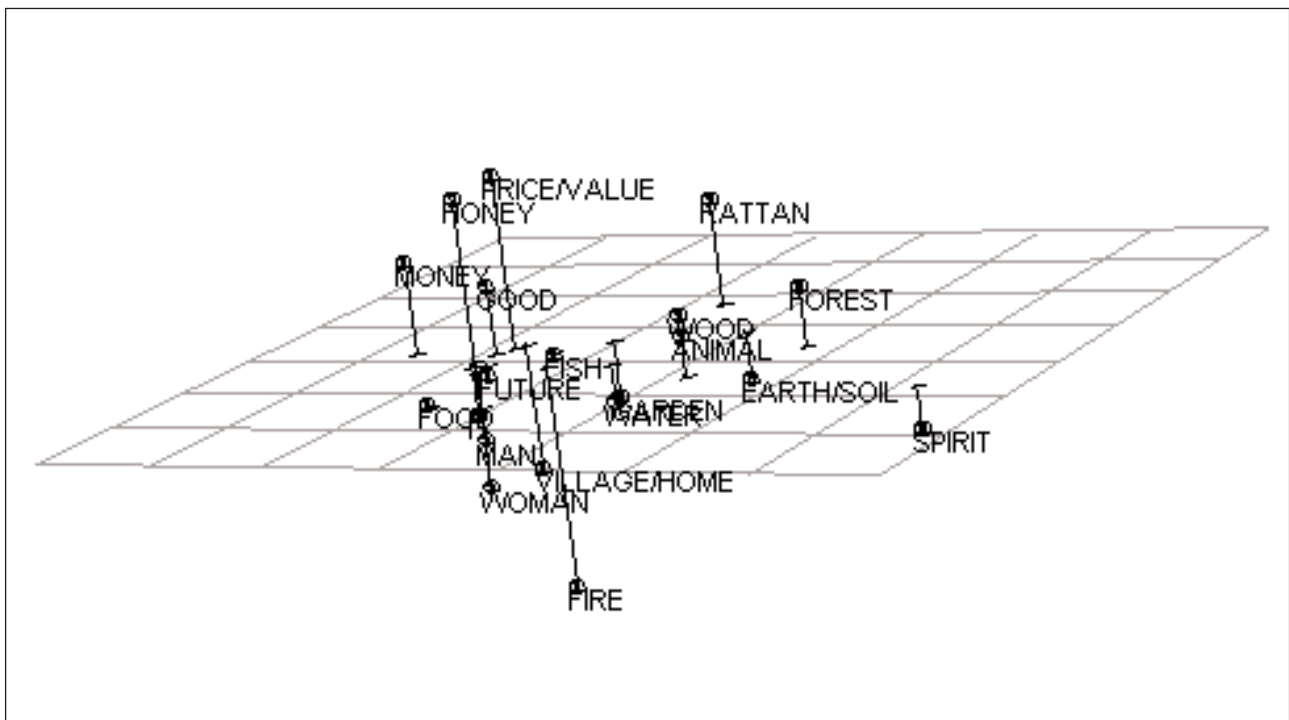


Figure 1. Cognitive Map of DSWR Dataset

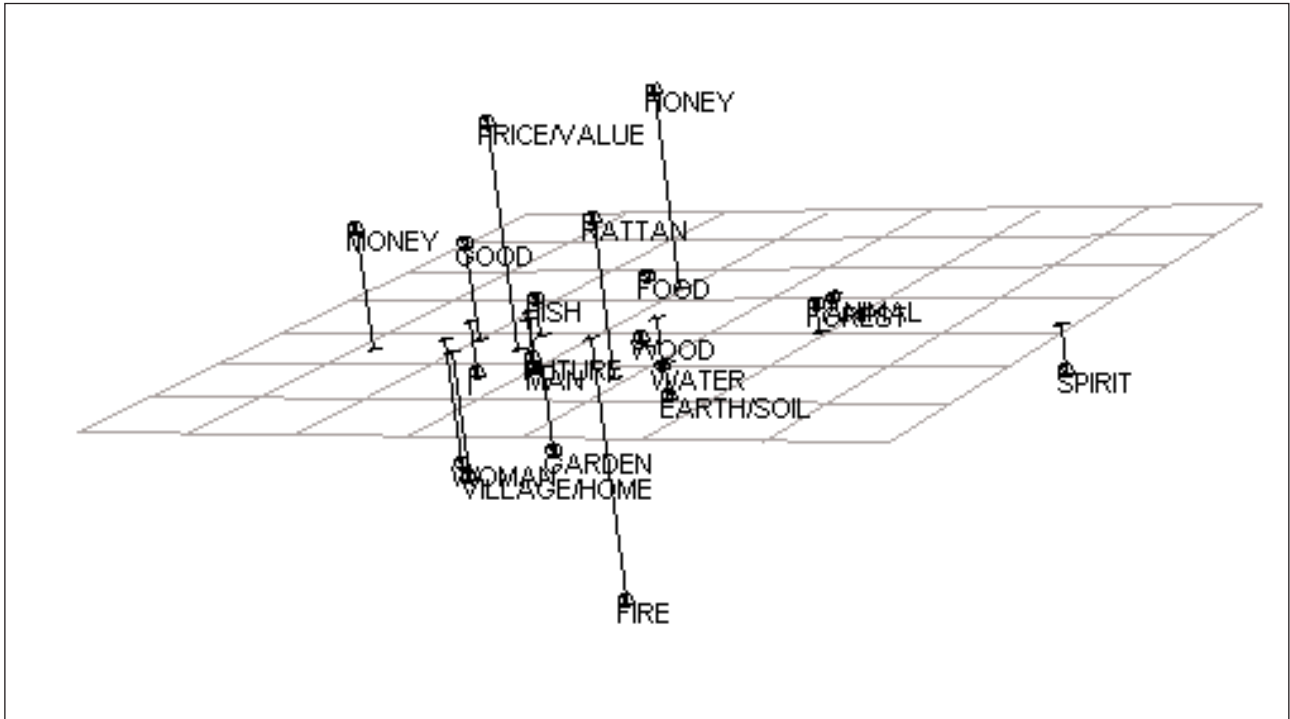


Figure 2. Cognitive Map of Women in DSWR Dataset

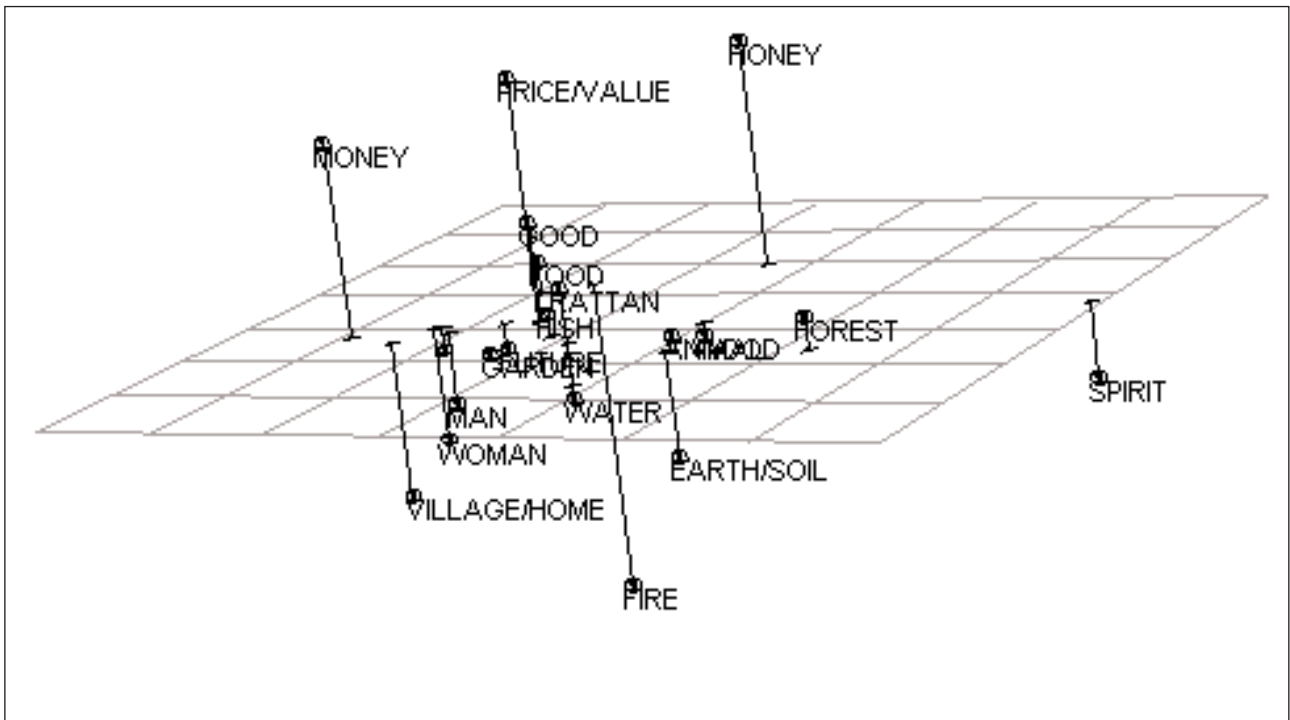


Figure 3. Cognitive Map of Men in DSWR Dataset

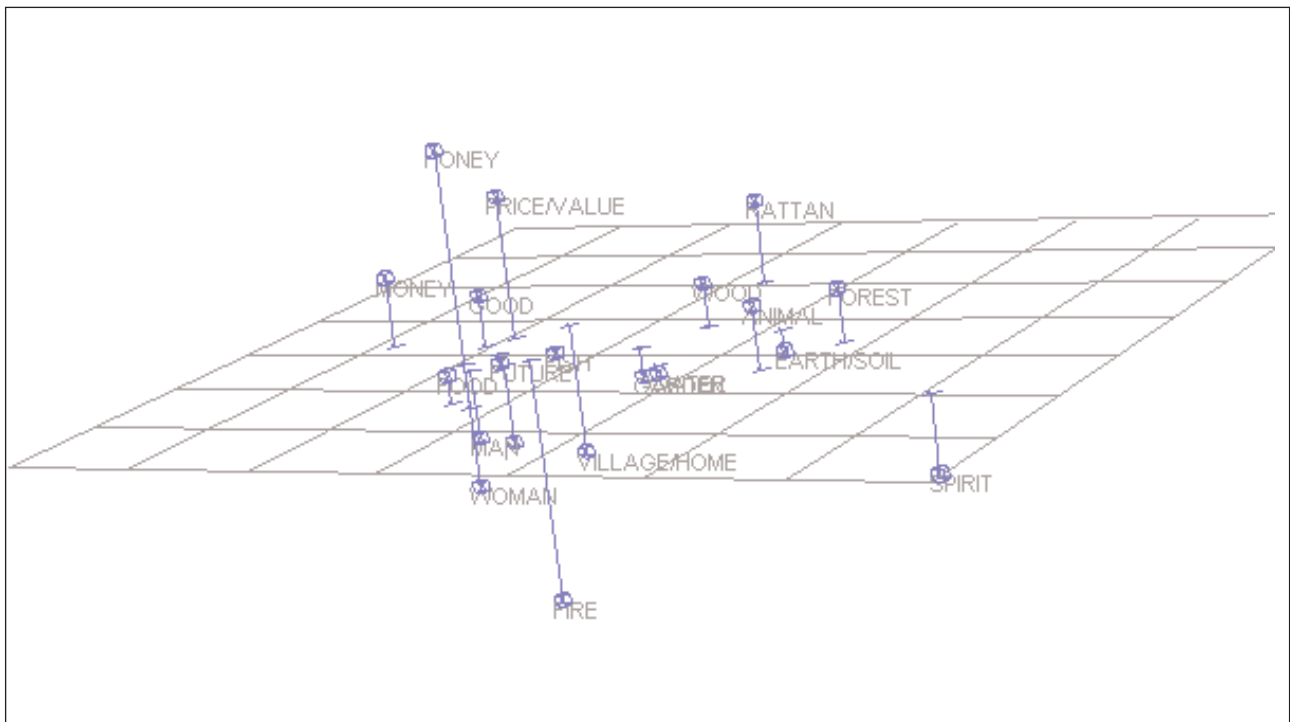


Figure 4. Cognitive Map of Iban in DSWR Dataset

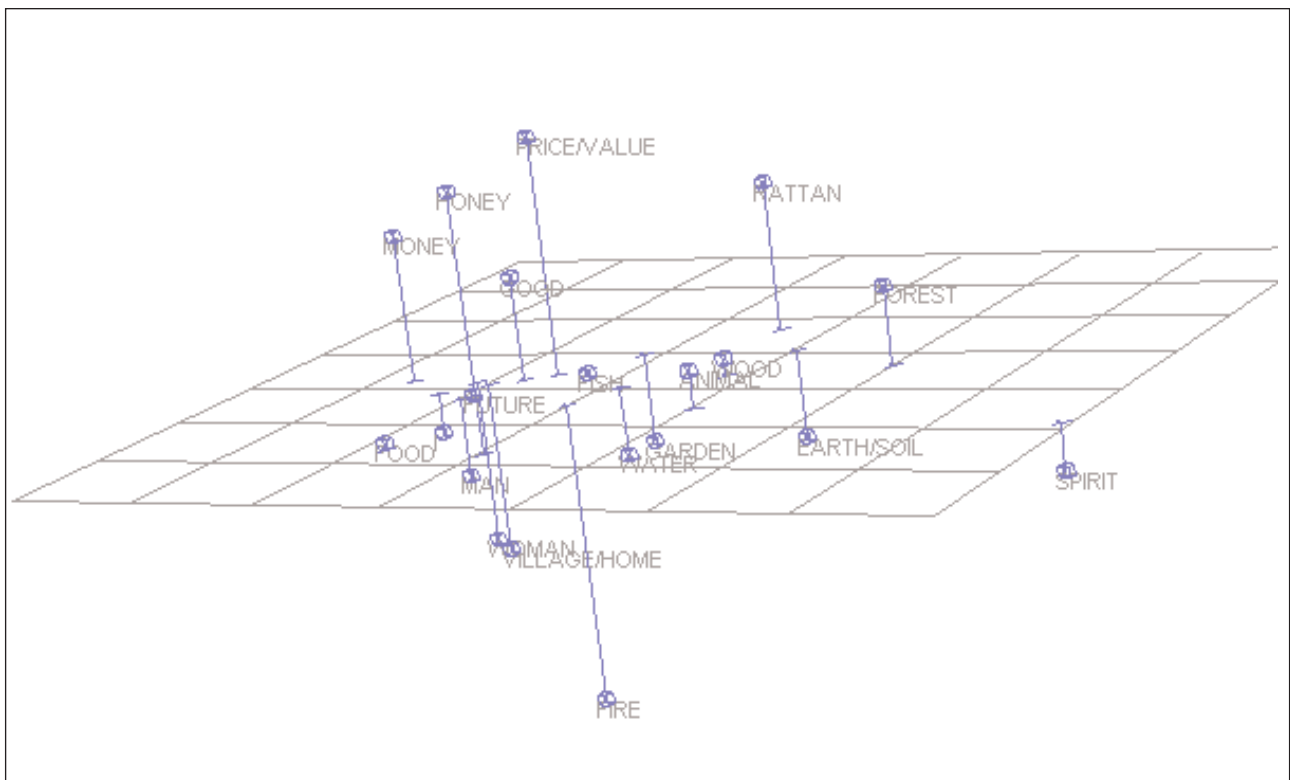


Figure 5. Cognitive Map of Melayu in DSWR Dataset

close spiritual connection between forest peoples and their environment (e.g., the collections by Banuri and Marglin 1993; Kemf 1993). Others suggest that women are particularly environmentally sensitive (e.g., Diamond and Orenstein 1990; Gomes and Kanner 1995; Roszak 1995). These data do not support such contentions for the West Kalimantan context. Among these people, **spirit** is the most distant from the other concepts, and it is particularly distant from **woman**.

We would add however that the terms used for **spirit** in West Kalimantan are not sufficient to represent all the connotations that go with the English term, "spirituality". Additionally the Iban concept of "spirit" includes both a positive and a negative element; among the Melayu "spirits" seem invariably bad. In fact, there is a wealth of qualitative data suggesting a significant spiritual link, in the western sense, between Bornean peoples and their environment.⁹

Fire, also distant from other concepts, was likewise not a concept that emerged from our knowledge of people's views of the people-forest link in Kalimantan. However, the Conservation Project, with whom we collaborated during data collection, was interested in this issue, since fire is perceived as a significant threat

to DSWR's unique the ecosystem. The project wanted to know how people perceived fire in relation to the other concepts we were examining.

Rattan and **honey** were selected as relevant for both ethnic groups. For the Iban these products are only two of a vast repertoire of regularly gathered non timber forest products; for the Melayu they are the two most important. In the Melayu context, these products have also been the focus of Conservation Project activities to increase production and local incomes. The Kelayang Iban have also long been involved in rattan collection and sale to timber companies and, more recently, processing of handicrafts for sale to the Conservation project. Note the closer distance between **honey** and **money** among the Melayu for whom honey collection can constitute a major income source at certain times of the year (Figure 5).

Another interesting feature of these cognitive maps is the fairly uniform closeness with which **man** and **woman** are perceived. They are slightly closer among the Iban than among the Melayu, which again fits with our expectations. No matter how we cut the pie, men and women seem to be perceived as much closer than they typically are in American studies of this kind

Table 1. DSWR Men's and Women's Perceptions of the Distance between **Forest** and Other Study Concepts

	All Female	All Male
FISH	3.50	3.81
WOOD	1.75	2.17
RATTAN	2.42	2.58
HONEY	2.96	3.24
GARDEN	4.12	3.06
PRICE/VALUE	6.09	5.36
GOOD	4.22	3.94
FUTURE	4.45	4.69
SPIRIT	4.05	4.54
ANIMAL	2.29	2.44
FOOD	6.48	5.10
EARTH/SOIL	1.65	1.72
WATER	2.78	3.10
I	4.67	4.71
MAN	4.96	4.76
WOMAN	5.85	5.21
VILLAGE/HOME	5.95	5.24
FIRE	6.96	5.36

Table 2. Men’s and Women’s Perceptions of the Distance between **Forest** and Other Study Concepts

Concepts	Ng. Kedebu’		Danau Seluang		Kelayang		Wong Garai	
	Female	Male	Female	Male	Female	Male	Female	Male
FISH	3.73	3.04	3.72	3.71	4.08	4.06	3.93	3.64
WOOD	2.00	1.32	1.67	1.73	1.73	1.84	2.64	2.32
RATTAN	1.77	2.35	2.06	2.27	2.03	3.13	3.68	2.86
HONEY	1.88	2.35	3.39	3.12	3.89	3.47	4.39	3.32
GARDEN	2.23	2.81	4.06	5.36	1.76	1.69	3.18	2.81
PRICE/VALUE	5.19	5.33	6.39	6.82	5.97	5.59	4.86	5.36
GOOD	3.96	3.11	3.28	4.48	4.95	3.59	4.37	5.00
FUTURE	5.42	3.89	3.39	4.45	5.35	4.19	4.86	5.14
SPIRIT	3.85	3.26	4.61	4.29	3.19	3.28	5.15	4.45
ANIMAL	1.62	1.48	2.33	2.15	1.57	1.91	3.30	3.59
FOOD	5.50	6.33	6.50	7.18	4.32	4.34	3.78	5.05
EARTH/SOIL	1.38	1.07	1.39	1.64	1.30	1.22	2.25	2.36
WATER	2.96	2.48	2.83	2.59	3.41	2.91	3.39	3.59
I	4.42	4.04	4.89	5.22	3.86	2.81	4.86	4.18
MAN	4.81	4.07	4.28	5.04	4.65	3.66	5.04	5.86
WOMAN	5.19	5.44	5.22	5.73	4.65	3.97	5.21	6.64
VILLAGE/HOME	5.65	5.48	4.67	5.92	4.84	4.34	5.21	6.59
FIRE	4.04	6.15	6.94	6.98	3.81	3.53	5.54	7.00

(Newton 1977; Newton, Buck and Woelfel 1984). The comparative lack of gender stereotyping in some Borneo groups has been documented in other studies (see Davison and Sutlive 1991; Dove 1980; Drake 1991; Mashman 1991, for gender studies among Ibanic groups)¹⁰. Our data seem to support these previous conclusions.

In including the concept, **price/value**, we were trying to get at the idea of "value" as something abstract and related to values (in a non-economic sense), but the local terms (*rega* in Melayu and *berega* in Iban) always implied both. This is consistent with previous analyses of other Bornean groups (cf. Colfer with Peluso and Chin 1997). Only the Iban analysis (Figure 4) shows this concept to be relatively integrated into the other concepts. This may reflect their higher sociocultural or philosophical valuation of their natural environment than the Melayu, which would be consistent with our impressions as well. The Iban and other Dayaks, though scorned at the national level as "backward", exhibit a marked self-confidence and commitment to their own way of life which does not characterize the Melayu. Although cash is much more important in Melayu daily

life, it may be that these Iban, like Kenyah Dayaks, consider money to be of less value than locally produced goods (because money quickly disappears, whereas rice, for instance, can be stored and more easily kept for emergency needs)

Whereas the plots provide the best holistic view of the data, the most accurate reflection of people's estimates of distance is the actual means. Tables 1 and 2 show the distances men and women perceive various concepts to be from one of our central concepts, **forest**. As mentioned previously, these means are accurate to about $\pm 5\%$ for the total sample, $\pm 6-8\%$ for the gender segments, and $\pm 10-15\%$ within each village. Obviously one could make a very large number of tables and figures, depending on which concepts were of interest for any particular research problem. Table 1 shows results from the total data set (which we call "DSWR"), reflecting the distances estimated by all the respondents in all four communities. Table 2 deals with each of the four villages studied, individually.

For DSWR as a whole, the concepts perceived as closest to forest are **earth/soil**, **wood** (predictably), and **animals**. **Rattan**, **water** and **honey** are also fairly

Table 3. DSWR Men's and Women's Perceptions of the Distance between **Money** and Other Study Concepts

	All Female	All Male
FISH	3.17	3.21
WOOD	4.74	3.93
RATTAN	4.51	3.56
HONEY	3.69	3.36
GARDEN	3.43	4.00
PRICE/VALUE	2.85	3.24
GOOD	3.62	3.18
FUTURE	4.01	3.52
SPIRIT	9.32	8.20
ANIMAL	5.58	6.01
FOOD	3.41	4.13
EARTH/SOIL	5.28	4.77
WATER	5.07	4.40
I	2.22	3.29
MAN	2.75	2.89
WOMAN	2.25	2.64
VILLAGE/HOME	3.46	2.99
FIRE	7.23	6.03

Table 4. Men’s and Women’s Perceptions of the Distance between **Money** and Other Study Concepts

Concepts	Ng. Kedebu’		Danau Seluang		Kelayang		Wong Garai	
	Female	Male	Female	Male	Female	Male	Female	Male
FISH	1.92	1.79	2.28	3.82	2.43	1.88	4.96	3.41
WOOD	3.48	4.14	2.78	4.73	3.89	2.91	5.07	5.50
RATTAN	2.65	3.65	3.06	4.65	3.11	2.88	4.74	5.18
HONEY	1.81	2.23	2.39	3.53	3.68	2.64	5.43	5.77
GARDEN	2.79	2.54	1.94	3.33	4.11	4.21	6.36	4.73
PRICE/VALUE	2.28	2.67	1.44	2.42	3.59	2.45	5.33	4.09
GOOD	2.64	2.07	1.67	4.10	2.76	2.12	4.64	4.41
FUTURE	3.19	3.76	1.67	3.50	3.59	4.33	5.07	5.50
SPIRIT	8.75	10.12	9.11	9.74	7.81	8.30	7.14	7.41
ANIMAL	6.85	4.36	4.00	5.55	5.78	5.03	6.54	7.05
FOOD	3.77	2.41	2.50	3.55	2.62	1.81	5.50	4.32
EARTH/SOIL	4.85	4.85	2.83	5.27	3.24	3.09	6.00	5.82
WATER	3.77	3.62	3.83	5.20	3.84	3.59	5.36	6.50
I	2.65	2.35	2.11	1.54	2.76	1.66	4.64	3.68
MAN	2.23	2.77	1.94	2.35	3.30	1.78	4.11	3.64
WOMAN	2.04	1.85	1.89	2.06	2.49	2.10	3.68	3.18
VILLAGE/HOME	2.85	2.85	3.06	3.67	2.43	1.55	3.07	3.73
FIRE	5.77	7.27	6.67	7.27	5.54	4.68	5.86	7.09

close. Women express the greatest distances between forest and **fire**, **food**, and **price/value**, with men also considering these as comparatively distant from **forest**. The distance of **price/value** from **forest** is interesting in light of international timber prices, and reflects a genuine difference between the views of locals and the views of outsiders. Both men and women consider **forest** to be closer to **man** than to **woman**, though the difference is not great.¹¹

Good, **future** and **forest** are concepts that we felt bore special significance for sustainability (see below). The distance between **forest** and these concepts falls in an intermediate range for both men and women. Men consider the forest to be slightly better than women do, and slightly less closely connected with the future. These data do not suggest that these people have a particularly close or positive feeling about the forest, despite their extreme dependence on it, considerable knowledge about it and continual interaction with it¹². From our general experience we know that forests also contain many dangers (dangerous or poisonous animals, opportunities for injury from falls, fast regrowth into places needed for other uses like housing and agriculture, malevolent spirits, etc.).

The concept, **money**, provides another lens for looking at perceptions (Tables 3 and 4). In Table 3, it is clear that the people of DSWR consider **money** to be more tightly integrated into this conceptual domain than is **forest**.¹³ Women consider **money** to be closer to people (**I**, **man**, **woman**) than do men. The only concept from which **money** is truly distant is **spirit**, and to a lesser extent, **fire**.

Careful inspection of these tables (1- 4) can yield an abundant harvest of insights into the world views found in these four villages, but this brief working paper is not the place to make such a thorough analysis.

Ethnic Differences in Conceptual Distances

As mentioned before, there are two main ethnic groups in the DSWR area, the Melayu and the Iban. Both groups have lived in the area for a long time, and rely heavily on natural resources for their subsistence, though stereotypically they use very different habitats. The Iban of Wong Garai reflect a habitat use that is closer to the stereotype than do the people of Kelayang, who have more Melayu neighbours and for whom, for

Table 5. DSWR Men's and Women's Perceptions of the Distance between Forest and Other Study Concepts

	Iban		Melayu	
	Forest	Money	Forest	Money
FISH	3.96	3.06	3.86	2.61
WOOD	2.08	4.20	1.69	3.88
RATTAN	2.60	3.84	2.06	3.55
HONEY	3.79	4.19	2.94	2.65
GARDEN	2.27	4.79	3.63	2.85
PRICE/VALUE	5.49	3.75	5.72	2.39
GOOD	4.50	3.38	4.10	2.77
FUTURE	4.87	4.53	4.27	3.44
SPIRIT	3.89	7.82	4.47	8.87
ANIMAL	2.43	5.97	2.29	4.99
FOOD	4.35	3.40	6.39	3.16
EARTH/SOIL	1.69	4.31	1.62	4.64
WATER	3.30	4.63	2.96	4.23
I	3.89	3.10	4.93	2.19
MAN	4.70	3.18	4.95	2.42
WOMAN	4.97	2.81	5.65	2.17
VILLAGE/HOME	5.14	2.60	5.46	3.21
FIRE	4.72	5.66	6.08	6.82

instance, fishing is more important than among the Iban of Wong Garai. Similarly, the Melayu of Danau Seluang have more interaction with Iban than do those of Ng. Kedebu'. Previous experience with cognitive mapping in Sumatra (Colfer, Newton and Herman 1989), as well as our qualitative evaluation of differences in values and lifestyles, suggested that ethnic differences might be quite significant.

Table 5 summarizes the overall ethnic differences, using **forest** and **money** as key concepts. Considering the differences in the lifestyles of the two groups, there are remarkable similarities, along with some not too surprising differences.¹⁴ For instance, the Iban live on dry land and practice swidden agriculture. Their agricultural endeavors, represented in English by **garden**,¹⁵ are intimately connected with the forest (since forest is regularly cut to make fields; and forest often surround fields). Note the markedly closer connection for the Iban between **forest** and **food**.

The Melayu, people who live by fishing in and around the forest, place **water** slightly closer to **forest** than do the Iban (who recognize the importance of water for fish and for their agricultural endeavors). Although the Melayu use far fewer forest products generally than do

the Iban, they concentrate their forest product collection on three items, wood, rattan and honey. Thus the closer connection between **wood** and **forest**, **rattan** and **forest**, and **honey** and **forest**, for the Melayu, *vis-à-vis* the Iban.

Not surprisingly the Melayu consider **money** to be closer, generally, to the other concepts than do the Iban (Table 5). Although both groups use money extensively, the Melayu rely on it for daily life (see also Table 4). Iban men, on the other hand, go away to Malaysia to earn money with which they then buy consumer goods. Iban daily needs are largely supplied by subsistence activities (agroforestry, agriculture, hunting, fishing, etc.). Kelayang¹⁶ is located closer to Melayu communities than is Wong Garai. It is not surprising that with increasing geographical distance from the Melayu and other marketing outlets, the cognitive distance between **money** and the other concepts would increase.

Galileo Concepts Related Directly to the Issue of Sustainability

Having mentioned the concepts, **good**, **future** and **forest** above, as possibly important ones to consider in assessing social C&I for sustainable forest management,

Table 6. DSWR Cognitive Distances among Selected Concepts for Sustainability.

	Good	Future	Forest
FISH	3.41	5.20	3.90
WOOD	3.73	4.97	1.86
RATTAN	3.38	4.96	2.30
HONEY	2.96	4.93	3.32
GARDEN	3.40	4.80	3.03
PRICE/VALUE	3.25	4.73	5.62
SPIRIT	7.63	7.83	4.22
ANIMAL	5.60	5.35	2.35
FOOD	2.97	3.82	5.49
EARTH/SOIL	3.64	4.03	1.65
WATER	3.56	3.86	3.11
I	2.95	3.23	4.47
MAN	3.04	3.45	4.84
WOMAN	3.16	3.83	5.35
VILLAGE/HOME	3.42	4.15	5.32
FIRE	5.02	5.30	5.48
MONEY	3.04	3.92	6.26

Table 7. Cognitive Distances among Selected Concepts for Sustainability

Concepts	Ng. Kedebu'			Danau Seluang			Kelayang			Wong Garai		
	Good	Future	Forest	Good	Future	Forest	Good	Future	Forest	Good	Future	Forest
FISH	2.95	5.15	3.98	3.83	5.27	3.71	2.77	4.93	4.07	4.52	5.58	3.8
WOOD	3.34	4.50	1.66	3.60	4.65	1.71	3.36	5.34	1.79	5.10	5.68	2.50
RATTAN	2.48	5.43	1.93	3.88	4.51	2.21	2.93	4.23	2.09	4.80	5.86	3.32
HONEY	2.44	5.16	2.74	2.88	3.97	3.19	2.41	4.76	3.70	4.70	6.16	3.92
GARDEN	2.45	4.17	2.49	4.06	4.68	5.01	2.94	4.80	1.74	4.74	5.98	3.02
PRICE/VALUE	2.55	4.00	4.90	3.25	5.28	6.71	3.04	4.33	5.79	4.68	5.76	5.08
SPIRIT	7.37	7.85	4.55	8.48	8.87	4.38	7.67	7.69	3.23	6.80	6.54	4.84
ANIMAL	5.14	5.17	2.36	5.42	4.43	2.20	5.66	6.29	1.73	6.52	5.62	3.43
FOOD	2.82	2.95	5.86	3.07	2.86	7.00	2.35	5.06	4.36	3.98	4.82	4.35
EARTH/ SOIL	3.78	3.34	1.66	3.53	3.07	1.57	3.57	5.09	1.26	3.66	5.00	2.30
WATER	3.56	3.80	3.22	3.39	2.61	2.65	3.30	4.77	3.17	4.16	4.42	3.48
I	2.52	3.15	4.76	3.10	2.60	5.13	2.21	3.11	3.41	4.46	4.42	4.56
MAN	3.08	3.71	5.05	3.25	2.37	4.84	1.71	3.39	4.20	4.54	4.59	5.40
WOMAN	3.27	4.17	5.70	3.58	2.88	5.59	1.84	3.37	4.34	4.26	5.22	5.84
VILLAGE/ HOME	3.71	4.06	5.34	3.81	3.26	5.59	1.97	4.33	4.66	4.42	5.26	5.82
FIRE	5.05	5.59	5.31	6.14	5.12	6.97	3.34	4.80	3.69	5.78	5.76	6.18
MONEY	2.17	3.79	5.59	3.46	3.03	6.79	2.56	4.03	6.04	4.54	5.27	6.9

we have prepared two tables (6 and 7) which examine the distances from those concepts to others in the data sets. Table 6 deals with the DSWR data set.

Spirit, interestingly is seen as comparatively close to **forest**, suggesting a possible mechanism for protecting the forest by encouraging belief in spirits. Iban views of spirits are decidedly ambivalent, including fear; in the Melayu case, spirits are considered to be bad. In Wong Garai, the Iban deal with spirits most safely by exhibiting humility in speech and action. Wanton destruction, boasting of fishing catches, etc. are not done where spirits might see or hear (particularly in the forest). This approach seems to have an obvious relevance for resource use and sustainability.

The distances from **price/value** and from **money** to **forest** are considerably larger than to **future**, and still larger than that to **good**. This could suggest the absence of what is considered a “conservation ethic” in the West; though Colfer, Wadley and Harwell have all noted features of the people’s world view that suggest a concern about the land and its future capability to produce.¹⁷ We remain uncertain whether this problem may be with the concept of a “conservation ethic”, in the first place. Or perhaps the inclusion of the concepts, “love” and “fear”, could provide a useful distance in trying to place different stakeholder groups on some sort of “conservation ethic” continuum.

The small distance between various forest products/production systems (**wood, rattan, honey, animals, fish, garden**) and **forest** is in marked distinction from the distance between those products and **future**. This may reflect a feeling that the future does not lie with exploitation of natural resources, that their future lies elsewhere or with other economic endeavours---despite the comparative proximity of **good** to these products.

Turning to Table 7 which describes the world view in each village, we find a greater distance between **forest** and **food**, for the Melayu as compared to the Iban. The latter obtain virtually all their food from the forest, whereas Melayu food either comes from the lakes and streams or is bought. **Woman** in all communities is perceived as farther from the **forest** than is **man**.¹⁸

Fire, one of the concepts which was of particular interest to the Conservation Project at DSWR, was fairly far from **good** and from **forest** on all sites. This is interesting because of the importance of fire in the Iban system of swidden cultivation; and in fish processing among the Melayu. People who considered **fire** close to **woman** or to **good**, for instance, typically mentioned its role in cooking food. There was considerably more burned forest around Danau Seluang than around Ng. Kedebu’. These data (and qualitative interviews as well) do not support the project’s hypothesis that fires

were more common in the Danau Seluang area because of different perceptions about fire. Both communities consider **fire** to be distant from **forest** and from **good**---though the people of Ng. Kedebu’ see **fire** and **future** as more distant than do residents of Danau Seluang (which is near the edge of the reserve, in an area that has been more extensively logged and where losses from fire have been greater).

Conclusions and Recommendations for Future Use

Although we are pleased with the results of our pretest and plan to revise and continue testing the method elsewhere, some questions have come up in the course of the conduct and analysis of the study.

First, we wonder if, even with a standard 10 unit measuring rod (the “black-white” distance specified for all respondents), the distances will be entirely comparable. Note the higher distances attributed generally in Wong Garai compared to Kelayang (the two Iban communities, see Table 7). We have had a similar experience in East Kalimantan, where we found the people of Long Ampung consistently to estimate higher distances than those in Long Segar (Colfer 1982). Interestingly in that study also the community with the larger distances was also the more remote. This issue has implications for the process of developing threshold values for making comparable cross site assessments.¹⁹

Second, we suspect we will have to work toward identifying a core set of concepts that are valid or important in all humid tropical forests (or perhaps even in all forests), with empty “slots” in the questionnaire for special, locally determined concepts. However, this will have to be assessed after more studies have been done over the course of the coming year. One of our concerns is the different meanings of a concept in different locations and among different peoples. The different meanings of what we have translated as “garden” between the Iban (*umai*) and the Melayu (*tayak*) was already mentioned. Another locally important difference relates to the importance among the Iban of varying stages of forest regrowth (one of which, for instance, *kampung*, is likely to be much closer to *spirit* than the concept we selected, *babas*). A core set, if it could be developed, would simplify the assessment process considerably. Without it, cross-site comparisons become more difficult.

Third, we will need to investigate relevant concepts in a variety of contexts, which lie along a continuum of sustainable forest management from both human and biophysical standpoints. DSWR represents a context in which the forests are and have been fairly sustainably

managed. We hope to be able to gather comparable data from more diverse stakeholders in Cameroon, Brazil, East Kalimantan, and ideally from temperate forests as well (such as the United States or Europe, see Richardson *et al.* 1996 or Cary 1995, for related studies). Until we have this range of variation in sustainability, we will not be able to analyze fully the implications of the "conservation ethic", emotional proximity to the forest, and the forest-culture link for sustainability.

In this short paper, we have not attempted a thorough analysis of the data coming from our pre-test. We have rather selected illustrative analyses which we considered possibly useful in assessing the three questions mentioned above. We wanted primarily to examine the method for its cost effectiveness, simplicity and reliability. We found the questionnaires

easier for our locally hired collaborators to administer than we anticipated, thus making the cost less than if we had had to do it ourselves. We are satisfied that the results reflect reasonably well the world views of the people, as determined by Colfer's, Wadley's, and Harwell's previous experience there. We feel there remains room for refinement, on the issue of a "conservation ethic".

As mentioned earlier, we would like to make the process still simpler and less expensive if we can do so without excessively sacrificing reliability. We remain uncertain what kinds of responses we will get among populations living in contexts marked by different level of sustainability. This information we can only get by further literature searches and by continued testing, as currently planned.

END NOTES

1. Colfer is a Principal Scientist at CIFOR and Social Science Coordinator for the project "Assessing Sustainable Forest Management: Testing Criteria and Indicators." She lived at the research site for 15 months in 1992-93. Joseph Woelfel is Professor of Communication at the University at Buffalo, in New York, and the principal originator of the Galileo methods discussed in this paper. Reed L. Wadley is a doctoral candidate in anthropology at Arizona State University, who did more than two years of fieldwork in Wong Garai (1992-1994). Emily Harwell is a doctoral candidate at Yale University's School of Forestry and Environmental Studies, doing long term research in Kelayang, West Kalimantan. Galileo, CatPac, Oresme, and ASG are copyrights of The Galileo Company. TerraVision is copyright J. K. Woelfel, J. D. Woelfel and S. Danielsen.
2. These tests were part of a CIFOR project entitled "Assessing Sustainable Forest Management: Testing Criteria and Indicators", led by Dr. Ravi Prabhu. The particular activities reported in this paper were undertaken with sponsorship from USAID, and in collaboration with the Indonesian Government (PHPA), Wetlands International - Indonesia Programme, and with the informal cooperation of the ODA Sustainable Forest Management Project in West Kalimantan. We thank all these institutions for their substantive contributions and cooperation in all our efforts. Most importantly, we thank the people of the Danau Sentarum Wildlife Reserve and its surroundings, for their patience and kindness in answering our many questions.
3. Traditionally, a Galileo study requires respondents to report their perceptions of the differences (often called "distances") among a set of concepts which are central to the definition of some topic, e.g., **forests**. These estimated dissimilarities are averaged across all respondents in any segment and projected onto orthogonal coordinate axes to produce a perceptual map or *space*. Within this space, distances are predictive of attitudes, beliefs and behaviors. Technically, 277 respondents estimated the pairwise dissimilarities among a set of terms including forest and 19 other concepts identified in previous analyses as pertinent to the perception of forests in Kalimantan villages. The resulting square mean dissimilarities matrix was then analyzed in a number of ways, including perceptual maps (multidimensional scaling or MDS), charts, graphs, tables and advanced artificial neural networks (ANN's). Perceptual maps were made using GalileoTM software, which produces very precise representations of the dissimilarities in graphic form, and which allows transformations (rotations and translations) to common orientations for easy comparisons of data over time and across subsamples. Previous research has shown Galileo to be an appropriate model when

- holistic models of cognitive structure and processes are required, when precise results are desirable, when a standard metric needs to be maintained across time or subsamples, as when time-ordered maps are needed, or when maps are to be compared from sample to sample, and when the concepts to be mapped are known. Galileo modeling may be less appropriate when investigators are uncertain as to what concepts occur in the cognitive model, or when light respondent burdens are crucial, there is no need to maintain an invariant metric over time and across samples, and precise results are not important (Woelfel & Barnett 1982; Woelfel *et al.*, 1986; Cary *et al.*, 1989; Woelfel *et al.*, 1989; Woelfel & Barnett 1992). When less is known about the concepts that need to be included, as is the case in preliminary studies, similar results can be obtained from CatPac, a self-organizing neural network which reads text and uncovers the main underlying concepts. CatPAac makes it possible to work from in-depth interviews rather than quantitative scales and derive similar results (Cary, 1995).
4. CatPac (described below) is a computer program which can perform this function quickly and easily from text.
 5. Version 3.0, Terra Research & Computing Co., 1995.
 6. Sample sizes are given approximately because overall sample size varies slightly from item to item. Complete statistics are available from the authors.
 7. Plots were made with TerraVisionTM, an interactive computer graphics program for perceptual mapping. (Terra Research & Computing 1995).
 8. In this case, the probability that the concept will be in its correct position *vis-à-vis* other concepts on the map is roughly 75%---a high figure, because of the high degree of agreement among respondents at DSWR about the distances among concepts.
 9. cf. Davison and Sutlive 1993; Howell 1984; Roseman 1991; Colfer, with Peluso and Chin 1997; observations during the June fieldwork of Iban ceremonies that “feed the spirits”, as part of the rice growing agricultural cycle; and more.
 10. See Colfer 1981, 1982, 1983, 1985a, 1985b, 1991, on the Kenyah; Sutlive and Appell, eds. 1991, for a thorough coverage of the issue; or Tsing 1993, for an unusual approach..
 11. Colfer found similar results among the Kenyah of two locations in East Kalimantan in 1980 (Colfer 1982).
 12. In the 1980 study of perceptions of forests in East Kalimantan, **forest** and **good** were considered quite close among both adults and young people in the remote Long Ampung; a little more distant among adults in Long Segar (a resettlement village closer to “civilization”), and still more distant among Long Segar’s young people (Colfer 1982).
 13. Table 6 shows the substantial distance between **forest** and **money**. That **forest** and **money** are not compared on this table is an artifact of our analysis process. We also conducted an analysis which used these results to predict the outcome of a vote where people had to choose between **money** and **forest**. **Money** won by a landslide.
 14. In the Sumatra case mentioned above, one ethnic group was indigenous and one in-migrants from a very different environment and culture.
 15. ‘Garden’ is not a good translation for *umai*, the Iban word used in the form. However, because the two groups have such different kinds of agriculture, and we wanted to compare the findings, we have used one English translation. *Umai* would be more properly defined as “field”.
 16. Pseudonyms are used for individual villages, in order to protect their privacy.
 17. Wadley notes that Wong Garai men make considerable money logging in Sarawak, and suggests, based on these data, that the forests at home may be considered more valuable as they are than are forests elsewhere.
 18. This was also true in the 1980 East Kalimantan study mentioned above (Colfer 1982). From simple interest, we performed an Automatic Message Generator (AMG) analysis on these data, for possible use in extension or awareness programs to encourage people to use the forest more sustainably. This software identifies the concepts with the most potential for moving **forest** closer to **me**. These concepts are located between **forest** and **me** in the cognitive space. The two top contenders were three-concept messages, consisting of **fish**, **honey**, and **woman**; and **honey**, **woman**, and **village/home**. A message which links forest to these concepts is likely to result

in local people's feeling closer to the forest and, presumably, behaving more sustainably towards it. Either of these 3-concept combinations had the potential to remove all but 5% of the distance remaining between **forest** and **me**.

19. One common practice of Galileo researchers which might alleviate this difficulty is to choose two concepts from within the domain as the criterion

pair. Several researchers (Woelfel & Fink 1980) have suggested that this might provide a more accurate model, since the measuring rod does not have to be "transported" such large psychological distance in order to be compared with the distances in the domain. A second advantage is that the internal criterion distance can be used to rescale the data after the fact, should differences in scale size appear.

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Appendix A - Typical Galileo Questionnaire, Using the Concepts from DSWR

Instructions

Please estimate how different or "far apart" each of the following words or phrases is from each of the others. The more different, or further apart they seem to be, the larger the number you should write. To help you know what size number to write, remember black and white are 10 units apart.

If two words or phrases are not different at all, please write zero (0). If you have no idea, just leave the space blank.

Thank you very much for your help.

black and white				
COL. -----				
0102	9-17	FISH	and WOOD	_____
0103	18-26	FISH	and RATTAN	_____
0104	27-35	FISH	and HONEY	_____
0105	36-44	FISH	and GARDEN	_____
0106	45-53	FISH	and PRICE/VALUE	_____
0107	54-62	FISH	and GOOD	_____
0108	63-71	FISH	and FUTURE	_____
0109	72-80	FISH	and SPIRIT	_____

black and white				
COL. -----				
0110	9-17	FISH	and ANIMAL	_____
0111	18-26	FISH	and FOOD	_____
0112	27-35	FISH	and FOREST	_____
0113	36-44	FISH	and EARTH/SOIL	_____
0114	45-53	FISH	and WATER	_____
0115	54-62	FISH	and I	_____
0116	63-71	FISH	and MAN	_____
0117	72-80	FISH	and WOMAN	_____

black and white				
COL. -----				
0118	9-17	FISH	and VILLAGE/HOME	_____
0119	18-26	FISH	and FIRE	_____
0120	27-35	FISH	and MONEY	_____
0203	36-44	WOOD	and RATTAN	_____
0204	45-53	WOOD	and HONEY	_____
0205	54-62	WOOD	and GARDEN	_____
0206	63-71	WOOD	and PRICE/VALUE	_____
0207	72-80	WOOD	and GOOD	_____

black and white

COL. -----

0208	9-17	WOOD	and FUTURE	_____
0209	18-26	WOOD	and SPIRIT	_____
0210	27-35	WOOD	and ANIMAL	_____
0211	36-44	WOOD	and FOOD	_____
0212	45-53	WOOD	and FOREST	_____
0213	54-62	WOOD	and EARTH/SOIL	_____
0214	63-71	WOOD	and WATER	_____
0215	72-80	WOOD	and I	_____

black and white

COL. -----

0216	9-17	WOOD	and MAN	_____
0217	18-26	WOOD	and WOMAN	_____
0218	27-35	WOOD	and VILLAGE/HOME	_____
0219	36-44	WOOD	and FIRE	_____
0220	45-53	WOOD	and MONEY	_____
0304	54-62	RATTAN	and HONEY	_____
0305	63-71	RATTAN	and GARDEN	_____
0306	72-80	RATTAN	and PRICE/VALUE	_____

black and white

COL. -----

0307	9-17	RATTAN	and GOOD	_____
0308	18-26	RATTAN	and FUTURE	_____
0309	27-35	RATTAN	and SPIRIT	_____
0310	36-44	RATTAN	and ANIMAL	_____
0311	45-53	RATTAN	and FOOD	_____
0312	54-62	RATTAN	and FOREST	_____
0313	63-71	RATTAN	and EARTH/SOIL	_____
0314	72-80	RATTAN	and WATER	_____

black and white

COL. -----

0315	9-17	RATTAN	and I	_____
0316	18-26	RATTAN	and MAN	_____
0317	27-35	RATTAN	and WOMAN	_____
0318	36-44	RATTAN	and VILLAGE/HOME	_____
0319	45-53	RATTAN	and FIRE	_____
0320	54-62	RATTAN	and MONEY	_____
0405	63-71	HONEY	and GARDEN	_____
0406	72-80	HONEY	and PRICE/VALUE	_____

black and white

COL. -----

0407	9-17	HONEY	and GOOD	_____
0408	18-26	HONEY	and FUTURE	_____
0409	27-35	HONEY	and SPIRIT	_____
0410	36-44	HONEY	and ANIMAL	_____
0411	45-53	HONEY	and FOOD	_____
0412	54-62	HONEY	and FOREST	_____
0413	63-71	HONEY	and EARTH/SOIL	_____
0414	72-80	HONEY	and WATER	_____

black and white

COL. -----

0415	9-17	HONEY	and I	_____
0416	18-26	HONEY	and MAN	_____
0417	27-35	HONEY	and WOMAN	_____
0418	36-44	HONEY	and VILLAGE/HOME	_____
0419	45-53	HONEY	and FIRE	_____
0420	54-62	HONEY	and MONEY	_____
0506	63-71	GARDEN	and PRICE/VALUE	_____
0507	72-80	GARDEN	and GOOD	_____

black and white

COL. -----

0508	9-17	GARDEN	and FUTURE	_____
0509	18-26	GARDEN	and SPIRIT	_____
0510	27-35	GARDEN	and ANIMAL	_____
0511	36-44	GARDEN	and FOOD	_____
0512	45-53	GARDEN	and FOREST	_____
0513	54-62	GARDEN	and EARTH/SOIL	_____
0514	63-71	GARDEN	and WATER	_____
0515	72-80	GARDEN	and I	_____

black and white

COL. -----

0516	9-17	GARDEN	and MAN	_____
0517	18-26	GARDEN	and WOMAN	_____
0518	27-35	GARDEN	and VILLAGE/HOME	_____
0519	36-44	GARDEN	and FIRE	_____
0520	45-53	GARDEN	and MONEY	_____
0607	54-62	PRICE/VALUE	and GOOD	_____
0608	63-71	PRICE/VALUE	and FUTURE	_____
0609	72-80	PRICE/VALUE	and SPIRIT	_____

black and white

COL. -----

0610	9-17	PRICE/VALUE	and ANIMAL	_____
0611	18-26	PRICE/VALUE	and FOOD	_____
0612	27-35	PRICE/VALUE	and FOREST	_____
0613	36-44	PRICE/VALUE	and EARTH/SOIL	_____
0614	45-53	PRICE/VALUE	and WATER	_____
0615	54-62	PRICE/VALUE	and I	_____
0616	63-71	PRICE/VALUE	and MAN	_____
0617	72-80	PRICE/VALUE	and WOMAN	_____

 black and white

COL. -----

0618	9-17	PRICE/VALUE	and VILLAGE/HOME	_____
0619	18-26	PRICE/VALUE	and FIRE	_____
0620	27-35	PRICE/VALUE	and MONEY	_____
0708	36-44	GOOD	and FUTURE	_____
0709	45-53	GOOD	and SPIRIT	_____
0710	54-62	GOOD	and ANIMAL	_____
0711	63-71	GOOD	and FOOD	_____
0712	72-80	GOOD	and FOREST	_____

 black and white

COL. -----

0713	9-17	GOOD	and EARTH/SOIL	_____
0714	18-26	GOOD	and WATER	_____
0715	27-35	GOOD	and I	_____
0716	36-44	GOOD	and MAN	_____
0717	45-53	GOOD	and WOMAN	_____
0718	54-62	GOOD	and VILLAGE/HOME	_____
0719	63-71	GOOD	and FIRE	_____
0720	72-80	GOOD	and MONEY	_____

 black and white

COL. -----

0809	9-17	FUTURE	and SPIRIT	_____
0810	18-26	FUTURE	and ANIMAL	_____
0811	27-35	FUTURE	and FOOD	_____
0812	36-44	FUTURE	and FOREST	_____
0813	45-53	FUTURE	and EARTH/SOIL	_____
0814	54-62	FUTURE	and WATER	_____
0815	63-71	FUTURE	and I	_____
0816	72-80	FUTURE	and MAN	_____

 black and white

COL. -----

0817	9-17	FUTURE	and WOMAN	_____
0818	18-26	FUTURE	and VILLAGE/HOME	_____
0819	27-35	FUTURE	and FIRE	_____
0820	36-44	FUTURE	and MONEY	_____
0910	45-53	SPIRIT	and ANIMAL	_____
0911	54-62	SPIRIT	and FOOD	_____
0912	63-71	SPIRIT	and FOREST	_____
0913	72-80	SPIRIT	and EARTH/SOIL	_____

 black and white

COL. -----

0914	9-17	SPIRIT	and WATER	_____
0915	18-26	SPIRIT	and I	_____
0916	27-35	SPIRIT	and MAN	_____
0917	36-44	SPIRIT	and WOMAN	_____
0918	45-53	SPIRIT	and VILLAGE/HOME	_____
0919	54-62	SPIRIT	and FIRE	_____
0920	63-71	SPIRIT	and MONEY	_____
1011	72-80	ANIMAL	and FOOD	_____

black and white

COL. -----

1012	9-17	ANIMAL	and FOREST	_____
1013	18-26	ANIMAL	and EARTH/SOIL	_____
1014	27-35	ANIMAL	and WATER	_____
1015	36-44	ANIMAL	and I	_____
1016	45-53	ANIMAL	and MAN	_____
1017	54-62	ANIMAL	and WOMAN	_____
1018	63-71	ANIMAL	and VILLAGE/HOME	_____
1019	72-80	ANIMAL	and FIRE	_____

black and white

COL. -----

1020	9-17	ANIMAL	and MONEY	_____
1112	18-26	FOOD	and FOREST	_____
1113	27-35	FOOD	and EARTH/SOIL	_____
1114	36-44	FOOD	and WATER	_____
1115	45-53	FOOD	and I	_____
1116	54-62	FOOD	and MAN	_____
1117	63-71	FOOD	and WOMAN	_____
1118	72-80	FOOD	and VILLAGE/HOME	_____

black and white

COL. -----

1119	9-17	FOOD	and FIRE	_____
1120	18-26	FOOD	and MONEY	_____
1213	27-35	FOREST	and EARTH/SOIL	_____
1214	36-44	FOREST	and WATER	_____
1215	45-53	FOREST	and I	_____
1216	54-62	FOREST	and MAN	_____
1217	63-71	FOREST	and WOMAN	_____
1218	72-80	FOREST	and VILLAGE/HOME	_____

black and white

COL. -----

1219	9-17	FOREST	and FIRE	_____
1220	18-26	FOREST	and MONEY	_____
1314	27-35	EARTH/SOIL	and WATER	_____
1315	36-44	EARTH/SOIL	and I	_____
1316	45-53	EARTH/SOIL	and MAN	_____
1317	54-62	EARTH/SOIL	and WOMAN	_____
1318	63-71	EARTH/SOIL	and VILLAGE/HOME	_____
1319	72-80	EARTH/SOIL	and FIRE	_____

black and white

COL. -----

1320	9-17	EARTH/SOIL	and MONEY	_____
1415	18-26	WATER	and I	_____
1416	27-35	WATER	and MAN	_____
1417	36-44	WATER	and WOMAN	_____
1418	45-53	WATER	and VILLAGE/HOME	_____
1419	54-62	WATER	and FIRE	_____
1420	63-71	WATER	and MONEY	_____
1516	72-80	I	and MAN	_____

 black and white

COL. -----

1517	9-17	I	and WOMAN	_____
1518	18-26	I	and VILLAGE/HOME	_____
1519	27-35	I	and FIRE	_____
1520	36-44	I	and MONEY	_____
1617	45-53	MAN	and WOMAN	_____
1618	54-62	MAN	and VILLAGE/HOME	_____
1619	63-71	MAN	and FIRE	_____
1620	72-80	MAN	and MONEY	_____

 black and white

COL. -----

1718	9-17	WOMAN	and VILLAGE/HOME	_____
1719	18-26	WOMAN	and FIRE	_____
1720	27-35	WOMAN	and MONEY	_____
1819	36-44	VILLAGE/HOME	and FIRE	_____
1820	45-53	VILLAGE/HOME	and MONEY	_____
1920	54-62	FIRE	and MONEY	_____

[These demographic data have been modified slightly, consistent with our experience in the field and with reference to standard Galileo formats]

What is your age? _____
 What is your sex? _____ (male=1, female=2)
 What is your occupation? _____
 What is your highest level of education? _____
 What is the name of your village? _____
 How far away is the nearest forest? _____
 Date in YYMMDD format _____
 The interviewer's name _____