Center for International Forestry Research

CIFOR Occasional Paper No. 46

Capturing Nested Spheres of Poverty

A Model for Multidimensional Poverty Analysis and Monitoring

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Contents

Abbreviations and Acronyms

Bappeda	*Badan Perencanaan dan Pembangunan Daerah* (District Planning and Development Agency, Indonesia)
BKKBN	*Badan Koordinasi Keluarga Berencana Nasional* (National Family Planning Coordination Agency, Indonesia)
BMZ	*Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung* (Federal Ministry for Economic Cooperation and Development, Germany)
BPS	*Badan Pusat Statistik* (Central Statistics Agency, Indonesia)
CIFOR	Center for International Forestry Research
DFID	Department for International Development (UK)
e.g.	for example
GDP	Gross Domestic Product
GEF	Global Environment Facility
GTZ	*Gesellschaft für Technische Zusammenarbeit* (German Agency for Technical Cooperation)
HDI	Human Development Index
HPI1	Human Poverty Index 1
i.e.	that is
NESP	nested spheres of poverty
NGO	nongovernmental organisation
No.	Number
p.	pages
pp.	pages
PPP	purchasing power parity
SLA	Sustainable Livelihood Approach
SWB	subjective wellbeing
UK	United Kingdom
UNDP	United Nations Development Programme
WIDER	World Institute for Development Economics Research

Acknowledgements

Arild Angelsen, Brian Belcher, Borany Penh, Marilyn Hoskins, Gill Shepherd and Mike Harrison generously provided very helpful comments on an earlier draft. We gratefully acknowledge support from the Federal Ministry for Economic Cooperation and Development of Germany (BMZ) through project number 2002.7860.6–001.00. We also express our thanks to the district governments of Malinau and Kutai Barat. The government of Kutai Barat has supported and funded the implementation of the poverty and wellbeing monitoring system. Special thanks go to Rama Asia, Silas Sinan, Yuvinus Nyintih, Subhan Noor and the whole monitoring team, trainers and more than 300 village assessors.

At CIFOR we thank Dina Hubudin, Charlotte Soeria, Gideon Suharyanto and Doris Capistrano. We also thank consultant editor Guy Manners. At BMZ/BEAF Stefan Krall, Michael Bosch and Iris Schubert kindly supported and supervised our project.

Abstract

In this paper we discuss recent trends in poverty concepts and suggest a locally adapted multidimensional model for measuring and monitoring poverty. The model comprises nested layers with subjective wellbeing in the centre surrounded by a core of health, wealth and knowledge, and a context that includes natural, economic, social and political spheres, as well as service and structural aspects. These nine facets of poverty cover basic needs, individual assets and capabilities, and the enabling environment that helps people escape poverty by ensuring sustainability, providing opportunities and minimising vulnerability. The model was tested in several monitoring trials and in the official poverty and wellbeing monitoring of Kutai Barat District, Indonesia, in early 2006. Twenty-one subdistricts covering 223 villages with more than 150 000 people were assessed. Examples drawn from this experience illustrate possible applications of the model.

1. Poverty is more than low income

Over recent decades, poverty concepts have profoundly changed from the mere consideration of income or consumption, to definitions that include multiple dimensions of deprivation and wellbeing.[1] Today, leading development organisations apply poverty definitions that comprise aspects like self-determined lifestyles, choice, assets, capabilities, social inclusion, inequality, human rights, entitlement, vulnerability, empowerment and subjective wellbeing. The new poverty concepts have found their way into the UN Human Development Report (UNDP 2005), the World Bank's World Development Report (2000/01; see also World Bank 2002) and into other, more qualitative poverty studies published by the World Bank.[2]

While they are more sophisticated, these new concepts have been difficult to quantify.[3] Therefore, international agencies such as the World Bank and UNDP, but also national governments, still favour money-metric poverty lines like the famous $1 ($2) per day,[4] or unfilfilment of basic needs (see Box 1).

Although there are close correlations among economic growth, income, subjective wellbeing and non-material poverty aspects,[5] the gap between a multidimensional understanding of poverty and the extremely reductionist one-dimensional indicators is disturbing. The emphasis on quantitative poverty measurement based on economic or basic needs parameters neglects many other dimensions of wellbeing. This could lead to the repackaging of old, simplistic poverty alleviation strategies that rely *solely* on macroeconomic growth, income generation, or infrastructural improvements such as building roads, schools and health posts. In addition, these figures often look far more precise than they really are due to the widespread difficulties in collecting reliable and accurate poverty data in many poor countries, and the need for extrapolation based on limited data.[6] Hence, the challenge is to find a practical

Box 1: Who is poor?

At the global scale, the World Bank and the UN define extreme economic poverty as having an income of less than $1 per day in purchasing power parity (PPP). The Human Development Index (HDI) of UNDP measures three fields: longevity, knowledge and decent standard of living. Longevity is measured by the percentage of people who die before age 40; knowledge is measured by adult literacy combined with the gross enrolment ratio for primary, secondary and tertiary schools; and standard of living is measured by real GDP/capita. The Human Poverty Index (HPI1) uses the same fields, but measures standards of living in terms of access to safe water and healthcare, and by the percentage of underweight children younger than 5 years (UNDP 2005).

In Indonesia, various measures are used for assessing poverty and wellbeing, mainly assessing the satisfaction of basic needs. More detailed descriptions are given by Maksum (2004) and Cahyat (2004).

compromise between a comprehensive poverty concept and a model based on quantifiable poverty indicators. In addition, the concept has to be simple enough that it appeals to decision makers who need answers to the following questions:[7]

- Who are the poor?
- How poor are they?
- Where do they live?
- Why are they poor?
- What can be done?
- What are the changes over time?

Many local governments, which face new responsibilities for poverty alleviation[8] under recent decentralisation, have few good answers to these questions. They typically lack the resources and capacity to answer them, and they often lack appropriate poverty concepts and reliable data.[9]

In this paper, we suggest a multidimensional poverty concept, building on the capability approach of Amartya Sen (e.g. 1993, 1997, 1999), the sustainable livelihood approach (SLA; e.g. Chambers and Conway 1991; Scoones 1998; Baumann 2000; Solesbury and Daniels 2002),[10] and the World Bank's qualitative approaches mentioned above. Although our practical work focused on forest-dependent poor, our model is sufficiently general to be used in many other rural settings.[11]

Using this model as a basis, we introduce a new quantitative tool to measure and monitor poverty at the household level, to provide some answers to the questions above. Examples from our work in Kutai Barat (Indonesia) are shown to illustrate the practical use of both the model and the monitoring tool. We conclude by showing how multidimensional poverty monitoring can lead to better planning and, thus, to more effective poverty alleviation.

2. Project context and methods

The CIFOR–BMZ project 'Making local government more responsive to the poor: Developing indicators and tools to support sustainable livelihood development under decentralisation' worked with local governments in forested areas of Indonesia (Kutai Barat and Malinau) and Bolivia (Pando) from 2003 until 2006. It applied a participatory learning approach for improving the understanding of trends in local poverty and wellbeing, and for developing local monitoring and planning tools to strengthen the local governments' poverty alleviation efforts.

The methodology included community baseline surveys, focus group discussions, in-depth anthropological case studies on local poverty concepts and socioeconomic change, and multistakeholder workshops (see Bullinger 2006; Haug in prep.). The methodology used for developing local poverty indicators and the monitoring system is further explained in Section 4. More details are given in Cahyat *et al.* (2007). Data used for producing the charts and poverty maps of Section 4 were collected through standardised household interviews during the poverty monitoring of Kutai Barat. The monitoring survey covered all 223 villages of the district with a sample size between 100% (villages with 20 or fewer households) to a minimum of 33% (villages with more than 60 households; 20 households were interviewed in villages with between 21 and 60 households). The calculation of indices is explained in Section 3.

3. NESP – Multidimensional spheres of poverty

3.1. Nested Spheres of Poverty (NESP): A multidimensional model of poverty

Poverty is a time-dependent condition. It can be temporary (acute or short-term poverty) or persistent (chronic poverty). It can be a permanent threat for those living just above the poverty line and it can be a trap for those who cannot get out of it.[12] Poverty is a lack of many things. It may be caused by insufficient income, or unsatisfied basic needs, such as health, education or housing. But poverty is also highly subjective and may be caused by feelings of deprivation, vulnerability, exclusion, shame, pain, and other forms of ill-being.[13] In addition, poverty is a result of a lack of means, capabilities, freedom and options for a better future.

Both unsatisfied basic needs and means to address this deprivation explain why poverty is often a self-reinforcing problem. We propose to

use these two conditions in a single concept of poverty. If there is no enabling environment for getting out of poverty, people get trapped in chronic poverty. Thus, poverty is not only 'having no fish', it is also 'not knowing how to fish', 'not knowing where to fish', 'not having a rod and line' or 'lacking the right to fish'. Plus, in many cases, there are 'no fish' because a lake has been polluted or has dried up. Ultimately, however, it is the subjective feeling of 'being hungry because of not having eaten fish' that is the very essence of poverty.

In order to capture all these notions and attributes of poverty, we conceptualised our poverty model in a nested shape (Figure 1). The centre is formed by subjective wellbeing (SWB), surrounded by core aspects of poverty, including basic needs, and the contextual enabling environment that represents the means to escape from poverty.

Subjective wellbeing (SWB) is highly individual and emotional. SWB is influenced by a plethora of factors, including comparison of one's living standard with that of others, or personal feelings of happiness, safety, inclusion and contentedness. It comprises many aspects listed in the World Bank's 'Voice of the Poor' study, such as bodily wellbeing, social wellbeing, having self-respect, or feeling safe and secure[14] and varies with moods and circumstances.[15]

Core aspects include 'basic needs' similar to the HDI dimensions, such as food, health, housing and education, but also comprise general individual ('basic') capabilities[16]—i.e. skills and physical condition—to get out of poverty. In our model, we aggregate basic needs and individual capabilities into three categories: health, adequate wealth and knowledge.[17] The core is also what most local people in our Indonesia study expressed as the principal aspects of poverty.[18] Together with SWB, it is a good measure of the poverty status of a household.

Context aspects frame the enabling environment for supporting self-driven attempts to escape poverty. The context includes economic and political opportunities, but also risks and vulnerability to being trapped in poverty. For the sake of simplicity, we segregated the context into four spheres:[19]

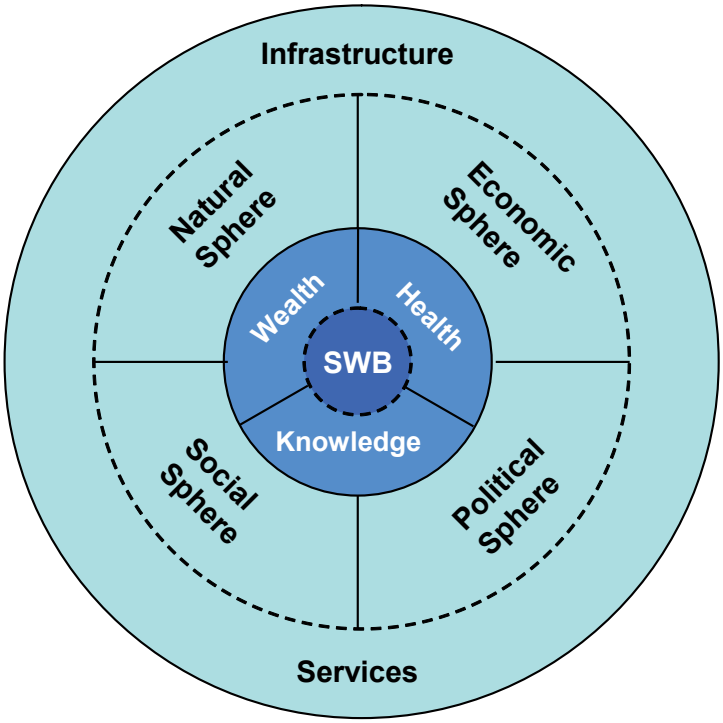

Figure 1. NESP – Nested spheres of poverty

- *Natural sphere*, including availability and quality of natural resources
- *Economic sphere*, including economic opportunities, but also economic safety nets
- *Social sphere*, covering social capital and cohesion, trust and conflict
- *Political sphere*, comprising empowerment, rights and freedom.

Interacting with all four spheres are infrastructure and services provided by government institutions, the private sector, development projects or civil society organisations.

The dynamics of poverty are reflected by the different layers of NESP. SWB has a very time-specific nature. As discussed above, SWB often fluctuates due to many influences. The analysis of our field data[20] showed a moderate correlation of SWB with the combined core aspects. This correlation also underlines the general importance of basic needs, as well as the high priority that local people in our study site ascribed to these attributes. Hence, improvement of the core generally leads to improved SWB. By the same token, a poor core usually means low SWB.

On a longer time scale, both core and SWB are influenced by the context.[21] For instance, knowledge increases as a result of improved education, health problems grow because of environmental pollution, SWB declines due to social conflict.

However, some of the context spheres may be means and ends at the same time. For instance, to have political freedom to participate in decision making may be important to improve core conditions, but it can also be regarded as an essential need and thus linked to subjective wellbeing.[22]

The dichotomy of core and context helps distinguish between the conditions of the poor and the quality of the enabling environment that directly affects future developments. In the case of poverty monitoring, each of the spheres in core and context requires different types of information and different responses from local governments. While the information about the core helps to measure impacts on individual living conditions and guides how to address shortcomings (for instance, through humanitarian aid), information about the context helps in the determination of the prospects for achieving a higher standard of wellbeing and can guide strategic support to local development processes.

Box 2. Linking NESP to SLA

The five capitals that are included in the Sustainable Livelihood Approach (Chambers and Conway 1991; Scoones 1998; Baumann 2000; Solesbury and Daniels 2002) are included in the NESP poverty model, but they are spread over both clusters. While some assets, such as knowledge and health (human capital) are found in the core, others, such as natural and social capital, are in the context of our model. Table 1 shows where the five SLA capitals appear in our NESP model.

Table 1. Location of SLA capitals in NESP model

SLA Capital	Location in NESP
Human	Core (health, knowledge)
Social	Context (social sphere)
Financial	Core (wealth – convertible goods), Context (economic sphere)
Natural	Context (natural sphere)
Physical	Core (wealth – housing), Context (infrastructure and services)

Adequate poverty monitoring, however, should not be based on either core or context monitoring alone. People might enjoy a short period of wellbeing indicated by relatively high scores of core spheres. But this can be based on unsustainable resource use, while the contextual spheres are simultaneously worsening until the boom is over and people will be trapped again in poverty. On the other hand, people can also suffer in a positive enabling environment. Despite a promising context, natural calamities or external shocks can throw people back into poverty.

The NESP model, especially with its context spheres, offers clear links to the various government sectors.[23] The examples shown in the next section illustrate how the poverty spheres can be related to the respective sectors.

Box 3. Poverty or lack of wellbeing?

With its broad basis, the model might be considered to be an ill-being/wellbeing model rather than a poverty model. However, we understand the two terms in a reciprocal way along a gradient from ill-being (in our definition: poverty) to high wellbeing (i.e. prosperity), and we use both concepts in an interchangeable manner. Although this definition is not conventional, it is useful when trying to accommodate different national concepts and helpful when assessing and analysing various dimensions of poverty. Furthermore, 'poverty' often has a negative connotation of passivity, incompetence or backwardness, and the use of the term can be offensive or demeaning. The term 'wellbeing' allows discussion of poverty in more positive terms. *Hence, 'poverty' should be read as 'lack of wellbeing' and 'wellbeing' as 'reduced poverty'*. In our practical work, we started with a comprehensive perspective and later refined this angle according to local perceptions of poverty and wellbeing, and the practical demand of the local government. This approach was welcomed by the local government as the various dimensions of our poverty model could easily be linked to the respective government sectors.

3.2. NESP indicators and indices

The NESP model offers a comprehensive basis for multidimensional poverty and wellbeing assessments. In order to convert it into a locally meaningful and specific concept, however, one needs to represent the model's spheres with a set of local poverty indicators. These indicators should comply with the following minimum set of 'SMART' criteria:[24]

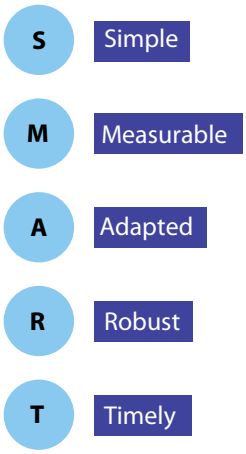

Figure 2. SMART criteria for poverty indicators

Simple means that an indicator is easy to understand and practical to use.

Measurable means that the indicator can be reasonably quantified and assessed. It also means that the indicator can be measured by locally available means (e.g. no expensive scientific methodology is needed).

Adapted means that the indicator is location specific, i.e. it should be relevant in its sociocultural and natural-geographic context.

Robust means that the indicator value ideally does not depend on who the assessor is or when the assessment is conducted (unless seasonality is a factor that needs to be captured). Robustness makes an indicator credible and acceptable to policy makers.

Timely means that the indicator changes on the same time scale as the poverty aspects. This facilitates adequate policy responses to the monitoring findings. E.g. if an indicator lags too far behind, impacts cannot be linked to policy action.

In our example from Indonesia, we used a set of indicators for each of the model's spheres, and each indicator received two or three possible values. For instance, in the case we assigned three conditions to a particular indicator, score 1 represented 'critical', score 2 'intermediate' and score 3 'good'.[25] The conditions were defined according to the local understanding of what is 'critical', 'intermediate' and 'good' (see examples in Box 4). The individual indicator ratings were finally set by the district's monitoring team and our researchers based on two field trials.[26]

The indicators of each sphere can be aggregated into normalised indices, one for each of the nine spheres, with a value range between 0 and 1. The resulting nine NESP indices can be analysed and presented separately. However, if desired, they can also be combined into composite indices for the core and the context.[27]

Locally collected NESP data reflect the local understanding of poverty and are, therefore, relative measures of poverty. However, this does not exclude comparison across sites, as long as

Box 4. Indicator conditions

Each indicator can be in a 'critical' (i.e. poor) or a 'good' state. Most indicators also offer 'intermediate' conditions. Here are some examples from the questionnaire used in Kutai Barat (Indonesia).

Knowledge (1 out of 3 indicators):
What is the highest level of formal education within your household?
1 primary school or less
2 junior secondary school
3 junior high school or higher

Economic Sphere (1 out of 5)
How long will the rice stock of your household last?
1 there is no stock
2 there is a stock, but it won't last until the next harvest
3 at least until the next harvest

Social Sphere (1 out of 3)
What is the level of mutual help (material and non-material) in your village?
1 low
2 medium
3 high

Infrastructure and Services (1 out of 8)
How difficult is it for you to reach the nearest market place?
1 impossible or very difficult
2 difficult, but usually possible
3 easy

The full questionnaire is attached in the Annex.

one is aware that relative poverty rates are being compared. In areas with similar living conditions, such comparisons seem reasonable.[28]

The following section illustrates how NESP indicators and indices are created and used for local poverty monitoring in an example from Indonesia.

4. Measuring poverty with NESP: An example from Indonesia

4.1. Local adaptation of NESP

The government of Kutai Barat district was not satisfied with the national poverty assessments, as they were perceived as unreliable and biased towards conditions on Java. So, they asked for help in developing a locally specific poverty monitoring system to allow the districts to better target poverty alleviation.

First, we developed the NESP model. We filled the general model with locally specific content based on an understanding of poverty that made sense to all project partners (local government, NGOs, communities, CIFOR researchers). Sixty focus group discussions, various workshops and in-depth community studies were used to compile long-lists of possible indicators that described the nine spheres in a locally meaningful manner.[29] After two rounds of field trials in 40 villages a final short-list was prepared[30] and used to measure poverty in all 21 subdistricts and 223 villages of the district.

The poverty indicators used in the 2006 Kutai Barat poverty monitoring survey are compiled in Table 2. In addition, the survey collected information on household structure, the use of forest products, income sources and on the perceptions of selected local government programmes for analytical purposes.

4.2. NESP-based visualisation of data

The indicators listed in the right column of Table 2 can be aggregated into nine normalised indices corresponding with the nine spheres in the left column.[31] In order to allow quick comparisons of different villages or subdistricts, we applied a simple colour code (Figure 3). The colours depend on the composition of the respective indices.[32]

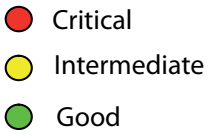

Figure 3. Colours reflecting the conditions of the NESP spheres

An example of the NESP conditions of villages monitored in Kutai Barat in February/March 2006 is given in Figure 4.

The NESP model allows easy comparison of different units (households, villages, subdistricts, etc.) at a glance. If a more quantitative comparison is needed, the real index scores can be compared in bar diagrams (e.g. Figure 5).[33]

Table 2. Aspects of the three wellbeing clusters: SWB, core and context

	Poverty Sphere	Indicator
SWB	*Subjective Wellbeing*	Feeling happy Feeling prosperous Feeling poor
CORE	*Health*	Food shortage for over 1 month Access to clean drinking water Access to health facilities and services
	Material wealth	Appropriate housing conditions Minimum material goods: motor bike/boat Minimum material goods: satellite dish/fridge
	Knowledge	Highest level of formal education in household School attendance Informal knowledge/skills
CONTEXT	*Natural sphere*	General disturbance of nature Occurrence of forest fires Occurrence of hornbills Overexploitation of natural resources General water quality
	Economic sphere	Number of income sources Stability/reliability of income sources Rice stock/ability to buy rice Access to capital (credit, loans)
	Social sphere	Level of cooperation Trust Level of conflict
	Political sphere	Resource use rights and access to resources Access to information Political participation in decision making
	Infrastructure and services	Access to secondary school Quality of education services Access to basic health facilities Quality of health services Condition of roads and bridges Access to marketplaces Access to communication facilities

The two ways of representing poverty data have different strengths and weaknesses. While the NESP model (Figure 4) gives a quick overview of the overall poverty situation of a village (or household or subdistrict, etc.), including critical sectors and possible trade-offs, the bar diagrams (Figure 5) provide a more differentiated picture that also allows comparing indices of the same colour code in a more quantitative way. This is especially helpful for index values which are close to the boundary between two colours and might therefore disguise significant differences between two villages.

Both versions instantly show which sectors are in a critical condition. In the example of Figure 4, Village A lacks education and healthcare and has problems in the economic sphere, Village B lacks education, while Village C clearly has environmental problems, and Village D suffers from inadequate infrastructure and government services. All these red spheres are signs of alert for the respective government agencies which then need to follow up with a more in-depth analysis of the underlying causes.

Another way of illustrating poverty monitoring results is to use data lists with colour codes (as in Table 3).

Poverty data can also be organised in thematic maps (see Figures 7 and 8).

Table 3. Data list with colour code (village names have been changed)

Village	SWB	H	W	K	N	E	S	P	I&S
Durian	0.52	0.67	0.49	0.48	0.75	0.48	0.60	0.43	0.67
Rambutan	0.53	0.55	0.70	0.51	0.86	0.61	0.63	0.49	0.71
Kelapa	0.27	0.56	0.32	0.46	0.88	0.62	0.58	0.49	0.71
Mangga	0.03	0.31	0.33	0.37	0.72	0.35	0.38	0.33	0.35
Lai	0.57	0.90	0.54	0.44	0.91	0.92	0.53	0.41	0.81
Jeruk	0.25	0.40	0.48	0.39	0.75	0.42	0.59	0.41	0.36
Salak	0.38	0.40	0.44	0.31	0.70	0.66	0.74	0.75	0.46
Pisang	0.32	0.35	0.41	0.33	0.43	0.56	0.53	0.40	0.39
Jambu	0.25	0.58	0.51	0.36	0.56	0.67	0.53	0.51	0.33

Notes: Colour codes as per Figure 3; abbreviations as per Figure 5.

4.3. Another example for applying NESP: Poverty maps

Poverty maps are a powerful tool to visualise poverty patterns. They show where poverty hotspots are and which poverty spheres are critical in which area. This helps answering the question 'Where are the poor?' However, the patterns revealed by poverty maps do not automatically provide answers to the problem 'Why are they poor', but only show correlations between different aspects of poverty.[34] Nonetheless, correlations are useful as they generally make a good starting point to look for causal links (see Section 6).

In order to demonstrate the illustrative power of poverty maps, we present a few examples from the poverty and wellbeing monitoring survey in Kutai Barat.[35]

Figure 6 shows an overview map of the study area on the island of Kalimantan (Borneo).

The examples in Figures 7 and 8 are based on the NESP approach applied in the poverty monitoring survey of Kutai Barat, February–March 2006.

5. Using NESP for more effective poverty alleviation

NESP as a multidimensional local poverty monitoring system provides comprehensive and relevant information important for district and subdistrict planning. The core and context information can help planning agencies to:

- Alert the local government on poverty hotspots
- Alert responsible government sectors
- Identify needs for addressing acute poverty (basic needs)
- Anticipate future impoverishment caused by an unfavourable context
- Identify strategic entry points to reduce chronic poverty
- Identify strategic entry points to strengthen the enabling environment (context)
- Identify priority areas for regionally more balanced development
- Identify which poverty alleviation measures worked and which did not
- Track changes of poverty data over time.

Through these actions, the local government can get answers to our initial questions.

Who are the poor?

Depending on the survey resolution, we can identify poor households, poor villages, and poor subdistricts, or geographic regions with high poverty.[36] Poverty lists and maps help local governments to identify poverty hotspots and allocate their aid on the basis of clear demand. Additional information on household structure shows whether poverty is especially related to ethnicity or certain clusters of households (e.g. those with only one adult, with disabled family members).

How poor are they?

The use of poverty indices allows quantification of the nine poverty spheres, which helps in allocating government support and aid. Analysing core and context separately can shed some light on the differentiation of acute

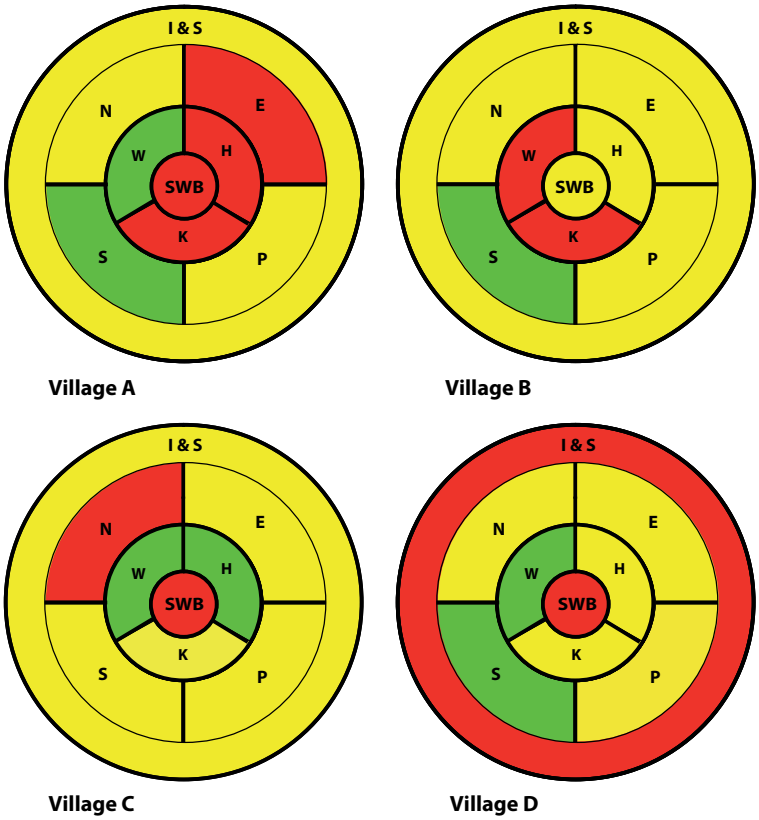

Figure 4. NESP representations of 4 villages in Kutai Barat (February–March 2006)
SWB subjective wellbeing; **H** health, **W** wealth, **K** knowledge, **N** natural sphere, **E** economic sphere, **S** social sphere, **P** political sphere, **I & S** infrastructure and services.

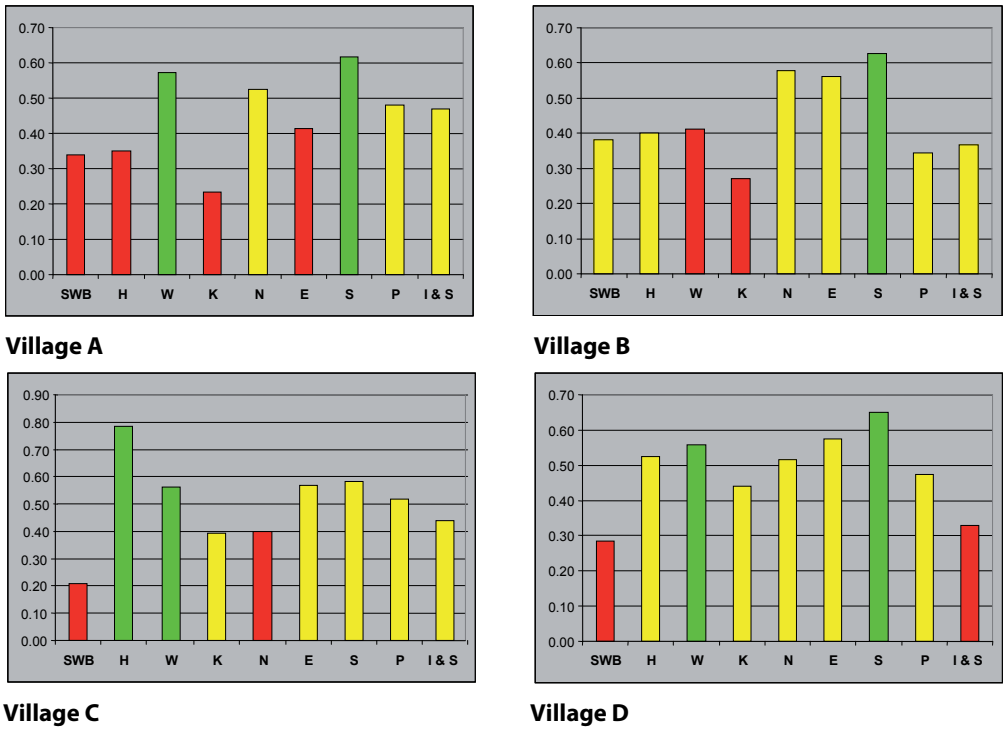

Figure 5. Bar diagrams of poverty sphere scores for the same 4 villages as in Figure 4
SWB subjective wellbeing; **H** health, **W** wealth, **K** knowledge, **N** natural sphere, **E** economic sphere, **S** social sphere, **P** political sphere, **I & S** infrastructure and services.

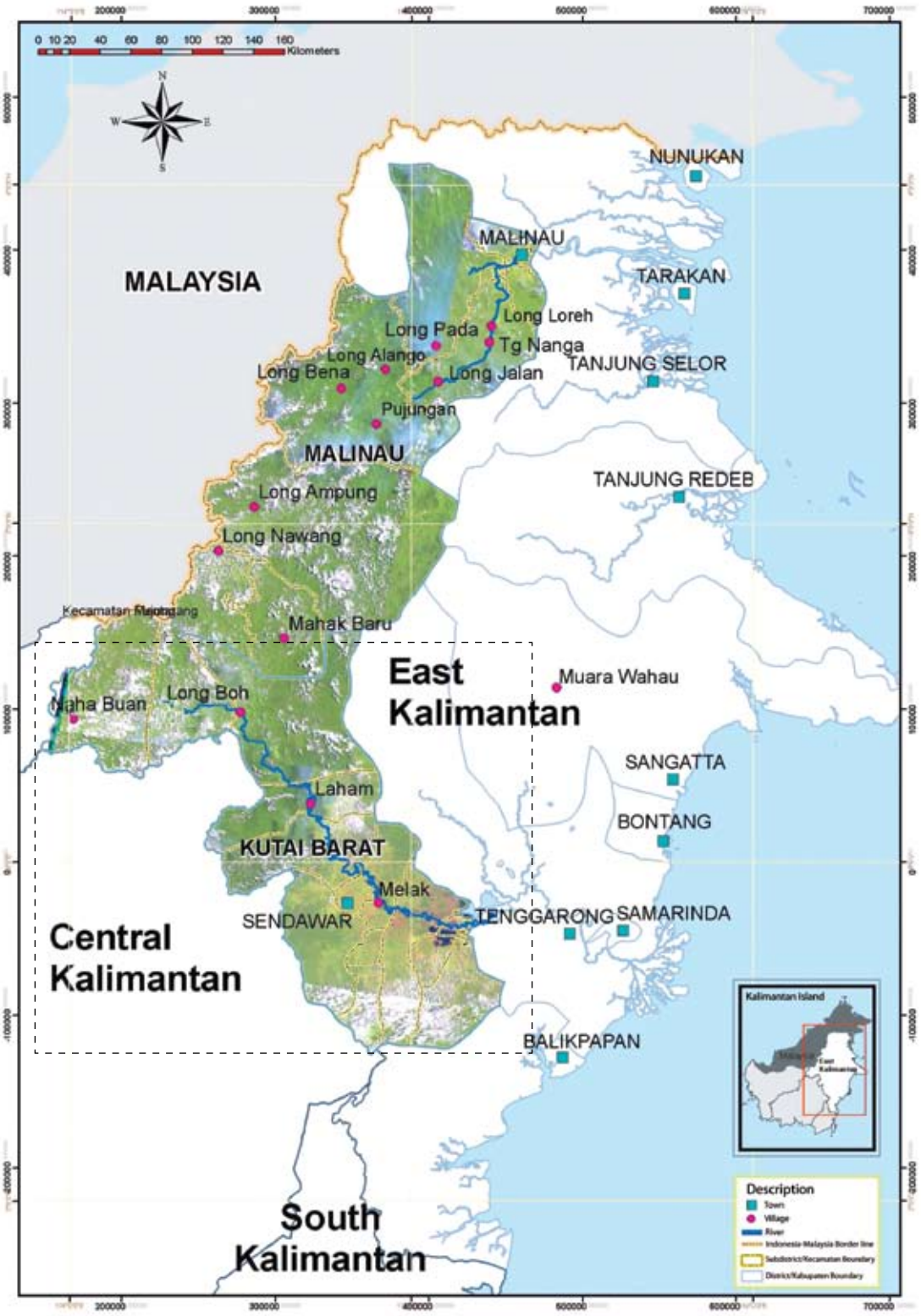

Figure 6. Overview map of Kutai Barat and Malinau (Andrianto 2006)

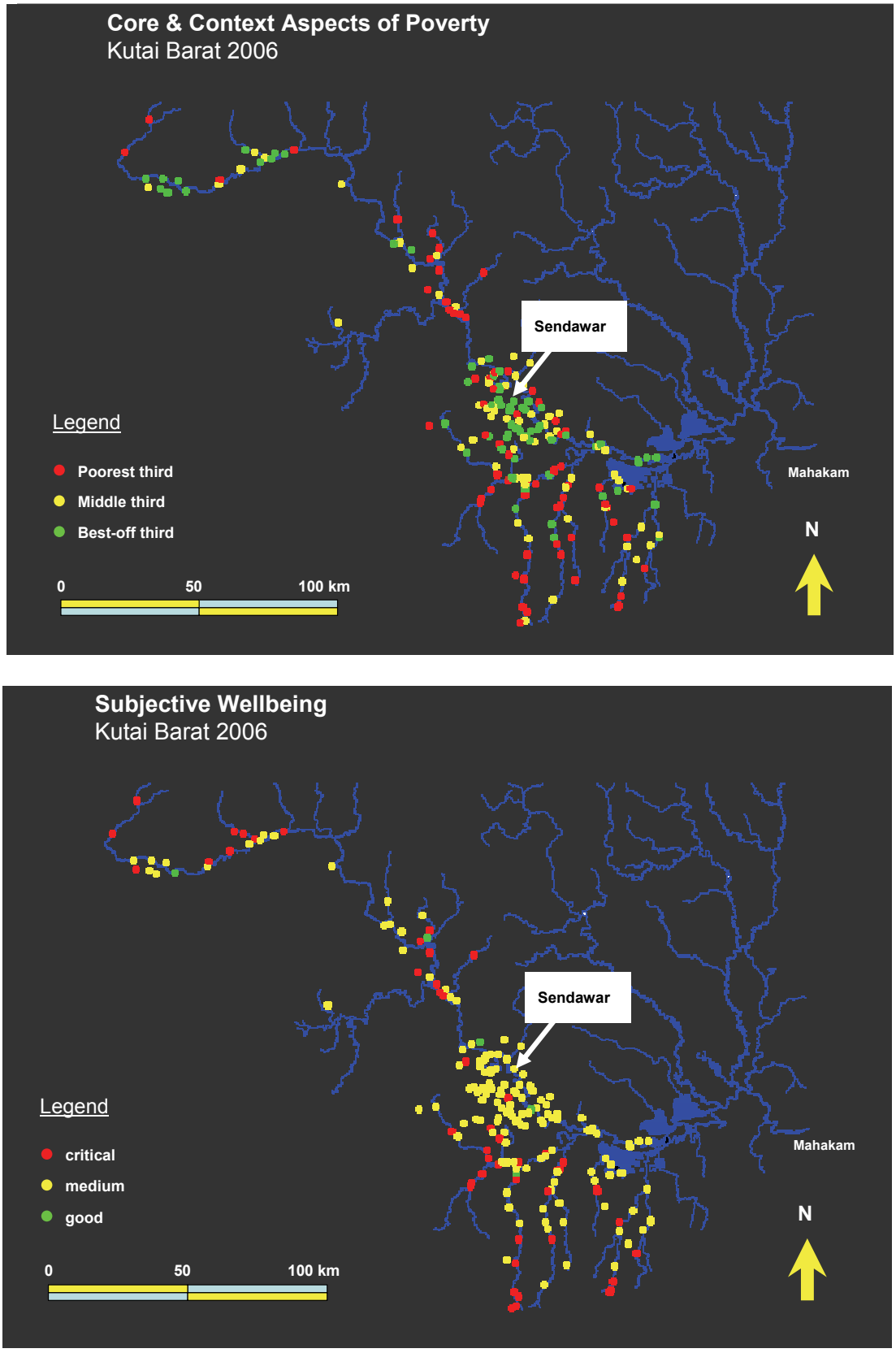

Figure 7. Core and context poverty (composite index of core and context) and SWB, Kutai Barat, February–March 2006

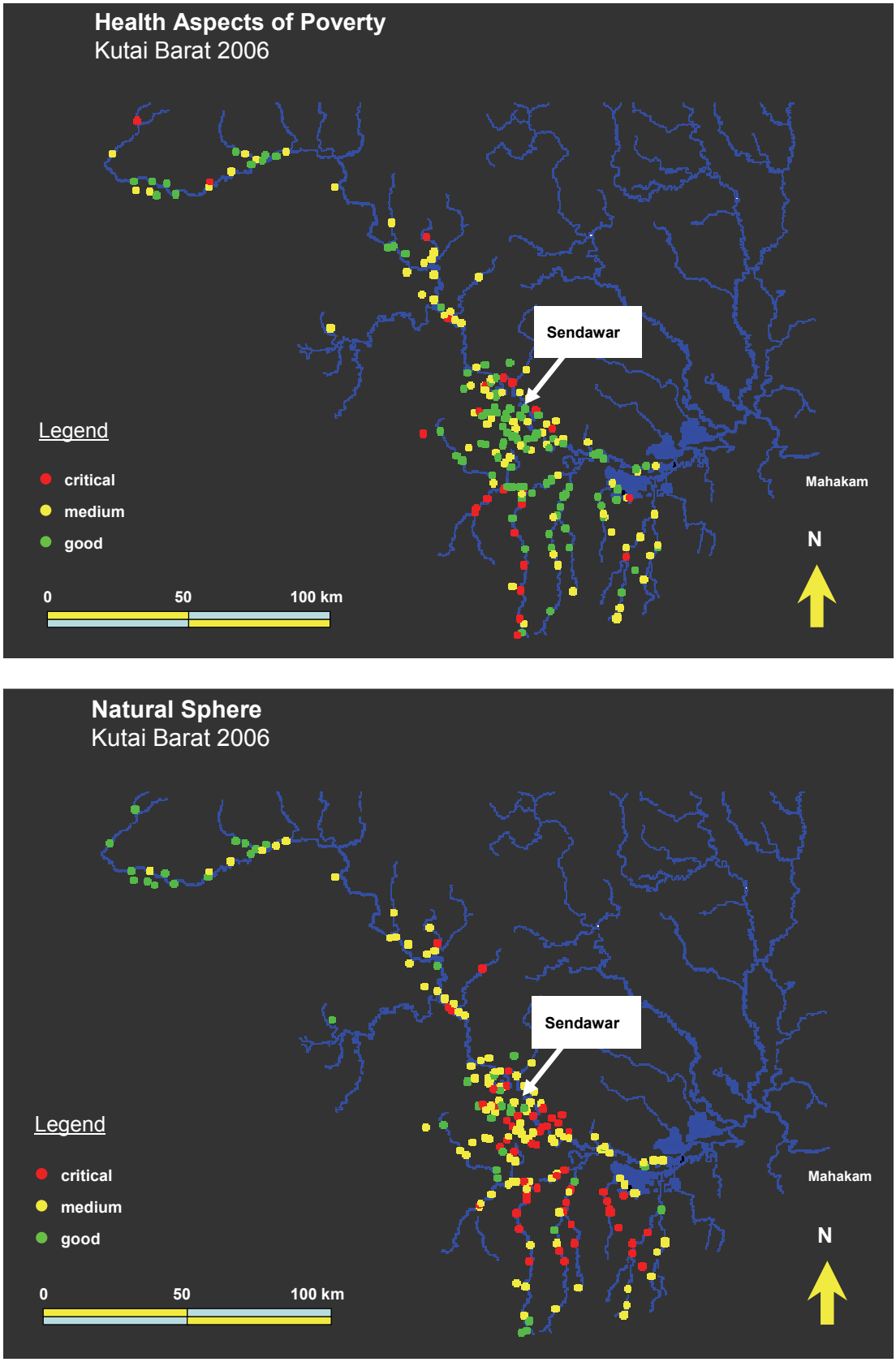

Figure 8. Health aspects of poverty and condition of natural sphere aspects, Kutai Barat, February–March 2006

poverty, which becomes most visible in the core aspects, and chronic poverty or long-term constraints of development as reflected in the context. Long-term monitoring shows how poverty rates change and whether poverty alleviation programmes work.

Where do they live?

The spatial information shown in poverty maps (Figures 7 and 8) helps the local government to identify hotspot areas. These areas can be poor for many different reasons. However, their identification is the first step to addressing the problem. Overlaying spatial information, such as infrastructure maps and poverty maps, can help to identify patterns of poverty.

Why are they poor?

Many poverty causes, such as natural hazards, fluctuating world market prices, or national political and economic crises, are beyond the local government's control. The analysis of multidimensional data sets and poverty maps can generate hypotheses and ideas on poverty causes. However, the visualisation of poverty data is no substitute for in-depth analysis. Therefore, any index that shows a critical value is only a sign of alert that must trigger some serious discussion or more detailed studies about the underlying causes. A basic causal analysis that aims to improve planning can be conducted at the village level (see Figure 9) with additional input from technical agencies, researchers or civil society organisations.

What can be done?

NESP flags critical conditions and helps identify priority areas and sectors. This can make development planning far more effective. In the case of Kutai Barat, the monitoring approach will be linked to the existing annual planning system (as shown in Figure 9).[37]

The monitoring results will be distributed to subdistricts and villages, where the findings are checked for plausibility by comparing rankings of the NESP spheres at village level. Critical spheres then become priorities for the annual village planning sessions. For instance, if the health condition is critical in Village A and the villagers agree on this fact, it becomes a top priority for planning the development activities of next year. As the monitoring system does not explain why health is critical, the village

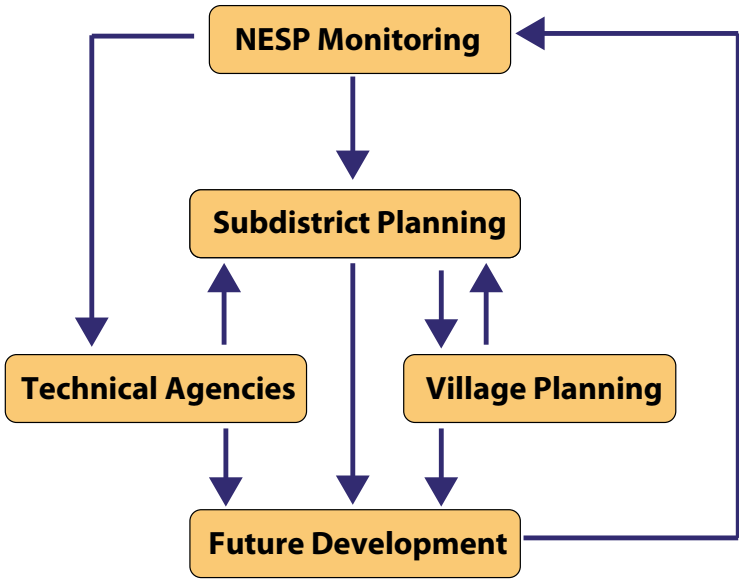

Figure 9. Intended monitoring and planning cycle in Kutai Barat

assembly conducts a basic causal analysis and elaborates suitable measures which are then proposed to the subdistrict level. Here the proposals are collected from all villages and discussed by the subdistrict government and related technical agencies. At the subdistrict planning session—where the villages are also represented—an annual development plan is prepared and submitted to the district government. In addition, information can be requested from other government agencies, or from researchers and civil society organisations familiar with the area. If these steps are conducted properly, a revised poverty alleviation strategy should reflect the spatial and sectoral priorities that emerge from monitoring. Such a strategy would need to address basic needs, as well as contextual constraints and opportunities in order to facilitate self-driven poverty alleviation.

What are the changes over time?

The poverty monitoring system we suggest above allows governments to track changes of poverty over time. NESP is not a static concept. In particular, the context spheres can be extremely dynamic. Capturing changes of core poverty and the enabling environment requires regular repetition of monitoring surveys. Depending on available resources, annual to biannual cycles will provide decision makers with sufficiently updated information. Some figures and lessons learned from our case study in Kutai Barat are listed in Box 5.

Box 5. Some figures and lessons learned from Kutai Barat

Scale:	All 223 villages and 21 subdistricts with more than 10 000 households were assessed
Sample size:	All households (100%) for villages with no more than 20 households; 20 households for villages between 20 and 60 households; 33% for villages with more than 60 households
Time:	Approximately 1 year for developing and testing the monitoring system; 45 minutes per interview; about 1 week per village
Costs:	Approximately US$ 140 000 for developing the system, including 2 test cycles (40 villages), baseline surveys, workshops and research staff time and travel costs; US$ 60 000 (fully covered by Kutai Barat) for implementation; i.e. less than US$ 900 per village (including all costs); for comparison, 1 km of fixed road costs about US$ 100 000 in Kutai Barat
Staff:	More than 300 assessors (data collection) trained; one monitoring team (development and organisation of monitoring system) of 8 people
Accuracy:	Teachers were used as village assessors. The relative ranking of villages within selected subdistricts matched the judgment of long-term experts and local informants far better than any other official poverty report. Several quality checks are built into the system. For detailed information see Cahyat *et al.* (2007).

Time and costs can be significantly reduced if the approach only needs to be locally adapted (e.g. in other rural areas of Indonesia).

Government support is crucial. As a monitoring and planning tool, the NESP approach has been warmly welcomed by district planners. The monitoring system was strongly supported by the local government between 2003 and 2005, covering the full costs of implementation. However, in early 2006 the government changed and the institutionalisation of the approach got temporarily halted. In the meantime, the regional planning agency (Bappeda) together with GTZ and CIFOR prepared an action plan for the future application and institutionalisation of the approach (see Figure 9).

Other organisations also showed interest in applying the approach in other districts of Indonesia.

6. Conclusion

In summary, the NESP model is a practical tool for measuring and monitoring poverty or wellbeing in its many dimensions. The model is dynamic and reaches well beyond basic needs and consumption expenditures. It covers qualitative aspects (such as subjective wellbeing), core spheres of poverty (like health, minimal wealth and knowledge and its related dimensions), as well as contextual spheres (including natural, economic, social, and political environment, and infrastructure and services).

Each of the spheres can be assessed by using a set of indicators which can be combined into sectoral indices (see Figure 7 and Table 3). If so desired, the indicators can also be converted into composite indices of the core and the context (see Figure 7), or into an overall aggregate.

Experience from its use in our Indonesian sites demonstrates that the model can be easily adapted to local conditions. In contrast to national poverty indicators, the NESP indicators reflect local peculiarities, such as cultural preferences of lifestyles, seasonality or local modes of subsistence. However, the approach can also be scaled up to larger areas because of the design of the indicator scores. Different regions (e.g. districts) could develop their own indicators; e.g. one very remote district might find the diversity of non-timber forest products an important base for livelihoods, while another district would put the emphasis on rice stocks. Both could be indicators under the economic sphere with a clear local understanding of which condition of the indicator is regarded as 'critical', which as 'intermediate' and which as 'good'. Combined with other economic indicators, the economic sphere index would then be comparable across the two districts.

By comparing the scores of the two economic sphere indices, we would see in which district more people are in a critical condition (economically defined), despite a different local understanding of what is relevant for economic wellbeing.

The example from Indonesia also shows that NESP is a concept that local decision makers can think and work with. It is inclusive and allows the accommodation of different stakeholder priorities. Through its scoring system it allows comparison across sites, given that the definition of what is a critical condition and what is a good condition can be agreed upon. The different representations of the model—as nested diagram, bar diagrams or poverty maps—address the different preferences of potential users, such as local or national governments, donors, researchers, NGOs or other civil society groups. However, attention has to be given to the temptation of mistaking the approach for an 'automatic poverty alleviation programme' where decision makers only sits in their chairs, look at colourful maps and take decisions to address the poverty problems in their regency. Like any other monitoring system, NESP can only indicate and hint where and of what kind the problems are. With its multisphere setup, the model visualises how complex poverty is and that solutions also mean trade-offs. Understanding the underlying causes of poverty and finding balanced ways for poverty alleviation remains the creative task of concerned people.

Endnotes

1 For comprehensive summaries of this trend see Kanbur and Squire (1999) or Angelsen and Wunder (2003).

2 E.g. the 'Voices of the Poor' study (Narayan *et al.* 2000a, b; Narayan and Petesch 2002).

3 See Sumner (2004, p. 14), Kanbur and Squire (1999, pp. 4–5), Angelsen and Wunder (2003, pp. 4–7, 10–11).

4 This poverty line was introduced in the 1990 Word Development Report of the World Bank. For a concise summary of the main points of critique, see Kanbur and Squire (1999), Reddy and Pogge (2005) and Sumner (2007). The global poverty lines are set at $1 per day (extreme economic poverty) and $2 per day (more precisely $1.08 and $2.15 in 1993 PPP). It has been estimated that in 2001, some 1.1 billion people had consumption levels below $1 a day and 2.7 billion lived on less than $2 a day. See http://web.worldbank.org.

5 See Angelsen and Wunder (2003, p. 10).

6 This argument is also one of the main points of critique brought forward by Reddy and Pogge (2005) against the World Bank's poverty reports. While admitting some methodological shortcomings, Ravallion (undated) emphasises the international consensus on the $1/$2 poverty lines.

7 Some of these questions are also asked by Reddy and Pogge (2005, p. 4).

8 Poverty alleviation is understood here in the sense of Angelsen and Wunder (2003, p. 2) as encompassing poverty reduction as well as poverty prevention.

9 E.g. data from the Indonesian Central Statistics Agency (BPS) contradicted the figures collected in parallel by the Indonesian Family Planning Coordination Agency (BKKBN), which left the local governments in deep confusion about the poverty situation in their districts. On the other hand, composite indices like the HDI and one-dimensional economic measures such as the $1 poverty line may allow cross-country comparisons, but they do not provide a solid basis for day-to-day poverty alleviation efforts especially by local decision makers.

10 The SLA was initially developed at the British Institute for Development Studies (IDS) in the 1990s.

11 The forest–poverty link has been discussed in detail by Angelsen and Wunder (2003), Wollenberg *et al.* (2004) and Sunderlin *et al.* (2005).

12 For a very thoughtful discussion of poverty traps and the links between natural resources and poverty, see Carter and Barrett (2006) and Barrett (2006).

13 The 'Voices of the Poor' study provides many examples of non-economic poverty (Narayan *et al.* 2000a, b; Narayan and Petesch 2002).

14 See Narayan *et al.* (2000b), Chapter 2.

15 In technical terms, SWB is a very ambivalent indicator, as respondents usually combine wishes or political statements with their scores on SWB. Appearing poor might either give high payoffs (e.g. subsidies and aid) or it is considered to be shameful or a sign of failed policies. Thus, any subjective statement about poverty or wellbeing is an intentional statement that requires additional information for solid interpretation.

16 See Nussbaum (2000, pp. 84–86). If capabilities are understood in the full meaning of Amartya Sen's framework (e.g. Sen 1993, 1997, 1999), we would have difficulties in separating the individual capabilities from those which are mainly located in the context (e.g. political environment regarding participation or social cohesion of a group).

17 See Streeten *et al.* (1981) and Stewart (1985). Wealth is understood as a minimum material wellbeing

comprising decent housing condition, appropriate clothing, some basic equipment, such as TVs, a bicycle or motorbike, etc. The definition of wealth depends on local standards. Knowledge includes both formal education and informal or traditional knowledge.

18 Income was also frequently mentioned, but mainly as a tool for improving health, wealth and knowledge.

19 The segregation into these four spheres is somewhat arbitrary. However, it was the most practical way to aggregate the poverty attributes compiled in our project workshops in terms of redundancy and comprehensiveness.

20 Spearman's rank correlation: $r = 0.528$, based on 10 431 household interviews covering 223 villages in Kutai Barat (Indonesia).

21 However, this is not a unidirectional causality; e.g. improved knowledge can influence the context through different resource use, new conflict resolution mechanisms, etc.

22 See Chambers and Conway (1991, p. 1).

23 Although there is a wide discussion about cross-sectoral governance approaches, practice lags far behind. Weak institutional coordination, lack of communication about and competition over budgets, resources and power are frequent constraints, and sectoral setups generally prevail.

24 This SMART system used here differs from the more conventional one, where S stands for 'specific', M for 'measurable', A for 'achievable and attributable', R for 'relevant and realistic' and T for 'time-bound, timely, trackable and targeted' (e.g. GEF undated).

25 Statistical findings from our field tests suggest that three to five indicators per poverty sphere index are enough to describe the nine poverty spheres. We tested a long-list of preliminary indicators and conducted correlation tests for different subsets to identify a representative group of indicators for each poverty sphere.

26 In some test cases, the distribution of scores was found not to differentiate enough between critical and good conditions. Those indicator ratings were then changed to better capture household differences.

27 Examples of sphere indices are shown in Figures 4 and 5. An example of such an aggregated index is given in Figure 7.

28 If neighbouring districts mutually accept their NESP indicators, the comparison would even be an absolute one.

29 This included local forms of livelihood support systems, specific cultural traits, and seasonality.

30 Based on correlation tests between different subsets of indicators and the full set for each sphere.

31 The indices are normalised to a range from 0 to 1. They can be further combined into an SWB index, a core index and a context index (composite indices).

32 If all indicators of an index cover the scores 1 (= critical), 2 (= medium) and 3 (= good), the boundary between red and yellow of the index is 0.333, and the one separating yellow from green is 0.666. If the indicators only offer choices of 1 (= critical) or 3 (= good), there is only red (up to 0.500) and green (above 0.500). For most indices, we used mixtures of indicators with scores 1, 2, 3 and indicators with 1 and 3. Thus, the boundaries between the three colours are slightly different for each index.

33 Note that some indices of similar values might be in different colours (e.g. K and N in Village C). This is because the boundaries between colours are different for each index (see Endnote 27).

34 GIS layers show correlations only, and not necessarily causality; the latter needs to be investigated separately. (See Vishwanath 2006, Slide 5.)

35 The maps are displayed for illustrative purposes only. They show another possible application of the NESP model. Detailed interpretation of the data will be published elsewhere.

36 The 2006 poverty monitoring survey worked with a resolution at village level covering more than a third of all rural households. In case the resolution should be at household level, a full census will be required. In addition to the indicators, basic household information was also collected.

37 Until now, the annual planning at village and subdistrict level is done without any data-based prioritising. This new planning step is currently being tried out in one subdistrict of Kutai Barat.

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Annex: Poverty monitoring questionnaire, Kutai Barat

The original questionnaire also included additional questions regarding income sources, forest dependency and selected government programmes. The following variables are the ones relevant for poverty monitoring.

Annex I. Official Monitoring Questionnaire

Household Questionnaire

Poverty Monitoring in Kutai Barat District

Household Number

Village Household

Household Number

Name of Respondent

Name of Head of Household

Name of Village

Name of Subdistrict

Name of Assessor

Date

Village Code **(Var 1)**

Subdistrict Code **(Var 2)**

!	All of these questions refer to conditions over the last 12 months, and apply **only to your household or village**. Please provide only one answer for each question.
!	**Household members include only those living together in one house or those being supported by the household.**

Household Base Data *Circle the appropriate answers below*			*Fill in a number in each of these boxes*
Var 3	How many people are there in your household?		
Var 4	How many families are there in the household?		
Var 5	How many living adult males are there in the household?		
Var 6	How many living adult females are there in the household?		
Var 7	How many living male children (younger than 17 years) are there in the household?		
Var 8	How many living female children (younger than 17 years) are there in the household?		
Var 9	What is the ethnic majority of your household?		*Write the circled numbers in the boxes below*
	1 Benuaq, **2** Tunjung, **3** Bahau, **4** Kayan, **5** Kutai, **6** Bentian, **7** Kenyah, **8** Seputan, **9** Bukat, **10** Bakumpai, **11** Oheng, **12** Penihing, **13** Luangan, **14** Buginese, **15** Banjarese, **16** Javanese, **17** Batak, **18** Other		
Var 10	Are there any orphans, single mothers or disabled persons in your household?		
	1	Yes, more than one	
	2	Yes, only one	
	3	No	
Var 11	Is yours a prosperous household?		
	1	No, it is not prosperous	
	2	Fairly	
	3	Yes, it is prosperous	

	CIRCLE THE APPROPRIATE ANSWERS BELOW		WRITE THE CIRCLED NUMBERS IN THE BOXES BELOW
Health and Nutrition			
Var 12	Have there been any shortages of food for more than 1 month during the past 12 months?		
	1	Yes	
	3	No	
Var 13	Does your household have access to clean drinking water (not necessarily from PDAM)?		
	1	No	
	2	Yes, but only sometimes	
	3	Yes, always	
Var 14	In the event of sickness, do members of your household always receive modern medical treatment from a doctor, nurse, midwife, or traditional care from a shaman or healer?		
	1	Never	
	2	Sometimes	
	3	Yes, always	
	3	Nobody has been sick during the last 12 months	
Material Wealth			
Var 15	(PLEASE ASSESS FOR YOURSELF, DO NOT ASK) What is the quality of the respondent's house like?		
	1	Below standard	
	2	Standard	
	3	Above standard	
Var 16	(PLEASE ASSESS FOR YOURSELF, DO NOT ASK) Does the household own a motorbike or an outboard engine?		
	1	No	
	3	Yes	
Var 17	(PLEASE ASSESS FOR YOURSELF, DO NOT ASK) Does the household own a satellite dish or a refrigerator?		
	1	No	
	3	Yes	
Knowledge			
Var 18	What is the highest level of education among the adult members of your household (including the household head)?		
	1	Primary school (SR/SD) or Packet A or lower	
	2	Secondary school (SLTP) or passed Packet B	
	3	High school (SLTA) or higher or passed Packet C	
Var 19	Are there any children aged between 7 and 16 years old in your household attending school (children funded by your household)?		
	1	None attend school	
	2	Not all attend school	
	3	All attend school	
	3	No children aged between 7 and 16	
Var 20	Are there any household members with additional off-farm qualifications (e.g. healing, making handicrafts, carpentry, driving)?		
	1	None	
	2	One person	
	3	More than one person	

	CIRCLE THE APPROPRIATE ANSWERS BELOW				WRITE THE CIRCLED NUMBERS IN THE BOXES BELOW
Var 21	Do you consider your household to be poor?				
	1	Yes, it is poor			
	2	Fairly			
	3	No			
Natural Sphere					
Var 22	Do you often go into a forest (primary or old-growth forest, not new underbrush) or to a lake in the vicinity of your own village?				
	1	No			
	3	Yes			
Var 23a	How much of the natural environment (e.g. forest, swamp forest, lake) around your village is damaged?				
	1	Half or more			
	2	Less than half			
	3	None			
	99	Don't know			
Var 23b	Have there been any fires in the forest or on land near your village in the past 12 months? (NOT INCLUDING CONTROLLED BURNING OFF AND PREPARATION OF FIELDS)				
	1	Yes			
	3	No			
	99	Don't know			
Var 24	Are hornbills or lesser adjutants still present in the forest, wetlands or lakes near the village?				
	1	No			
	3	Yes			
	99	Don't know			
Var 25	During the past 12 months, have any non-timber forest products (e.g. fish, birds, wild animals, birds' nests, rattan, eaglewood) been extracted to the extent that they have virtually disappeared?				
	1	Yes, or there are almost no such products left in our area			
	3	No			
	99	Don't know			
Var 26	What is water quality like in the nearest river or lake?				
	1	Poor			
	2	Reasonable			
	3	Good			
Economic Sphere					
Var 27a, 27b & 27c	Which of the following have been the most reliable and important sources of income for your household over the past 12 months? (CHOOSE NO MORE THAN 3)				
	1	Trading	11	Other fees/compensation	
	2	Timber fees	12	Village organiser honorarium	
	3	Civil service or private salary	13	Farming (vegetables, coffee, livestock, aquaculture)	
	4	Support from family			
	5	Rubber	14	Fish (from a river or lake)	
	6	Rattan	15	Eaglewood	
	7	Birds' nests	16	Hunting	
	8	Timber	17	Other forest products	
	9	Handicrafts	18	Services (tradesman, workshop, etc.)	
	10	Store/shop/kiosk	19	Other (please specify)	

	CIRCLE THE APPROPRIATE ANSWERS BELOW		***WRITE THE CIRCLED NUMBERS IN THE BOXES BELOW***
Var 28a	How many sources of income do you have?		
	1	One	
	3	More than one	
Var 28b		Is this/Are these stable sources of income?	
	1	No steady income source	
	3	Yes	
Var 29	How is rice sufficiency in your household?		
	1	No provisions, sometimes we are unable to buy rice	
	2	No provisions, but we can always buy rice despite difficulties	
	3	We never have trouble buying rice	
	3	We have sufficient provisions to last until the next harvest	
Var 49	How difficult is it to secure business loans from DPM, a CU or a bank?		
	1	Impossible or extremely difficult	
	2	Difficult but possible	
	3	Easy	
	3	Never tried to apply and not interested	
Social Sphere			
Var 30	How willing are village community members to help each other (doing work or financially)?		
	1	Not very willing	
	2	Reasonably willing	
	3	Very willing	
Var 31	How are feelings of mutual trust among community members in the village?		
	1	Low	
	2	Medium	
	3	High (most people are trustworthy)	
Var 32	Do conflicts frequently arise between people or families in the village?		
	1	Yes, frequently	
	3	Rarely occur	
Political Sphere			
Var 33	Can you gather natural products (timber, fish, birds' nests, gold, river rocks, sand, etc.) in the region around your village to sell?		
	1	Gathering natural products is prohibited	
	2	Yes, but with difficulty	
	3	Easily	
Var 34	Does your household have daily access to news or information from TV, newspapers or radio?		
	1	No	
	2	Yes, from one source	
	3	Yes, from more than one news / information source	
Var 35	Do you or other members of your household participate in decision-making processes in your village (not including decisions made by customary councils in resolving disputes)?		
	1	Never	
	2	Sometimes	
	3	Always	

	CIRCLE THE APPROPRIATE ANSWERS BELOW		WRITE THE CIRCLED NUMBERS IN THE BOXES BELOW
Var 36	Do you consider your household to be happy?		
	1	No, it is unhappy	
	2	Reasonably happy	
	3	Yes, it is happy	
Forest Dependency			
Var 37	Did you have any produce from last year's harvest?		
	1	No, because we did not plant any crops (CHOOSE [1] IN VAR 38)	
	3	No, due to crop failure	
	3	Yes, we harvested this year	
Var 38	What was the age of the forest cleared for your swidden field?		
	1	Do not farm	
	2	Less than 5 years	
	3	Between 5 and 10 years	
	4	Between 10 and 20 years	
	5	More than 20 years	
	6	Primary forest that has never been cleared	
Var 39	In the past 12 months, have non-timber forest products (e.g. eaglewood, rattan, resin, honey, birds' nests) been important for your household in terms of income or for your own needs?		
	1	Not important	
	2	Important	
	3	Very important	
Var 40	In the past 12 months, has game (e.g. sambar deer, bearded pigs, birds, tortoises, terrapins, fish) been important for your household in terms of income or for your own needs?		
	1	Not important	
	2	Important	
	3	Very important	
Infrastructure and Services			
Var 41	How difficult is it to get to the nearest secondary school?		
	1	Very difficult / impossible	
	2	Difficult, but usually possible	
	3	Easy	
Var 42	What are lessons like in the school that children in the village usually attend?		
	1	Poor	
	2	Reasonable	
	3	Good	
Var 43	Are there any school- or college-aged children (6 to 24) in your household who receive scholarships/subsidised education from any source?		
	1	No	
	3	Yes	
	3	No children aged between 6 and 24	

	CIRCLE THE APPROPRIATE ANSWERS BELOW		*WRITE THE CIRCLED NUMBERS IN THE BOXES BELOW*
Var 44	How difficult is it to get to the nearest health facility (dispensary, community health centre, village birthing clinic, hospital, village midwife, etc.)?		
	1	Very difficult / impossible	
	2	Difficult, but usually possible	
	3	Easy	
Var 45	How good are the healthcare services where villagers in your community usually go for treatment?		
	1	Poor	
	2	Reasonable	
	3	Good	
Var 46	Do you have an Askes Gakin or Askes Kin health insurance card?		
	1	No	
	3	Yes	
Var 47	Do you have a fuel compensation card?		
	1	No	
	3	Yes	
Var 48	How often has your household bought Raskin subsidised rice (not rice donated by a company or NGO) over the past 12 months?		
	1	We frequently buy it	
	2	We sometimes buy it	
	3	We never buy it	
Var 50	Have any training, agricultural extension, courses or enterprise assistance activities been held in your village over the past 12 months?		
	1	No	
	3	Yes	
Var 51	In what condition are the roads and bridges leading to the subdistrict town?		
	1	There are none	
	2	In bad repair	
	3	In good condition	
Var 52	How difficult is it to get to the nearest market?		
	1	Very difficult/impossible	
	2	Difficult, but usually possible	
	3	Easy	
Var 53	Have you received aid for uninhabitable housing in the last 12 months?		
	1	No	
	3	Yes	
Var 54	In terms of quality and quantity, how have government support programmes been in your village over the last 12 months?		
	1	Poor	
	2	Reasonable	
	3	Good	

	CIRCLE THE APPROPRIATE ANSWERS BELOW		*WRITE THE CIRCLED NUMBERS IN THE BOXES BELOW*
Var 55	In terms of quality and quantity, how have nongovernment support programmes from companies, organisations, etc., been in your village over the last 12 months?		
	1	Poor	
	2	Reasonable	
	3	Good	
Var 56	How is your access to communications facilities: telephone, cellular phone or radio (walkie-talkie, SSB)?		
	1	Very difficult / impossible	
	2	Difficult, but usually possible	
	3	Easy	
Var 57	Can you get spiritual services appropriate to your beliefs or religion?		
	1	No	
	3	Yes	
Var 58	Are there any sports facilities, tourist objects or other places considered suitable for recreation in the village?		
	1	No	
	3	Yes	
Var 59	Have you ever heard of GSM?		
	1	Never	
	2	Yes, but am not sure what it is	
	3	I know about GSM and understand its objectives	

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CIFOR receives its major funding from governments, international organizations, private foundations and regional organizations. In 2006, CIFOR received financial support from Australia, Asian Development Bank (ADB), African Wildlife Foundation, Belgium, Canada, Carrefour, Cecoforma, China, Centre de coopération internationale en recherche agronomique pour le développement (CIRAD), Convention on Biological Diversity, Cordaid, Conservation International Foundation (CIF), European Commission, Finland, Food and Agriculture Organization of the United Nations (FAO), Ford Foundation, France, German Agency for Technical Cooperation (GTZ), German Federal Ministry for Economic Cooperation and Development (BMZ), German Foundation for International Cooperation, Global Forest Watch, Indonesia, Innovative Resource Management (IRM), International Institute for Environment and Development, International Development Research Centre (IDRC), International Fund for Agricultural Development (IFAD), International Tropical Timber Organization (ITTO), Israel, Italy, the World Conservation Union (IUCN), Japan, Korea, MacArthur Foundation, Netherlands, Norway, Netherlands Development Organization, Overseas Development Institute (ODI), Peruvian Secretariat for International Cooperation (RSCI), Philippines, Spain, Sweden, Swedish University of Agricultural Sciences (SLU), Switzerland, The Overbrook Foundation, The Tinker Foundation Incorporated, The Nature Conservancy (TNC), Tropical Forest Foundation, Tropenbos International, United States, United Kingdom, United Nations Environment Programme (UNEP), United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Forum on Forests (UNFF), Wageningen International, World Bank, World Resources Institute (WRI) and World Wide Fund for Nature (WWF).

Gönner *et al.*
Capturing nested spheres of poverty: a model for multidimensional poverty analysis and monitoring/by Christian Gönner, Michaela Haug, Ade Cahyat, Eva Wollenberg, Wil de Jong, Godwin Limberg, Peter Cronkleton, Moira Moeliono, Michel Becker.
Bogor, Indonesia: Center for International Forestry Research (CIFOR), 2007.

CABI Thesaurus: 1. poverty 2. models 3. monitoring 3. living standards 4. wellbeing 5. Indonesia
I. Title

ISBN: 978-979-1412-04-9
ISSN 0854-9818
24p.

Printed by Indonesia Printer, Jakarta

Cover photos by Christian Gönner

Published by Center for International Forestry Research
Mailing address: P.O. Box 6596 JKPWB, Jakarta 10065, Indonesia
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