



Research, part of a Special Feature on [A brave new world: integrating human well-being in conservation](#)

## “Living a good life”: conceptualizations of well-being in a conservation context in Cambodia

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**ABSTRACT.** Conservation practice has sometimes been criticized for relying on simplistic assumptions about social contexts in natural resource management. Despite recent advances conceptualizing the interface between human well-being and the environment, very few studies moving from theory to practice exist. We address this gap by providing one of the first careful examinations of local conceptualizations of well-being in a conservation context, using mixed methods to examine the multidimensionality and heterogeneity of well-being conceptualizations across three sites in northern Cambodia. Each site faced different levels of conservation activities and development pressures, the latter being mainly linked to the degree of impact from economic land concessions. Our results highlight village context as a key line of variation in individual well-being, rather than differences related to age, gender, or wealth. Our results suggest that conservation incentives that mirror people’s aspirations can balance out negative trade-offs linked to compliance and can contribute to well-being. We show that multifaceted values are attached to well-being components, highlighting the importance of subjective indicators and perceptions to capture fully the social changes and impacts of conservation in complex contexts. We conclude that enquiries into subjective well-being should become an integral part of participatory assessments and adaptive management of conservation interventions.

**Key Words:** *agricultural concessions; Cambodia; community-based conservation; human well-being; rural development; social heterogeneity*

### INTRODUCTION

Conservation practice has sometimes been criticized for relying on simplistic assumptions about social contexts in resource management and for underestimating the importance of understanding differences between, and relationships among, individuals and groups within communities (Agrawal and Gibson 1999, Waylen et al. 2013, Dawson and Martin 2015). Recently, several critics pointed out that failures in biodiversity conservation and poor social outcomes from devolved conservation policies were largely due to a lack of understanding of local social structures and values, disregard of experiences from the field, and naïve assumptions about the social context within which interventions were embedded (Wells and McShane 2004, Ban et al. 2013, Dawson and Martin 2015). At the time, researchers highlighted the difficulty of representing any given group’s perceptions of conservation impact, in part because of a lack of universally accepted approaches and the impossibility of applying a one-size-fits-all procedure (Barrett and Arcese 1995, Adams et al. 2004).

Since the late 1990s, the field of conservation has come a long way in incorporating social concepts into a biologically dominated discipline. A body of literature now reinforces the conviction that the success of conservation strategies heavily depend on communities’ structure, motivations, and aspirations (Roe et al. 2011, Brooks et al. 2013, Howe et al. 2014). Conservation projects have increasingly incorporated development goals such as poverty alleviation and sustainable livelihoods in addition to biodiversity conservation outcomes (Robinson 1993, Bossel 1999, Smith et al. 2013).

Recently, the conservation literature has begun to incorporate the concept of human well-being as a key consideration in designing successful policies and measuring intervention impacts (Agarwala et al. 2014, Fry et al. 2017). This has been driven by

attempts to improve biodiversity outcomes, but also by an ethical principle that conservation should at the very least “do no harm” to the local populations affected (United Nations 1992, IUCN 2003, 2014), and by the recognition that conservation aims are intrinsically linked with the interest or motivation that leads local people to manage their resources sustainably (McShane and Wells 2004, Barrett et al. 2005, Sunderland et al. 2007). The link between conservation and human well-being has been emphasized increasingly in international policy and reflected in conservation organizations’ mandates and activities (United Nations 1992, Cardinale et al. 2012, Gurney et al. 2015).

A human well-being framework provides a potentially powerful approach to integrating goals related to different values within decision making, which can also help to build political support and mobilize funding (Bottrill et al. 2014). Additionally, the concept of well-being allows researchers to acknowledge and evaluate trade-offs between more diverse and subjective aspects of human development and the protection of nature, which is essential for conservation management and policy decisions (Daw et al. 2015). The concept of well-being thus represents a move away from the inadequacy of one-dimensional economic proxies primarily used in the 1990s to measure development (Ravallion 2003), and presents a nonprescriptive approach for thinking through what kind of information needs to be collected for the development of more holistic indicators that represent the aspects of people’s lives that they value (Woodhouse et al. 2015).

The acknowledgement of the importance and complexity of social dynamics constitutes an invigorating (and challenging) development in conservation science. However, little empirical work has been done to date to explore local communities’ perceptions of well-being in a conservation context. Although explorations of well-being conceptualizations have been widely used in the fields of development, psychology, and health, only a

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handful of studies explore local perceptions of well-being directly linked to environmental resource management (Schaaf 2010, Abunge et al. 2013, Britton and Coulthard 2013, Dawson and Martin 2015, Poe et al. 2016).

These novel approaches are needed to explore the holistic and nonmaterial trade-offs that conservation interventions can trigger when it comes to local people's livelihoods, motivations, and strategies under changing circumstances (Berkes 2004, Sandker et al. 2009, Souto et al. 2014). This knowledge is especially important when conservation interventions such as payments for ecosystem services (PES) come into play because the success of such interventions in achieving conservation goals depends on understanding the priorities and incentives of local communities. This learning is a vital step in evaluating the impacts of conservation interventions on multidimensional well-being using bottom-up mixed methods to assess contextualized priorities of local communities.

Here, we present findings from research aiming to understand local conceptualizations of well-being in an area of northern Cambodia with ongoing conservation interventions (Clements et al. 2010). This research will serve as the basis for further analysis of the effects of conservation projects on human well-being, which will be used to guide and monitor future conservation interventions. This work represents an effort to avoid the top-down, donor-defined indicators that are often used in quantitative conservation evaluations (Vira and Kontoleon 2012, McKinnon et al. 2016).

### **Operationalizing well-being as a concept**

The concept of well-being is widely used in social science, arising in response to the inadequacy of economic proxies for measuring development and the need for more holistic indicators of growth and quality of life (Ravallion 2003). Subjective measures that are person-centred have long been established empirically in health sciences as appropriate ways to define one's quality of life, instead of externally defined objective indicators (Diener et al. 1985, Ruta et al. 1994). Across fields, well-being as concept has been used for the creation of cross-country data sets (Deaton 2007, Diener et al. 2010), national assessments and indexes (Grossi et al. 2006, Lind 2014, Topp et al. 2015), and localized contextualized studies (Adelson 2000, Donatuto et al. 2011). A prominent example is Narayan et al.'s (2000) "Voices of the Poor" research, undertaken under the World Bank's commission, which reviewed participatory poverty studies conducted in the 1990s and conducted a series of new studies across 23 countries in which poor people discussed their perceptions of a good life and a bad life. Five constituents of well-being emerged from this research: material assets, health, good social relations, security, and freedom of choice and action.

Since the 1990s, several studies have contributed to advances in conceptualizing the interface more specifically among poverty, well-being, and the environment, aiming to guide conservation practitioners toward increasing their consideration and inclusion of local perspectives (Bottrill et al. 2014, Woodhouse et al. 2015). Applications in the field of development have further provided a basis for the adoption of local considerations in conservation, including the Millennium Ecosystem Assessment (2005) and the three approaches studied by the University of Bath's "well-being in developing countries" (WeD) research (Gough and McGregor

2007). Although some researchers and practitioners argue for slightly different approaches, convergence has appeared in academic and international policy circles with respect to two main principles for conceptualizing human well-being.

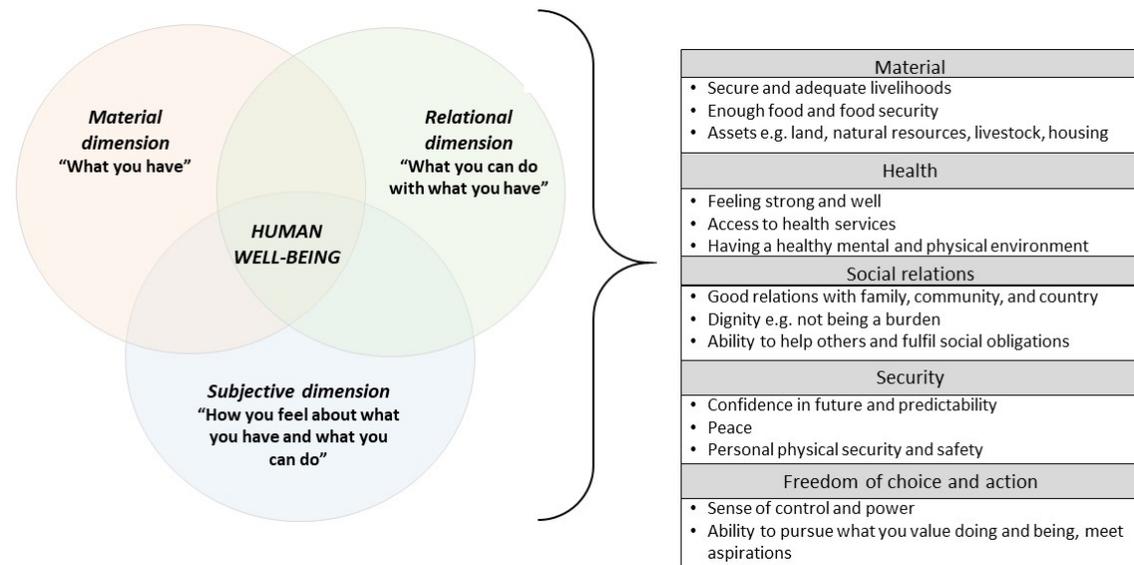
First, human well-being is a multidimensional concept (Millennium Ecosystem Assessment 2005, Gough and McGregor 2007, White 2010). Well-being can be understood in terms of three interacting dimensions: the objective material circumstances of a person, a subjective evaluation by the person of their goals and the processes they engage in to attain them, and a relational dimension capturing the person's ability to achieve those goals through social networks and interactions (Gough and McGregor 2007). Several frameworks, including Voices of the Poor and the Millennium Ecosystem Assessment, consider well-being as encompassing five primary domains across the three dimensions: material, health, security, social relations, freedom of choice and action (Narayan et al. 2000, Millennium Ecosystem Assessment 2005, Woodhouse et al. 2015; Fig. 1). Human well-being is not only multidimensional in terms of domains but also in terms of the degree to which it is shared, or collective, rather than individual (Gough and McGregor 2007, Woodhouse et al. 2015).

The second principle observed is that conceptualizations of human well-being are heterogeneous (Agarwala et al. 2014, Dawson and Martin 2015). Well-being is a social construction; hence, it needs to be defined by the individuals and communities where well-being is to be assessed (Gough 2004, Schaaf 2010). Heterogeneity can occur geographically, but also along socioeconomic lines, including, but not limited to, gender, religion, wealth status, age, ethnicity, and livelihood type (Agarwal 2001). The idea of "communities of interest" (Ziller 2004) suggests that the interests or concerns that pattern social life and underlie interactions between groups of people can be more relevant than physical location (Hoggett 1997). These two principles form a strong foundation upon which to base further research on well-being in the context of conservation. However, despite the term's popularity, well-being is rarely defined or carefully examined in an empirical context by those concerned with conservation.

One of the key steps forward is to build up a collection of case studies to draw out generalizable lessons and identify commonalities in researching and understanding conceptualizations of well-being (Milner-Gulland et al. 2014). Qualitative case studies can serve as important baseline information from which to ascertain what local populations care about and against which to gauge conservation effects at a later stage. Here, we seek to address this need by providing careful baseline examinations of local conceptualizations of well-being across conservation contexts. We do this by focusing on studying conceptualizations of well-being within a landscape in which the conservation and development context varies but the underlying attributes of the ecological and social system do not.

We investigated three sites in a northern Cambodian landscape as a case study, using qualitative and quantitative analysis to answer two overarching questions: First, how are the principles of multidimensionality and heterogeneity of well-being conceptualizations reflected in local realities in northern Cambodia? Second, what are the implications of these findings for research and for the design of conservation interventions that

**Fig. 1.** Framework for researching human well-being used in our study, based on McGregor and Sumner (2010) and drawing on the World Bank’s “Voices of the Poor” research (Narayan et al. 2000). Well-being encompasses five primary domains, which can each be seen through the lens of the three dimensions.



aim to measure and improve human well-being as part of their activities? Our hypotheses are, first, that well-being conceptualizations will vary across land-use settings (e.g., by village); and second, that important elements of peoples’ conceptualizations of well-being are also elements that conservation particularly influences, specifically, land and natural resources.

To explore these questions, we used a well-being framework that integrates the Voices of the Poor and WeD’s perspectives to provide conceptual guidelines for measuring the impacts of conservation interventions on human well-being. This framework was developed based on in-depth literature review (Agarwala et al. 2014) and consideration of a range of frameworks that embraced the material, subjective, and relational dimensions such as WeD’s work, (Schaaf 2010, Dawson and Martin 2015), or spanned social-ecological well-being components such as the Voices of the Poor/Millennium Ecosystem Assessment framework (Abunge et al. 2013, Britton and Coulthard 2013) and Poe et al.’s (2016) place-making framework.

We address correlates of human well-being across conservation contexts, rather than focusing on the underlying attributes of the social and ecological system, because quantitative assessments of the impact of specific conservation interventions on material well-being are already available (Clements and Milner-Gulland 2015, Beauchamp 2016). We test whether local conceptualizations of well-being are linked to domains affected by conservation rules, more specifically, land and natural resources, without initial biases or prompts from the researchers about conservation interventions.

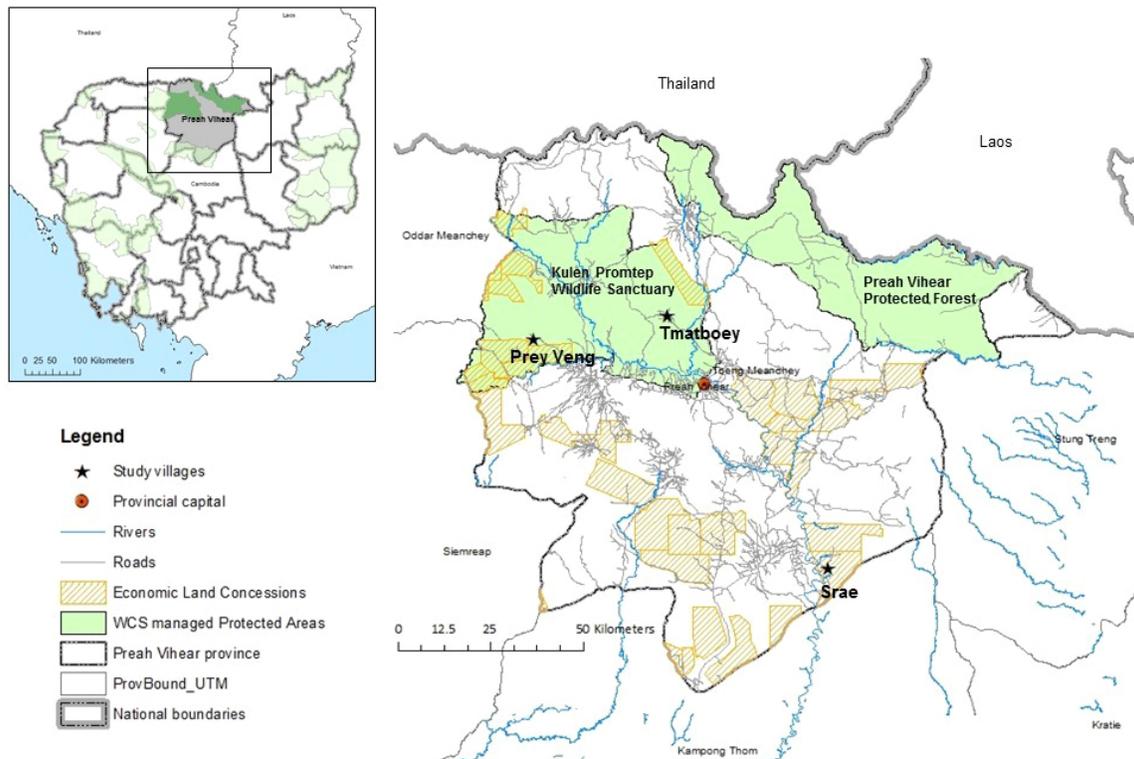
#### Positionality statement

Recent calls to integrate self-reflections in applied research fields such as development and conservation science have recommended

including a declaration of self-ethnography and explicit, more personal statements about the hard choices researchers have had to make when faced with the realities of practical research (McShane et al. 2011). The following paragraph presents the scientific approach underlying this work, including brief self-ethnographies establishing the background of the researchers (Mosse 2005). This exercise has been deemed increasingly important in clarifying the purpose and identifying potential biases in the application of scientific expertise (Jäger et al. 2013, Pasgaard 2015).

This work was done in the framework of a wider project funded by the Economic and Social Research Council and Department for International Development on “Measuring complex outcomes of environment and development interventions,” led by the Wildlife Conservation Society (WCS), Imperial College London, University College London, and University of Colorado Boulder. This paper is driven by a pragmatic desire to inform the approach of practitioners at different scales, thereby increasing the success of conservation and improving social outcomes. When considering the pragmatic users (Mertens 2003), these include the local population across the study site, WCS as the intervention manager and intermediary, but also other biodiversity conservation researchers aiming to bridge social and biological sciences in the field. Most of the authors have a primarily quantitative and academic background, generally in the biological sciences, which is reflected to a certain extent by the use of mixed methods rather than purely qualitative ones or using a full ethnographic study. Steps taken to reduce bias and improve understanding of the local cultural and political context during the implementation of the research included spending three months living in local villages, extensive country experience by two authors, learning the local Khmer language by the lead author, careful breakdown and translation of complicated

**Fig. 2.** Northern Plains landscape in Preah Vihear province, northern Cambodia.



concepts in interviews, and the training of in-country students that were independent of WCS to implement the surveys so that no link between this research and conservation organizations would be made. At a later phase of work, the same team returned to ask for permission to use the data as part of a wider evaluation of conservation impacts.

## MATERIALS AND METHODS

### Study site

Cambodia provides an interesting milieu in which to examine conceptualizations of human well-being across different conservation and development settings because it is being shaped simultaneously by both agendas. Cambodia has been governed by the same, relatively fixed, elite since the removal of the Khmer Rouge from power in early 1979, with Hun Sen and his Cambodian People's Party in power since then.

One of the clearest instances of expropriation is through land speculation, which can be observed in recent conservation and development trends in Cambodia (Diepart and Dupuis 2014). Both conservation and development are stated as priorities of the Royal Government of Cambodia's long-term "Rectangular Strategy" for development and the related National Strategic Development Plans (Royal Government of Cambodia 2014). At the same time, large-scale economic land concessions are converting large areas of land, with little evidence of conservation or local development priorities being respected (Beauchamp et al. 2018b). Although the interface and trade-offs between development and conservation interventions can be observed in

several developing countries, Cambodia presents an interesting case study because of its recent accelerating land-use change triggered by a series of recent environmental and development laws.

Since 2008, Cambodia has seen rapid economic progress, registering annual gross domestic product growth of nearly 7%, along with an average annual population growth rate of 1.7% between 2000 and 2013 (Asian Development Bank 2015; World Bank Cambodia overview: <http://www.worldbank.org/en/country/cambodia/overview>). Part of Cambodia's national development strategy takes the form of economic land concessions (ELCs), or the granting of land to private companies for investments in plantations and large-scale agriculture. Although ELCs are meant to respond to the national impetus for economic development (Phelps et al. 2013; Ministry of Agriculture, Forestry and Fisheries: <http://www.maff.gov.kh/>), disputes have arisen specifically around the unfair eviction of local communities from land, human rights abuses, and the partial pattern of ELCs granted over high-value forests and protected areas, thus affecting local livelihoods (Üllenberg 2009, Bues 2011, Hor et al. 2014, Beauchamp et al. 2018a).

The Northern Plains of Cambodia has been affected by both conservation projects and development pressure of ELCs. Located in the province of Preah Vihear (see Fig. 2), the landscape is considered an area of high biodiversity interest (Myers et al. 2000, O'Kelly et al. 2012) and contains two protected areas: the Kulen Promtep Wildlife Sanctuary, managed by the Ministry of Environment, and the Preah Vihear Protected Forest managed by

the Forestry Administration of the Ministry of Agriculture, Forestry and Fisheries. Kulen Promtep Wildlife Sanctuary was established in 1993 as part of Cambodia's first protected area network, and Preah Vihear Protected Forest was declared in 2002. Most Cambodian protected areas contain human settlements dating from before the boundaries were drawn, and the level of enforcement of protected area rules is generally low (Clements et al. 2010). These factors result in unclear property and user rights for the communities living in protected areas, where resource-use rules under Cambodian law allow local uses such as nontimber forest product collection, although forest clearance, commercial logging, and hunting or trade of threatened species are illegal. The creation of new settlements within protected areas is forbidden, and the number of households allowed to migrate to protected area villages is limited. However, villages are permitted by protected area authorities to expand agriculture to a limited extent within agreed land-use plans.

Since 2002, the international nongovernmental organization WCS has assisted the Ministry of Environment and Forestry Administration's conservation efforts in both protected areas (Clements et al. 2010, 2013a, Clements and Milner-Gulland 2015). A core effort of WCS since 2005 has been to assist communities in developing participatory land-use plans for protected area villages so that the villages gain official status and to formalize the customary tenure rights in place in the wake of the weak implementation of the 2001 Land Law (Clements et al. 2014). The participatory land-use plans clearly delineate the areas around villages that farmers are permitted to clear for growing rice or other produce vs. those kept under strict protected area management rule, thus limiting the conversion of habitat to rice fields (Clements et al. 2010). The three PES schemes were designed in response to a high level of threat in a situation in which conservation opportunity costs for forested land, or in other words, the pressure of not expanding agricultural land, were moderately high (Clements et al. 2010).

Ecotourism projects have been established in three villages to date: the most prominent one started in 2005 in Tmatboey, the second project was established in 2008 in Dongplat, and the third began in 2010 in Prey Veng (Clements et al. 2010, Clements 2012). The three sites contain high-profile target species such as Giant Ibis, which attract international bird watchers. The ecotourism program aims to conserve globally threatened wildlife by establishing local village-level tourism that directly links the revenues received from tourists to the preservation of the species' habitat.

The Ibis Rice scheme started in the four core villages of Tmatboey, Dongplat, Prey Veng, and Narong in 2008. This program was designed as a more viable option for large-scale replication across the Northern Plains, compared to the restricted number of ecotourism opportunities possible. The scheme has now been expanded to 11 villages. Under this agri-environment payment program, farmers who keep to local land-use planning rules and the no-hunting rules of the protected area are allowed to sell their rice at a higher rate than the traders' price through to the third-party marketing organization Sansom Mlup Prey through a village-level committee responsible for management of the land-use plan. The participatory land-use plans thus provide the basis for monitoring the Ibis Rice project (Travers et al. 2014).

Finally, the bird nest protection program, which started in 2003 and is now implemented across > 24 villages, provides small direct payments (up to USD \$5/day) to local villagers who report and protect the nest of a specific endangered bird species during the nesting period (Clements et al. 2013b). The endangered bird species found in the Northern Plains are particularly vulnerable to human disturbance, particularly the collection of nests for eggs and chicks by local people for consumption and trade (Clements et al. 2013b). This program was designed to locate, monitor, and protect nesting sites around villages, providing a small direct payment to individuals who would report and successfully protect the nests until the chicks fledge as an alternative incentive.

Households across the landscape are composed of subsistence farmers with similar livelihoods revolving around small-scale rice farming, with additional nontimber forest product harvesting and fishing. Collecting liquid resin from dipterocarp trees has also traditionally been an important livelihood in these communities (Rainey et al. 2010, Clements et al. 2014). This region of northern Cambodia has few ethnic minorities and has seen fairly consistent improvement in economic development since 2008 (Clements and Milner-Gulland 2015). Within this dynamic system of social, economic, and environmental change, three sites were chosen for examination because of their contrasting conservation and development contexts. This approach was considered the best to capture the most variation in local well-being conceptualizations across the area.

Tmatboey is a core village for conservation projects in Kulen Promtep Wildlife Sanctuary, with all three PES schemes running since 2008. It is one of main villages where WCS has been involved since the start of its activities in the Northern Plain in 2005. Tmatboey features high local community involvement in the three PES schemes and contains mature village-level institutions. For example, the local ecotourism scheme has been independently run by village institutions since 2012. The village has not been affected by ELC pressures.

Prey Veng has also been included in the three conservation schemes, but joined at a later stage in 2010. Hence, community involvement in conservation and village-level conservation institutions are still developing. In 2008, conflict with an ELC over the southern part of the village's land erupted. Following collective action supported by WCS, the ELC gave back most of the land, and the conflict was resolved. However, the proximity of the ELC suggests the potential for future conflicts to occur.

Srae is located outside of the protected areas and does not feature a conservation project. However, it has been faced with high pressure from ELCs, two of which together cover the entirety of the village and its agricultural land. This situation has been a source of unresolved conflict since 2009.

## Methods

### *Data collection*

Research was conducted between October 2013 and May 2014. On average, one month was spent in each village, during which the interviews were conducted, to allow villagers to become accustomed to the researchers' presence, with the aim of dispelling suspicions and to reduce strategic bias or lack of openness (Sheil and Wunder 2002). A complementary set of focus groups, semi-structured interviews, and key informant interviews was used to

**Table 1.** Interview statistics across villages.

Village	Population	Total interviews	Interviewee subgroups					
			Female	Male	Older	Younger	Richer	Poorer
Village A	315	21	10	11	11	10	11	10
Village B	85	17	10	8	11	7	8	10
Village C	105	18	9	8	6	11	8	9
Total	505	56	29	27	28	28	27	29

gather information at the relevant household and village scales. Discussions were conducted in Khmer by interviewers who were not from the villages and who were usually of the same gender as the respondent to minimize the chances of making the respondent uncomfortable when talking about potentially sensitive issues. Participants for individual interviews and focus groups were chosen randomly from a hand-drawn map of the village and according to the households' availability.

All research protocols were approved by the Imperial College Research Ethics Committee before the start of the research. Prior to each interview and focus group, the purpose of the research and content of the interview were explained. Participants were informed they were not obliged to participate, that they could stop the interview at any point, and that all their answers would be kept anonymous. Because of low levels of literacy, verbal consent was obtained. To avoid strategic bias in responses, our research group members were clearly introduced as independent social researchers.

Focus groups and key informant interviews were first conducted to understand the population dynamics in the village and to confirm meaningful issues in the communities. Two focus groups were held in each village for each gender, comprising six to nine individuals each, to provide triangulation for individual interviews and additional understanding of factors affecting perceived changes in well-being at the village level. Households were chosen randomly from a hand-drawn map of the village, and one participant per household was selected, taking into account gender and availability to participate. Focus groups provide a forum to explore themes around well-being and to attribute causes to changes at the village level. They were first asked to discuss "what it means to have a good life." Following the free-list of as many components as they wished, participants were then asked whether each named component had improved or deteriorated at the village level over the preceding three years, with a focus on the causes of changes. Changes observed were rated on a Likert scale from highly positive (+3) to highly negative (-3).

The individual semi-structured interviews focused on defining personal conceptualizations of well-being for the respondents (Table 1). Available villagers willing to participate were chosen within randomly selected households, with the sample roughly stratified by age, gender, and wealth status to improve representation across demographic subgroups. Age groups were simplified into two categories to reflect generational perceptions for those < 40 and > 40 years old, the latter of which reflects a mature age. The wealth status of each household was identified during a field visit via discussions with key informants classifying the household as either above or below the average household status in the villages.

Interviews were semi-structured, allowing new questions and topics to be discussed according to the individual's responses. Questionnaires were designed to elucidate important aspects of human well-being for individuals using free-listing so as to place responses within the broad context of the respondent's life and to avoid imposing categories or prompting responses. Respondents were asked to list as many things as they wished in response to the question: "For yourself, what does it mean to have a good life?" Respondents could respond in their own words and with no interruptions; interviews lasted 30–90 min across the sample. The respondents were asked to describe why the responses mentioned were important, which drew out links between different components of well-being. They were also asked about their personal satisfaction with, and issues they faced with regard to, each component of well-being they had named. The sample size was guided by principles of data saturation, i.e., the point at which further interviews did not bring up further themes or new ideas (Seale 1999, Guest et al. 2006, Mason 2010).

*Qualitative analysis*

The semi-structured interviews and focus groups provided insights on conceptualizations of well-being across three villages. Qualitative analysis took the form of narrative analysis, which seeks to preserve the integrity of personal biographies or a series of events that cannot be understood adequately in terms of their discrete elements (Riessman 2005). Responses and personal stories told during interviews were thematized by consensus among the three members of the field team, who all spoke Khmer. The narrative analysis followed an iterative process during which responses were first grouped by theme based on the component named and on the reason for its importance. For example, if a respondent's answer was, "Pigs are important because they provide for alternative sources of income," the response was grouped with other income diversification responses. However, if the response was, "Pigs are important because they provide for alternative sources of protein," then the response was categorized in terms of food, with regard to the quality of nutrition intake. The respondent's satisfaction with the component, and changes in this area of well-being over the preceding three years, provided grounds upon which to triangulate the meaning of the component for a particular individual.

The categorization followed an iterative process through which typologies of well-being components were developed after data collection in each village (Caracelli and Greene 1993). Data entry captured the entirety of the interview scripts, giving the team an overview of all the data. Typologies were then inductively defined and consolidated in the light of the data from all three villages using the dimensions and domains of the framework for researching human well-being (Fig. 1). Responses were first categorized as a component and then placed in a corresponding

domain. Although the aggregation required for quantitative analysis reduces the ability to capture nuances, the multidimensionality and meaning of each component is highlighted in Table 2 with examples from the categorization process. Results are accompanied with quotes to convey the granularity of cultural meanings and social dynamics in the Cambodian villages. Often, components are valued and thought of in many ways simultaneously, with different themes being strongly interrelated. Table 3 provides examples of the how quotes were categorized into components using both the “what” and “why” along with further discussion from the interviews. Quotes are used to support quantitative results and to represent better the local expressions of well-being. Changes in satisfaction with well-being components expressed during focus groups were aggregated at the village level because no significant difference was observed between women’s and men’s groups from the same village.

**Table 2.** Variables used in regressions as main predictors of variation in human well-being.

Variable	Variable type	Description
Component	Binary	Yes = ranked in top three of interview No = not ranked in top 3 of interview
Age	Binary	Younger = < 40 years old Older = ≥ 40 years old
Sex	Binary	Male Female
Wealth	Binary	Richer than average village household Poorer than average village household
Village	Categorical	Village A = high conservation / low pressure Village B = medium conservation / medium pressure Village C = low conservation / high pressure

#### *Salience analysis*

Free-lists were analyzed using the concept of cultural salience as defined by Bernard (2006). Cultural salience can be calculated using the following equations.

$$Salience = \frac{1 + Length_i - Position_i}{Length_i} \quad (1)$$

$$Cultural\ salience = \frac{\sum Salience_i}{n} \quad (2)$$

Each well-being component named during an interview has a salience score. Cultural salience refers to the importance of a component to the culture of the studied communities, aggregating the salience of components across all respondents. This assumes that components mentioned earlier in a free-list are more salient than components named later, and that components mentioned by more individuals are more salient (Stryker and Serpe 1994). For this reason, we also used the frequency of components mentioned in the analysis to reflect the recurrence across interviews as a measure of centrality across respondents. For

example, a low salience score can reflect either a component named early by few respondents, or a component named later by most respondents.

#### *Statistical analysis*

Binomial regression was used to explore the relationship between the 10 most culturally salient well-being components and hypothesized predictors of variation within the landscape, namely gender, age group, wealth status, and village in individual interview responses (Table 2). Individual component binomial regression models were fitted as a binary response (yes/no) depending on whether that component had been ranked in the top three of a respondent’s free-list. Despite the structure of the data collected, the addition of village as a random effect instead of as a fixed factor resulted in null or very low variance and associated standard deviation in the random effect, so village was treated as a fixed factor. Pearson Chi-squared tests were used to confirm whether there were significant differences in the frequency of components named between demographic subgroups and between villages.

## RESULTS

### **Domains of well-being**

In most interviews, the most frequent first response to “What does it mean for you to have a good life?” was “agricultural land.” Indeed, agricultural land has the highest salience score (0.59) and frequency (77%) across all villages (Table 4).

*“Land is life. It provides for everything.” – 56 year-old man, Tmatboey.*

When talking about land, respondents clearly specified its agricultural function and associated this mainly with rice production, and sometimes with cash crops, which are a rapidly expanding new source of income. Such land is distinctively considered separate to other natural resources, which include their own references by respondents to the common-pool resources of forests, grasslands, and nontimber forest products.

Within the top ten most culturally salient components, eight can be categorized as material resources while one relates to health and one to social relations. Well-being components with salience scores > 0.30 or with > 50% frequency include food, health services, income from livelihoods, and education services. Natural resources came up as the sixth most salient component, with a frequency of 61%, yet a salience of 0.29. Natural resources are primarily referred to as a source of consumption and income, especially in Tmatboey, where ecotourism has taken off. However, the value of ecosystem services provision is also recognized.

*“Forest is my friend: It gives me wood for my house and my fire, leaves and wildlife to eat, and it makes money from tourists. It is also good because it keeps rain water in the soil.” – 32 year-old woman, individual interview, Prey Veng.*

A house, agricultural material, water availability, the road, family and love, and solidarity in the village were all named by at least one-third of respondents. Across the landscape, respondents’ conceptualizations of well-being did not include elements related to freedom of choice and autonomy.

**Table 3.** Quotes exemplifying the categorization process.

Component	Primary level	“What does it mean to have a good life?”	“Why is this important?”
Agricultural land	Household	“More land”	“Land is good quality, but we have eight members in my family so need bigger plot”
Food	Household	“Land is life. It provides for everything”	“Land is our food, our way of life, our extra income, and our tradition”
		“Enough good food: Malis rice (species) ideally, three times a day with vegetables and fish” “Meals three time a day, with rice, vegetables, and mix of fish or meat”	“To make your family strong, get energy to go to school and work” “To keep healthy, work well, and have a good life”
Health services	Household	“A health centre with qualified doctor and enough medicine and materials”	“Better health means better lives. Good doctors and materials are needed to keep our family from diseases. If not far, you don’t spend much time or money getting there”
	Household, Village	“Health and access to medicine”	“Be healthy to be well. Have enough medicines to treat diseases, enough health staff at the nearest post”
Income from livelihoods	Household	“Some money on top of farming”	“With money can buy medicine, repair materials that break, buy food and clothes, and give a bit to children for school”
		“Earn some income from a secure livelihood”	“Good job, farming or other, to support all the family. Ideally you enjoy it, but most times you have no choice”
Education services	Village	“More teachers with proper training and who go teach regularly. Simple school building is okay, but need teachers”	“Schools are factories to produce human resources. With knowledge, children can go work to help develop the village, the country, and Cambodian society”
	Household	“Children to be able to attend school”	“Good human resources in family means wealthy family, helps develop the country too. If you give money to children, that will run out one day, but knowledge doesn’t leave them”
Natural resources	Household, Village	“A big forest with a lot of wildlife”	“Good timber for houses, absorbs rain, provides firewood, and is where the wildlife stays. Important for ecotourism as ‘No forest, no people!’”
	Household	“Nontimber forest products”	“You can buy a straw roof and collect to eat (tastes good!) or to sell”
House	Household	“A clean and solid house”	“A house should be big enough for family, solid against the rain and storms, kept clean to make the family happy and comfortable”
		“A house that fits your needs, with a least of metal sheet roof. But depending on your status, you can have a bigger one (with two or three roofs with tiles)”	“It protects from the sun and rain. Also so relatives can come visit easily and often; it brings status in village”
Agricultural material	Household	“A good axe, knife, and machete at least. A tractor if you can afford” “A mini-tractor for my family”	“You need it to make your livelihood, ideally to make the activity faster and less hard” “To prepare land, transport products, and make farming faster than cattle”
Water availability	Household	“A well near the house”	“To cook, grow vegetables, clean: helps being free of diseases. If close to house, is better because water is heavy to carry”
		“A good well”	“For daily use at home: to wash, cook, and grow a vegetable garden”
Family and love	Household	“A happy family”	“If the family is not happy and don’t listen to each other, it causes stress and worries”
		“Taking care of each other in the family, listen to each other, and no verbal or physical violence”	“A caring family can work well together and have good life, get good income, children will be happy. If we don’t get along, it’s stressful for all members!”

**Table 4.** Salience score and associated frequency of well-being components named in individual interviews across the three villages, ranked according to cultural salience.

Well-being domain	Component named	Frequency	Cultural salience
Material	Agricultural land	77%	0.59
Material	Food	46%	0.35
Health	Health services	57%	0.34
Material	Income from livelihoods	43%	0.32
Material	Education services	59%	0.30
Material	Natural resources	61%	0.29
Material	House	46%	0.27
Material	Agricultural material	41%	0.25
Material	Water availability	36%	0.21
Social relations	Family and love	38%	0.21
Material	Roads	43%	0.20
Material	Livestock	29%	0.18
Material	Transportation material	23%	0.13
Social relations	Solidarity in the village	32%	0.09
Material	Clothing	16%	0.09
Material	Market access	16%	0.07
Security	Access to natural resources	16%	0.06
Material	House materials	11%	0.05
Health	Hygiene	5%	0.05
Material	Infrastructure: electricity	9%	0.04
Social relations	Religious services	13%	0.04
Social relations	No violence	5%	0.03
Security	Equality and ethics in the village	4%	0.01
Security	Security and safety	4%	0.01
Social relations	External development support	2%	0.00

**Geographies of interest**

Comparing the three villages showed that the frequency of components named in each well-being domain varied considerably among land-use contexts (Table 5). Respondents from Tmatboey were significantly more concerned with components from the social relations dimension, followed by those from Srae. Tmatboey respondents also discussed issues related to the security dimensions of well-being more often than those from the other two villages, especially issues related to access to land and natural resources, and equality and ethics in the village.

In contrast, only minor differences were observed between demographic subgroups. Men mentioned components related to the domain of health slightly more often and components related to security more than twice as often as did women. The older age group named health and social relations well-being components more frequently than did the younger group. Lastly, richer than average households tended to state components in the health category more frequently, whereas households poorer than average spoke more often of social relations. However, none of these differences between demographic subgroups were significant ( $P < 0.05$ ; Table 6).

A more detailed look at the differences between villages was taken by singling out the top ten most culturally salient components across the landscape and running binomial regressions to detect whether membership of a subgroup or village was a significant

predictor of well-being preferences (Appendix 1 Table A1). Only three models came out with significant variables (i.e.,  $P < 0.05$ ): agricultural land, income from alternative livelihoods, and family and love.  $R^2$  values were generally low, except for family and love; younger people and those in Srae were more likely to highlight this factor as important.

**Table 5.** Frequency of components named in individual interviews in each village, aggregated by well-being category. ELC = economic land commission.

Well-being category	Village A high conservation/low ELC	Village B moderate conservation/moderate ELC	Village C low conservation/high ELC
Material	100%	100%	100%
Health	57%	59%	61%
Social resources	95%	41%	72%
Security	33%	18%	17%
Freedom	0%	0%	0%

**Table 6.** Frequency of components named in individual interviews by demographic subgroups, aggregated by well-being category.  $P$ -values from Pearson Chi-squared tests between demographic subgroups.

Well-being category	Male	Female	Older	Younger	Richer	Poorer
Material	100%	100%	100%	100%	100%	100%
Health	63%	55%	63%	55%	64%	54%
Social resources	70%	72%	74%	69%	61%	82%
Security	33%	14%	22%	24%	18%	29%
Freedom	0%	0%	0%	0%	0%	0%
$P$	Male vs. female, 0.06		Older vs. younger, 0.12		Richer vs. poorer, 0.91	

Variation between villages in the salience of components was more frequent than between age groups, whereas gender and wealth were found not to be significant predictors of components' salience. Srae respondents notably focused on income from other livelihoods and family and love, as more prominent components in their conceptualizations, whereas agricultural land was more likely to be named as one of the top three components in a free-list in Prey Veng. The latter village has seen an increase in the conversion of rice field to new types of crops, mostly by younger families.

*“Life is better than before, even if I lost my resin trees. I now grow cassava on new land and get more money from traders.”* – 24 year-old man, individual interview, Prey Veng.

There appears to be a generational divide in well-being preferences: Younger generations prefer diversifying income sources from other livelihoods, rather than traditional livelihoods such as being only a rice farmer. Family and love also ranks higher in younger respondents' well-being conceptualizations.

**Developments since 2015**

Perceived changes in the status of named components of well-being during focus groups were mostly positive, yet variations

between villages were observed (Table 7). The perceived condition of agricultural land, in terms of current quantity and quality, was seen as highly increased in Tmatboey and moderately increased in Prey Veng, but moderately deteriorated in Srae. Whereas Prey Veng has seen the return of most of the land first taken by an ELC, a large section of Srae's agricultural land, and hence, the primary source of food and money for many households, has been claimed by ELCs.

**Table 7.** Perceived changes in well-being component satisfaction from focus groups across villages, ranked according to cultural salience. Changes rated as: highly positive, + + +; moderately positive, + +; slightly positive, +; no change, 0; slightly negative, -; moderately negative, - -; highly negative, - - -.

Well-being component	Village A	Village B	Village C
Agricultural land	+ + +	+ +	- -
Food	+ +	+ +	+ +
Health services	+ +	+	+ + +
Income from livelihoods	+ +	+	+ + +
Education services	+ +	-	+ +
Natural resources	+ +	- -	- - -
House	+	+ +	+ +
Agricultural materials	0	+ +	+
Water availability	+ +	+ +	+ + +
Family and love	+	+ +	+ +
Roads	+ +	0	+
Livestock	+	0	0
Transportation material	+ + +	+ +	0
Solidarity in the village	-	+ +	+ + +
Clothing	+ +	+ +	+ +
Market access	0	+	+
Access to natural resources	0	0	- -
House materials	+ +	0	+ + +
Hygiene	0	+	+
Infrastructure: electricity	0	0	+
Religious services	0	+	0
No violence	+ +	0	0
Equality and ethics in the village	0	+	+ + +
Security and safety	+	0	0
External development support	0	+ +	+

*"We lost our land to the ELC three years ago. Now we have to borrow rice from other families, and our children have to work with us to pay back our debts."* – Man, focus group, Srae.

Prey Veng and Srae also recorded negative changes in the condition of their natural resources, and access to natural resources had moderately decreased in Srae. Respondents linked these changes to the presence of ELCs in their village area and also to the ripple effects of intraprovincial corruption and illegal logging. These external pressures are strongly influencing the villagers' livelihood strategies, causing villagers to turn to alternative livelihoods such as timber logging in Srae, where no conservation measure is in place.

*"My husband started timber logging a month ago, the trader advanced us the money for the chainsaw. It doesn't matter because if we don't cut our own trees, outsiders*

*will come and take them."* – 37 year-old woman, individual interview, Srae.

The resolution of conflict and the presence of conservation actions seems to have made a difference in moderating the negative impacts of the ELC on the forest in Prey Veng, albeit local conservation efforts are still developing.

*"Four years ago, there was the ELC and a lot of outsiders coming to cut our trees. Since the Community Protected Area was established, there is more control against these activities, and things will get better soon."* – Woman, focus group, Prey Veng.

Both focus groups in Tmatboey underlined that solidarity in the village had deteriorated over the preceding three years. This change was also reported by individual respondents.

*"We are not helping each other as much as before because money has become more important. For example, we now sell food to each other instead of sharing."* – 56 year-old woman, individual interview, Tmatboey.

By contrast, focus group respondents from Prey Veng and Srae registered improvements in solidarity in the village over the preceding three years. Srae also notably recorded highly positive perceived changes in equality and ethics in the villages, linked to Srae's response to the two ELCs over their land.

*"To increase security against outsiders, we had to increase solidarity in the village."* – Woman, focus group, Srae.

## DISCUSSION

We used mixed methods to explore the composition of, and variation in, well-being conceptualizations across three villages. This process was the first stage of developing meaningful constructs that could be used to assess the effects of conservation on the lives of people living in northern Cambodia. The case study supports the hypotheses that conceptualizations vary by village and land-use context, but with a strong overlap of land-related contexts, a primary area of concern for conservationists developing interventions in the study site. Our study also highlights the multidimensionality and heterogeneity of well-being conceptualizations, shedding light on features that are key to understanding the social dynamics of the landscape in which a conservation project is implemented.

Grounded knowledge, rather than generalization, about which well-being dimensions are prioritized and how that varies across a landscape is required when it comes to designing realistic project goals and incentives, supporting and building local governance in a dynamic landscape, and understanding intervention impacts. Having a baseline and an understanding of the multifaceted local well-being priorities thus becomes a critical issue for assessing the impacts of community-based conservation efforts on local well-being, deriving lessons learned for sustainable adaptive intervention management and adjusting to shifts in well-being priorities in communities as time passes.

### "Land is life"

Considering the multidimensional experiences of well-being within a society can provide valuable information about priorities for the local population and drivers behind local behaviors. In

this case, the salience and centrality of land in Cambodian life reaffirms the importance of traditional agricultural practices in the study sites. However, dimensions related to social relations, health, and security were also central to human well-being in the area. Most components were linked with the well-being of the household rather than the individual or a wider community, which also reflects the traditional unit of life in Cambodian society. The higher salience of family and love, in contrast to solidarity in the village, supports the view that conceptualizations occur primarily at the household level. Young couples generally operated as separate economic units after only a few years of marriage.

*“Having a good life is having a good rice field to take care of your wife and children. You care for one another and work together as a team.”* – 27 year-old man, individual interview, Tmatboey.

While land falls within the material well-being domain, conceptualizations of well-being were highly multidimensional. The claim that “land is life” is itself multifaceted, representing the status and condition of a villager’s land, the food and livelihood derived from farming, the security of providing for future household needs, as well as a form of status within the village. Creating and implementing rules to prevent land expansion in conservation areas is likely to be a sensitive issue with villagers. However, in a context of high development pressure, gaining security of access to land and protection from ELCs can potentially offset the concern of losing the opportunity to increase livelihoods by farming more extensively. In fact, Tmatboey and Prey Veng respondents reported positive changes to the status of agricultural land and maintained access to natural resources after conservation interventions to implement participatory land-use plans. Our results suggest that conservation incentives that mirror people’s aspirations can overcome negative trade-offs and contribute to well-being.

#### **Well-being in a dynamic social system**

Heterogeneity in well-being conceptualizations between individuals and communities has been highlighted as an obstacle to collective action (Agrawal and Benson 2011); hence, responding to communities of interest at an appropriate scale is essential for conservation to match project governance with system dynamics. We found geographical location (village) to be a more important factor than gender or wealth in explaining variation in conceptualization of well-being, with generational variation being an important secondary line of variation.

Tmatboey respondents reported the highest frequency of named components in the social relations dimension, despite recording a decrease in solidarity in the village. Similarly, the adverse effects of ELCs in Prey Veng and Srae seem to have increased the relative value that respondents gave to agricultural land and respondents’ sense of community solidarity compared to those in Tmatboey. This result falls in line with notions that responding to adversity, in these cases the presence of an ELC, can be a strong driver of formation of communities of interest (Dalby and Mackenzie 1997). Presenting a united front against a common threat can be a strong basis for creating collective thought and action. Adversity may alter well-being preferences and provide a suitable institutional and governance system under which local collective action can be undertaken (Ostrom 2000, Agrawal and Benson 2011).

Britton and Coulthard (2013) found that discussing challenges allowed communities to establish new social networks during crises. Such is the case in Prey Veng, where feelings of solidarity, equality, and ethics in the village increased over the three years following the fight against the ELC. In this case, conservation seems to have played a positive role for the village because the presence of nongovernmental organizations helped them get land back. This contrasts with the situation in Tmatboey, where the only well-being component seeing a decrease was solidarity in the village. With the success of the ecotourism and premium rice PES schemes in Tmatboey came a commodification of rural life and further exposure to economic development, damaging the traditional spirit of solidarity in the village.

However, solidarity in the village could be affected by other factors as well. Clements and Milner-Gulland (2015) showed that the ecotourism and premium rice interventions operating in Tmatboey have increased the material well-being of participants, but that these participants were better off than average to start with and were more likely to belong to village elites. In fact, participation in PES programs is voluntary, and often only families that can afford to divert labor out of one of their current livelihoods tend to participate (Mahanty et al. 2013). Other studies on local perceptions of well-being (Coulthard et al. 2011, Abunge et al. 2013) have stressed that although conservation interventions can improve the well-being of some stakeholders, this often conflicts with the freedoms and well-being of others whose access and conditions may have been compromised by the new rules and institutions required to deliver the conservation outcomes.

The differences in perceived changes across the three villages cannot serve as a basis for attributing whether conservation and ELC presence have caused such changes. However our research points to the human well-being components affected with the most variance by land-use dynamics. Components such as food, health services, income from livelihoods, and clothes all remain unchanged or positive, which suggests that household-specific socioeconomic status and external development drivers such as distance from provincial can be more influential than land-use interventions (Beauchamp et al. 2018a). Components of land and natural resources are most affected, but so are related relational and subjective components such as solidarity in the village and access to resources. These results confirm the importance of including subjective indicators and perceptions when assessing social change along with quantifiable resources to capture fully the impacts of conservation in complex contexts.

#### **Implications for conservation interventions**

Conservationists have responsibilities toward the communities in which they work to ensure, at the very least, that they do not harm people (Roe et al. 2010); however, negative consequences can occur from imperfect implementation or from unintended side-effects (Bottrill et al. 2014, Larrosa et al. 2016). Our case study suggests that, despite conservation rules restricting one of the most salient components of communities’ well-being, positive well-being outcomes can be perceived by local communities in the face of external pressures (Beauchamp et al. 2018a). Even more so, the presence of a trusted mediating nongovernmental organization supporting village institutions can successfully help to resolve land conflicts with ELCs (Ingram et al. 2014, Lambrick

et al. 2014). The institutional arrangements created by PES in the villages provides a successful alternative to the inequality of the Cambodian national land system (Clements et al. 2010).

Our study also shows that successful conservation projects can nonetheless open the door for disagreements and perceived unfairness in communities, damaging community solidarity and potentially hindering the long-term benefits of a program. Addressing this issue will require understanding how people view the effects of conservation on their lives because their perceptions will affect engagement and participation in interventions. Under the current fast-paced change in Cambodia, village structures, local institutions, and thus, motivations for cooperation and incentives for conservation are likely to change rapidly (Nilsson et al. 2016). Failure to adapt to changing incentives could mean the failure of years of conservation-linked community development assistance.

Given the generational divisions we highlighted, attention should be given to building local entities that are representative at the village level and that accommodate both the traditional views of older generations and the aspirations of youth. Catering to younger generations is especially important in the Cambodian context of a population structure imbalance due to the post-Khmer Rouge baby boom (Hukin 2014). Considering the lack of educational infrastructure in Cambodia, the development of conservation-oriented educational programs and infrastructures could be particularly powerful. Failure to address the aspirations of young people could lead to generational gaps in maintaining village-level institutions and declines in conservation participation in the long run.

#### **Implications for future research**

Most quantitative evaluations focus on observable indicators, or the material, observable dimensions of human well-being such as standard economic measures of development (Vira and Kontoleon 2012, McKinnon et al. 2016). These measures fail to capture well-being outcomes considered relevant by local people such as tenure security, education, ability to insure against shocks, and political power (Sen 2001, Agrawal and Redford 2006, Gough and McGregor 2007). Using contextualized exploration of well-being as a sequential stage in conservation evaluations can help to develop better adapted indicators of conservation success and to point to areas of failures where more attention is needed, for example, solidarity and social inequality. Well-being components can therefore be useful as a more holistic socioeconomic indicator for elucidating subtle conservation impacts on people, which effects are among the most complex to assess because they affect multiple aspects of human lives (Woodhouse et al. 2015).

Gauging the extent to which changes in well-being were actually caused by the conservation intervention to date in our case study would require a well-being baseline established at the beginning of the project. Examples of such work are rare; however, our work, performed in collaboration with WCS, illustrates the growing recognition of conservation nongovernmental organizations of the need to adopt human-centered and participatory approaches to reinforce conservation management. These innovative steps are mirrored by the emergence of practical guidelines aiming to support practitioners in the implementation of a well-being approach in conservation (Woodhouse et al. 2016). Nonetheless, local perceptions of the correlated relationships between

interventions and well-being change can be obtained post-hoc, as in our study.

Using the concept of well-being is not without challenges, mainly because of its inherently subjective nature. First, the determinants of subjective well-being can change radically when a situation changes (Fry et al. 2017). Therefore, the process of establishing domains needs to be repeated each time well-being is assessed, rather than simply asking about changes in already-described domains. It is not possible to assess well-being change against a static baseline. Additionally, just as conceptualizations of well-being vary, so do individual timelines for perceiving changes in their well-being. For example, some individuals might consider perceived changes over one or two years while others might compare their well-being over a longer time frame. Therefore, working through a well-being framework requires constant adaptation at different geographical and temporal scales. Additional case studies are needed to provide the evidence supporting the move from theory to real-life application and to identify potential commonalities in well-being conceptualizations across different settings, especially with regard to the perceived effects of interventions on village solidarity, equality, and ethics.

#### **CONCLUSION**

The value of exploring complexities in well-being conceptualizations is shown through the improved understanding of the multidimensionality of valued components and the disaggregated heterogeneity highlighting social dynamics in the communities studied. Enquiring about conceptualizations of well-being and integrating local perceptions of change should become not just a preliminary step, but an integral part of the participatory process of conservation interventions, including impact evaluations. The bottom-up approach used here provides some of the internal validity needed to complement large-scale policies, capturing the multidimensional and heterogeneous dynamics of the system, which is required for effective project design and accurate evaluation (Leach et al. 1999, Gurney et al. 2015).

*Responses to this article can be read online at:*

<http://www.ecologyandsociety.org/issues/responses.php/10049>

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Predictors	Agricultural land			Food			Water			Education services			Health services		
	Coef	S.E	p	Coef	S.E	p	Coef	S.E	p	Coef	S.E	p	Coef	S.E	p
Intercept*	0.16	0.67		<b>-1.48</b>	<b>0.75</b>	*	<b>-1.76</b>	<b>0.88</b>	*	<b>-1.36</b>	<b>0.82</b>	.	<b>-1.85</b>	<b>0.80</b>	*
Women	0.18	0.60		0.72	0.64		-0.12	0.79		0.47	0.76		0.86	0.72	
Younger	<b>-1.44</b>	<b>0.64</b>	*	0.21	0.64		-0.34	0.79		0.34	0.77		0.04	0.70	
Richer	-0.21	0.59		-0.35	0.62		0.88	0.78		0.07	0.74		1.64	0.72	.
Village B	<b>1.75</b>	<b>0.77</b>	*	-0.15	0.78		-0.58	0.95		-1.94	1.15	.	-0.83	0.78	
Village C	0.38	0.70		1.00	0.73		0.02	0.87		-0.72	0.82		-1.19	0.85	
R <sup>2</sup>	0.20			0.12			0.08			0.18			0.23		
Predictors	Natural resources			Income			Family & love			House			Agricultural material		
	Coef	S.E	p	Coef	S.E	p	Coef	S.E	p	Coef	S.E	p	Coef	S.E	p
Intercept*	-1.68	0.89	.	-1.09	0.80		<b>-3.95</b>	<b>1.59</b>	*	-1.51	0.80	.	-1.21	0.89	
Women	-1.13	0.80		-0.41	0.69		-1.54	1.09		-0.67	0.69		-0.94	0.83	
Younger	0.02	0.77		-0.76	0.69		<b>2.83</b>	<b>1.36</b>	*	0.67	0.70		0.99	0.84	
Richer	0.51	0.75		-0.45	0.68		-1.23	1.13		0.02	0.67		-0.74	0.83	
Village B	-0.16	1.00		0.38	0.91		-0.16	1.55		0.61	0.79		-0.08	0.88	
Village C	1.07	0.87		<b>1.80</b>	<b>0.80</b>	*	<b>2.45</b>	<b>1.36</b>	*	-0.17	0.86		-1.57	1.22	
R <sup>2</sup>	0.17			0.21			0.49			0.07			0.19		

\* Intercept - Men; Younger; Poorer; Village A