Holistic conservation approaches: Supporting resiliency in times of crisis

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1 | INTRODUCTION

The COVID-19 global pandemic highlights the need for integrated solutions to human health, nature conservation, and social justice to restore the integrity of social-ecological systems (Miller, 2020; Miller et al., 2020; Oldekop et al., 2020). Community-based conservation (CBC) offers both opportunities and challenges in addressing the underlying issues across the tropics that lead to pandemics, such as climate change, social and economic inequalities, biodiversity loss, and food insecurity (Critchlow et al., 2017; Laurance, Sayer, & Cassman, 2014; Otto et al., 2013). Many approaches used to address these multi-dimensional challenges have been single-sectoral in nature (Gill et al., 2019). Holistic CBC offers opportunities in producing positive outcomes across multiple sectors (e.g., livelihoods, food security, health, and climate change adaptability; Otto et al., 2013), and in doing so represents a potential solution to building social-ecological resilience. Therefore, in theory holistic integrated approaches should support social-ecological resiliency that, in the face of the negative impacts of a global pandemic, could buffer against an increase in environmental loss.

2 | THE PLANET INDONESIA MODEL

Planet Indonesia is an environmental non-governmental organization (ENGO) working to conserve at-risk ecosystems through village-led partnerships. The ENGO looks to improve human well-being and produce conservation outcomes through a simple four step approach: (a) secure rights and co-management opportunities for communities, (b) provide incentives and deterrents to support sustainable resource management, (c) facilitate inclusive local governance institutions (later referred to as Conservation Cooperatives) to oversee decision-making processes, and (d) support regenerative value chains for resilient livelihoods. The flagship Conservation Cooperative (CC) model is used to facilitate this process (see Miller et al., 2020 for an evaluation of the model). CC’s integrate livelihood, health, and education services into conservation programs while acting as a community-based organization to be a local governance and decision-making body. The CC approach attempts reduces environmental loss through a holistic strategy that integrates community-led enforcement alongside creating access to healthcare, reduction of inequalities through livelihood development, and financial service provisions to empower individuals to shift away from exploitative activities. All services are co-designed with community partners and are based upon local needs and opportunities. Integrated CBC has been identified as a solution to build social-ecological resilient systems based upon its potential to produce multi-dimensional outcomes (Westerman, Oleson, & Harris, 2012). In theory, integrated approaches should create resilient systems that can absorb “shocks” such as those created by COVID-19 crisis.
We present findings from social-ecological data collected from 2018 to 2020 in the Gunung Nyiut Nature Reserve (GNNR) in West Kalimantan, Indonesia. GNNR is a 91,759 ha protected area located in the districts of Bengkayang, Landak, and Sanggau along the West Kalimantan—Sarawak, Malaysia border (see Supporting Information pg. 1–2). This data has been collected as a part of the ENGO’s monitoring, evaluation, and learning strategy (MEL). In addition, the ENGO pivoted in July 2020 to deliver a large conditional cash transfer (CCT) where additional data was collected on the impacts of COVID-19 at the household level. Detects of poaching, illegal logging, encroachment (e.g., illegal farming), and other activities were collected during monthly patrols co-led by ENGO staff, local community members, and government park rangers. The ENGO works alongside communities to utilize the Spatial, Monitoring, and Reporting Tool (SMART) to improve the effectiveness and efficiency of patrols (SMART; https://smartconservationtools.org/; Critchlow et al., 2017). Monthly data reports were used to calculate encounter rates (# of detections/patrol effort in kilometers) to explore if exploitative activities increased since the time of the pandemic or were on average higher than the same time period in 2019 and 2018. If the hypothesis that holistic CBC can build social-ecological resiliency to negative shocks was expected to see no significant fluctuation or increase in exploitative activities inside the Gunung Nyiut Nature Reserve during the COVID-19 pandemic.

### 3 | OUTCOMES

First, data were collected prior to COVID-19 to measure across various indicators of well-being and participation to investigate if program interventions helped support resiliency (see Supporting Information pg. 7–10). Data collected prior to the start of COVID-19 provides critical insights as community-level resiliency would need to be measured to “test” if the level of resiliency achieved could withstand the negative impacts of the pandemic. A participatory impact assessment (PIA) conducted in the in 2019 showed that farmers were experiencing increased harvest rates, had diversified the commodities they were producing, and had reduced spending by an average of 59% by transitioning to locally organic and semi-organic alternatives instead of purchasing chemical fertilizers and pesticides (see Supporting Information Section pg. 7).

We conducted a spatial analysis to detect forest loss in control and treatment sites in the GNNR landscape. We created a 5-km buffer around each village within the buffer zone using Geospatial Information Systems (GIS). We analyzed the loss of primary forest in 11,637-ha control and 19,063-ha treatment within protected area from January 1, 2016 to December 31, 2018 using the CIFOR Borneo Atlas. Results revealed that deforestation was five times higher in control sites versus treatment sites. CIFOR’s platform does not offer data from 2019 to 2020 and therefore we could not analyze data from the past 2 years (see Supporting Information pg. 12–13).

Household enrollment in Cooperatives continued to rise steadily over the past 4 years and throughout the pandemic, suggesting previous households that had opted out pre-COVID-19 sought out services and enrolled during the pandemic. Loans to members from cooperatives saw a spike in April and May of 2020 suggesting that members experiencing economic shocks turned to Conservation Cooperatives for support, which was one of the intended strategies of the integrated approach to create economic safety nets for communities (see Supporting Information pg. 10). Additional data from Conservation Cooperatives revealed that community members were taking out loans for a variety of reasons ranging from meeting daily basic needs to covering medical bills and their children’s education (see Supporting Information pg. 10). These findings supported the ENGO programmatic theory to facilitate resilient and self-reliant communities.

During the pandemic, a survey was conducted to establish first if the COVID-19 pandemic had an impact on communities in our study site. In July, 2020 MEL teams conducted surveys to assess the initial impacts of COVID-19 on nine partner communities living across one of West Kalimantan’s remaining tropical forest landscapes. We used a stratified sample across villages and gender with a 90% CI of 860 program beneficiaries to target 87 respondents. However, field teams were able to collect data from 91 individuals, slightly above the target number of respondents (see Supporting Information pg. 18–19).

Results revealed that 100% of men and 89% of women reported they were negatively affected by pandemic (see Supporting Information pg. 20–22). 89% (male—91%, female—85%) of respondents identified a downturn in the economy as the most significant impact of COVID-19 on their lives. This establishes that COVID-19 pandemic has had significant shocks on local communities in the study area. When then asked about how they will spend the COVID-19 relief stimulus provided, respondents stated multiple uses (see Supporting Information pg. 20–21). Primarily these included using funds to meet basic household needs (43%) for example, buy groceries, followed by expenditure related to children’s education (26%), saving additional funds in Conservation...
Cooperatives (9%), purchasing agricultural inputs (8%), paying for medical costs (6%), investment in business (5%), and paying debts (3%).

SMART patrol data collected up until March 2021 revealed encounter rates (detection/kilometer patrolled) for land violations (e.g., illegal farming inside protected area, burning, and construction), illegal logging, and poaching (e.g., snare detection, gunshot heard, and poacher encountered) did not increase during the COVID-19 crisis (see Supporting Information pg. 11). While patrolling effort varied from month to month all encounter rates controlled for the distance patrolled in order to correct for biases in the variation of each units' coverage. When comparing the same time period to 2018, when the intervention first started, encounter rates for land violation revealed an 80% reduction, illegal logging revealed a 97% reduction, and encounter rates for poaching detections revealed a 75% reduction. This trend continued until the most recent data recorded at the time of this publication in March 2021. This suggests that despite significant shocks from COVID-19, local communities did not turn to exploitative activities inside the nature reserve to overcome economic and social hardships. In addition, a multiple linear regression was utilized to test for correlation between participation in the CC model, harvest rates (kg) from farmers participation in the agricultural program, participation in tree planting activities and SMART patrol encounter rates. These data were collected per village per month from 2018 to 2020 (see Supporting Information pg. 16–17). All three were highly correlated ($R^2 = 0.58$, value = 0.0016) indicating that illegal activities were lower when participation in the program was higher.

## 4 | FUTURE EVALUATIONS

Results provide evidence that integrated CBC approaches can improve social-ecological resiliency at the local level. Despite community members experiencing negative shocks of the pandemic, it appears that the CC approach has built levels of resiliency that are protecting against catastrophic collapse of the social-ecological systems. Further surveys are needed to understand the causal pathways between various interventions and social, economic, and environmental outcomes. It is critical that future evaluations include data from counter-factual control sites to establish if the results produced through the ENGO’s programming were a direct result of the intervention or by chance. Furthermore, a closer look at what services through the CC model produce different outcomes at different magnitudes would help inform future practices by identifying which interventions may be contributing the most towards social-ecological resiliency (see Miller et al., 2020). For example, the literacy intervention and health intervention were relatively new and not distributed across all communities equally, therefore were not included in this study. Future surveys need to investigate their role in helping mobilize community members, improve community health, and their influence on overall outcomes of the program.

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## CONFLICT OF INTEREST

The author declares that there exist no competing financial interests or personal relationships that could have appeared to influence the work reported in this study.

## AUTHOR CONTRIBUTIONS

This article was conceived and written by Adam Eric Miller.

## ETHICS STATEMENT

The research presented in this article was approved by the organization affiliated with the first author.

## DATA AVAILABILITY STATEMENT

Supporting Information has been provided to support claims in this piece. Additional raw data is available after a data-sharing agreement MOU is signed between the interested individual and the organization. Please Contact corresponding author for details.

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**SUPPORTING INFORMATION**

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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