Conservation and Family Planning: What is the value of integrating family planning into conservation projects?

Papers of the Population Association of America Annual Meeting 2012
San Francisco, CA. May 3-5

Cara Honzak, World Wildlife Fund, USA
Judy Oglethorpe, World Wildlife Fund, USA
David López-Carr, University of California, Santa Barbara Department of Geography

Abstract

Conservation organizations have integrated family planning into site-based conservation activities in selected countries for almost two decades yet lacked strong evidence of the approach's value to conservation. The aim of this analysis was to identify evidence of linkages between family planning interventions and conservation outcomes in conservation field projects. The analysis examined a portfolio of eight projects across six countries that had: primary end goals of conservation, been involved for at least three years in bringing family planning to local communities, and substantial amounts of monitoring and evaluation. WWF staff conducted semi-structured interviews with field project managers about linkages between family planning interventions and conservation outcomes. WWF staff then solicited existing data from projects and synthesized evidence. Results indicate strong evidence for the earliest stages of several common assumption patterns, particularly in support of the assumption that family planning interventions implemented by conservation organizations lead to an increase in family planning use in the remote areas where these projects are implemented. Other linkages remained more tenuous.

Keywords

population, environment, conservation, family planning, evidence, linkages

Introduction

In the 1990s the conservation sector began to pilot a strategy in which family planning was integrated into site-based conservation, an approach today known as the "integrated population, health and environment" or "PHE" approach. At the same time, the idea of the Integrated Conservation and Development Project (ICDP), which shares similarities with the PHE approach, was developing along a separate path. Starting in the 1980s, the conservation sector adopted the ICDP approach, and through the 1990s the approach expanded rapidly. Like PHE projects, ICDPs frequently held biodiversity conservation as the primary goal, and aimed to provide benefits to local communities through a variety of activities. The types of activities implemented by ICDPs covered a whole range of intervention types. Early ICDPs received

heavy criticism from the conservation sector for not being able to provide documented evidence of success (Hughes and Flintan 2001, Wells and McShane 2004). ICDP failures were attributed to a number of factors, including weak and overly complex project design.

Drawing on lessons from early ICDPs, PHE projects aimed to be more targeted yet still integrated. Early PHE projects were defined by the inclusion of family planning as an essential project intervention. Beyond this, project scopes included a variety of related interventions: maternal and child health, HIV and STI prevention and treatment, food security, and/or natural resource management. By the early 2000s, PHE approaches implemented by conservation organizations were no longer exclusively defined by the inclusion of family planning. While family planning continued to be an important pillar of the PHE approach, in some project areas conservation organizations engaged in health interventions that did not include family planning. Reasons for this varied but were not based on evidence related to the value of the approach.

In the last decade, the PHE approach was strengthened by support from donors such as USAID (the U.S. Agency for International Development), the David and Lucile Packard Foundation, Johnson & Johnson and the Summit Foundation. In 2000, when the 189 member states of the United Nations agreed to the Millennium Development Goals (MDGs) and the time-limited targets set within, the conservation sector was further challenged to move beyond traditional models of conservation. Dozens of international and national conservation organizations responded to the mandate. Since 2000, organizations such as WWF (known internationally as World Wide Fund for Nature and in the US as World Wildlife Fund), CI (Conservation International), and JGI (the Jane Goodall Institute) began to integrate the PHE approach into some of their site-based conservation efforts.

Conservation practitioners noted that many of their field projects were located in remote areas of developing countries where biodiversity was relatively intact and where local communities often suffered from high rates of tropical illness and malnutrition, and poor access to health services, clean water, and basic sanitation (López-Carr et al 2010; Bremner et al 2010, 2012). Research demonstrated that communities living in those areas were often some of the least economically prosperous (Mulangoy and Chape 2004), and dependent on natural resources and small-scale agriculture for their well being, thus exerting a disproportionate direct impact on biodiversity (Carr 2004. 2007; DeSherbinin et al 2007). Practitioners also observed that rapid population growth in areas with heavy reliance on subsistence livelihoods and local natural resources seemed to be leading to rapidly diminishing natural resources and increased pressure on land in many areas of high biodiversity. Research demonstrated the close association between high fertility and population growth in frontier areas (Sutherland et al, 2004; Carr et al 2006). Studies also demonstrated that population growth due to high fertility is highly correlated with deforestation, soil degradation and land fragmentation (Carr et al 2005; Pan et al 2007).

Practitioners therefore assumed that even if they achieved short-term conservation and socio-economic results in particular places, these gains would likely be lost in only a few decades due to population growth. They also recognized that women's health and empowerment were fundamental to the success of development efforts, and advances in basic development indices were critical to the success of conservation efforts. After more than a decade of implementing PHE, conservation practitioners continued to make these observations, but also

became more informed about the complex relationships among the factors that influence population, health and conservation.

As PHE strategies implemented by the conservation sector became more sophisticated in response to this development, a number of research and analytical efforts were undertaken. However, it proved difficult to demonstrate verifiable and quantitative benefits of taking an integrated approach. With one exception - the IPOPCORM operations research project that is now in the process of publishing its results - the evidence base related to the value of the approach for conservation remained virtually non-existent. For example, the disadvantages of the approach have received little attention in the literature. This may be due to fact that most analysis on this topic has been carried out by the same organizations that implement these projects. No research aiming to compare the benefits of the approach to the disadvantages has been conducted, and there is also no research comparing the approach to other social welfare interventions. Furthermore, documented disadvantages remain similar to those faced by integrated conservation and development projects, including: lack of clear goals, difficulty in obtaining funding, challenges of cross-sectoral partnerships, and complex project frameworks and monitoring-evaluation systems (Margoluis, 2009).

The research and analytic efforts that have been undertaken, their results, and the challenges they faced, are described in the subsequent paragraphs. The results demonstrate some of the few lessons that have been learned about the value of the approach for conservation, and underscore common challenges that are faced by those who attempt to undertake research in this field. Four operations research projects have attempted to demonstrate and document the relationship between conservation results and family planning in conservation field programs. Of those projects, only the IPOPCORM project (the Integrated Population and Coastal Resource Management project) successfully identified study sites with comparable characteristics, and produced statistically significant results. IPOPCORM conducted statistical analysis that demonstrated a positive relationship between integrated PHE approaches and conservation results, in a single country—the Philippines. The project undertook operations research to investigate whether taking an integrated approach to PHE has any benefits over separate, single-sector approaches. The project found that the integrated approach had a significantly higher positive impact on several reproductive health and food security indicators, and on coastal resource management indicators, at lower total cost than did single-sector approaches (Castro and D'Agnes 2008).

The results of the other PHE operations research projects and attempts to conduct more intensive PHE project monitoring and evaluation have been less successful at demonstrating and documenting the value of the approach for conservation. Major challenges include the diversity of environments in which PHE projects are implemented, documenting the complex nature of PHE projects, distilling universally relevant lessons from them, the relatively poorly developed status of monitoring in the conservation sector compared with the health sector, low levels of donor support for cross-sectoral research and the long-term nature of population and conservation results relative to short project cycles (Oglethorpe, et al 2008).

Other operations research projects include two that were conducted prior to IPOPCORM's implementation by World Neighbors (WN). In one of these projects, in Ecuador,

WN partnered with *Centro Médico de Orientación y Planificación* (CEMOPLAF), a non-governmental organization with expertise in delivering reproductive health to remote communities. In the other project in the Philippines WN partnered with Participatory Research, Organization of Communities, and Education towards Struggle for Self-Reliance (PROCESS). Only the project in Ecuador produced statistically significant results, demonstrating two conclusions. 1) Offering reproductive health, agricultural and natural resources management services in an integrated manner can substantially improve the image of the institutions involved- in this case CEMOPLAF (a family planning organization). 2) Integrated service provision can lead to significant increases in family planning knowledge and acceptance when compared to single sector projects (World Neighbors 1999).

Although both of the lessons learned by WN are directly related to the family planning sector, the results are highly relevant to the conservation sector. WN's findings suggest that partnerships between family planning and natural resources management-focused organizations to implement PHE projects can lead to an improved image for one of the organizations involved, and that family planning knowledge and use can increase in remote target communities (which is a short-term desired outcome for many site-based PHE projects carried out by the conservation sector).

Between 2001 and 2004, Voahary Salama, a non-governmental umbrella organization, led another relevant operations research project in Madagascar called the Environmental Health Project (EHP). The EHP project found statistically significant results related to tree planting, malnutrition, and contraceptive use that suggested integrated projects were more successful than single sector projects (Kleinau, et al 2005). Unfortunately the variation in starting characteristics of the comparison sites -including capacity of implementing organizations- limited the degree to which correlations could be observed.

Although these four projects were the only ones that attempted to demonstrate statistical correlations between integrated family planning-environment interventions and conservation outcomes, several other relevant research efforts were also undertaken during the same time period. These efforts aimed to synthesize and summarize projects and project strategies of relevance to the broad PHE community and some, specifically to the conservation community.

Ounce of Prevention (Margoluis, et al 2001) was one of the conservation sector's first publications to consolidate understanding of health and conservation linkages in site-based conservation. The report reviewed 34 projects and concluded by presenting the conservation sector with a ground-breaking analytical framework for understanding health and conservation linkages. Strategies used by health and conservation projects were broken into two categories, those that were designed around conceptual linkages, and those that relied on operational linkages. Operational strategies were further stratified into four groups that the authors called: symbiotic, barter, bridge, and entry-point strategies. Conceptual linkages refer to the extent that priority biodiversity issues in a community are directly related to the maintenance of intact biodiversity in the local environment. Operational strategies refer to the ways in which projects managers utilize health activities to achieve conservation outcomes. These broad terms are still highly relevant in the field of health and conservation today. The sub-categories of operational strategies are not defined here, in part because they have now been subjected to further

development. A few years after the publication of *Ounce of Prevention*, the PHE approach was becoming a more widely recognized field of practice. Simultaneously, several of the large international conservation organizations were making progress on setting standards of practice in monitoring and measuring results in conservation. An organization called Foundations of Success (FoS) was one of the key actors in the conservation measurement movement, and one of its founders was also involved in authoring *Ounce of Prevention*.

Global PHE practitioners took advantage of this convergence of timing and authorship to advance the PHE field. A group of these practitioners invited FoS to build upon the framework developed in *Ounce of Prevention* and apply the most modern tools in conservation measurement to expand understanding of PHE linkages. As a result, in 2004 FoS laid out a series of diagrams that demonstrated how PHE interventions were assumed to lead to conservation and health outcomes, based on a PHE literature review from multiple countries. FoS did not confirm or refute assumptions that were made in the projects that they analyzed. FoS organized these diagrams into discrete categories (Stem and Margoluis 2004). This was one of the first attempts to expand the framework for how PHE linkages may function.

When the FoS results were shared with a group of PHE stakeholders in Bangkok in 2004, the PHE community agreed that one of its top priorities was to document the state of knowledge about whether or not, and to what degree PHE approaches were achieving conservation and human well-being outcomes. Following from this mandate, the World Wildlife Fund in the United States, with support from the United States Agency for International Development (USAID) and Johnson & Johnson, decided to conduct an analysis of PHE interventions, in part, to determine the viability of the approach for scale-up in areas of high priority for biodiversity conservation. WWF worked with Foundation of Success to develop an analytical framework for exploring the question: "what is the added value for conservation outcomes of integrating family planning into site-based projects?" The first step involved working with Stem and Margoluis to further narrow the above-mentioned FoS-defined categories to include only those that linked family planning (or family planning packaged with other health interventions) to conservation or natural resource management targets. WWF staff then used this refined list of categories to conduct a global analysis.

The results of this analysis have now been used by WWF to develop project strategies and monitoring that builds on the evidence base. Based on these and additional learning results, in 2008 WWF developed a conservation-focused PHE manual and formalized a partnership with Johnson & Johnson and the USAID to scale up its PHE work.Among the large number of actors in the PHE field, there is wide variation in the definition and use of the terms "population, health, and environment" and "integrated PHE approach." WWF selected definitions for these terms that allowed us to gather information relevant to the conservation sector, while not narrowing our terms so severely that we would overlook lessons from closely related sectors. For example, in terms of "biodiversity conservation," which for the conservation sector is the "environment" part of "PHE," the WWF analysis uses a broad definition, encompassing biodiversity conservation, natural resource management (NRM), and in a few cases that will be specifically identified, agriculture.

Within the context of PHE projects, WWF interprets the term "population" as "family planning", representing the wide array of reproductive health interventions that always includes

but may not be limited to family planning (FP). Although the term "population" also implies work on human migration, and WWF works on human migration issues in some sites which are PHE project sites, the WWF definition of "population" within this analysis does not include efforts to adapt to or influence human migration. This decision was made due to the funding support that was strongly tied to the family planning sector, and also the need to limit the scope of the analysis.

The term "health" covers curative or preventive health interventions including health care, health information, improved water supplies and sanitation. The presence of health interventions was not strictly essential for a project to be included in the analysis, although nearly all projects did have some form of health activity. Over the last decade PHE projects evolved from "PE" projects, in which other kinds of health interventions were not necessarily or usually part of project interventions. After several years of implementing PE projects, implementers realized that in many of the remote areas where these projects were carried out, it did not make sense to offer only family planning services when communities had many other high priority health needs. Some projects still operate as PE projects, although the field has adopted the broader term to reflect changing practice.

When first embarking on this analysis, WWF did not define the term "integrated" because the term seemed to have many different definitions, and sometimes was not even included but just implied. At the time, none of the definitions in use had been consolidated or documented. After the research for this paper was concluded, the authors of this paper published a framework to define the term "integrated" in a manual for conservation practitioners. That framework considers integration in terms of the following four elements: 1) the relationship of conservation organization to its health or development partners; 2) the relationship of conservation priorities to community health priorities; 3) the level of integration in activities, including communication; and 4) the level of integration in project results (Oglethorpe, et al 2008).

The results of the WWF-led analysis are documented in this paper and include: the methodology (including definitions used), results, a discussion of the results, and a discussion, conclusion and recommendations.

Methodology

Within the overarching theme of potential integrated PHE linkages, we probe the following six hypotheses:

1. **Hypothesized linkage "Decrease in Human Fertility":** Family planning interventions, integrated into site-based conservation efforts, increase use of family planning in remote, underserved communities, helping to reduce fertility and slow population growth, leading to reduced pressure on natural resources in the long term.

2. **Hypothesized linkage "Increase in Women's Empowerment":** Family planning interventions, integrated into site-based conservation efforts, empower women, thereby increasing conservation capacity through increasing women's involvement in natural resource management, conservation and the formal economy.

3. **Hypothesized linkage "Increases in Trust, Goodwill, and Entry Points for Conservation":** Family planning interventions, integrated into site-based conservation efforts, generate trust and goodwill towards conservation organizations and their environmental partners (including creating entry points into communities), leading to increased community involvement in conservation activities.

4. **Hypothesized linkage "Increases in cost efficiency and effectiveness":** Family planning interventions, integrated into site-based conservation efforts, generate cost efficiencies and effectiveness for conservation.

5. **Hypothesized linkage "Increase in Youth Empowerment":** Family planning interventions, integrated into site-based conservation efforts, and targeted at youth, empower youth, thereby transforming attitudes and behaviors key to conservation success in the short and long term.

6. **Hypothesized linkage "Increase in PHE awareness":** Family planning interventions, integrated into site-based conservation efforts, and including a communications component on PHE linkages, increase awareness of PHE linkages among stakeholders, improving the effectiveness of family planning and conservation activities integrally linked to conservation threats and reaching wider audiences with conservation messages.

We selected projects for our analysis based on three criteria: a) the project had a primary end goal of biodiversity conservation, b) the project had been involved for at least 3 years in bringing family planning to communities, and c) a substantial amount of monitoring and evaluation data had been conducted in relation to the project. We identified 20 projects that might fulfill these criteria, based on a review of project literature. After contacting most of those projects to solicit further information, WWF staff found that few projects - including those in the WWF network- met all of the criteria. As such the analysis was limited to eight projects- 1 WWF project and 7 non-WWF projects. They were located in remote areas of: Mexico, the Philippines, Kenya, Tanzania, Madagascar, and Uganda and included a variety of terrestrial and marine ecosystems.

WWF staff then conducted semi-structured interviews with several field project managers in each of the conservation organizations involved. The structure of the interviews was based on the conceptual models that FoS derived from PHE literature (Stem and Margoluis 2004). The methodology involved guiding the interviewees in constructing diagrams called "results chains" articulating project staff assumptions about linkages between family planning interventions, or packages of interventions that included family planning, and conservation results. Results chains are a standard planning and evaluation tool utilized in the conservation sector to link project interventions to assumed results, in a logical sequence of if-then assumptions about change. As such, results chains can be viewed as a sub-component of a complete project conceptual model (they are usually developed after a conceptual model is developed), and are used for project planning or evaluation. Standard guidelines for constructing results chains is outlined in the conservation sector's *Open Standards* (Conservation Measures Partnership, rev. 2007). WWF staff leading the interviews and group exercises were trained and experienced in the application of these standards.

According to the standards, conceptual models should be developed at the beginning of a project, and updated over time as a project learns and adapts to new information. The *Open Standards* are still relatively new to the conservation sector. Therefore it often happens that conservation staff and projects design these models retrospectively, as was done in this analysis. Such models can then be used to retrospectively analyze existing data to determine the extent of documentation that exists for particular sets of assumptions about how interventions function to impact expected results.

The process of documenting assumptions in this way is similar to retrospective hypothesis testing- a practice that we acknowledge is not ideal for hypothesis testing. However, we use it for the purpose of refining our hypothesis generation, and for providing preliminary information about the evidence base related to these refined hypotheses.

The output of the analysis was a series of diagrams that articulated the assumptions practitioners held about linkages in their PHE projects. To build the diagrams, WWF interviewers started by soliciting a list of priority threats to conservation targets from their interviewees. WWF interviewers then worked with interviewees to diagram interviewee assumptions about how project interventions directly and indirectly reduced threats to conservation outcomes. To help interviewees conceive how to frame their assumptions, and make sure that interviewees did not overlook key categories of linkages, interviewers prompted interviewees with several linkage types documented by Foundations of Success from PHE literature.

That list of linkage categories is defined by the intermediate results that that were assumed (in the PHE project literature) to link family planning interventions to biodiversity conservation targets. These intermediate results included:

- slowing population growth
- reducing family size
- improving overall health, or health of vulnerable groups
- empowering women
- improving trust, goodwill, and entry points for conservation among local communities or governments
- expanding target audiences through cost savings, resource sharing, or joint messaging, and
- creating exchange agreements with communities or governments (Stem and Margoluis 2004).

Interviewers then guided interviewees in drawing timelines that reflected interviewee impressions about points in time at which key results were seen or could be anticipated. Interviewees were then invited to work with interviewers to list existing or potential indicators that linked to the results in the diagrams. Based on these indicators, existing data and qualitative evidence was solicited to support or refute assumptions, and hypotheses of interviewees were explored. A single results chain with relevant indicators developed through one of the interviews is included in Figure 1.

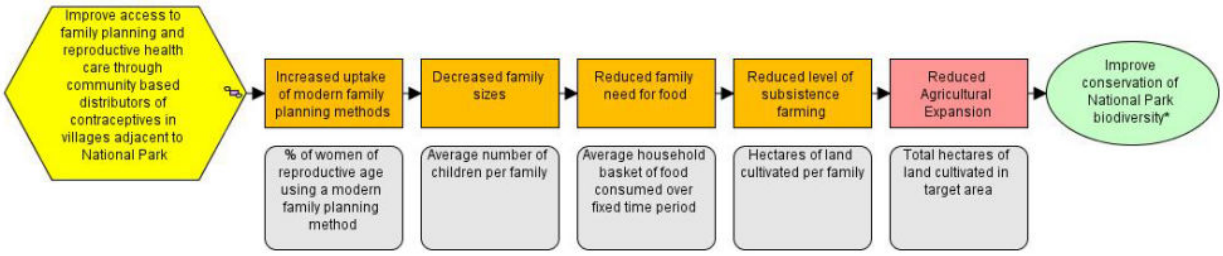

Figure 1: The name of the National Park has been removed to maintain confidentiality of the project/practitioner who developed this diagram.

WWF staff used the FoS linkage types documented in the literature to assign each priority linkage described by interviewees to a relevant linkage category. In making the assignments, WWF staff also left open the possibility that articulated linkages would not adhere to the FoS linkage categories. The number of linkages that fell under each category was then tabulated to observe which types of assumptions were most common among practitioners.

WWF staff reviewed project reports and other data made available to interviewers. They looked for data related to the indicators identified by interviewees, and for data related to any additional indicators that interviewees might not have mentioned.

During data review, WWF staff noticed that some evidence made available to interviewers suggested that additional linkages not articulated by interviewers might be relevant to the projects. WWF staff decided to establish a new category of additional linkages that were noted as "observed linkages" in the analysis. To make this process less biased, WWF staff re-reviewed evidence from sampled projects looking for evidence related only to: the set of four linkages that was found to be most commonly assumed by interviewees in our sample, and the one type of linkage for which strong evidence had been found in the IPOPCORM operations research project. The analysis documented the state of knowledge about common patterns of assumptions held by conservation practitioners implementing PHE projects.

Results

The analysis had two types of findings: findings related to assumptions of the practitioners in the sample, and findings related to the evidence available in our sample. Assumptions patterns can also be thought of as practitioner "hypotheses" about linkages or "conviction" about linkages. "Evidence" includes both quantitative data and qualitative information. The conservation practitioners in our sample shared three general patterns of assumptions about PHE linkages in common. We labeled these patterns: "decrease in human

fertility," "increase in women's empowerment," and "increase in trust, goodwill, and entry points for conservation." A fourth general pattern of assumptions that we labeled "increase in cost efficiency and effectiveness" was not found among the practitioners in our sample, but was commonly "observed" by WWF staff (see methodology section for explanation of the concept "observed"). The projects in our sample also shared in common two additional sub-patterns of assumptions that are actually nuanced versions of the general patterns.

The fine details of the assumed linkages in our sample were diverse, but the core elements of the linkages within each category shared notable similarities, including: the general order of the results that were assumed to follow from the family planning interventions, the types of interventions that were assumed to relate to certain types of intermediate results, and the basic relationships among the factors related to direct threats to conservation outcomes.

In our sample the "decrease in human fertility" and "increase in women's empowerment" linkages are identical in the earliest stages of the linkages. Practitioners assume that before subsequent results related to fertility and women's empowerment can be achieved, the use of modern family planning must first increase. In our sample, strong evidence existed to support the assumption that family planning interventions implemented by conservation organizations lead to an increase in family planning use in the remote areas where these projects are implemented.

The four commonly assumed linkages, two additional sub-categories of assumed linkages, and the evidence related to these assumptions are discussed in the subsequent paragraphs. Each category and sub-category of assumption patterns is given a linkage type name as a descriptor, and then we describe how practitioners in our sample assume that the linkage functions. Under each linkage type, we first present our findings about the assumptions patterns in sections entitled "Findings about Assumptions." We then present evidence related to each category of linkages under sections entitled "Findings about Evidence."

1. **Hypothesized linkage "Decrease in Human Fertility":** Family planning interventions, integrated into site-based conservation efforts, increase use of family planning in remote, underserved communities, helping to reduce fertility and slow population growth, leading to reduced pressure on natural resources in the long term.

Findings about Assumptions: Practitioners from all eight projects articulated this type of linkage among their most important linkages.

In all of the projects sampled, community-based distribution of contraceptives was initiated or revitalized by projects. Most of the projects also carried out additional activities related to increasing knowledge, access and capacity related to family planning. All of the projects sampled were implemented in remote, underserved areas with high levels of fertility.

According to the practitioners in our sample, the theory behind this linkage is that this combination of activities implemented in these sites improves access to family planning. The earliest stage of this linkage is therefore an assumption that these interventions will meet latent demand and generate new demand for family planning, increasing use. The common element among these linkages is that increasing use is assumed to decrease family size from what it would have been without the intervention.

The final set of assumptions then splits into two groups. Under the first scenario assumed by the majority of practitioners in our sample, limiting family size decreases household needs, decreasing household consumption, and in aggregate across a population, was then assumed to reduce total consumption of natural resources. Under the second scenario, limiting family size increases the quantity of resources (such as food, money) available per capita in the household; this is assumed to increase household expenditure on goods that improve children's education. In aggregate, the second scenario theoretically also eventually reduces total local consumption of natural resources because educated children migrate out of fragile ecosystems and increase the wealth of families, allowing families to have choices and make more sustainable decisions about consumption and livelihoods.

Under the first scenario, practitioners have assumed that families and populations with fewer members will consume fewer natural resources. They have also assumed that unless the total fertility rate goes well below replacement rate (which no one said), the final goal cannot be reached for several decades (because even at or slightly below replacement rate, populations will continue to grow for several decades due to large proportions of youth in the populations of the projects in our sample). The timelines of the practitioners in our sample did not reflect this realization.

Under the second scenario, practitioners assume that members of the target population will choose to spend additional resources on improving their children's education. While this scenario could require less time than the first scenario to reduce threats to conservation, it also reflects a leap of faith that the target population values children's education over all other possible expenditures.

Findings about Evidence: All of the projects sampled had evidence supporting the early stage of this type of linkage. For all projects in our sample, family planning impact indicators indicated that use of family planning among target populations had increased over the life of projects. Five sampled projects used an indicator called contraceptive prevalence rate (CPR, which measures the number of women of reproductive age using modern family planning) as a proxy to represent access to family planning. This indicator is considered by the family planning sector to be one of the most reliable measures of access to family planning. For those projects in the sample that reported CPR, the median increase in CPR per year was 3%.[1] The other three projects in the sample had less reliable indicators to demonstrate changes in family planning use, but the data suggested that use had also increased in those three projects.

None of the projects sampled had evidence demonstrating practitioners' other assumptions about this linkage type, such as the idea that increases in use of family planning lead to decreases in fertility or to reductions in natural resource use. At the same time, none of these projects had been operating for more than 5 years, making it nearly impossible that such impacts would have taken place yet.

2. **Hypothesized linkage "Increase in Women's Empowerment":** Family planning interventions, integrated into site-based conservation efforts, empower women, thereby

[1] Five of the eight projects reported CPR, but interviewers determined that two of the projects CPR values might not be as reliable as they should be (but definitive information was unavailable). Either way, the median CPR was still 3 percent, which is one reason the authors include median rather than mean CPR.

increasing conservation capacity through increasing women's involvement in natural resource management, conservation and the formal economy.

Findings about Assumptions: Practitioners from seven of the eight projects articulated this type of linkage among their most important linkages, but practitioners from only three of the projects called their linkages "women's empowerment."During interviews, we did not provide interviewees with a definition of "women's empowerment."
As part of the semi-structured interview, we simply prompted interviewees with the term "women's empowerment" as one of the types of linkages that they might want to describe (to see other prompts, see Methodology section of this article).

During the analysis, we compared the use of the term "women's empowerment" by our interviewed practitioners with that conveyed in PHE literature and summarized by Foundations of Success (Stem and Margoluis 2004). The FoS document does not define "women's empowerment" per se but uses an if-then diagram to demonstrate how PHE literature uses the term. That definition is the following: through the delivery of various PHE interventions, women become able to manage the timing and spacing of their births, which then enables them to better manage other areas of their lives; as a consequence, women are then able to engage in improving natural resources management; this improves conservation outcomes.

We found that the definitions used by our practitioners and the FoS document were almost identical, except that our practitioners had provided more details about how the linkage functions. Therefore we categorized the linkages that practitioners had labeled as "women's empowerment" as such. We also categorized linkages from an additional four projects as "women's empowerment" linkages. Practitioners from the latter four projects had not used the term "empowerment" in their linkage descriptions, but their linkage descriptions aligned with the FoS and practitioner- articulated definitions.

The details of how this linkage is assumed to function in our sample are as follows: The earliest stage of the linkage is identical to the "decrease in human fertility" linkage. After the assumption of increased family planning use, the linkage begins to diverge. Increasing use is assumed to lead to limiting family size and increasing birth spacing, the latter of which is not part of the "decrease in human fertility" linkage. Spacing and limiting leads to women having more time and better health for themselves and their children.

As a result of having better health and more time, women are assumed to spend this time on one or both of two kinds of activities: income generation activities, which are assumed to increase women's status and wealth (through time spent on greater income generation); or (sometimes as a result of increased wealth or status) involvement or leadership in managing natural resources and conservation. One of the underlying and unstated assumptions of our sampled practitioners is that greater involvement and leadership by women in natural resources management (NRM) and conservation makes NRM and conservation more successful.

Findings about Evidence: We divided the evidence for this linkage into three components which are related to each other in a linear if-then progression: first, the linkages between PHE interventions and a decrease in human fertility (which was the assumed first step in this linkage for all but two of the "women's empowerment" linkages assumed by practitioners); second, the linkages between a decrease in human fertility and an increase in women's empowerment (such

as women's health, time, wealth, or status); third, the linkages between an increase in women's empowerment and a decrease in conservation threats.

As stated in the section on "decrease in human fertility," we explained that all of the projects had some kind of evidence demonstrating that PHE interventions increased the use of family planning (the first component of this linkage). In addition, one project had evidence that birth spacing had increased from one year to two years. Beyond this, there was very little evidence in our sample indicating whether these increases lead to the whole array of assumptions about women's empowerment and conservation that stem from this early stage of the hypotheses.

Of the seven projects for which these linkages were identified, three of them had better evidence than the others – though none of the evidence was strong- and they were all located in the Philippines.

The project with the best evidence was able to demonstrate that midwives and female *barangay* (village) health workers who had been cross-trained in PHE issues began reporting illegal environmental activities. Activities included logging in protected forest areas, and the reporting was done by texting information on their cell phones when they observed violations during their visits to communities (Viernes 2006). Practitioners from a second project in the Philippines said that they had evidence of an increase in the number of women undertaking alternative livelihoods (the second component of this linkage), but the data were not provided to WWF staff.The third project from the Philippines had endline data showing that in comparison to baseline values, more women were working in marine sanctuaries and involved in alternative sustainable livelihoods (such as seaweed farming); illegal fishing had declined; and fish catch per unit effort had increased. However, evidence did not clearly indicate that these secondary results were uniquely related to the family planning and PHE awareness interventions, despite the assumptions of project managers.

For example, it appeared that reductions in illegal fishing in the marine sanctuary may have been due primarily to the community and local government's motivation to acquire tourism revenue rather than directly to family planning project inputs. Also, revenues from the sanctuary resulted in improved government services that contributed to improved health and quality of life. Nonetheless, family planning interventions seem to have contributed to improved health of mothers and children, and to have increased participation of women in a variety of activities, including spending more time promoting family planning, health and environmental messages and patrolling the sanctuary.

Of the remaining four projects, three had no evidence at all to support the women's empowerment linkage beyond an increase in the use of family planning. An evaluation of the fourth project concluded that "women are not yet empowered and the control of women by their husbands has in many cases continued to prevent or limit women's participation and benefits in the area of reproductive health." A third project only had evidence of an improvement in the final conservation outcome (increased forest cover), but no evidence to support all of the impact indicators in between the PHE interventions and the conservation outcome.

One reason that evidence in support of this linkage may not have emerged in our sample is that none of the sampled projects integrated health and family planning from the inception of the conservation organization's work in a particular conservation area; a family planning component was usually added to on-going conservation efforts. The literature suggests that a change in women's status may be dependent on the manner in which a project is developed. Pielemeier et al (2007) found that "[g]ender-related value-added (both for P[family planning] and E[environment]) has been most evident where PHE programs are integrated from initiation (rather than adding a P component to an ongoing E program) and when men and women are brought together to receive P and E messages. Without these program characteristics, project results do not yet suggest clear gender value-added" (Pielemeier 2007:30).

3. **Hypothesized linkage "Increases in Trust, Goodwill, and Entry Points for Conservation":** Family planning interventions, integrated into site-based conservation efforts, generate trust and goodwill towards conservation organizations and their environmental partners (including creating entry points into communities), leading to increased community involvement in conservation activities.

Findings about Assumptions: Practitioners from three of the eight projects articulated this type of linkage as among their most important. Practitioners from two additional projects did not articulate this linkage but had evidence suggesting that this type of linkage was relevant to reducing their conservation threats.

According to the practitioners in our sample, the theory behind this linkage is that family planning interventions implemented in the remote, underserved sites where these projects are undertaken generates goodwill and trust in a variety of ways, depending on the particular characteristics of each community served by the interventions. In many of the places where conservation projects work, the feelings of local community members towards conservation entities and their environmental affiliates are fearful, suspicious, and even hostile. In a single target area for a conservation project, the perceptions of different communities can range widely depending on which communities perceive themselves to gain or lose natural resource rights if they cooperate with the project. Conservation entities are also frequently perceived by local communities as having little interest in local people's well-being in comparison to that of wildlife, habitat and the well-being of non-local people (such as international donors).

Practitioners from the three projects that articulated this linkage said that in general, health and livelihood interventions (not necessarily the results of the interventions) are highly effective and efficient means of generating goodwill and trust in conservation among communities or stakeholders. They are tangible, improve lives relatively quickly, fill a service gap in these remote areas, and meet needs that are considered by communities to be of high priority. Furthermore, it was explained that these interventions help demonstrate that conservation entities care about local people.

Two of these practitioners explained that family planning was merely a subset of these kinds of goodwill-generating interventions, except in one case. In this latter project which is in the Philippines, practitioners explained that family planning generated goodwill among women in particular, making them more receptive to participating in conservation activities; it was

assumed that the increase in participation was the result of family planning meeting the unique health needs and desires of women.

Of the five projects in which this linkage was articulated or observed, three of the projects carried out health interventions that were broader than just family planning, and two of the projects also carried out livelihood projects.

Findings about Evidence: These five projects had some evidence of how health interventions generated goodwill and trust among local communities, and of eased entry into project sites or improved effectiveness of conservation interventions as compared to efforts prior to the introduction of PHE activities.

Only one project had evidence of this type of linkage that could be specifically attributed to the family planning interventions versus a package of diverse and integrated interventions. This is because it was the only project in our sample that delivered only family planning and conservation interventions (not micro-credit or other health interventions). In that project, communities living in an area considered to be of high conservation value to the relevant conservation organization viewed the Ministry of Forestry (MoF) as corrupt. Communities perceived that the conservation organization had a close affiliation with the MoF and its objectives, and did not want to collaborate with the organization on issues related to forestry. As a result, initially, this conservation organization was not able to gain entry into communities to conduct conservation work.

The conservation organization then launched a community-based family planning and conservation project across the relevant landscape. The conservation organization used its own transportation and logistical network to bring in a health partner to deliver family planning in those sites. The conservation organization's project coordinators observed that through this effort, they gained sufficient community goodwill to begin conducting conservation activities in the sites where they previously had been unable to gain entry. Community participation in conservation activities increased, and key intermediate conservation outcomes related to long-term threats to biodiversity targets were achieved. For example, tree plantings increased, fuel-saving stoves were constructed and adopted, and key steps in transfer of forest management to communities transfer were achieved.

Two other projects had compelling evidence that this type linkage might be highly relevant, but they both had other interventions taking place simultaneously. This made it difficult to assess which interventions or package of interventions was most relevant to the generation of goodwill and trust in conservation.

In one of those two projects, evaluators credited the project with dramatically improving community participation in natural resource management and the collaborative forest management process that was underway in the target area. District officials are cited as calling the project's successes in Forest Management "exemplary." By the end of the project, the county where the project operated had the largest number of planted trees in the district, the project established 5 permanent tree nurseries and 61 flying nurseries, and households in the area raised 500,000 tree seedlings from the nurseries. Also, evaluators concluded that the project helped cultivate the goodwill and awareness of forest value that led communities bordering the forest

reserve to demarcate 10 out of 60 forest patches outside the main reserve as community-owned and managed, thereby helping to stem all the conservation threats listed by our interviewee. However, it is not entirely clear from the evidence-base that these results derive directly from health inputs, since the health and family inputs cannot be disaggregated from the broader interventions conducted by this project. What is clear is that the broad set of interventions undertaken by this project generated the goodwill necessary to achieve these goals.

The other example is from the Jane Goodall Institute's (JGI) experience in the area around Gombe National Park in Tanzania. For many years JGI-Tanzania experienced suspicion and rejection from communities fearful of the potential expansion of Gombe National Park. JGI staff could not even discuss chimpanzees – the focus of their conservation efforts. As a result of PHE interventions and complementary development interventions such as micro-finance and girls' scholarships, communities now collaborate in JGI's mission of conserving chimpanzee habitat. Village chiefs, other community leaders and youth openly discuss chimpanzee conservation, travel with JGI to visit the Park, and work closely with JGI to alleviate one of the biggest threats to conservation in the area: shifting cultivation (Mtiti 2006). Like the project cited above, JGI does not have the ability to disaggregate the effects of the family planning and health components from other project components, making it challenging to determine which of the project's components were most relevant to the change in attitudes and behavior of target communities.

Finally, only one of the five projects was able to demonstrate that communities see an association between the health services provided and the conservation organization's involvement in delivery of those services- a key intermediate outcome that would contribute to the reliability of this linkage. A situation analysis report of that project says that the clinic operated by that project "is perceived [by communities] to belong to the [conservation organization name deleted to maintain anonymity] management." Further, the same report indicates that 97% percent of the target population is "satisfied" with the services provided by the clinic. In the same project, WWF staff was unable to find evidence of the specific added-value of this positive reputation for the organization's conservation activities, but the organization's management explained that high levels of tension exist between the conservation entity, its conservation programs and local communities. Therefore, this evidence suggests that the clinic may help provide positive public relations among local communities for the conservation organization and its activities.

4. **Hypothesized linkage "Increases in cost efficiency and effectiveness":** Family planning interventions, integrated into site-based conservation efforts, generate cost efficiencies and effectiveness for conservation.

Findings about Assumptions: The theory behind this linkage is that if a conservation project or organization engages in family planning, the project or organization might be able to derive benefits from sharing resources or target audiences with the projects or organizations delivering family planning.

None of the practitioners interviewed cited cost efficiencies or effectiveness among their most important linkages. We included this linkage because data from our sample indicated that this might be an important linkage in more than half of the projects.

After completing our analysis we concluded that the structure of our interviews, and the use of linear diagrams to elicit linkages from interviewees, may have discouraged practitioners from exploring operational linkages such as efficiencies. The interview structure was designed to explore conceptual linkages (such as women's empowerment or fertility) and operational linkages (such as efficiencies); for example, interviewers prompted interviewees with "efficiency" as one of several types of linkages that interviewees might have held as assumptions. Despite the interview design, we observed that our interviewers focused on describing the conceptual linkages of their project strategies, rather than the operational linkages (like this one).

Findings about Evidence: Only one project in our sample, JGI in Tanzania, had documented information demonstrating cost efficiencies or effectiveness. Practitioners from all of the other projects in the sample were able to articulate anecdotal evidence of efficiencies believed to have occurred, but none of them had supporting documentation.

In the case of the JGI project around Gombe National Park, project evaluators deemed the integrated project to be effective and efficient, reaching 22 villages with over 170,000 people at a relatively low average cost of $350,000 per year (approximately $2.00 per person covered per year). Evaluators did not compare these values with any other values such that one could interpret the extent of this efficiency or effectiveness.

Examples of verbally articulate evidence included: sharing transport, office space, security, and program expenses; expanding target audiences; and building on community infrastructure. For example, practitioners from WWF in Madagascar explained that they do not have large cadres of experienced community-based trainers like their health partner. By cross-training the partner organization's staff in conservation messaging, they expand their reach more efficiently in communities.

An evaluation conducted by Pielemeier et al (2007) also found that integrated PHE projects were valued by community members "for being more efficient in use of their time (fewer community meetings, less paperwork, interaction with one implementing agency rather than two or more)" (Pielemeier et. al 2007:23). The operational structure of some of the projects in our sample suggests that this type of benefit could have been derived by community members. However none of the projects in our sample had attempted to measure community members' perception of the value of their time.

The following two linkages deserve mention although they are actually sub-categories of previously mentioned linkages, and they relate more to the way that interventions are designed and delivered than assumptions about intervention results. One of these sub-categories is related to targeting youth and the other is related to increasing awareness of PHE linkages among target communities.

5. **Hypothesized linkage "Increase in Youth Empowerment":** Family planning interventions, integrated into site-based conservation efforts, and targeted at youth, empower youth, thereby transforming attitudes and behaviors key to conservation success in the short and long term.

Findings about Assumptions: Practitioners from three of the projects articulated linkages related to youth. The assumption pattern specifically relates to targeting youth living in the same remote communities as the general populations discussed under "decrease in human fertility." Practitioners assume that when family planning and conservation interventions are delivered simultaneously to youth, they produce benefits for conservation that are unique from targeting communities at large.

The underlying assumptions of this linkage are that the proportions of youth in populations are large in proportion to older and younger age groups in the places where these projects are undertaken. As a result, even with replacement level fertility, these populations would experience higher population growth than if the age composition of the population was more evenly distributed. Furthermore, the remoteness of the communities where these projects are undertaken is frequently correlated with higher than average levels of early marriage (and therefore high levels of first births taking place at young ages).

The assumption pattern among our sample is that youth, as a result of their age, are more receptive than adults to new ideas and ideas related to giving them control (or empowering them) over their entire future- such as their bodies, livelihoods, wealth, health, sexuality, and environments. When projects provide this new and holistic "PHE" information in a way that is focused on youth, practitioners assume that youth are more likely than adults (or than they would be without targeted information) to use family planning and to engage in activities that advance conservation. The result is a decrease in population momentum- a type of decrease in the fertility rate that could dramatically change the rate of future population growth. As assumed under the "decrease in human fertility" linkage the final assumed impact is on reducing natural resource needs and consumption.

Findings about Evidence: These three projects did not provide evidence of this type of linkage.

The IPOPCORM project found that integrated family planning and coastal resource management interventions were more effective in changing sexual practices among youth compared to single-sector approaches. In particular, the results of multi-variable regression analysis indicate youth are more likely to use contraception at sexual debut, and young males are less likely to be sexually active, in the IPOPCORM study area with an integrated approach compared to their counterparts living in non-integrated study sites. Trends also showed a significant decline in income-poverty among youth (D'Agnes, et al 2010).

6. **Hypothesized linkage "Increase in PHE awareness":** Family planning interventions, integrated into site-based conservation efforts, and including a communications component on PHE linkages, increase awareness of PHE linkages among stakeholders, improving the effectiveness of family planning and conservation activities integrally linked to conservation threats and reaching wider audiences with conservation messages.

Findings about Assumptions: Practitioners from five of the projects articulated linkages related to PHE awareness. The assumption pattern is that if project target groups understand the linkages between P, H and E, they will be more interested and more likely to change behaviors related to P and E than if the P or E information was delivered separately to them.

There are several underlying assumptions behind this set of assumptions, each of which was articulated by at least one practitioner among the five projects. One assumption is that cross-training (such as training health practitioners about the environment and vice versa) and training on PHE linkages increases trainees' overall sense of control over their lives. Coupled with provision of concrete tools/inputs to their communities (such as modern family planning, functional natural resource monitoring frameworks and agencies, and start-up capital for microenterprises), this type of training empowers individuals to realize that their needs are holistic and that they are not powerless in any of the fundamental domains of their lives including: access to local natural resources, good family health, control over family size and birth spacing, and a sustainable livelihood.

Another underlying assumption of this linkage is that packaging family planning messages with environmental messages enables a project to reach new audiences with family planning messages and environmental messages. Practitioners in our sample assumed that men should be more easily reached with family planning messages by linking family planning messages to information about the environment, such as relating birth spacing to spacing of crops, or waiting for fish to regenerate. Practitioners in our sample also said that women should be more easily reached and convinced about the importance of conserving the environment when conservation and health and family planning services or messages were delivered simultaneously. Further, practitioners in our sample assumed that entire populations would be more receptive to conservation messages and family planning messages when these messages were packaged together, because the package of messages provided a comprehensive framework for community development.

Findings about Evidence: The five projects that articulated these linkages did not provide strong evidence to support any of these assumptions.

One of the few pieces of evidence in our sample that supports this type of hypothesized linkage comes from a set of assumptions articulated by one of our sampled interviewees, and is supported by data gathered through an evaluation conducted by Pielemeier of the same project. PROCESS-Bohol in the Philippines found that women are more receptive to natural resource management messages when they are put together with family planning messages, meaning that the project could dramatically expand the sensitization of communities on key conservation threats (Pielemeier 2005).

Also, in two projects, practitioners observed that members of the health sector who were educated about environmental issues and PHE linkages increased vigilance of illegal and unsustainable activities in their communities, including illegal extraction of natural resources and illegal immigrant settlements.

Discussion and Conclusion

This analysis provides lessons that could help the conservation sector determine next steps in research and project development in integrating family planning with conservation activities. The projects in our sample comprise almost the entire population of recent PHE projects implemented by the conservation sector. Our analysis also represents the first systematically gathered documentations of lessons from multiple countries about evidence related to the value to conservation of taking this integrated approach.

The prevalence of only four general categories of assumptions within our sample indicates the existence of a shared understanding among conservation practitioners about why conservation organizations choose to undertake these types of projects. Therefore, in spite of the often cited concern that it is difficult for the conservation sector to establish common indicators for these kinds of projects, we conclude that it should be possible. In particular, the most universal assumptions lie in the early and middle stages of these linkages, at which stages it should be particularly feasible to establish common indicators, or at least, indicator-types. Some of these indicators have already been established and, we observe, are working well to learn lessons across the sector, ie. contraceptive prevalence rate and birth spacing of last birth (though the latter indicator has not been extensively utilized). This could be taken several steps further to address the middle stages of these linkages, such as for women's empowerment, establishing indicators related to the most common assumptions (related to time available to women who use family planning, health status of women and children who use family planning, how women who use family planning use their non-household time).

It will still be challenging to establish common indicators related to the specific direct threats to conservation within each linkage type, but it may be possible to establish common indicator types based on the linkage type. For example, for "decrease in fertility" linkages that rely on decreased pressure on natural resources, the specific natural resources of concern to a particular ecosystem and that are consumed by households could be measured and general consumption trends across projects could be assessed.

Among the four common categories of linkages, the large proportion of practitioners in our sample that cited "decrease in fertility" and "increase in women's empowerment" linkages compared to "increase in trust, goodwill, and entry points for conservation" and "increase in cost efficiency and effectiveness" linkages suggests that the former two types of linkages might be more relevant than the latter two types of linkages to the conservation sector. It may also indicate that if researchers are interested in learning more about the relevance of the latter two types of linkages, they will need to work closely with practitioners to tease out assumptions related to these kinds of linkages and provide suggestions about what kinds of indicators would help practitioners to better measure the assumed results of these types of linkages. They will not be able to assume that relevant data are being collected and that they can simply go out and collect existing evidence.

The extent of evidence available in relation to all of the assumptions presented by our sample demonstrates that the field of family planning in site-based conservation is still very young. Persistence and dedication to quality data collection is strongly needed.

The evidence base related to the "decrease in human fertility" and "increase in women's empowerment" linkages demonstrates strong evidence only for the very first steps of those linkage patterns- increases in family planning use in the remote areas where these projects are implemented. The types of assumptions that follow this result suggest that these sites need a longer timeline than the five to six years of implementation that was common among our sample. One of the key assumptions of the "decrease in human fertility" linkage was "reduce family size," but changes in family size cannot be measured until women complete their reproductive years. This makes it challenging for a five or six year project to accurately measure these kinds of results. It could be useful to find a proxy for this indicator, such as an indicators related to reproductive intentions, or to birth spacing, as an indicator suggesting how women's reproductive intentions are changing over time (for example, a woman who increases her birth spacing or waits to have her first birth may run out of time to have more children).

A women's empowerment linkage appears to be highly relevant to the conservation sector, but is also poorly documented. Almost all of the sampled practitioners considered women's empowerment linkages to be highly relevant to their theories about how their interventions related to their conservation outcomes, yet only a few projects had made any effort to measure the direct time or health benefits of family planning. Meanwhile the assumption of improved health and increased time preceded almost all other assumptions that practitioners held about how women's empowerment affected conservation outcomes. Clearly, these are two types of indicators that warrant more monitoring.

Evidence for increasing goodwill towards conservation or creating an entry point for conservation was inconclusive due to the fact that no project had undertaken family planning interventions in complete isolation from other interventions. Most of the projects in our sample had undertaken broad sets of interventions that included family planning as part of a larger reproductive health intervention, or even more broadly, as part of a maternal and child health intervention. Most projects also had micro-credit components. At the same time, more than half the projects in our sample had some evidence that their projects may have established goodwill and entry points for conservation. An evaluation conducted by David Carr in 2008 of 8 WWF PHE projects concluded that it is "overwhelmingly" evident that WWF's population and health work buys goodwill for environmental conservation outcomes (Carr 2008). While our analysis could not confirm this conclusion, our sample does provide evidence suggesting that broad health interventions, and possibly family planning by itself (at least sometimes), packaged with micro-credit opportunities for women, has a positive impact on goodwill towards conservation and creates entry points for conservation. If the PHE community wants to measure the specific contribution of family planning activities to achieving the results assumed under this linkage type, then more rigorous monitoring and research is needed.

The authors of this analysis also observed that among our sample, there was no documentation of family planning interventions having decreased goodwill towards conservation. Many conservation practitioners have expressed concern that undertaking family planning in these remote sites where conservation is already sometimes a conflict-inducing topic, may actually increase hostility towards conservation. Putting all of the evidence (and lack thereof) together for this linkage type, the sector would be advised to continue delivering family planning interventions as a package with micro-credit for women (and possibly youth as well),

and possibly with broader health interventions, until or unless any entity wishes to test this theory.

The linkage type that we have called "increasing cost effectiveness and efficiency" was not well explored or documented by our analysis. The IPOPCORM operations research project in the Philippines, which we consider to have produced the most reliable information to date about the validity of the linkages that we explored in this analysis, concluded that integrated approaches had a higher positive impact at a lower total cost than single-sector interventions (D'Agnes, et al 2010). Therefore it is surprising to note that this linkage type was not articulated by any of our interviewees as a major rationale of their projects, nor was it well documented by monitoring or evaluation data that those projects had collected. The weakness of the evidence in our sample means that we are unable even to suggest whether this result is likely to be found in project sites outside of the Philippines. All of the other projects in our sample were carried out in countries and areas of countries that have much higher levels of infant and maternal mortality, and lower levels of development, literacy, family planning use and gender inequality than many parts of the Philippines. As such this linkage type deserves exploration by the PHE community. To do this, PHE practitioners will need common indicators and frameworks for measuring efficiencies and cost effectiveness.

The relative lack of evidence in our sample related to the youth and PHE awareness sub-linkages coupled with a fairly significant number of projects assuming that these linkages were important, provides lessons that can also be taken into account in the design of project interventions. The IPOPCORM project found that that integrated family planning and coastal resource management interventions were more effective in changing sexual practices among youth compared to single-sector approaches. In particular, the results of multi-variable regression analysis indicate youth are more likely to use contraception at sexual debut, and young males are less likely to be sexually active, in the IPOPCORM study area with an integrated approach compared to their counterparts living in non-integrated study sites. Trends also showed a significant decline in income-poverty among youth (D'Agnes, et al 2010).

Our findings put together with the IPOPCORM findings suggest that projects of this type should strongly consider including integrated PHE awareness components in their projects, and particularly in relation to youth. Despite the lack of strong evidence for the PHE awareness linkage, projects might consider integrating this intervention types in all aspects of their projects due to the fact that several of the other linkages to final conservation impacts assumed in their projects take a much longer time to achieve than the conservation impacts assumed by PHE awareness linkages. Therefore if these linkages are playing an important role in reaching conservation outcomes- as assumed by several practitioners in our sample, projects will be more likely to reach their conservation goals more quickly in these projects by integrating PHE awareness.

In closing, the conservation sector could benefit from further research on the topic of the value added of site-based family planning for conservation, through an integrated PHE approach. Such research could explore priority topics such as linkages with women's empowerment, and how quickly this approach might impact governance, particularly of natural resources. Further research would be useful on how health and family planning interventions can build goodwill and trust among key stakeholder groups for conservation, and effectively change behavior and attitudes towards issues that are key to conservation success. Finally, given the challenges of

raising funds for PHE projects in a world where most donor funding is single-sector focused and limited, it would be useful to review innovative ways in which conservation organizations can facilitate community access to family planning and health services at little or no extra cost to conservation programs.

References

Albasin, S. 2008. Personal communication. Interview by Cara Honzak with Sheila Albasin, Successful Communities from Ridge to Reef Project, World Wildlife Fund, Philippines.Blom, A. 2008. Personal communication.

Bremner, J., D. López-Carr, L. Suter, J. Davis (2010). Population, Poverty, Environment, and Climate Dynamics in the Developing World. *Interdisciplinary Environmental Review* (11)2-3: 127-161.

Bremner, J., J. Davis, D.L. Carr. (2012). Population Growth, Ecology, and Poverty. In *Integrating Ecology and Poverty Reduction*. J. C. Ingram, F. DeClerck and C. Rumbaitis del Rio eds., Springer: New York. Pp. 65-78.

Carr, D.L. (2007). Resource Management and Fertility in Mexico's Sian Ka'an Biosphere Reserve: *Campos*, Cash, and Contraception in the Lobster-fishing Village of Punta Allen. *Population and Environment* 29(2): 83-101.

Carr, D.L. (2004). Proximate population factors and deforestation in tropical agricultural frontiers. *Population and Environment* 25(6): 585-612.

Carr, D.L., W.K. Pan, R.E. Bilsborrow (2006). Declining Fertility on the Frontier: The Ecuadorian Amazon. *Population and Environment* 28(1): 17–39.Carr, D.L. 2008. Population, Health and Environment in Africa and Asia: An evaluation of WWF's USAID and Johnson & Johnson-supported projects. World Wildlife Fund, Washington D.C.

Carr, D.L., L. Suter, and A. Barbieri. 2005. Population Dynamics and Tropical Deforestation: State of the Debate and Conceptual Challenge. *Population and Environment*, 27(1): 89–113.

Castro, J. and L. D'Agnes. 2008. Fishing for families: Reproductive health and integrated coastal management in the Philippines. Focus Issue 15, April 2008. Environmental Change and Security De Sherbinin, A, D.L. Carr, S. Cassels, L. Jang (2007). Population and Environment. *Annual Review of Environment and Resources* 32(5): 1-29.

Program, Woodrow Wilson Center, Washington D.C. Available at http://www.wilsoncenter.org/topics/pubs/ECSP_Focus_Apr08 Castro.pdf. Accessed May 2008.

Conservation Measures Partnership. Revised 2007. Available online at: http://www.conservationmeasures.org/wp-content/uploads/2010/04/CMP_Open_Standards_Version_2.0.pdf. Accessed January 2011.

D'Agnes, L., J. Schweithelm, K. Kanel, and B. Shrestha. 2006. Opportunities in population and health for community forest user groups in Nepal. ARD (Associates in Rural Development) Inc., Burlington, VT.

D'Agnes, L., H. D'Agnes, J.B. Schwartz, M.L. Amarillo, and J. Castro, 2010. Integrated management of coastal resources and human health yields added value: a comparative study in Palawan (Philippines). *Environmental Conservation*, 37: 398-409.

Honzak, C., J. Oglethorpe, and D. Carr. 2008. The value of taking an integrated approach to population, health and the environment: Lessons from Asia, Africa and Latin America. Presentation at the 3rd National Conference on PHE, Tagaytay, Philippines. Kalema-Zikusoka, G. 2008. Personal communication.

Hughes, R. and F. Flintan. 2001. Integrating Conservation and Development Experience: A Review and Bibliography of the ICDP Literature. London: International Institute for Environment and Development.

Kleinau, E., O. Randriamananjara and F.Rosensweig. 2005. Healthy people in a healthy environment: Impact of an integrated population, health, and environment program in Madagascar. Environmental Health Project. Washington, D.C. Available at http://www.ehproject.org/PDF/phe/madagascar-phe.pdf. Accessed August 2007.

López-Carr, D., M Erdman, A. Zvoleff, L. Suter (2010). How are population patterns different in ecological priority areas? Mapping demography onto conservation areas. *Proceedings of the European Population Conference*. September 1-4, 2010, Vienna, Austria. http://epc2010.princeton.edu/download.aspx?submissionId=100685

Margoluis, C. 2009. Healthy Relationships: Examining Alliances within Population-Health and Environment Projects. World Wildlife Fund, Washington, D.C.

Margoluis, R., S. Myers, J. Allen, J. Roca, M. Melnyk, and J. Swanson. 2001. An ounce of prevention: Making the link between health and conservation. Biodiversity Support Program, Washington, D.C.

Mulangoy, K. J. and S. Chape. 2004. Protected areas and biodiversity: An overview of key issues. United Nations Environment Program/World Conservation Monitoring Centre and Convention on Biological Diversity, Cambridge, U.K. and Montreal, Canada.

Mtiti, E. 2006. Personal communication. Interview by Cara Honzak with Emmanuel Mtiti, Tacare Project, Jane Goodall Institute, Tanzania.

Oglethorpe,J., C. Honzak, and C. Margoluis. 2008. Healthy People, Healthy Ecosystems: A Manual on Integrating Health and Family Planning into Conservation Projects. World Wildlife Fund, Washington, D.C.

Pan, WK, D.L. Carr, A Barbieri, RE. Bilsborrow, C. Suchindran (2007). Forest Clearing in the Ecuadorian Amazon: A Study of Patterns over Space and Time. *Population Research and Policy Review* 26(5-6): 635-659.

Pielemeier, J. 2005. Review of population-health-environment programs supported by the Packard Foundation and USAID. David and Lucile Packard Foundation, Los Altos, Ca and USAID, Washington, D.C. Available online at: http://www.ehproject.org/PDF/phe/ll-packard2.pdf. Accessed August 2007.

Pielemeier, J. 2007. Lessons from the first generation of integrated population, health, and environment projects. Focus on Population, Environment, and Security. Woodrow Wilson Center/USAID, Washington, D.C. Available at http://www.wilsoncenter.org/topics/pubs/Focus_12.pdf. Accessed May 2008.

Sutherland, E, D.L. Carr, S. Curtis (2004). Fertility and the environment in a natural resource dependent economy: Evidence from Petén, Guatemala. *Población y Salud en Mesoamérica* 2(1): 1-12.

Stem, C., and R. Margoluis. 2004. Conventional wisdom on causal linkages among population, health, and environment interventions and targets. Foundations of Success, Bethesda, MD.

Viernes, M. 2006. Personal communication. Interview by Judy Oglethorpe with Mar Viernes, Conservation International, Philippines.

Wells, M. and T. McShane. 2004. Integrating Protected Area Management with Local Needs and Aspirations. *AMBIO: A Journal of the Human Environment*, 33(8): 513-519. Royal Swedish Academy of Sciences, Stockholm, Sweden.

World Neighbors. 1999. Integration of Population and Environment II - Ecuador Case Study. Lessons from the Field. World Neighbors, Oklahoma City, OK.