

POPULATION, HEALTH, AND ENVIRONMENT IN AFRICA AND ASIA

An evaluation of WWF's USAID and Johnson & Johnson- supported projects



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Acronyms and Abbreviations

AAPPEC	Association l'Auto-Promotion des Populations en l'Est Cameroon
ADRA	Adventist Development and Relief Agency
AIDS	Acquired Immune Deficiency Syndrome
AMA	Associacao do Meio Ambiente
AMREF	African Medical and Research Foundation
ARI	Acute Respiratory Infection
ASOS	Action Santé Organisation Secours
CAR	Central African Republic
CBD	Community Based Distributor
CDC	Conselho de Desenvolvimento Comunitario
CFCC	Community Forest Coordination Committee
CFUG	Community Forest User Group
CPR	Contraceptive Prevalence Rate among Women of Reproductive Age
CPUE	Catch Per Unit Effort
EAME	Eastern African Marine Ecoregion
EU	European Union
FCHV	Female Community Health Volunteers
FHI	Family Health International
FP	Family Planning
FPAS	Family Planning Action Session
GO	Government Organization
GTZ	German Agency for Technical Cooperation
HIV	Human Immunodeficiency Virus
ICS	Improved Cook Stoves
J & J	Johnson & Johnson
KM	Kominina Mendrika
KMNR	Kiunga Marine National Reserve
KWS	Kenya Wildlife Service
LGU	Local Government Unit
LPG	Liquefied Petroleum Gas
MCH	Maternal and Child Health
MoH	Ministry of Health
MPA	Marine Protected Areas
NGO	Non-Governmental Organization
NRCS	Nepal Red Cross Society
PHE	population-health-environment
QNP	Quirimbas National Park
RH	Reproductive Health
SIV	Simian Immunodeficiency Virus
SRT	Sangha River Trinational
STD	Sexually Transmitted Disease
TA	Technical Assistance
TAL	Terai Arc Landscape
TB	Tuberculosis
TBA	Traditional Birth Attendant
USAID	United Sates Agency for International Development
VCT	Voluntary Counseling and Testing
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

Introduction

This executive summary is a distillation of the results of an evaluation conducted from August to December 2007 in review of World Wildlife Fund (WWF) Population, Health, and Environment (PHE) projects sponsored by Johnson & Johnson and United States Agency for International Development (USAID). The PHE sites are located where the human-environment penumbra is in constant flux, where human populations swell most rapidly, suffer most desperately, and depend most directly upon and impact most profoundly some of the richest forest and marine ecosystems on Earth. The PHE projects facilitate basic health care and reproductive health (RH) provision with the working thesis that improving human health and environmental conservation jointly adds value to each independently.

Methods

Independent evaluation instruments were used with 754 individuals: WWF staff, health and environment partners, and local men and women in individual and focus group interactions. The evaluation was conducted in WWF high priority marine and terrestrial conservation sites with PHE programs in Philippines, Nepal, India, Mozambique, Madagascar, Kenya, Cameroon, and Central African Republic. The Bhutan PHE site, where the project had already finished, and the China PHE site, which has recently begun, were not evaluated. Similarly, the USAID-funded population analysis work by WWF US is external to the evaluation.

Results

The WWF PHE programs were run at 37 cents to \$6.64 per capita annually. The impressive and inspiring results that were achieved for such a sum challenge two dominant paradigms. The first relates to the demographic transition, and more specifically the urban transition. During the coming decades all the world's several billion net additional people will live in the world's poorest cities. Yet this belies the fact that in many conservation priority areas the demographic transition has scarcely commenced. What about these areas? It also challenges the related notion that has predominated development assistance in recent years: invest in urban areas to achieve greatest yield on investments. While certainly more people can be accessed at less cost per person in urban areas, the qualitatively distinct human-environment milieu of ecological priority regions demands a similarly distinct valuation.

The results also strongly point towards the importance of investing in livelihoods in tandem with PHE interventions. Invoking livelihoods is key for selling PHE: people think in terms of their livelihoods first and see their relationship with the environment through a livelihoods lens. It is also key for doing PHE: People struggling to make ends meet in priority ecoregions don't enjoy ample leisure time to practice conservation as a hobby; it must be integrated seamlessly into how people survive and thrive. Livelihoods are also important for the first point above in stimulating demand for FP.

Some PHE interventions built capacity or infrastructure. Others were aimed for direct impacts on outcomes. Among these were direct interventions such as saving turtles. Others were preventative, such as preventing human impacts on turtles by seizing illegal fishing gear. Similarly, some population and health outcomes were indirect, others direct. How successful were the WWF PHE programs in improving population, health, and environmental outcomes in target sites?

Population

The projects have had mixed success regarding population outcomes. Capacity building for family planning remains as diverse as the levels in the demographic transition in the target areas, from rudimentary or absent at one end of the spectrum to well advanced and sustainable at the other end. Several problems have limited success. First, the poorest sites, such as the BA'aka in CAR, and Madagascar, have relatively low demand for family planning. Relatively great demand exists for basic health care and nutrition, to prevent deaths, largely among infants, and to combat easily controllable infectious diseases. In these places little progress in family planning indicators may be observed in the first several years of a project. However, this is highly appropriate for populations in early stages of the demographic transition. In these areas mortality must fall and subsistence must be ensured first before there is demand for family planning. Working first on mortality and subsistence is almost certainly a more sustainable path to ultimately reducing family size through family planning adoption. Unfortunately, in some sites where this would be a more appropriate way to proceed, e.g. Madagascar, such an approach is not undertaken because USAID funds are restricted to family planning within a rather literal framework. Where this is the case an argument can be made that USAID funds are worth pennies on the dollar relative to J & J funds.

Despite these restrictions, Contraceptive Prevalence Rate among Women of Reproductive Age (CPR) has shown variable but notable changes. For example, CPR has increased dramatically in the Kiunga district of Kenya (though reporting error from 2003 likely understated users), nearly doubled in Madagascar's Spiny Forest, increased by nearly 20% from 2006 to 2007 in Nepal's Khata region, and increased slightly in Roxas district, Philippines (the site of most reliable data on this variable). Adequate data on CPR is not available for other sites.

Health

Modest financial infusions have had the effect of literally turning infant mortality around in a matter of months in several sites. Key to project success, and antecedent to any sustainable outcomes that can be attributable to the project, is the successful development of local health infrastructure and capacity-building. Capacity building results vary according to number of years the projects have been funded, existing infrastructure, and the education level of locals. Where some existing infrastructure exists and where at least some locals are literate, training has happened rapidly and impressively. These sites include Kenya and Nepal. For example, from 2005 to 2007 the number of community-based health volunteers trained in Kenya has expanded from an initial group of 47 to over 80. In the Philippines, trained health volunteers swelled from 29 to 50 during the same period. Conversely, CAR has had difficulty training local volunteers. Among the BA'aka for example, it is rare to find even one literate person

among many clans. This makes it very difficult to garner local buy-in to the need for health volunteers in the first place and further hampers the effective communication of skills and knowledge necessary for the position. Nevertheless, two BA'aka play important roles in the CAR PHE project and are fundamental reasons the BA'aka attend the clinic. Two exceptions here are India and Madagascar. The locals in India's Terai are largely literate and enjoy at least elementary education. Yet, despite excellent relations between WWF and locals and their desire and ability to become more involved with improving health in their communities, local capacity has remained undeveloped. Conversely, in Madagascar, despite low literacy and education among locals and less flexible USAID funding, nearly 100 people have been trained.

Another way to build local capacity is through training locals to build their own infrastructure, the proverbial giving fishing lessons rather than fish. An excellent example of this is the pit latrine project from Cameroon. After initial training on how and why to build them, pit latrines have increased in number, dramatically reducing diarrhea and helping to prevent cholera. Another example comes from Kenya where locals have begun to organize on their own volition to clear brush and areas where water collects to help prevent malaria.

A last issue regarding sustainability is the value accrued to health services when people must pay for them. In Nepal for example, Forest user groups already existed with a revolving fund. Extra money made and deposited in the revolving fund was then made available to help to run the clinic. Similarly, in the Philippines CBDs have made money from their services after only one year. This is quite an achievement given the recent history of the project.

Improved water and sanitation efforts, basic health care provision, and anti-malarial treatment and mosquito nets have reduced infant mortality. Estimates from the WWF director and health partners in Kenya's Kiunga National Reserve suggest that vaccination campaigns have resulted in complete coverage for children under five. Prior to these campaigns, coverage was about one-third of this age group. Although there is evidence that similarly impressive results were achieved elsewhere, these results are not supported by standardized data. In India while seven core villages are the sites of the camps, a total of 25 villages are reached since villagers from nearby communities travel to the health camps. In Cameroon, following the build up of pit latrines, the number of new childhood diarrhea cases plummeted.

Environment

In Philippines, Kenya and Mozambique, communities have established "no-take" marine sanctuaries in collaboration with WWF. In the older sanctuaries, locals report that, in less than two years since the marine conservation zones were implemented, fish volume has at least doubled while fish diversity has also increased. These sanctuaries have had immediate impacts not only on conservation outcomes but also on fisher family wellbeing and nutrition.

In Mozambique, the increase in marine richness within the sanctuaries has had the spillover effect of enhancing fish catches outside of the sanctuaries. Population outcomes have also been influenced by the increased fish catches. Contrary to conservation outcomes in the short-term, the impact has been through an in-migration rate exceeding 5% yearly following the establishment of the sanctuary. While population in the short-

term is increasing as a result of environmental conservation, over the longer term a successful PHE message could help to limit in-migration where it threatens livelihoods. As well, it could support an increasing demand for FP as people wish to improve education for their children, and thereby increase investments in fewer children.

Other measurable results include a 22% (from 50 to 72%) increase of marine turtle nests reported by communities in Kiunga Reserve. On the terrestrial side, there has been an 8% increase in the number of households within PHE target sites using fuel-saving stoves in Madagascar's Spiny Forest during the first phase of the project, and a 4% increase during the second phase of the project.¹ Further, the project has catalyzed the increase in tree nurseries from 3 to 7 and the number of tree plantings from 2,160 to 106,250 accompanied by government recognition of almost 98,000 ha. of new area under community forestry management. In Nepal, the percentage of households using clean energy (ICS or biogas) increased from 11.3% in 2006 to 13% in 2007 (projected target = 25% by 2008). As a result of this increase, an additional 225 metric tons of firewood were saved this year (projected target = additional 682 metric tons saved by 2008). In addition, the Community Forest Coordination Committee (CFCC) provided loans from the revolving fund for 1,029 solar lamps in the project site this year, which is another form of clean energy and savings for poor households (saves kerosene). In India, households in the project area are changing energy use from locally collected firewood to liquefied petroleum gas (LPG) (less than 20% at baseline to an anticipated 50% or more by 2008). There has been an estimated 60-70% reduction in fuel wood collection. Lastly, in Mozambique efforts to increase food security also promise important environmental conservation impacts. During this fiscal year, locals have been trained in composting, and in the creation of "curvas de nivel" (trench and dyke), a type of mini-terracing. Both practices promise to reduce soil erosion and capture soil nutrients and water for reuse. Early adopters are demonstrably enthusiastic about increased yields observed in their first harvest year with the new techniques; several other villages have adopted the approach and results should be observed in the next harvest.

Data collection

USAID and WWF have made admirable efforts to establish continuous monitoring plans for their joint PHE sites. Johnson & Johnson should insist on monitoring as well. Joint program funding should help to streamline the process. There remain, however, areas of potential improvement both in planning and in monitoring local implementation. Central USAID and WWF efforts appear to have mixed utility in the field and to donors. Conceptual chains have been useful to central efforts to identify key relationships, processes, and proximate, distal, and synergistic relationships. They have also helped local WWF PHE directors and staff to understand PHE linkages. For example, in places where the linkages happen over a long time horizon, for example in CAR, it enabled WWF staff to value intermediate steps (e.g., training local health volunteers) towards ultimate outcomes (e.g. decrease in mortality and fertility). Population variables are well standardized; the health and environment ones are too localized. Capacity to collect, clean, and interpret data is lacking.

¹ At the end of 2006, the Spiny Forest, Madagascar PHE project changed some of its target sites. The first phase refers to the period prior to this change and the second phase to the period following this change.

While there appears to be some consensus among PHE practitioners on health and population indicators, metrics for environmental outcomes have remained largely distinct in each ecoregion and incompatible with related outcomes in cognate regions. Although environmental variables tend to be more diverse and difficult to measure, the value of attempting to collapse them into major categories may exceed the cost of not doing so. For example, despite nuanced and heterogeneous human-environment dynamics that are largely site-specific, environmental outcomes, nonetheless, can be distilled to the following human impacts on terrestrial systems -logging, agriculture, poaching, and on marine systems –illegal and unsustainable fishing. This suggests rich possibilities for standardizing environmental outcomes in future monitoring plans.

PHE Synergy and value-added

Overwhelmingly, it is evident that WWF's population and health work generate goodwill for environmental conservation outcomes. Indirectly, community commitment is fostered through an understanding of linkages between health and the environment. In other cases the exchange is more direct. A second environment-health linkage is the improved health and increased quantity and quality of working hours enabled by improved health that can allow for better (or worse) stewardship of the environment. Lastly, a potentially positive feedback loop exists where conservation efforts lead to increased resource availability, which leads to better nutrition achieved in fewer hours of work, which ultimately enables more time to spend on conservation efforts. A combination of scientific and anecdotal data supports each of these links.

The PHE Message

Some PHE messages could be scaled-up for use in other PHE sites. The family planning action seminars conducted in the Philippines developed by Save the Children and the movies produced in CAR are prime examples. However, some messages are best crafted at local levels. For example, in Kenya's Kiunga district Muslim men are largely opposed to family planning. More effective messages in such a context are framed in terms of child spacing for education and economic reasons. Interactive messages are the most effective. To *whom* a message is directed is important. Women of childbearing years are an appropriate cohort to target for the FP message when their infants are being immunized. Similarly, because the majority of the population in the PHE sites is young, targeting youth is highly appropriate.

Partners: Win-Win?

A common denominator of success in all sites is effective collaboration with health partners. Building capacity in locals and health partners is necessary for effective outcomes and their sustainability. Where partnerships are more developed, partners yield benefits from the relationship as well, such as the Philippines and Kenya, where the involvement of both non-government organizations (NGOs) and government organizations, particularly Health Ministries (MoHs) is present. Another common theme is the necessity to have local community members involved and trained as health partners. A last recurrent theme of note is the importance of regular coordinated meetings among partners, WWF, and locals. For the sustainability of partnerships it is imperative that the partners come into the agreement with equivalent investment and interest in the

projects. Another key to partnership sustainability is the persistence of partner staff. Lastly, the MoHs need to be involved to ensure the greatest chance of sustainability.

Champions

A recurring theme among project successes was the identification of one or more champions who put the interests of the project before their own interests. Their passion, credibility, and charisma are major catalysts for project success and expansion. Dona Aida in Mozambique is one of these champions. Her tireless advocacy of marine sanctuaries (documented in the country sections) launched a national adoption of them along Mozambique's coastline.

Cost Effectiveness: Bang for Buck

An important, perhaps underappreciated, aspect of a successful PHE program is the selection of an appropriate geographical target for integrated PHE interventions. With the exception of Mozambique, all PHE programs target between five and fifty thousand people in five to thirty villages in priority biodiversity sites or landscapes where there are strong human-environment interactions. This order of magnitude appears appropriate for the combination of resources currently available given the desired PHE outcomes. Mozambique is a heuristic counterexample. Priority places for PHE work should include the benefit of doing one for the other two. Lastly, the modest results from this report are highly suggestive of ample success of funding efforts within an order of magnitude of 37 US cents (Mozambique) to 6.64 US dollars per person (Kenya) per year. In addition to the internal synergistic effect of the PHE programs, external synergy has also been accomplished through leveraging PHE resources to acquire further funding. Several examples of this have achieved significant results and are documented in WWF's 2007 Ridge to Reef report.

Technical support

Technical support appears to provide great additional value for PHE projects. Where technical support was high, for example through ADRA in Nepal and Save the Children in Philippines, project interventions were generally more cost and outcome effective. A challenge to the sustainability of technical support to the WWF PHE projects is that PHE technical advisor, Cara Honzak, works only part-time. Furthermore, existing projects in Philippines, Kenya, Cameroon, and elsewhere aim to expand their current PHE target regions. It is an inopportune time for the PHE technical advisor's time to be reduced, as the number and geographical scope of the PHE projects are in expansion mode.

Johnson & Johnson vs. USAID funding

The more flexible J&J funding provided greater value on the dollar compared to USAID money. USAID funds are constrained to a narrow and proximate definition of family planning. As many of the PHE sites are located in remote rural regions in early stages of the demographic transition, other health interventions, most significantly child health interventions, are themselves the most appropriate interventions for the ultimate USAID goal of family planning.

Contraceptive Methods

While it is imperative for PHE programs to offer couples as broad a suite of contraceptive options as possible, it is clear that injectables and pills are the most popular means. They are easy to take and administer and they largely elide the involvement of husbands who are sometimes indifferent or even opposed to family planning. Condoms are important for HIV and STD transmission reduction and have been successfully marketed as such in Nepal where male labor migration puts families at risk for both. However, in other sites with similar risks, condoms are under-utilized, e.g. in CAR.

Sustainability and scaling up

It is imperative to maintain funding in existing sites until they can stand alone. In other words, concentrate investments not in a reduced suite of PHE sites but rather do so more broadly. The ethical contradiction of protecting animals but not people is a thorn that can be removed by earnest PHE and livelihood interventions. The modest results from this report are highly suggestive of ample success of funding efforts within an order of magnitude of 37 US cents (Mozambique) to US\$6.64 per person (Kenya) per year. While the former is much closer to sustainability, the potential demographic and environmental conservation payback is also lower.

The necessary ingredients for sustainability will include:

1. A broad-based understanding of PHE linkages shared by WWF staff, partners, and locals that leads to changes in behavior commensurate with the PHE message and
2. Certain conditions at each level:
 - Household: Sufficient human, logistical, transportation, and provision capacity along with volition to behave consistent with the PHE message.
 - Village: Village volunteers such as trained health volunteers, midwives, and conservation regulators and advocates, who can facilitate health, population, and conservation outcomes.
 - Site: sustained health partner presence in the form of, e.g., continuously stocked hospitals and health clinics staffed round the clock by trained nurses and or MDs.
 - Regional: sustained government and institutional support.

SECTION I: INTRODUCTION TO THE REPORT

This report summarizes an evaluation conducted from August to December 2007 to review the WWF (World Wildlife Fund) Population, Health, and Environment (PHE) projects sponsored by Johnson & Johnson and United States Agency for International Development (USAID). To evaluate PHE project effectiveness, independent evaluation instruments were developed for WWF staff, health and environment partners, local men, and local women. Results are based on individual and focus group investigations involving 754 locals, and WWF and partner staff. Instruments were applied in WWF US priority conservation sites that are integrating population and health interventions. The countries involved in this project include Philippines, Nepal, India, Mozambique, Madagascar, Kenya, Cameroon, and Central African Republic.

The PHE projects aim to facilitate the provision of basic health care and reproductive health (RH) care to some of the most isolated and impoverished rural communities in the world. The hope is that, ultimately, improving human health and environmental conservation in concert adds value to each independent outcome. In remote, ecologically rich ecosystems, people's wellbeing is closely tied to the sustainability of the natural resource base. In such regions, six of the eight of which are home to indigenous peoples, survival and wellbeing depend largely on subsistence agriculture and successful stewardship of natural resources through hunting and gathering, fishing, and forest resource extraction for food, medicine, and building materials. Accordingly, the regions targeted for PHE interventions are among the most dynamic human-environment systems on the planet. People with some of the highest poverty, fertility, and mortality rates on earth interact intimately with some of the most precious ecosystems. In sum, this is where the human-environment co-existence is in flux; it is where human populations grow most rapidly, suffer most acutely, and directly depend upon and impact the richest forest and marine ecosystems.

The following report will provide a brief evaluation for each country's PHE project. This section will give a background to each country's PHE context; an evaluation of the relative progress made on each of its stated goals, and will conclude with specific suggestions for improving current outcomes and for the potential to scale-up substantively and geographically. This "country report" section will be followed by a discussion of overall impressions and outcomes from the eight countries combined. The evaluation does not include the Bhutan project (which has closed) and China (which is just starting). Also, it did not evaluate the USAID-funded population analysis work. Specifically, this last section will include a presentation of some concrete results and recommendations for monitoring, sustainability, and scaling up PHE efforts nationally and internationally.

SECTION II: COUNTRY REPORTS

Roxas - Philippines

Background

On Palawan Island in the Philippines (Figure 1), WWF and local partners have largely succeeded in accomplishing Population Health Environment (PHE) objectives in its integrative project launched in 2005 at a funding level of \$70,000 per year.

WWF has:

- Skillfully teamed with Save the Children Philippines and the Roxas Local Government Unit (LGU) to reach new family planning (FP) users in Roxas through an innovative FP awareness and commodity distribution system;
- Initiated the development of a series of community marine sanctuaries; and
- Established a monitoring system to conserve the marine area around Roxas.

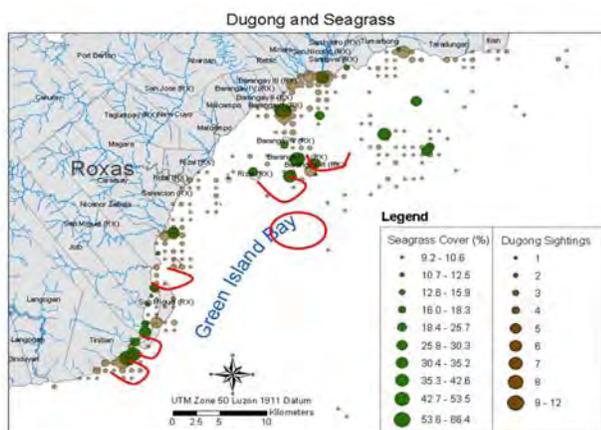


Figure 1: Palawan Island, Philippines

Strong linkages with partners are clearly a key factor in the effective functioning of the project in accomplishing each of the objectives enumerated below. In most cases this linked program strategy (or parallel sets of activities) has been effective. In a minority of cases, partner commitments have wavered; for example, the LGU initially was motivated by WWF to invest in enforcement of MPA regulations but has recently pulled back. Below is a brief evaluation of progress to date on the project.

Objectives

1: To improve Family Planning (FP), Reproductive Health (RH), coastal resources management, Population Health Environment (PHE) knowledge and awareness among coastal communities and build capacity of PHE development agents

The components of this objective have not merely improved; they have succeeded with tangible and notable results. Family planning outcomes had changed dramatically even before the initiation of the project. Desired number of children is now 2 to 3 and it appears that an increased number of couples have acted on this desire through the use of contraceptive options made available through the project. Before project inception a strong demand existed for contraception but this demand has likely become even stronger

due to the efforts of the project. Most importantly, the affordable and consistent supply is now reaching the rising demand. A revolving fund (PhP 10,000 per community or barangay) promises to be a sustainable solution for affordable family planning indefinitely. The predominant FP method used remains the oral contraceptive pill. With half or less of the target barangay population of child bearing years using contraception, the PHE message and reliable supply of contraceptives promise to increase this user rate.

Currently the supplies are obtained in two ways. First, when staff in the Palawan WWF office travel to Manila (usually the project director) they send an order to the Municipal Medical Officer in Manila who then contacts a local dealer. Alternatively, the supplies are purchased from a traveling sales representative in Roxas. However, the representative's availability is not regular and prices are slightly more expensive than when purchased in Manila.

Since the initiation of the project, 5 new marine protected areas have been established at the barangay level and several more are being planned. While it is difficult to say to what degree, if any, the PHE projects take credit for these, it appears that the overall package offered by WWF, conservation with PHE, has enabled a synergistic appreciation of the value of conservation for the overall wellbeing of local populations. The establishment of marine protected areas has had a profound effect on fish catch with fisher folk reporting significant increases in fish catch following several years of decline that had left many fisher folk unemployed. Catch per unit effort (CPUE) has nearly doubled from 2004-2006 and the population of two fish species being monitored have also increased. A snorkeling observation of reserve versus adjacent open fishing areas corroborates the remarkable differences. Coral in the reserve fishing areas, for example, shines with a riot of color and species diversity supporting an even more colorful and diverse palette of teaming fish. Conversely, non-reserve coral is pocketed by blanched areas and a relative scarcity of fish. Sustainability is likely because locals have witnessed that after only two years of coral protection, fish catch dramatically improves. Thus, a real incentive is created to maintain the system of self-policing these marine protection areas indefinitely. Another incentive is generating revenue through tourism.

Family planning and reproductive health have become integrally incorporated into resource management strategies. PHE knowledge and awareness is now greatly increased in the 7 target communities (barangays) and has extended organically to neighboring communities. The capacity of the PHE development agents has been excellent and shows great promise of sustainability. Moreover, the components of this objective have been achieved synergistically. This has been accomplished through the WWF-Roxas' close coordination of the multiple health and resource management partners involved in the project. They have conveyed a clear, coordinated message of the value added of doing PHE work integrally and of the importance of population and health to ecological and development sustainability.

Patrols by a community-based fishermen's organization for illegal fishing in Roxas are regularly scheduled. Municipal waters are patrolled and the fish catch is closely monitored. A 2006 survey indicates that hard coral cover noticeably decreased during the previous two years. However, species richness remained constant, although abundance and biomass declined. WWF staff opined that the decline in species abundance and biomass could be due to fishing pressure or poor water conditions prior to the monitoring event.

2: To improve access to FP/RH services and infrastructure promoting FP/RH commodities and system

Except for permanent methods such as tubal ligation and vasectomy which are accessible only during medical outreach missions, most FP methods are now available. Local physicians are untrained in contraceptive surgery and remain unreceptive to the idea of performing such operations, possibly because demand for them would scarcely compensate the time taken for training and the potential risk involved.

Access to FP/RH has been dramatically improved. Before the project these commodities were purchased at a great premium at local pharmacies. Choices were limited and supply unreliable. Public resistance to purchasing contraceptives at retail value was also exacerbated by a recent history of free distribution by USAID.

To ensure that supply remains constant, a sustainable network of Roxas residents who travel to Manila must be created, or an alternative supply option must be found. On a positive note, a new supplier in Puerto Princesa made contact with the project in August. The next shipment of contraceptives might be ordered directly from this supplier. The infrastructure appears solid and sustainable. Demand is strong, and is facilitated by the message supplied from the project. Demand is being met through the network of local health promoters trained by WWF and the district health office.

3: To promote sustainable fishing practices and techniques among fisherfolk families and policy makers through emphasis on PHE linkages

It is evident through conversations with fishermen and key informants that local communities understand the PHE linkage. It is abundantly clear to them that the protection of marine areas has led to a fishing rebound. It is also evident to them that sustainability translates not only into marine protection but also into the reduction of human pressures on marine resources through managing population growth.

Many of the communities have supported the establishment of marine protected areas (MPAs). Fish catch per unit effort (CPUE) has improved from 0.07-2.4 kg/man hour to 1-3 kg/man hour from 2005-2007 and the population of two fish species being monitored has also increased.. Five new MPAs have been established and several more are planned. Strict enforcement by the municipal government (in 2006) helped reduce the operation of illegal commercial fishing practices (e.g., trawling or using a Danish seine) and the use of dynamite and cyanide within municipal waters. Enforcement of fishing laws and increased improved coastal monitoring has made an impact. The local WWF staff reports, however, that during recent months the LGU has decreased coastal patrols due to lack of funds, a trend that threatens to encourage a return of illegal fishing activities.

4: To identify and develop sustainability measures to promote PHE

The PHE consultants hired at the start of the project were effective. They established contacts with prospective partners from the health and business sector for FP supplies and introduced them to other NGOs who have been conducting PHE in other areas (e.g. Save the Children). The relationship with Save the Children was established through WWF's association with the University of Michigan PE fellows program. Judy Oglethorpe and Cara Honzak invited Bill Fischelis (Honzak was also a PE fellow at that time), who was based at Save the Children-Philippines, to provide TA to the WWF Roxas

project. Through this contact and negotiations, WWF-Roxas received a fuller set of TA from Save the Children. The project has incorporated budgets for coastal resources monitoring and management in the LGU's annual budget. The commodity distribution system is already running with a revolving fund, which if handled properly should be able to supply the needs of the different communities. The commodity distribution system has already produced revenue for workers following one year of operation. People within the LGU and in the community have already been trained to provide basic health and FP. Policies (resolutions and ordinances) have been enacted. Whether all these will continue to be implemented after WWF-Philippines exits Roxas will largely depend on the incumbent mayor and his priorities and on the people themselves.

The project appears sustainable through the success of the above objectives. Challenges moving forward will be to maintain an affordable supply of contraceptive commodities, to continue the PHE message as very successfully learned from Save the Children, and to continue training of local health promoters with the undiluted PHE message. Support from the next new municipal mayor will also be crucial.

Conclusion and Recommendations

Key to the project's success has been the identification of and collaboration with health and environment partners. Prior to project initiation, meetings were held with stakeholders to assess need and competency. By involving stakeholders from the onset, key implementers garnered ownership and increased buy-in to the project, thus promoting sustainability. Particularly effective is the covenant with Save the Children, through which Roxas PHE workers/volunteers learned the Family Planning Action Session module (FPAS) developed by Save the Children. The dissemination of education materials has been widespread and has enhanced the PHE message; these include PHE calendars with information on FP methods, important dates such as vaccination, FP counseling, programs, tree planting, coastal clean-up, and coastal resources monitoring.

Several challenges exist going forward.

- Ensure that the current system of procuring contraceptives in Manila at reduced cost is maintained or improved. This will mean maintaining the efforts of a local doctor, volunteer, or government worker with frequent travel to Manila and/or securing an alternative, possibly cheaper method of procuring contraceptives, perhaps through the internet.
- Convince the LGU to sustain efforts on the health and environmental conservation sides of the project. For example the alarming trend of fewer coastal patrols due to decreased investments in marine monitoring by the LGU is a dangerous about-face for marine conservation and is not the direction the project should be going at such an early, fragile stage. It is imperative that the LGU maintain its good will and efforts to date in the project.

There are great scaling up opportunities in the Philippines due to a very active national advocacy body and a strong government basic health infrastructure. The project shows great promise for replication to the remaining barangays in the District of Roxas.

Currently there is great interest from neighboring barangays; indeed many residents travel to the 7 target barangays to receive inexpensive contraceptive commodities. Although to a conservationist, this “magnet effect” could appear worrisome, over time it is likely that such interventions will stimulate the mobilization of supply chains in neighboring areas as well. Local government efforts will need to be mobilized for this to happen successfully and sustainably. Further, the PHE model might be successfully scaled up to the Tawi Tawi conservation area where WWF has worked with the local communities for several years. For this to happen, in addition to the lessons learned from Roxas, local initiators must be sensitive to the notably different cultural context of the region.

Lagga Bagga - India

Background

India's Lagga Bagga region remains the only corridor of intact forest linking Kishanpur Wildlife Sanctuary in India with Nepal's Suklaphanta Wildlife Reserve (Figure 2). Rich in tiger and swamp deer and a last remnant of forest habitat for rare tiger populations, the corridor is of

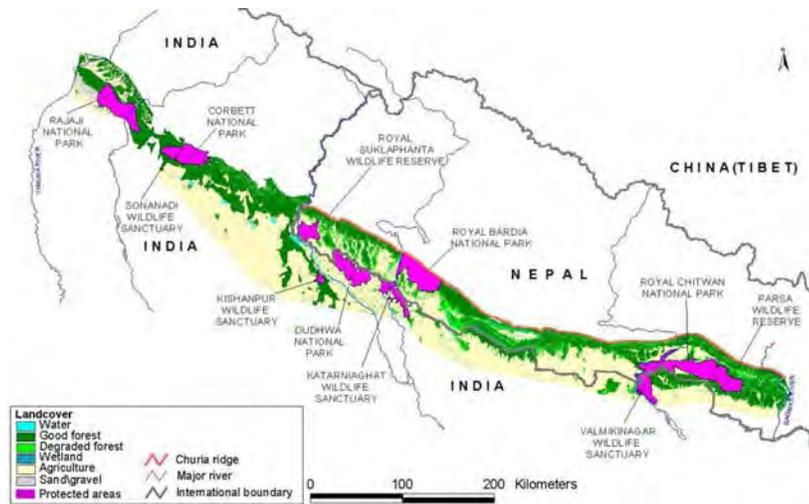


Figure 2: Lagga Bagga Region

highest priority for the ecological integrity of the larger Terai Arc landscape. Threats to Lagga Bagga are manifold: stream siltation, overgrazing, unsustainable fuel wood harvesting, grassland and forest fires, and pesticide runoff are all exacerbated by poverty and poor healthcare. WWF is collaborating with indigenous groups and migrant workers to counter these threats. Three groups inhabit the Lagga Bagga corridor: wealthy landholders, refugee settlers who work as laborers, and indigenous peoples. The latter two groups represent the vast majority of inhabitants and are the most dependent on forest resources.

Poor communities lack the wherewithal to access healthcare and family planning services and to find alternatives to unsustainable resource extraction. With the aim of safeguarding biodiversity integrity in this region, WWF:

- initiated a conservation project in this corridor in 2002, and
- set up free health camps to improve healthy people-healthy forest synergies and as entry points to, and in exchange for, community conservation.

Coupled health and conservation efforts have made notable strides.² The following report discusses progress to date based on interviews with 144 villagers, key informants, donors, and partners among the 28 communities (total population = 50,000) of high ecological value selected by WWF and particularly 7 core villages (total population 10,000). The program, currently in its 4th year of J&J support, has been run at approximately \$40,000 annually.

Objectives

1: To improve access and quality of healthcare

² Healthy Communities, Healthy Ecosystems in the Eastern Himalayas. Mid term report, WWF, 2007 and Eastern Himalayas Work Plan, WWF, 2007.

According to locals, health access has gone from virtually non-existent to nearly complete coverage since the implementation of the health camps. However, this coverage is usually available only one day every 1-3 months and volunteer doctors were concerned about the lack of follow-up because of infrequent camps. People were also concerned that they sometimes receive only a few days worth of medicine with few options for continuing treatment because of the lack of pharmaceutical supplies at local shops and pharmacies. Conversely, health care for Forestry Department and WWF employees and their families living in the same area includes transportation to hospitals and clinics as needed. The major cause of mortality in rural developing communities arises from several illnesses that disproportionately afflict infants and young children such as gastrointestinal illnesses, respiratory infections, and malaria. One community reported increasing incidence of uterine tumors. Sanitation, vaccination, and medicinal interventions aimed at the youngest and most vulnerable has led to a sharp decrease in child illnesses, particularly respiratory infections.³

Health camps occur monthly or every 2-3 months, reaching hundreds of families per visit. There is demand for camps to be held more frequently. Camps receive and treat typically 100-300 villagers per camp. While seven core villages are the sites of the camps, a total of 25 villages are reached since villagers from nearby communities travel to the health camps. It is the hope of the program to create adequate sustainability in existing target communities and then to ultimately scale the project to neighboring areas. Several representatives from neighboring villages exhorted us to initiate health camps in their villages as well. The Project has linked with local health workers and others with the aim of providing improved health and family planning to the target cohorts of the project villages. Medicines for general health and family planning commodities have led to immediate gains in health. Family planning commodities are provided during the health camps, coupled with awareness campaigns in the form of posters and audio-visual presentations.

The dramatic improvement in health access and health care for target villages thrives on the spirit of the local WWF field director and the volunteer doctors he has recruited. Their efforts are laudable, their results dramatic. However, the model is only partially sustainable. Locals must be capacitated and NGO and Government Organization (GO) health partners must become involved for the project's success to endure and flourish.

Of more immediate concern, to date the camps have focused on basic health care provision in the form of medical and pharmaceutical interventions. However physicians and others could do more to promote preventative efforts such as improved nutrition, and basic hygiene. Another need in the communities to date inadequately addressed by the health camps but with great future promise is the promotion of the PHE integrated message and family planning. Lastly, the provision of free care may not be sustainable. This was initially a problem in the Philippines. USAID provided free care and people were unwilling to pay once USAID terminated its program. A solution may be to ask patients for a small contribution, thus increasing their own perceived value of the care and also creating a foundation for the revolving fund.

2: To reduce the incidence of illness

³ Data available in forthcoming 2008 WWF report.

While more local capacity is needed for the sustainability of health programs, audio-visuals and poster presentation during the health camps have motivated villagers to improve general hygiene, sanitation and reduced disease transmission. People we interviewed claimed that they have gained awareness of links between improved sanitation and health and have made notable efforts in improving personal hygiene and a cleaner environment.

Adopters of clean energy and Liquefied Petroleum Gas (LPG) have increased from less than 20% baseline to an anticipated 50% or more by 2008. This has led to a reduction in firewood collection. Both the links between improved health from LPG, which leads to decreased respiratory infections, and improved sanitation and health, have motivated locals to understand first-hand the power of linkages between health and the environment.

3: To improve the access to family planning and reproductive health

The Project has successfully partnered with local health workers and volunteer doctors for improved access to health care in the target groups of the project villages. Medicines, both for the general health and for family planning efforts have led to health improvements. Family planning commodities are provided during the health camps, and awareness has increased in the Pilibhit villages but not in Dudwa. It appears however that most awareness has been raised by the MoH midwife and evolved by word of mouth among women rather than through direct promotion in the health camps.

Nearly a third of the adults of reproductive age were using some modern form of family planning in 2006. New adopters have increased in number and are expected to represent over 50% of target populations by 2008. Vaccinations are covering nearly all newborns and infants. In several villages we visited, people claim that family size has shrunk from 4-6 and from even as much as 7-11 in some tribal villages, to 2-3 as family planning commodities have been made available at the health clinics.

More information on family planning options and consistent commodity provision would improve user adoption. Information on family planning is mixed. For example in some communities women are afraid that the contraceptive pill will make them ill. Consequently women in such villages opt for tubal ligations. In other communities where there is a fear of tubal ligation outcomes, the exact opposite reaction occurs, and women opt instead for using pills. According to a local midwife, tubal ligation demand has increased from a handful yearly to nearly 40 in the past two years.

Progress in reproductive and infant health is promising but more can be done. A crucial next step will be to hire local women health care assistants and to motivate the visiting gynecologist to provide reproductive health counseling to women and couples as is done successfully in the Philippines.

4: To improve sanitation and reduce disease

Some cultural context is important to preface here. Communities of Bengali origin have tended to prioritize hygiene and sanitation and as a result have suffered fewer related illnesses than other ethnic groups in the area. The posters and presentations at the health camps have begun to expand this behavior to other ethnic groups. Now it is apparent that most people in the target area are beginning to understand the intimate linkages between health and the environment through sanitation and hygiene. More can

be done to leverage this as an opportunity to spread the more general PHE message as well as to educate locals in direct linkages between certain illnesses and environmental health. This is very important as, again, most mortality is concentrated among infants who could be saved with simple sanitation and nutrition interventions.

5: To enhance functional literacy

The project's mantra, improved health means a healthy mind in a healthy body, has been widely accepted by locals. Again, to build on this message buy-in, other PHE messages could be integrated. This understanding among locals has meant that more children are being sent to school. The functional literacy rates of boys and girls are now good in project villages. Improved literacy has enabled locals to be more open and able to buy in to population, health and environment messages.

6: To improve awareness of and participation in conservation

There has been an estimated 60-70% reduction in fuel wood collection (accomplished with funding complementary to Johnson & Johnson), mainly because of the development of alternative livelihoods through the revolving fund as well as the effective communication of the PHE message disseminated at the health camps. Consequently, local communities have incorporated alternative fuels instead of selling collected fuel wood. Key to this success has been the alternative livelihoods sponsored by external European and Australian funding. Some of these include cattle camps, which encourage trade of unproductive cattle for a smaller number of better bred, stall-fed cattle to provide milk and manure, thus reducing pressures on the forest, and women's workshops for basket production from forest materials. Hunting has decreased due to successful conservation messages and stringent park security on behalf of park and forest guards. Wild animals causing conflict are being pushed back into forests rather than killed. While the very poorest still remain occasionally dependent on hunting, animal kills are down an estimated 90%. Provision of tin roofs in some communities has reduced the collection of thatching grass.

The villagers conclude that providing them with basic health facilities has clearly enabled WWF to gain support for conservation of forest resources and wildlife. WWF has further facilitated this by leveraging external funds to provide training in alternative livelihoods which in turn further reduce pressures on local environmental resources. Further, during health camps the message of wildlife conservation and sustainable resource extraction is used.

There is an obvious quid pro quo here where villagers feel obliged to help Forest Department and WWF with resource conservation in exchange for health aid. The next step is to develop the PHE message to foster increased ownership among locals of the notion of preserving the environment to benefit their own health and economic interests. Philippines is a good model for this in general. As well, specific lessons learned from the Central African Republic with educational movies filmed in conjunction with locals could be implemented successfully here.

Conclusions and Recommendations

Strengths of this project are impressive and include the following:

- While it is clear that WWF has gained cache among the communities through livelihood work, it is also clear that people greatly appreciate the health interventions. To what extent remains a question. Improved monitoring needs to redress this and other basic data deficiencies.
- The communities were very well selected for conservation interventions yet also have a very high need for health care and a high population density in the area.
- The director of the program was well selected as he did his dissertation in the region and therefore had a strong network of contacts among the villages. This is very important as these remote villages are not accustomed to working closely with external agencies and such trust is invaluable and allows a more rapid and efficient program development.
- Volunteer doctors are passionate and tireless workers for the PHE cause.
- Park guards appear very professional and well trained. Importantly, they also have a good presence with a density of about one guard per square kilometer of protected forest. While perhaps this is unsurprising given India has so little forest remaining and the Indian Terai is of high conservation priority, the effectiveness is quite stunning. Intensive agriculture stops abruptly against a wall of intact forest stands in many of the park boundaries. Park guard data indicates that hunting and extractive impacts on the forest have plummeted as a result of these efforts. Enhanced support for the guards through the project and concomitant goodwill enhanced with the communities appeared to coincide with improved conservation outcomes.
- The WWF office has done a good job of remaining integral to the WWF mission and explaining to locals that they are not providing health care but are merely facilitating it. They have also been honest in explaining their mission to communities at the outset, and clear about the terms of providing healthcare in exchange for reducing pressure on the forest.

Challenges for future development of the project include:

- WWF's dilemma of promoting greater access and quality of local health care but not being a health organization itself. There are liability concerns in the event of the death of a local villager at the expense of inadequate health care. Furthermore, there is currently no exit strategy in place in regards to health work.
- Other concerns include the dearth of Ministry of Health personnel and other health partners apart from doctors. Because of these and other concerns, the sustainability of the project also remains in question.

Several priorities are particularly recommended. WWF India needs to:

- Determine whether or not to continue this work. If it is to continue, then it needs to find reputable partners to make the project more sustainable, and reach a better comfort level. Once it finds partners it needs to redesign the approach and strategy so that infrequent health camps can be augmented or replaced by a more sustainable mode. Similarly, the supply of medicines needs to be rectified. WWF should not be purchasing medicines and doing all the health logistics.
- Develop partnerships with health organizations and educate them on PHE linkages. An assessment of potential health partners is of highest priority. Care and Action Aid, for example may be working nearby, and might be willing to expand into the area. Raise awareness in likely partners about PHE advantages, seek common goals, and develop a strategy to work together.
- Do more to promote preventative efforts such as improved nutrition and basic hygiene. Another need in the communities to date inadequately addressed by the health camps but with great future promise is the promotion of the PHE integrated message and family planning.
- Improve the explanation to locals about why WWF is supporting population and health work as it links to environmental outcomes. This could be done through increased investment in delivering the PHE message. Because of obvious land pressures this should be easier to achieve here than in other circumstances, and indeed people here often did understand well the links between population, health, and environment better than in other sites. But the PHE message could still be more consistently adopted.
- Train locals and NGO and GO partners to become more involved and have more ownership of the project with an aim towards sustainability. While the quid pro quo approach to conservation may be effective in the short term, it is unsustainable.
- Apply lessons learned from other areas (Terai Arc Landscape-Nepal and Philippines) including creative seminars and learning units from the Philippines and movies filmed with locals in the Central African Republic. Towards this end, visit the Nepal Terai and attend the Philippines conference to find out what is happening there, and in other countries.

A high priority is to bolster the family planning component of the project. Many early adopters exist and demand has soared. Supply lags demand and this need not be the case with the level of funding for the project. Partnering with an NGO such as Save the Children or a family planning NGO would be a huge boon to the project. In the meantime, at the very least one or more female health workers should be trained to capacitate a group of local women midwives or maternal and child health representatives. Beyond this, train community women, community health volunteers and peer educators, ideally through partners. We heard the frustrations of girls who finish secondary school

and then cannot find jobs; they would be good candidates to train as community health workers.

Terai Arc Landscape - Nepal

Introduction

The Terai Arc Landscape (TAL) encompasses one of the most biologically diverse habitats on Earth (Figure 2). The alluvial grasslands and subtropical deciduous forests of TAL support 86 species of mammals, 550 species of birds, 47 species of herpetofauna, 126 species of fish, and over 2,100 species of flowering plants. TAL covers the only remaining natural habitat on the southern slopes of the Himalayas for the Royal Bengal tiger, Asian elephant and one-horned rhinoceros. The alluvial plain of TAL is also the rice bowl of the country, and is home to 6.7 million people from various ethnic and indigenous groups (WWF 2007).⁴

Within TAL, the Khata corridor links Bardia National Park with the Indian Katarniaghat Wildlife Sanctuary. Communities in the corridor area are unusually poor; the average family works less than half a hectare of land to feed several children while the average per capita annual income remains under US\$50. Within this human landscape of poverty, pressures build on surrounding forests, with households using an average of 6.5 to 7.5 metric tons of firewood per year. Diseases such as gastrointestinal infections, eye infections, pneumonia and typhoid are ubiquitous. The area has also suffered acute political instability at the hands of Maoist insurgents. Despite these multiple fundamental challenges, the Community Forest Coordination Committee (CFCC) and its 32 Community Forest User Group (CFUG) members, the Red Cross, Adventist Development and Relief Agency (ADRA), the Ministry of Health, four credit providers, and other savings and credit cooperatives have provided WWF's partners vital collaborative opportunities with local communities. Johnson & Johnson funding has supported WWF and partners to provide improved health care in the area. The following report is compiled with the help of over 9 WWF staff and 6 partner staff and approximately 50 village leaders and villagers. The target population includes 24,709 people and approximately 3 households in 32 Community Forest User Groups. With total funding of \$80,000 from USAID (18 months from July 2006) and \$40,000 annually from J&J (3 years July from 2005), the project has had notable success as explained below.

Objectives

1: To improve health care services

Funds were used to build a health clinic run by the local CFCC in order to service basic health care and to take part in a host of partner-building activities. Prior to the project, low levels of understanding existed among community members about how human health relates to conservation. However, following peer educator training and several educational workshops on the linkages between health and environment, the project has been well accepted by the communities. Moreover, many of them feel that they can continue implementing some of the programs such as awareness-raising regarding family planning methods without further project support. This achievement is due to successful

⁴ (From: Healthy Communities, Healthy Ecosystems in the Eastern Himalayas 2007).

local capacity building which, in itself, emerged thanks to clear linkages consistently conveyed by WWF on PHE linkages.

While it is too early to comment on concrete health outcomes among local populations, it is evident that the project team has done an excellent job in improving health care infrastructure in Khata. The Khata community health clinic was improved from a small office area to a large four room clinic thanks to Johnson and Johnson sponsorship. The clinic provided medical support to nearly 1,700 people in 2006. One result of the improved care is evident in one village where, following recent floods, there were no diarrheal cases due to water filtration, new wells, putting bleach down wells, and latrines. A key strategy to success was WWF's partnership with the Nepal Red Cross Society (NRCS), which helped support clinic development early in the project.

Further health care access has been extended through health workshops held three times in 2006 under NRCS sponsorship, which provided specialized care from medical doctors to over 300 people. WWF also sponsored six health awareness events where the PHE message was disseminated through local community organizations. Lastly, first aid training from 2005 was culminated by 28 health care volunteers receiving first aid kits.

2: To improve reproductive health and access to family planning

Various local capacity building efforts are quantifiable. The Project development and implementation workshop trained 32 Female Community Health Volunteers (FCHVs) while youth peer educators were trained by ADRA. Three focus groups with Community Forests Users Groups (CFUGs) yielded information on available health care and improvements needed. Further, a survey revealed a total of 4,053 couples pertaining to 2,977 households from 32 CFUGs in the Khata corridor were potential users of family planning. The contraceptive prevalence rate (CPR) was 43% among women in 2006 and has risen to over 50% this year.

Interviews confirm that communities' capacity has considerably improved in integrating health and environmental issues in Khata. Prior to the project, only primary health care needs were emphasized and only a handful of community forest user group members were involved in providing health service from a small clinic established by the Red Cross. The first infusion of funding, from J&J, involved primary health care, first aid, and the creation of the improved clinic. In the first year of the project, the Red Cross was brought in to assist with the clinic development. The Red Cross did some training of CBDs and first aid assistance. USAID funds over the last year have been used for ADRA to provide training to youth peer educators and CBDs on family planning/RH, with env ?part too. Since the initiation of the project, users have been involved as peer educators to cover primary and reproductive health care. Because CFUG members are involved as peer educators and the communities pay health care professionals in the clinic to deliver services, through the CFCC revolving fund, communities retain indefinitely trained human resources even when people out-migrate in search of jobs in urban areas.

Following initial struggles, the population component of the PHE message has been received well by locals. Radio programs and seminars in the local language produced by WWF have spread the message of PHE. According to the WWF project manager, the message has been so well received that he anticipates current family sizes exceeding 4 children per woman will be reduced to near replacement level within 10 years: "I guarantee you it will be under 2.5 within 10 years." If this is achieved, the

project director is confident that this will result in a great conservation boon since the key ecological problem in the area is the need for new land and fuel wood, the demand for which will be dramatically reduced by the 1.5 fewer children per family he anticipates within the decade. However, in-migration remains a threat to resources as well. To counteract the latter, locals will have to see the link between PHE in the form of migration's effects on resources as well. Currently, local people understand the links quite well. A potential means to stem migration to Khata is through governance and community control over land and resources – which the strong CFUGs do very effectively

In sum, concrete and synergistic PHE outcomes such as the use of biogas, latrines, and reduced pressure on forest, improved sanitation, and reduced acute respiratory infection, have been observed. The buy-in is very high with PHE as people realize through WWF branding of health efforts that WWF values their life more than that of animals. It has helped the PHE project also that WWF has had a livelihoods approach for many years and people's attitude is already very positive towards conservation as they are gaining the positive benefits from forest conservation through income-generating activities and forest subsistence produce.

Table 1. Use of family planning methods in Khata

Particulars	No
Married couples with women of reproductive age:	4,053
Permanent	1105
Male:	17
Female:	1,088
Temporary:	634
Condom use by male:	204
Different temporary methods adopted by female:	430

From 2007 Healthy Communities, Healthy Ecosystems in the Eastern Himalayas

3: To improve water treatment, sanitation and fuel efficiency

Johnson and Johnson funding has led to the production and subsidized purchase of locally made toilet pans for nearly 300 families, exceeding projected demand by 20%. Further, efforts to educate people on the importance of sanitation have led to a notable increase in interest for latrine building on household plots. In addition to the improvement in hygiene from this latrine boom, exposure to harmful animals such as snakes has been reduced since people no longer use the forest, and fecal contamination of water resources has improved. Funding has also supplied water filters, wells and well treatment, along with arsenic treatment. Results have been dramatic. With improved sanitation, diarrhea, once the primary cause of child mortality, has been virtually eradicated. To put this rapid achievement in perspective, eliminating diarrhea extends life expectancy by over 10%, or several years in countries with high infant mortality.

The adoption of biogas and fuel-efficient stoves that reduce smoke exhaust in the household has enjoyed mixed results. Nearly 15% of households have adopted clean

energy alternatives followed by a reduction in acute respiratory infections (ARI) from 30% in 2006 to 26% in 2007 (D'Agnes 2007, *Integrating Population and Health into Forest Management Agendas in Nepal*). However, there were complaints that the stove design should be changed to fit the needs of locals where extended families often cook together. Also, many fuel-efficient stoves were damaged in flooding this year.

USAID funded HIV/AIDS work has been successful in educating people of PHE linkages in the context of HIV and the key role of migration in transmission. People have also been educated in how abstinence and condoms can prevent transmission and recent data show a notable increase in male condom use.

Lastly, a novel and successful idea that could be used elsewhere is the use of enquiry boxes in all the villages where people can anonymously write requests for topics to be covered in sessions. Now it is much easier to discuss these issues which have been traditionally sensitive.

Conclusion and recommendations

Nepal has impressively integrated health work into conservation work, and leveraged additional funding to increase the effectiveness of their health work, especially in the way they have promoted sustainability. Activities such as integration of PHE into CFUG plans, and having a CFCC subcommittee on health, are helping to integrate and institutionalize PHE. This is one of the most potentially sustainable projects we have observed, with the possible exception of the Philippines. Having the community (through the CFCC) as a true health partner that is increasingly taking financial responsibility for the project is remarkably effective – and the health services are being paid for through natural resource income-generating activities – though it remains a challenge. Central African Republic and Cameroon for example wish to do this but haven't yet achieved it. Although the CFCC has a number of competing demands for its funds, and does not yet have great income generating potential, WWF-Nepal has told the community they will cease to fund the project in a couple of years, and that they have to become financially independent.

The Red Cross played a very important role as a catalyzing agent in enhancing the capacity of the CFCC members. The CFCC has started to manage all health activities as the Red Cross has pulled back. Other partners came on board and have taken the project to the next level. The technical assistance provided by USAID funds was key in the strategic planning of the USAID-funded component. The financial “add-on” effectively complemented the J&J funded work which provided very specific services. The USAID funds enabled a wider reach and more and more frequent camps. The add-on further enabled family planning to be much more effective; previously CBDs distributed commodities but didn't promote awareness. Awareness promotion by CBDs and youth peer educators as a result of ADRA training could now make a big difference. However, USAID funding (\$80k over two years) was insufficient for this ambitious component. This should be borne in mind for future projects. Fortunately, this project was able to leverage further funding (Kenya also did this effectively through AMREF).

The monitoring in this project is now probably better than most; they are one of the few to have CPR data. It makes a big difference to have a health partner that is paid to

help with the monitoring, and can provide training in monitoring. Another important lesson is the great help to the project initially by Leona D'Agnes' technical oversight.

While the Nepalese health sector, a national government priority, is relatively flush with funds, competition for monies for conservation is fiercely competitive. Thus, the need to partner with health organizations is evident. However, in addition to leveraging local contacts in WWF conservation areas, the small scale of the PHE model enables a focus on prevention rather than fixing health problems post-hoc.

The program director is eager to scale-up the successes from Khata Corridor to other WWF conservation landscapes such as Terai Arc and Sacred Himalaya. He explains that the first step has been accomplished: to create a growing demand among locals. He suggests that the exact same system can be replicated immediately with modest funding: "All is ready; I have the landing gear out – more bang for your buck now." He concluded "We will do cross-fertilization with health workers from Khata Corridor to new corridors. We will go to areas we already have a presence. We are not Columbus going to America."

Even if the entire amount cannot be sustainably retained, a funding level of 80-90% would be adequate to sustain the project indefinitely the manager asserts. Further, in regards to forest management, sustainability is no longer considered a challenge. He is confident that it will remain sustainable. In sum, the PHE project in Nepal, despite many challenges common to other PHE sites, has been unusually successful and can serve as a model of PHE implementation.

It is recommended that WWF:

- Continue to gradually transition financial responsibility for the Khata health operation to the CFCC so that it becomes independent in 2-3 years.
- Use Khata as a pilot demonstration project, and bring partners and community members from elsewhere to see it; develop WWF reputation for PHE in Nepal and promote awareness of PHE benefits in the country.
- Continue to gradually transition financial responsibility for the Khata health operation to the CFCC so that it becomes independent in 2-3 years.
- Start PHE in another 3 critical corridor/bottleneck places, drawing on WWF PHE capacity developed in Khata, and on technical assistance from new PHE Fellow; ensure that project meets communities' priority needs; set aside adequate funding and ensure technical support for monitoring.
- Ensure privacy for clients visiting the Khata health clinic (at the moment there is no privacy).
- Continue to foster closer partnership with the District Health Office to promote greater collaboration, including prevention of further stock-outs of contraceptive commodities.

- Modify the design of improved cook stoves to accommodate larger capacity needed by extended families and design flood protection for ICSs.
- Provide more direct assistance to the CFCC to enhance its management skills and project management, monitoring and reporting systems and practices.
- Take PHE to landscape level (and partnering with local governmental structures including a new federal state level depending on how that develops) in order to promote scaling up and closer partnerships with the Ministry of Health.

Lobeke - Cameroon

Introduction

The Congo Basin (Figure 3) covers a full quarter of the planet's intact tropical rainforests (second in size only to the Amazon) and boasts the most impressive assemblage of mega-fauna on Earth, including virtually all of the planet's great apes and the vast majority of Africa's forest

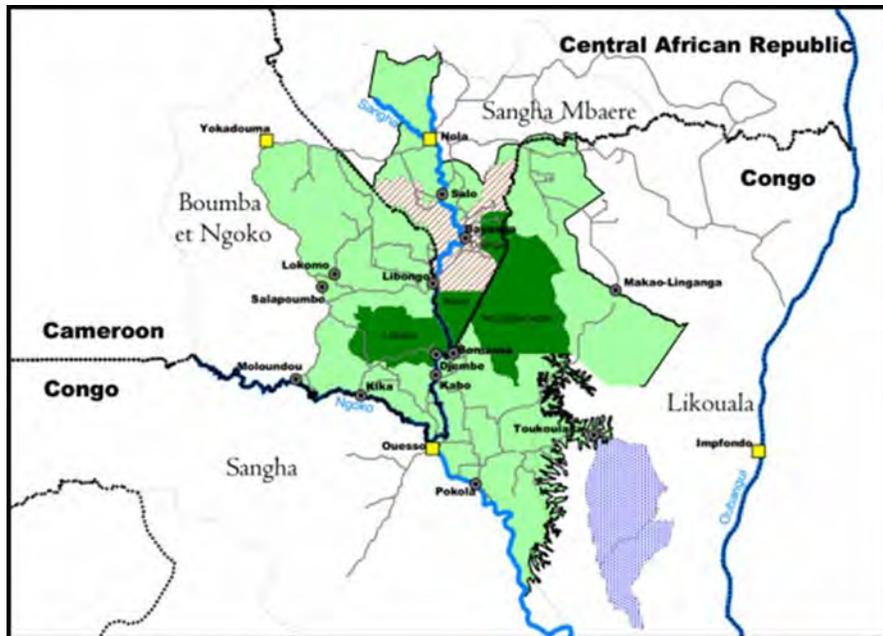


Figure 3: Congo Basin PHE

elephants. With over 10,000 plant species, of which nearly one in three is endemic to the region, and 1,000 bird and 400 mammal species, the Congo Basin is by any measure a global treasure trove of biodiversity. Home to forest pygmies, the region suffers an unusual confluence of human and environmental threats. The human population has a doubling time of less than twenty years, and an annual growth rate which may be the highest in the world. Life expectancy remains well below 40 years as disease is rampant and health care scant. Suffering is not unique to humans in the region. Poaching claims countless mammals daily while Ebola outbreaks reap half or more of affected gorillas. Concomitantly, logging, mining, and agriculture destroy yearly nearly a million hectares of forest canopy. The Congo Basin PHE received a grant of \$100,000 to support community initiatives supported by strategic partners that demonstrate linkages between human health, biodiversity and the health of the planet. This infusion followed Summit Foundation funding in 2002.

While nutrition is common to all programs, other health interventions are tailored to community needs. The aim of the project is to collaborate with partners to promote conservation integrated with healthcare and alternative livelihoods among communities living within remote forests in Cameroon and the Central African Republic (CAR). With these objectives, WWF and partners have innovated a program in and around two protected areas concentrating some of the highest elephant and gorilla populations in the Basin, Lobeke and Dzanga Sangha, core forests of the Sangha River Trinational (SRT) Conservation Area, a 28,000 square kilometer core conservation area within Central Africa's vast yet besieged rain forests. The following country report evaluates the

progress of the project in integrating human health and environmental conservation among BA'aka (Cameroon) pygmy communities.

On the strength of superior partnering, an impressively trained and dedicated staff, and strategic village selection for PHE implementation, the Lobeke project has demonstrated potential for future sustainability. This report evaluates the progress of the Lobeke project based on meetings with 80 people, including WWF staff, health partners, and villagers.⁵

Objectives

1. Increase access to health care.

The project has fostered superior relations across a range of partners to both create a human network for health care and to supply this network with priority materials. The project has supplied condoms, mosquito nets, baby weighing scales, and malaria pills to local health clinics of border villages of Ndongo and Ngoyla, Catholic missionaries, and local health services. Further, local health care capacity is slowly becoming established through the training of village health scouts. Health scouts have been unusually effective in convincing young couples to use condoms to prevent STDs and AIDS. The message of abstinence, faithfulness, and safety, in that order, has apparently worked. When condoms are disseminated in villages they quickly run out. More condoms should be supplied. Similarly, only a fraction of villagers have mosquito nets, and many babies remain unvaccinated. Lastly, basic health care materials are scarce; midwives complain of lacking scissors, gloves, and alcohol, for example. Complete coverage of the communities in these basic and inexpensive preventive health commodities in collaboration with health partners should be feasible and a priority usage of Johnson and Johnson funding.

2. Increase capacity of local health workers.

Health scouts covering most villages in the region, including four BA'aka communities, have been trained in basic first aid and community health care through preventive medicine targeted at the major illnesses afflicting locals: malaria, intestinal tract infections, infant illnesses that can be prevented through vaccinations, STDs and AIDS. Several traditional healers have also been integrated into the PHE network, which has been particularly useful for palliating chronic diseases and for increasing partnerships with modern health care personnel. Midwives have been trained in hygienic practices and in methods of family planning. More training is necessary. The Catholic mission director wishes to have nurses in each community. While this is unlikely in the near future, increased training of midwives and health scouts can bring this dream at least modestly closer to reality.

⁵ Healthy Communities, Healthy Ecosystems in the Congo Basin, Lobeke National Park, WWF Technical Report. 2007.

3: Improve health

The project's goal of reaching at least 10% of village households with pit latrines is a great success. According to the Catholic mission hospital records, 110 latrines were constructed initially with WWF support. In little over a year 250 have now been completed as locals "compete with neighbors", explained the Catholic hospital head. The organization, training, and need for latrine sanitation coalesced to produce outstanding results that appear to be scaling up self-sustainably. Concomitant with the burgeoning construction of latrines has been the sharp decrease in diarrhea outbreaks from seven percent in October 2006 to 1.4 percent by January 2007 and a reported similarly dramatic decrease in child and infant morbidity and mortality according to Catholic Hospital records.

While village health campaigns have focused on HIV/AIDS and other contagious diseases, it appears that the goal of reaching 60% of adults with family planning messages has been achieved. However, natural methods are the contraceptives of choice as the program doesn't distribute any commodities except condoms. They can't receive other methods from the Catholic hospital and although alternative methods are available elsewhere, distribution is a problem.

The program's encouraging start could be greatly expedited through further training of health scouts and midwives, an increase in extent, number, and creativity of message delivery including more involvement from the large and energetic school health and environment club, and learning from the example of the CAR to produce movies on health and environment in local communities. Similarly, HIV-AIDS work mainly focuses on awareness and prevention. There is a need for a mobile VCT as people aren't being tested enough with only the Catholic hospital doing testing so far. Infant mortality has been reduced rapidly but still has much further to fall and considerably more human and capital investment before it will be sustainably low. The early success of latrines is an encouraging first step towards providing potable water to the villages. While funding unlikely allows a well to be built in each community, it should be a feasible priority for the use of chlorine and other, inexpensive alternative methods to be practiced in all communities within two years. Following awareness campaigns, WWF staff reports that vaccinations have increased after initial resistance among some villagers who remain skeptical of them. They further report that effective posters and campaigns have led to a significant drop in household consumption of great apes, a health risk to humans.

4: Raise awareness of links between health and conservation

Partners have educated locals on environment-health linkages through the dissemination of posters made by WWF staff and student club members, and through increased communication with community members. WWF has helped traditional healers, already collaborating with national health partners, to create an association to enhance collaboration over forest management. As a result of these efforts, WWF staff reported that communities think that at last WWF is doing the right thing by helping them with health. Thus, this small project is important for WWF's image with communities.

While awareness has helped increase vaccination use and modestly increase family planning, the potential exists for considerable improvement. While the WWF staff is well aware of PHE linkages, the crucial project partners-the Catholic hospital director, the district health representative, the high school health and environment club, midwives

and health scouts-offered only mediocre responses to questions about such linkages. An exception to this pattern was the strong PHE message conveyed by traditional healers. Prerequisite to locals buying into this message is the project leadership understanding the value added by such synergies. Organizing an effective training for all partners on PHE synergies should have been done already and needs to be done as soon as possible.

Conclusion and recommendations

Three strengths of this project are 1) the superlative partner infrastructure– the team includes a Catholic mission hospital, the sub-prefectural health director, and AAPPEC (Association l’Auto-Promotion des Populations en l’Est Cameroon), 2) vital and creative public school health-environment clubs, an effective Community Based Wildlife Management Committee, caring and motivated health scouts, a new traditional healer association, and midwives, the size and strategic location of targeted communities-important for both their location relative to priority conservation areas and for the great need for health care, and 3) the dedicated, creative, well trained, and energetic staff (although for reaching women it would be desirable to have a woman on the project staff). Some revenue from community hunting zones is being allocated for health which indicates that communities are serious about sustaining the project.

The following suggestions are proffered:

- First, priority spending needs to be focused on the proverbial low hanging fruit. In this case, a dynamic potentially sustainable partnership infrastructure is in place yet basic materials and medicines are not regularly available. Basic health care commodities for health scouts and midwives for basic health interventions such as scissors, bandages, alcohol, gloves, basic materials protecting villagers from disease (e.g., mosquito nets, bleach for cleaning drinking water), and medicines that can dramatically and swiftly reduce infant and child mortality (e.g. antibiotics, anti-malarials) should be made available to all villagers as soon as possible. Other priorities include expanding the program to populations in the conservation corridor, developing potable water sources, increasing HIV-AIDS and Ebola awareness and testing, and improving transportation methods for health care.
- Transportation is a problem but should not be prioritized over preventative interventions. Perhaps a motorcycle-ambulance with a side car stretcher could be a cost-effective option.
- Partners need to be convened more frequently in order to incorporate them into the decision making of project priorities and planning implementation. A second reason to convene partners is to enhance health scout and midwife training to enable these local health representatives to increasingly fulfill roles played by certified nurses. Lastly, a project-wide meeting could help advance a value-added, synergistic, PHE approach. This component of the project remains in its infancy but could make swift advancements due to the excellent partnership network in place. If project leaders are largely unenthusiastic and unaware of PHE linkages we can expect much less still from locals. WWF staff could take a big first step

towards remediation on this point by inviting all partners to a workshop highlighting PHE interactions.

- Cross visits with neighboring CAR staff and materials developed in the Philippines and elsewhere where PHE synergies have been developed would help catalyze this project's efforts.
- The project needs more funding – with a little bit more they could possibly tip the balance and be much more effective – as was the case with add-on funding in Nepal.
- WWF should consider if TBAs and traditional healers should be paid. They observe the health scouts getting remunerated while they don't. This discourages them.
- There is a need for a strategic plan for health work to avoid duplication and fragmentation of efforts.
- With these suggestions, there is exciting potential for sustainability over the medium to long term and for scaling up to the 11 other priority conservation landscapes across the vast Congo Basin.

Dzanga-Sangha - Central African Republic

Introduction

The Congo Basin covers a full quarter of the planet's intact tropical rainforests (second in size only to the Amazon) and boasts the most impressive assemblage of mega-fauna on Earth, including nearly all of the planet's great apes and the vast majority of Africa's forest elephants. With over 10,000 plant species, nearly one of three is endemic to the region, and 1,000 bird and 400 mammal species, the Congo Basin is by any measure a global treasure trove of biodiversity. Home to the BA'aka pygmies, a remote forest people, the region suffers an unusual confluence of human and environmental threats. With possibly the highest annual population growth rate worldwide with a population doubling time of less than 20 years, life expectancy remains well below 40 years as disease is rampant and health care scant. Suffering is not unique to humans in the region. Poaching claims countless mammals daily while WWF staff reports that Ebola outbreaks reap half or more of affected gorillas; concomitantly, logging, mining, and agriculture destroy yearly nearly a million hectares of forest canopy.

The Congo Basin PHE (Figure 3) received a grant of \$100,000 to support community initiatives supported by strategic partners that demonstrate linkages between human health, biodiversity and the health of the planet. While nutrition is common to all programs, other health interventions are tailored to community needs. The aim of the project is to collaborate with partners to promote conservation integrated with healthcare and alternative livelihoods among communities living within remote forests in Cameroon and the Central African Republic (CAR). With these objectives, WWF and partners have innovated a program in and around two protected areas concentrating some of the highest elephant and gorilla populations in the Basin, Lobeke and Dzangha Sangha. These core forests of the Sangha River Trinational (SRT) Conservation Area, a 28,000 square kilometer core conservation area within Central Africa's vast yet besieged rain forests, are the site of the first transboundary initiative in the Congo basin. The following country report evaluates the progress of the Dzanga Sangha, CAR project in integrating human health and environmental conservation. It is based on interviews with 60 villagers from Ba'Aka and Bantu communities, health partners, and WWF staff.⁶

Objectives

1: Increase access to health care

Health access among target communities with the support of Johnson & Johnson, provides some of the first health care even at the most basic level to this recently settled population. The two BA'aka villages and five Bantu villages adjacent to Dzangha Sangha, with a total population 12,000, are the target populations for the PHE project. According to the latest GTZ report on the population of the reserve (Recensement de la population des villages de la reserve de DS-Année 2005 released in March 2006), there are 6188 people living within the reserve. Approximately half of the people in the region live in the sub-prefecture capital Bayanga. This population has waxed and waned with boom and bust cycles in the local logging industry.

⁶ Healthy Communities, Healthy Ecosystems in the Congo Basin, Dzanga Sangha, WWF Technical Report. 2007.

Starting from little to no health care access for the villages in the region, clear improvements have been achieved. Health facilities have improved, and a growing health staff is increasingly better trained. Nevertheless, mortality remains very high and human and capital investments in basic disease prevention promise to make a significant impact per dollar invested over the medium to long term. While the majority of illnesses can be prevented with relatively minor investments in infrastructure, training, and medicines, access to larger hospitals in emergencies remains a problem as well. Although an ambulance is undoubtedly important, due to budgetary constraints and potential problems with maintenance, a more cost-effective solution may be a motorcycle equipped with a side car that can hold a stretcher. Johnson and Johnson funding has supported Bayanga health center upgrades, expansions, a new lab, and medicines. The health center now gives regular vaccinations and can intern several patients overnight. However, the hospital director was inebriated when he received us, many medicines were available unreliably, and only one person was interned at the hospital at the time (although there were several mothers present receiving vaccinations for their infants). Surely the need is greater than the use of the hospital we observed. Several informants corroborated that the hospital director is frequently inebriated on the job. Further, the prefectural health chief, whom locals and health workers regard as incompetent and indifferent, refused to meet with us. These key leadership positions must be improved immediately to enhance the chances for PHE to become sustainable.

Approximately 50 percent of children are vaccinated, the number falling to 25% among BA'aka villages. While locals were initially reticent to be vaccinated, increasingly they are seeing the positive effects and, importantly, the absence of negative effects, inspiring greater coverage and the potential to reach virtually all infants, mothers, and young children within the coming years. Vaccines are regularly given at scheduled clinics in the Bayanga hospital. The main community nurse schedules regular vaccinations in each community several times a year.

Basic contraception availability has increased with condoms and contraceptive implants, distributed at the hospital, and, although irregularly, at village health posts. Pills are not as regularly used because of the perceived difficulty of women following the daily schedule. Yet much more can be done with family planning. Scant advancement has been achieved in communicating the importance of family planning, family planning techniques, and their key linkages with the environment. This theme could serve as the protagonist for the next film project in the successful video messaging campaign. Further, health scouts and local midwives could be convened for a workshop on these issues to facilitate message dissemination among community members and to provide a source of counseling on family planning and appropriate methods.

2: Increase capacity of local health workers

WWF has trained staff and volunteer health scouts to provide health services and information about conservation and natural resource use to the surrounding communities. Health workers have been equipped with a health center, medicines, transportation, and other critical tools needed for providing minimal levels of health care to these remote communities.

A medical doctor and health technician have not yet been posted in the Bayanga health center. The doctor should be able to perform minor surgery, such as cesarean sections and superficial interventions and supervise hospital operations. The lab technician should be able to conduct and interpret basic health assays to vastly improve and expedite illness diagnosis. Currently a very well trained nurse who was only one year short of completing the medical degree in Romania staffs the WWF health post. His knowledge is indispensable to the project but even his earnest dedication is not enough to meet the great needs of the population. Eight health scouts have been trained to serve the five largest villages after Bayanga. Villages also receive regular visits from a mobile nurse. Much more help is needed. More nurses could be hired and local health scouts could receive further training in order to fulfill some tasks performed by nurses.

A health outreach agent visits all villages at least twice yearly. This component of the project is impressively creative. A WWF staff member was trained in film making and film software processing following the purchase of a video camera with J & J funds. To date two films were produced in local villages highlighting major health issues and preventive measures for malaria and sand fleas. The films were then screened to great attendance and keen interest as a rare and special “movie night” in each village. Despite these positive initiatives, greater technical assistance is needed for the nurses and health scouts for disease prevention and treatment, and to promote family planning. Ignorance of disease etiology is ubiquitous; people have little (accurate) idea of how they get sick. This is observed by the insalubrious failure of some segments of the population to use mosquito nets, to drink from a clean water source (many use the same river for both washing and drinking), to avoid use of latrines, and to engage in safe sex. A plan of attack for increasing awareness and knowledge is well under way with the films and outreach. Though knowledge levels are currently low, such efforts could vastly improve health behaviors in the coming years.

3: Improve health

Modern health care is rudimentary in the region and was sporadic in BA’aka villages before the project launching. While a notable impact has been made immediately following project implementation, infant mortality remains above 50% in BA’aka villages (more than twice the national rate). More needs to be done. A first priority is to provide complete, reliable, and constant access to basic inexpensive materials and medicines that will immediately and dramatically reduce infant mortality: mosquito nets, vaccinations, malaria medicine, antibiotics, and chlorine to sterilize water. The most expensive item on this list, mosquito nets, costs merely \$10 per person. With German Agency for Technical Cooperation (GTZ) and other funding leveraged, there should be sufficient funding to cover the target communities in these basic health commodities. Ultimately, improved water sources are necessary. However, given the cost of building and maintaining wells, such infrastructural development should not be a priority of Johnson & Johnson funds at this time. GTZ collaboration in rural development could be a convenient means to accomplishing this to complement PHE funding. There are several inexpensive ways to provide clean water. A simple ditch well can be built quite readily as the water table in the area is not burdensomely deep. Chlorine tablets, boiling water, or filters could also be used. Another priority is to bolster local’s immune

systems at little cost by adding quality protein and variety to the diet in the form of dairy and eggs. Immediately, lives would be saved, particularly those of infants and people suffering from nutrition-related diseases such as intestinal infections and TB.

The problem is not only technical and financial, however; it is also educational. Locals must be convinced that these measures are necessary for their own health. For this, they need to identify themselves the causes of their health problem as well as the solutions to solve them. Currently there is a rapidly narrowing but still yawning gap to bridge before locals invariably understand PHE linkages and are self-motivated to demand the efforts and commodities needed to provide proper preventative health. Chlorine tablets, boiling water, filters or other methods could potentially be used.

Family planning is nearly absent, with only incipient usage among the Bantu and none among the Ba'aka, and needs to follow the overall health infrastructure built to date. Condom use is virtually absent among men, contributing to a rising HIV infection rate, concentrated largely among young men who travel to work based in Bayanga. Men and women explain that it is taboo to use condoms primarily for two reasons: 1) men don't like the feel of them and 2) they think it sends a message to women partners that they might be infected with HIV or another STD. In Bayanga adoption has increased from 0% usage to approximately 5% of women now using some form of modern contraception. It remains virtually absent among the BA'aka. At the local hospital only 3 BA'aka versus 107 Bantu women were receiving modern contraception.

With early adoption taking place with little WWF intervention, this could be an opportune moment to launch a family planning campaign. Women explain that this is a critical turning point in contraceptive adoption. Similar to the process of vaccine use, skeptical women were waiting to see the results from the pioneer adopters. Now women, some of whom traditionally practice rhythm method and avoidance of intercourse, are taking note that modern contraception provides effective control and, most importantly, little to no side effects. Further, women attempt to space births by two years and are often unable to do so. Contraception, at the least, could allow this demand to be fulfilled.

Villagers complain that WWF is already stretched to provide health care for its staff of approximately 100 workers and has little or no time or resources left over to treat locals. Further, irregular medicine availability in the hospital means that villagers often need to purchase medicines at private pharmacies at an elevated cost. The proposed hiring of a doctor to care for both WWF staff and locals is a good way to ameliorate this tension. Such a hire could justify a "top off" financial incentive to help attract quality candidates. Currently the BA'aka largely avoid the main hospital. Restructuring the hospital administration and bringing in a doctor could help encourage the BA'aka to attend the hospital rather than the currently unsustainable practice of relying on the WWF health clinic. Any effort ultimately is unsustainable if fully supported by WWF only without partnership with the ministry of Health (MOH).

4: Raise awareness of links between health and conservation

To meet the protein demands of a growing, increasingly urban population, bush meat hunting is expanding, threatening wildlife conservation, food security, and traditional BA'aka culture. Further, bush meat consumption is a serious public health

risk, as SIV and Ebola can be transmitted through primate carcasses (although it appears that people avoid eating primates, consuming primarily blue duiker and other cephalophes, porcupines and potamocheirus).

Following educational campaigns using posters and films, the project has begun to raise awareness among residents regarding the relationship of health and the environment. Some early results are noted: virtually all BA'aka agree that the bush meat trade threatens their food security, most teachers and all health care workers can identify three symptoms of malnutrition, and approximately half of the area teachers integrate nutrition and health care into their lesson plans. The locally produced films on health and conservation shown to eager crowds of hundreds in each village are a positive start. Recent partnering with the new pastor for the region promises to help promote family planning; he has pledged to preach the importance for the family to have fewer children and the links to environmental sustainability.

Villagers agree that there are fewer animals and fish due to fishing and hunting by locals and visitors. Ba'Aka villagers resoundingly agree that hunting catches have declined and that distance to good hunting grounds is increasing. However, the fatalism of day to day survival means that even though they understand that their own population growth negatively impacts animal populations, they feel that it doesn't matter since they anticipate that there will always be problems in the future. Their immediate priority is to supply food to eat today.

Conclusion and recommendations

Positive aspects that have contributed to project success include the excellent selection of villages which impact the reserve and have great health care needs, the tireless dedication of the staff, and the superb community ties they have fostered. The needs and challenges facing this project are daunting; the opportunities for change are exciting. Although GTZ can help with funding and technical skills, very low capacity exists among local partners and the government health sectors. Political and societal instability and a dearth of financial, technical, transportation, and logistical infrastructure to support WWF and partners' goals are limiting factors of remarkable magnitude. Adding to overall deficiencies is the inconsistency of the already meager provisions and infrastructure maintenance. Boom and bust cycles from timber extraction represent the only significant pulses of capital investment in the region. As the national government controls timber concessions and largely benefits from tax revenue generated by them, business and government investments –mostly the former- in health mimic the profound yet unreliable impact of logging boom and bust pulses. Sustainable health structures must ensure acceptable health care in a post WWF landscape even during timber busts.

Given the state of government and private sector partnering, WWF will need to do several things:

- Put a WWF health manager in a position to dedicate adequate time and attention to management of the health component.
- Continue to advocate government assistance (while maintaining low expectations) and to simultaneously invest in community buy-in and non- government partner collaboration. An early advocacy campaign should focus on replacing the sub-

prefectural health chief and the director of the local hospital and provide a doctor and lab technician for the health center.

- In the meantime, key lessons can be learned from other PHE sites. For example, an exchange with their Cameroon neighbors in Lobeke could provide an infusion of ideas on civil society partnerships, local capacity building, and PHE synergies. Similarly, lessons learned from the Philippines in integrating environment and population into health care could yield useful outcomes.
- Monitoring remains inchoate. It must be a priority to follow examples from other PHE sites to measure baseline conditions and to analyze the effect(s) of interventions. While a modest socio-economic survey was undertaken, little reliable, well organized, consistent health information is available.
- Penurious transportation access remains entrenched among the remote populations of Dzanga Sangha. However first priorities integral with need and budgetary constraints call for the provision, purchase, maintenance, and delivery of the most basic and inexpensive materials and medicines. These will profoundly and rapidly lower infant mortality: mosquito nets, vaccinations, malaria medicine, antibiotics, and chlorine to sterilize water. While improved water sources are ultimately a worthy goal, the cost of building and maintaining wells should not be a Johnson and Johnson priority but rather should be negotiated with complementary funding through GTZ.
- Lastly, adding quality protein and variety to diet in the form of dairy, eggs, and vegetables that locals can cultivate on their own would help prevent nutrition-related diseases such as intestinal infections and diseases, such as TB, that are prevented with adequate nutrition.

Artful navigation will be needed for WWF to negotiate and reconcile the potential conflict between the legal and ethical commitment to providing complete health care to project staff, regardless of financial concerns, and the much greater potential yield on investments in improved health for the local populations. Ultimately, the two are integrally connected; a healthier project staff is able to provide better service to target populations, and target populations, in turn, will benefit from the improved health infrastructure and capacity developed for WWF staff. More directly, it is difficult to control disease in one population without controlling it in the other. WWF should review any pertinent health components of the comprehensive strategic development plan facilitated by GTZ to avoid reinventing the wheel in this aspect.

The most important obstacle to project development and success is a clear plan of attack to reach agreed objectives among project partners. While such an effort is uniquely challenging in the CAR, it is a necessity for sustainability. Complementary funding remains poorly leveraged from current donors such as the Sacharuna foundation GTZ, the EU, and the CAR government.

Spiny Forest - Madagascar

Background

Among the richest ecosystems on the planet, the Spiny Forest covers over two million hectares of southern Madagascar 2,080,000 ha (Figure 4). The region is inhabited by such unique flora and fauna as the ring-tailed and *sifaka* lemurs, tortoises, and endemic birds, reptiles, and amphibians. However, rapid population growth stemming from high fertility rates, in-migration of swidden farmers, and unsustainable resource use is swiftly encroaching on this rich ecosystem

In 1998, WWF initiated the Ala Maiky Program with the aim of preserving biodiversity, ecological processes, and viable species

populations within Madagascar's dry forests. WWF has been collaborating with the national NGO, Action Santé Organisation Secours (ASOS) in 23 villages in four communes targeted in priority conservation areas. The villages have approximately 300-3000 people each for a total of approximately 20,000 inhabitants within the key conservation target area.

WWF and ASOS have made significant strides towards ensuring integrated population, health, and natural resource management in the target communities. An initial baseline survey and Participatory Rural Appraisal led to the development of work plans featuring population work and the identification of local volunteers to serve as community-based distributors for family planning commodities and other health and environmental supplies. During the last two years, the project has focused on PHE behavior change through dissemination of information, education and communication (IEC). However, the funding was too narrow for the needs of the area. Basic health services were needed and are key to the success of population work as well.

The central PHE team, the WWF PHE project executant, the local WWF PHE staff, and the ASOS Fort Dauphin Director – are all very knowledgeable, well trained, dedicated, and hard working. Further, this project has promoted and monitored PHE interventions in a region with unusually challenging work conditions due to great poverty

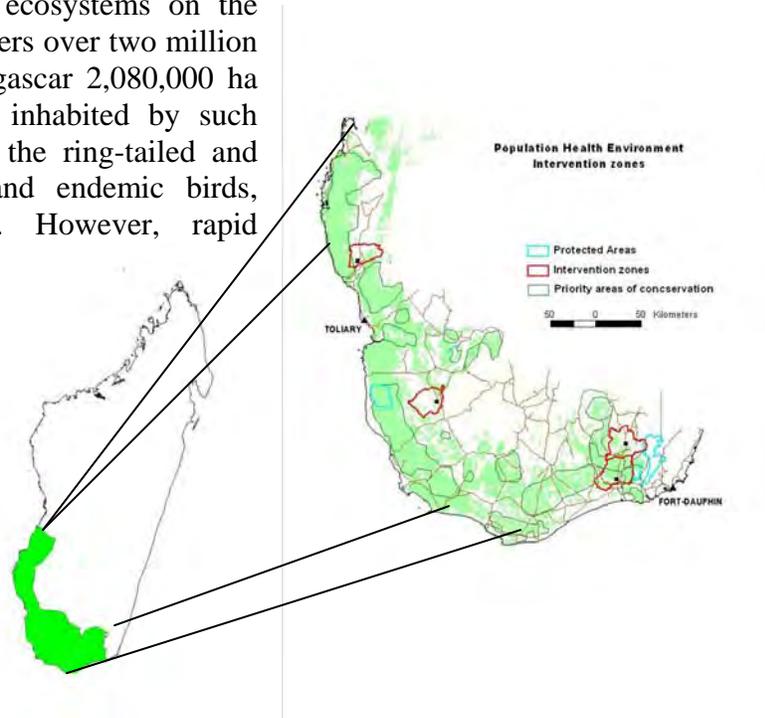


Figure 4: Conservation area, Madagascar

and scarcity of means regarding government services, and equally difficult geographical access. One place for improvement for ASOS is in monitoring. WWF should not have to collect health data and ASOS data has been collected with questionable quality controls. Villages seem well selected by conservation priority first and then also for receptivity and accessibility and health needs. The following report evaluates progress made to date based on interviews with the PHE Madagascar Director, the PHE field Director, and the ASOS PHE Director (the evaluation team was unable to travel to the field because of lost time due to the Air France strike).

Objectives

1: To internalize PHE at different levels

Despite the challenges mentioned above, the team has successfully incorporated the PHE message into local opinions and public deliberations. This is a key first step and merits continued efforts. This region remains in a very early stage of the demographic transition (high fertility and decreasing mortality) and will require further PHE message work and livelihood interventions to raise demand for family planning. One challenge particularly is that communities along roads are ahead of other communities in PHE message uptake since it is easier to access these communities and they are also more educated and more accustomed to outsiders. In interior communities, conversely, sometimes only one or two people in a whole village have even basic literacy skills. For example, prior to the inception of the project and its partners, some villages had already taken the initiative to educate more of their girls, while in others the social norms still maintain that women should have as many children as they are able to bear. Before 2004 there was basically no health care in the area. With people suffering from malaria and schistosomiasis, for FP demand to increase among men and women, basic health and livelihood must be supported before PHE is self-sustainable. Work on reforestation, improved agriculture including vegetable gardens, and other livelihood activities, address urgent needs and, therefore, are important bridges to family planning. At this stage in the demographic transition improving FP knowledge and access was not the most effective way to (ironically) achieve FP adoption over time. However, because USAID funds were limited to specific family planning activities and linked environmental activities, livelihood and health issues were relegated to a secondary status when their need was of a primary importance.

PHE integration efforts have been catalyzed by internal WWF meetings, meetings with partners, and participation in regional and national efforts to promote PHE. Salient among the latter are the Ala Maiky Ecoregion Conservation Program and the Champion Commune Program (known as the *Kominina Mendrika* or the KM approach in Malagasy), under which PHE is a benchmark for success in development goals. Key to local buy-in is the Communes' initiative to establish and train local committees to monitor the CC processes. In recent years, the WWF project was able to partner with the SanteNet project which worked at Commune level.

The project has experienced notable success at different levels of analysis. At the WWF level, significant message uptake has been achieved during the two years of funding. According to the project director, two years ago few WWF staff knew about the PHE approach. Now, thanks to information-sharing and PHE promotion by the project

director, some WWF program leaders are willing to develop new concept models incorporating PHE. As the project director states: “The objective is to make people know what are the project focus and activities and try to convince them that integrated approach are beneficial for Conservation works.” At the national and regional levels, WWF has forged relationships around PHE approaches such as with USAID funded NGOs. Lastly, at the local level, communities have been mobilized to not only receive but also contribute to PHE activities.

2: To improve FP and RH knowledge, services, and use in priority areas of the ecoregion

WWF has done an excellent job partnering with health and development organizations to promote PHE under difficult conditions. Because of the difficult access and differential literacy rates mentioned above, some places have experienced rapid progress – with 60% FP adoption rates, while other places remain at 0%. Between these are the more typical communities that have between 10-25% adoption rates. While this might seem small, adoption rates above 20% suggest early widespread adoption and the promise for more rapid adoption among neighboring communities. In the more successful cases, there have been instances of running out of commodities. Most women prefer injections because they are easy to use and provide longer protection. Further support for such efforts is likely to present itself in the near future as the Madagascar President is an outspoken proponent of family planning and this could help galvanize local chiefs to support PHE efforts.

The government has recently made contraceptives free but the use rate remains unchanged for several reasons. First, until the early adopters have shown good success and continued good health over months and years, rumors will circulate about potential health side effects and ineffectiveness. Further, men don't want to use condoms as they opine that women are inferior so why should they use them. They appear relatively unconcerned about the number of children women have and how multiple births may affect women's health. Lastly, HIV/AIDS has yet to emerge as a large enough threat to convince people to use condoms for prevention. Champions are key. In one community where the head is an advocate and practices what he preaches with only three children, there is nearly a 2/3rds contraceptive usage rate. In another, even though the women want modern family planning, the traditional healer is against it, and there is no usage.

Due to the remoteness of the project's target communities, CBD volunteers play a key role in increasing access to FP and RH. Further, sustaining project success beyond the life of the project will require the project to establish reliable channels such as the CBDs through which community members can access FP-RH products, complete information, and follow-up care, and establish a critical mass of early adopters and continuous users in all of the sites. To achieve these goals, the project focused on enhancing the technical skills of CBDs through trainings.

In each site, there are 2 CBDs that provide general health supplies and information (with basic medicines such as palustop - Chloroquine that is prepackaged by social marketing company Population Services International or PSI, chlorine for water purification, mosquito nets and others) and 2 CBDs that provide FP/RH (they stock pills and condoms). This approach is utilized by other projects in the region, and efforts are coordinated with partners to synchronize approaches used.

The project has impressively overcome deep-seated traditions of large family sizes and very poor access to family planning. Despite these roadblocks, family planning and reproductive health have been disseminated within all PHE WWF target sites (11.5% estimated CPR). In some sites, it is encouraging that demand has risen for FP commodities; however, supply has not kept up with demand.

Several things can be done to improve outcomes. First, the government needs to effectively fulfill its commitment regarding the distribution of FP commodities. Continued lobbying of the regional Public Health Office where supplies are distributed is needed in order to ensure a consistent supply to more remote public health clinics to satisfy CBD needs. ASOS and WWF project leaders recount that they engaged the regional Public Health Office in lobbying their involvement in the PHE program. As a result, the CBDs have now been formally integrated into the MoH system and are able to receive their supplies from the MoH.

Further, while CBD training has been quite effective, continued follow-up is necessary so that they feel incorporated into the larger PHE network despite their geographic isolation and have improved data collection and monitoring. Lastly, greater synergy and communication is needed among partners while implementing PHE activities to ensure that agendas are shared among all parties and roles remain clear.

3: To increase capacity and responsibility of communities to effectively manage natural resources in priority areas of the ecoregion

The principle threats to the region's ecological integrity are slash and burn agriculture and cattle ranching. Food security is a problem and people are worried more about today than about tomorrow or sustainability. Only a few park guards patrol the entire PA or the community management transferred forest. Because of this, what is more effective is the support of ASOS agents and village volunteers who promote conservation activities such as fuel-saving stoves and mobilize local volunteers to serve as models for their usage. The stoves free up women's time previously used collecting firewood, and reduce pressure on forest resources. Fuel stoves affect the household welfare, since women testify that they are more available to carry out income generating activities.

Strong social mobilization has enabled an increase of awareness among communities and has resulted in a 9% adoption of fuel saving stoves. However, the progress was hampered due to the inclusion of new sites. More sensitization at the local level is still appropriate here as the regions remain geographically isolated. Sustainability will take time but good collaboration with regional partners and WWF Conservation projects to date promise continued development.

Other conservation activities that promise sustainability due to their enhancement of livelihoods and welfare include the setting up of tree nurseries, the productive and wiser management of forest through community leadership with the dissemination of extant laws related to forest management, and the use of bricks for home construction to replace pressure on natural forest resources

4: Improved sustainability of FP and RH in priority areas of the ecoregion

Several key factors are recommended to improve sustainability of FP and RH in priority areas of the ecoregion. First, further facilitation of collaboration between CBD (participation of CBDs in the social mobilization organized by the Ministry of Health)

and public health centers is needed, particularly to secure a steady supply of health commodities. Follow-up trips are recommended convening PHE WWF agents, partners, and public health workers. Lastly, more lobbying at the regional level could be useful to increase supply distributed to remote public health centers.

In order to maximize sustainability, WWF and ASOS have decided to focus resource efforts going forward on the Spiny Forest communes rather than expanding to new areas. WWF and ASOS should build on efforts to date to continue efforts to promote sustainability through the Champion Community and Champion Commune approach.

Ultimately, to scale up to new areas will require time, and more funding, resources, and capacity at all levels, unlikely in the next 2 years. However, this does not preclude the sharing of results and lessons to a larger number of people by encouraging other partners. Indeed, this is the mandate of Voahary Salama.

Conclusion and recommendations

Given the focus the project director has devoted to monitoring, this is one of the better monitoring efforts – with a good system developed, and well developed training. However, there are many challenges due to the great remoteness and early stage in the demographic transition of many target villages, and improvements that ASOS could make.

Some observations and lessons follow:

This was a very ambitious project – most of the other PHE projects have worked in much smaller geographic areas with a smaller number of communities

- The project was based on a macro-analysis of biodiversity, migration, and natural growth trends in the Spiny Forest and a scientific analysis of the most appropriate areas to work.
- Project sites are very scattered, and are administered from two separate offices. This has made project logistics expensive and difficult. It may be more efficient to concentrate efforts in a smaller area, where unmet need was greatest.
- In the most remote areas with very poor health access before the project, it would have been more efficient to have focused on basic health first, but the nature of the USAID funding did not permit this.
- Some of the sites also needed support to livelihood activities but funding was not always available.
- There are limitations to partner capacity. WWF is funding the organizational audit for ASOS as a way to try to increase their management capacity. ASOS was the only health organization in the region so there was no choice of partner. This is an important lesson for the program as a whole (and similar to government capacity lessons from CAR).

- The capacity for monitoring in ASOS remains very low.
- WWF tried to operate at a higher, landscape level, leaving ASOS to do most of the work at community level (unless WWF was working with a particular community at a certain time on, for example, a forest transfer). This approach was less than ideal as ASOS's environmental approach remained formulaic in its focus on cook stoves and tree planting. Adaptive management on the part of the national WWF office was displayed in the placement of a local PHE representative.
- The program needs to make projects more responsive to community needs, and not have such a narrow focus. Rather, a broader nature, health, wealth and power approach is very appropriate rather than merely focusing on PHE.
- To make the project as sustainable as possible, ASOS's capacity, especially in monitoring, needs to be improved. The incorporation of other health partners should be considered. Some elements of sustainability are encouraging with trained CBDs and some dependable health supplies from the MoH.

Kiunga National Marine Reserve - Kenya

Background

Nestled within the globally-recognized East Africa Marine Ecoregion that stretches from South Africa to Somalia, northern Kenya's Kiunga National Marine Reserve (KMNR) (Figure 5) is home to over 11,000 species, two-thirds endemic to the Indo-Pacific Ocean. The coalescence of three distinct habitats, reefs, mangroves and seagrasses, sustains a treasure trove of biodiversity. Over 15,000 Bajuni people inhabit the Lamu coast with another several thousand Boni residing in the interior, sustained principally by harvesting forest products. The Bajuni, of mixed Arab and Bantu descent, interact with the local ecosystem through fishing, mangrove harvesting, small-scale farming and livestock rearing.

Kiunga absorbs seasonal in-migration in the form of fishermen from Somalia, and from the Kenyan urban centers of Lamu, Malindi, Mombasa and Kizingitini. Having exhausted the fishing stocks in their own areas, these migrants are attracted by the relative abundance of fish and crustaceans in Kiunga – a trend that has recently threatened the sustainability of the area's coastal resources. Another pressure on the local ecosystem is the extraction of traditional medicines, for instance shark fins, and turtle meat and eggs.

At 6 births per woman, fertility remains extremely high and contributes to an annual population growth of 2.5%. Population growth, unsustainable fishing and farming, and marine resource extraction, combine with rising sea temperatures (which have begun to bleach local coral reefs) to threaten the rich coastal and forest habitats of the KMNR. These threats impact human systems as unsustainable practices decrease yields per unit effort. The following report assesses the progress of the Kiunga WWF partnership in conserving the area's exceptional marine and terrestrial resources for future generations through an integrated PHE approach. Information was gathered through meetings with 74 men, women, health workers, community-based health commodity distributors, Ministry of Health, WWF, and AMREF staff.

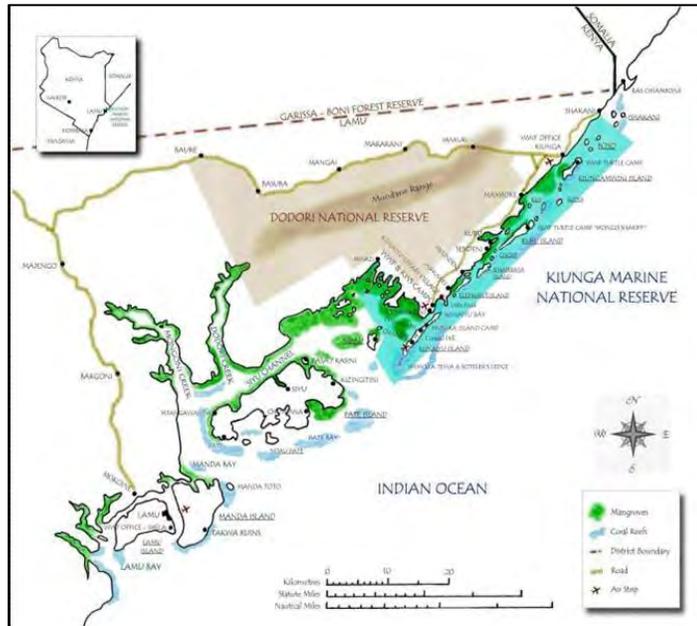


Figure 5: Kiunga National Marine Reserve (KMNR)

Objectives

1: To increase awareness and adoption of family planning and reproductive health measures

A notable increase in FP use and access has resulted from the project. The rapid increase in awareness of and appreciation for family planning and reproductive health is impressive. Whereas several years ago many were unaware of family planning options, virtually everyone now knows about family planning and trusts that it works. Still, men lag far behind women in this regard. A distinct characteristic about the Kiunga area is the way in which religion and culture mediate how the PHE message can be disseminated. WWF and its health partners have maneuvered with great tact in this difficult cultural environment. At the beginning of the period men wanted nothing to do with contraception and many women were afraid to use it. Now most men are largely impassive on the subject and tacitly accept that women are using contraception, while many women use it without fear, even though it is not normally discussed between husband and wife.

WWF has been the vehicle of logistics by which the Ministry of Health (MoH), African Medical Research Foundation (AMREF) for the first three years, and now Family Health International (FHI) access PHE target villages. MoH staff has recently received training by FHI to implement integrated health interventions. As opposed to prior years in which AMREF used to focus on family planning exclusively and separately, and MoH did the other health interventions, FHI's novel integrated approach brings together HIV-STD staff, clinicians, community health workers, and other available team members from the MoH (14 divisions with 4-30 people in each) from the Lamu District Health Office. These integrated teams travel monthly to the main villages where they hold mobile health clinics. During the clinics, a MoH staff provides awareness on a selected topic such as family planning or HIV/AIDS, followed by consultations. The evaluation team saw an HIV/STD presentation in a Boni village, following which community members who desired it received voluntary counseling and testing (VCT) for HIV. The testing procedure was delivered, coupled with discussion about FP options in private in a village hut. Further FP information and options are provided when women give birth or attend baby and child clinic sessions. Strong cultural preference has meant that most women give birth at home, attended by Traditional Birth Attendants (TBAs). TBAs have been trained by FHI, AMREF and the MoH to detail FP options during birth or when they observe a young woman is pregnant. Further, TBAs and community based distributors provide several FP methods. Lastly, TBAs have been encouraged to bring women into the hospital to give birth if there are complications in pregnancy. Increasingly TBAs are doing this as they receive recognition from the MoH for doing so in the form of honorary placards.

Several challenges remain. First, Boni villages to date have been reached with much less frequency though efforts are underway to improve this. Problems hampering delivery to remote Boni communities have included road access during rainy season; indeed, even during the dry season it is very remote and time consuming and overnight stays are necessary to reach all Boni villages. Second, because of the firmly rooted Muslim religion and local culture in Bajuni communities, it appears that the vast majority

of women use contraceptives without their husband's knowledge – and many if not most do not even reveal their usage to friends and neighbors. Men remain largely opposed at worst and tacitly approving at best. There was no mention of concerns about domestic violence (or efforts to prevent this by FHI messaging) as a result of men opposing or not knowing about their wives' FP use.

Conversely, in Boni villages, despite less overall development, male cultural preference for large families is weaker and, not coincidentally, all women and men were aware of FP methods. Further, in one Boni village during the evaluation men said that they used to have 10 or more children while younger men have 6 children and that they have noticed that the youngest women are having no children or very few and they remain unsure why this is so. The most plausible explanation is that women are receiving injectables and pills without telling their husbands – as consistently reported by TBAs, and MoH and WWF staff as well as by local women. For this reason particularly, and because it is easier to manage, women prefer injectable contraception.

2: To improve institutional capacity

PHE institutional capacity has made great strides recently through partnerships with the MoH and with FHI. The integrated approach has been notably successful. The MoH workers showed a great preference for it and the MoH wants to extend this method throughout the district. Other fruitful partnerships exist with community based CBDs, health workers, and TBAs trained in PHE. Intimate and fruitful institutional capacity building exists with the Kenya Wildlife Service based alongside the WWF team in Kiunga, as well as with Kenyan and European research institutes. Lastly the several volunteer reserve guards in each community have added great value to WWF conservation efforts. Infrastructure improvements made by the project include mobile clinics, the construction of the Mkokoni dispensary, refrigerators for drug and vaccine storage, water supplies and improved sanitation for health facilities.

What is lacking is the further integration of the E in the PHE nexus. There is apparently an environmental message conveyed by WWF staff at trainings for health workers. But when I asked health workers or community members at the local level how population and environment are connected they offered few convincing responses. They spoke on how a healthy environment provides better health for people or that fewer children meant better health for remaining children but did not mention that population affects environment.

Due to the geographical isolation and accompanying hardships of the Kiunga area, most Ministry of Health medical workers do not serve for more than 9 months in the area. As the only NGO operating in the area, the community has great development expectations from WWF and a continued health presence is urgently needed to meet raised expectations and to secure initial positive results. The organization of logistics, transport for field interventions and the operation of the mobile health clinics is expensive and time-consuming. All of these can be ameliorated by working to reduce staff turnover.

Security is a concern, with Kiunga situated in a very isolated location just south of the Somali border. Somali bandits frequent the area. Since the project has started, however, more and more women and children from nearby Somali villages are coming to Kiunga's health center, where they are treated, thereby building goodwill in Somali

communities. Improved health services could appear troubling from a conservation perspective, through drawing migrants to the region and having potentially negative environmental consequences. However, this does not appear to be a concern as Somalis seeking health care have not remained in neighboring Kenyan villages. As WWF has intelligence that many turtles are consumed in Somalia, the same turtles that migrate along the coast, this is a good opportunity to also disseminate conservation messages across the border.

3: To improve community capacity for reproductive health by changing behavior and practices

Demand among women for family planning has existed for several years at least. Not until recently were RH commodities available with regularity in remote villages. They are now free and, although occasionally there is a lack of supply in Nairobi and shipment is delayed (perhaps once a year at most) by several weeks, commodities can be purchased in pharmacies. In May 2007 WWF purchased 6 month's supply of FP commodities to assist people through a recent delay in shipment. J & J funding has been critical in this regard since a reliable supply is necessary for FP to be successful and the 6 month buffer supply should maintain sustained provisions through several years of down times at a very low price. However, until now, the project has not been able to use USAID funds to purchase FP commodities; this has been a severe restriction. For example, it has sometimes been difficult to get initial supplies for CBDs, even if they sell commodities and use those funds to purchase the next lot.

4: To promote the sustainable use of natural resources, and to secure the long-term welfare of the area's habitats, species, and communities.

Initially inhabitants were skeptical of WWF efforts, because they thought WWF was concerned only about nature and not about people. However in recent years WWF employees and KWS guards observe that communities are much more cooperative. This was corroborated by interviews with locals. Community members now regularly report on illegal fishing practices or on fishermen from elsewhere fishing illegally within the reserve. (Illegal fishing usually constitutes the use of fine-meshed nets that catch young fish indiscriminately.) People are paid to identify and protect turtles and their hatchlings. As evidence of increase in local goodwill and buy-in, even as payment has decreased, the percentage of total turtle nests reported by the community has increased over the years. Boni hunting of terrestrial animals and turtle hunting and fishing illegally have decreased notably. Fish catches have fluctuated seasonally but have remained healthy. Local fishermen have exchanged some of their illegal mesh-sized nets for legal nets (funded by USAID's Global Conservation Program); this gear exchange is still ongoing. Beach Management Units are working more effectively. The communities have voluntarily established no-take marine zones which they control and manage internally. A few years ago this would have been impossible because of the association of the idea with the reserve and the resistance to government control of their resources – an indication that relationships have greatly improved. Changing attitudes have been attributed to the PHE work, the school scholarships program, and support for livelihoods through the flip-flop crafts (Sam Weru. pers. comm.). Community members and leaders largely corroborate this opinion.

J&J Objectives

1: Falling levels of maternal and infant mortality and morbidity rates due to malaria prevention

Maternal and infant mortality and morbidity rates due to malaria prevention are monitored during health camps and at village health centers. There are now two village health centers and a dispensary- built by the project- among the WWF target villages that provide new malaria medicine. WWF recently distributed 200 nets to pregnant women and women with children under 5 who had been vaccinated. This effort was leveraged through a national anti-malarial campaign supported by USAID. WWF partners also bring anti-malarials to the health camps. Treatment is free and is handled by facility staff.

Now, virtually all households in coastal target communities have mosquito nets. Insecticide treated nets are particularly targeted to mothers with children under five; immunization cards are used to cover malaria treatment as well and keep record of supply and demand and as proof that a household is a priority or not for a mosquito net. Health committees have also been organized and rallied to perform regular clean-ups to clear bush and areas of water collection where mosquitoes were breeding. Lastly, WWF has improved and covered wells in some villages. These combined efforts have been welcomed among community members who invariably report that malaria has been reduced from a very common illness to one that has rapidly become relatively rare.

2: Meet or exceed goal of 100% immunization coverage for the entire Kiunga Division by 2008

The goal of complete immunization has been largely exceeded, because of additional children brought from Somalia for vaccination. All of the village health clubs continue to function at full capacity and have expanded to a wider audience. However, some children in remote Boni villages have yet to be immunized. With growing support from new partner FHI and from the MoH, achieving this latter goal by 2008 is possible.

3: Awareness and adoption of family planning strategies and decreasing levels of STD/HIV infection

While increased awareness and adoption of family planning strategies have been observed, the team is just starting to measure decreasing levels of STD/HIV infection. Lamu is the division with perhaps the lowest HIV rate nationally yet is the only division in Kenya to have a rising HIV rate. (The rate is estimated to have risen from slightly below to slightly above 3%.) VCT is increasing and has recently been incorporated into the mobile clinics; soon sufficient data should exist as a baseline to measure these trends for Kiunga. As mentioned above, the awareness and adoption of family planning has been a great success story with user rates rising from a small minority of women to a majority, and notable increase in acceptance recently among men – even if tacitly.

WWF and partners have made significant progress in working within the traditions of local communities. Successful communication about sensitive health issues, including the acceptance and use of condoms and the approach to women's health issues,

have been brokered by setting aside separate, special times when the clinic sees only women patients. More needs to be done, however, to cater to cultural beliefs and mores.

4: Overall improved health status among communities and stabilization of the population growth rates that enable communities to adopt less compromising methods of natural resource use

Health is improving as described above. From household and key informant interviews, it appears that family size has become smaller, from typically 6-12 children to 4-6. However, there are still strong cultural and religious norms among men for large family size. From interviews it appears that women would like to have 2-4 children but this is not yet the case with men. Men generally wish to have many children, and some men abandon their families for a younger wife. Nevertheless, the growing population is not having as large an impact as they might due to the impressive marine and terrestrial conservation programs implemented by WWF jointly with the KWS.

5: Expanded capacity of local communities to ensure sustainable management of natural resources

As described above, in each community there are several reserve conservation volunteers and Beach Management Units trained by WWF to monitor wildlife and to safeguard resources by reporting infractions. WWF has also successfully launched ecotourism activities involving locals leading visits to turtle nesting sites and mangrove ecosystems. Funding for these ecotourism activities has been identified from several potential donors.

Joint management of the natural landscape is overseen by several agencies involved in area management: Mangroves and terrestrial forests through the KWS, fishery through the National Fisheries Service. WWF helps to convene and organize these partners as a team working together with locals. As the WWF Kiunga Project Executant asserts, the latter is key in order for people to “Decide together, e.g., that you can’t cut mangroves. For them to feel like it is helping themselves to conserve their resources.” As a consequence of this management system, every fishing village now requires a beach co-management unit collaborating with the Fisheries Department. These units, regulated by the fisheries department, check licenses, gears, and include representatives from local fishers. By-laws generated through this partnership include zones for authorized fishing, and the authority to confiscate nets. Lastly, WWF has implemented a joint ecological monitoring program where experts train locals on data collection.

Through an innovative program established a number of years ago by WWF, local women have created an artisanal group whereby they turn flip flops washed on the beach as flotsam and jetsam into a variety of artifacts, from jewelry to wall hangings. The program has generated income for local women, much of which they have used for children’s education while also cleaning up waste on the beaches. A grant was given to the Gatsby Trust to link the women’s group to markets for their products. However, sales in one village appeared to be flat and women complained that large orders are now rare. Time disallowed following up on this criticism for corroboration and possibly solutions. As this program has shown potential, perhaps WWF can follow-up on this issue. Monitoring problems remain, and need to be resolved with the Ministry of Health. To

date it is difficult to quantify the results of the good work they are doing. Despite the lack of reliable hard data, it appears that the program is moving towards sustainability. Perhaps the project could absorb a modest reduction in funding for Kiunga as WWF and partners scale up to the rest of the Lamu seascape for next year. The project stands a strong chance of becoming independent of WWF health/pop funding in several years.

Conclusions and recommendations

Community relations are much improved. The local WWF director has a great sense of cultural awareness and truly has his finger on the pulse of the “how” of implementation in this culturally challenging location. Staff and partners are passionate, skilled, and dedicated. The MoH appears to be increasingly integrating with FHI and WWF to continue the partnership and to scale-up the integrated health approach with FHI. The leveraging of funds has been exemplary through working with international NGOs for livelihood funding, the MoH for health interventions and national universities for monitoring assistance. The complementarity between J&J and USAID funds has been excellent, J&J having provided a high degree of flexibility and having funded many of the components that USAID funds could not. Some funds have been leveraged, for example from AMREF for water supplies for the Boni. However, WWF has gained considerable support from MoH, and recently from FHI. The selection of communities and project priorities appears consonant with WWF and PHE mandates. In sum, on the power of the excellent network of health workers and conservation promoters, sustainability and scaling up is several years away but looks very promising. To achieve sustainability more effectively and efficiently, some recommendations are suggested.

- More capacity is needed with data collection and monitoring. Perhaps a full-time person integrating human and ecological data would be useful, who could liaise effectively with MoH’s district data staff. Data to date is of varying quality, coverage, and timeliness. Improving this is key to building on very successful local and international leveraging of funds. Particularly, better socio-economic monitoring to accompany the biological monitoring is needed.
- Hiring a full-time PHE person would help the project. Currently the local WWF director dedicates nearly half his time to PHE even though it represents a small fraction of his budget. Further, despite his great enthusiasm for the subject, he has no formal health or family planning training. A full-time nurse for Mkokoni Dispensary is essential. The Coast APHIA II Program could be a source for a full-time placement funded initially by USAID and subsequently by MoH.
- Leveraging funds for livelihoods would be a useful direction for the stage of the early development and early demographic transition of the area. People need to see that their investments in children will pay off before demand for family planning really takes off. Women have largely bought into this already. Now men need to as well. The flip-flop guild is one such idea. Its success needs to be

revisited and other ideas and funding sources for livelihood improvement could be generated usefully and synergistically with the PHE mission.

- Before continued creativity sidelines basic provisions, mosquito nets and legal fish nets need to be in all homes and among all fishers. Provision of other supplies such as kits for TBAs should also be improved.
- For health evacuations, providing a boat for the MoH might help sustain collaborations over the mid to long term.
- Improvement of the integrated PHE message is a priority for organic buy in, ownership, and scaling up. This is currently a weak point but one of great promise in this project. All the ingredients are there: an eager and skilled staff, partner network, and leadership who have all bought into PHE. Now the links need to be made explicit and sold to the communities. For example, currently, CBDs, health workers, and TBAs demonstrate limited understanding (or at least ability to articulate) the link. The local WWF director understands how to convey the message of the importance of having fewer kids not through a population pressure message but rather through more food, better health, more fish and healthier ecosystems with smaller families. Now the message simply needs to be crafted and delivered for community consumption.
- Youth programs in schools on PHE as done in Cameroon could help leverage the PHE message already present in the Ministry of Education curriculum. Ideas from Philippines on FP messages for couples and from CAR on integrating PHE through locally filmed movies could also be useful ways to develop and divulge an effective PHE message.
- Ligation and vasectomy are highly appropriate FP methods as most women wish to have 2-4 children and then stop rather than space more than 2-3 years. However, fear of health implications and violating cultural mores preclude adoption of permanent methods. More and better information on these services would be useful.

Quirimbas - Mozambique

Background

The Eastern African Marine Ecoregion (EAME) stretches for 4,600 km along the Eastern Africa coastline from Southern Somalia, through Kenya, Tanzania and Mozambique, to the northern coast of South Africa. The ecoregion is home to some of the planet's most diverse coral ensconced in the longest fringing reef in the world, old-growth mangrove forests, and extensive sea grass communities. A host of mammals, including the threatened dugong and many whale and dolphin species, and all of the Indian Ocean turtle species share the reefs with 1,500 species of fish and over 3,000 species of mollusks. Millions of poor coastal dwellers rely on terrestrial and marine resources in this natural milieu to make ends meet. (Successful communities from ridge to reef, World Wildlife Fund Work Plan 2004). Quirimbas national park has a population of 90,000 people, with about 35,000 in the buffer zone (Figure 6) (Sean Nazareli, pers. comm.).

Within this context, Johnson & Johnson and WWF have supported interventions aimed at increasing food security for local communities living in Quirimbas National Park, Mozambique. The first is the creation of two fishing sanctuaries in the park with the aims of increasing fish catch per effort to enhance food security and livelihoods of fisher communities, and of conserving marine resources. A primary terrestrial component of the project is the mitigation of human/elephant conflicts and agricultural intensification. The objectives stated in the original proposal are collapsed here into the three main broad outcomes of the Quirimbas PHE project: increased food security and nutritional status through the establishment of marine sanctuaries, through reduced human-animal conflict, and through agricultural intensification. The following report explains the objectives of WWF's recent efforts on nutrition-health-environment linkages among the park's 95,000 people living in 90 villages. The evaluation is based on meetings with 210 people in 5 villages and with staff of the local partner NGO Associacao do Meio Ambiente (AMA).



Figure 6: Quirimbas National Park.

Objectives

1: To increase food security and nutritional status through the establishment of marine sanctuaries to improve fish catches

Threats to the coastal resources include the in-migration of fishermen from Tanzania, Kenya, and other parts of Mozambique, and illegal fishing with small nets. Large international fleets fishing deeper waters also affect local fish stocks indirectly. Sanctuaries supported by Johnson & Johnson funding have created positive spillover effects. Interviews with fishers, WWF staff, and partners corroborated that marine biodiversity has increased in the sanctuaries and recent over-fishing has been reversed. The no take zones have increased quantity and diversity of fish, even in other islands. Meanwhile, increase in fish richness within the sanctuaries has led to an increase in fish catch outside of the sanctuary. Johnson & Johnson funding played a critical role in growing the sanctuary concept from the original two sites to two additional ones, thus facilitating the adoption in the following two years to still more sites within and outside the reserve. Johnson & Johnson support was particularly useful for anchoring a sanctuary in a mainland coastal area which required significant negotiation. Following the establishment of this sanctuary, several other mainland sanctuaries spread northward and southward.

Networking with key locals has been critical to the success of marine sanctuaries. Dona Ida, a WWF liaison in Matemo and a local religious leader, is a firebrand for the sanctuary cause. Having sold the concept to her community on Ibo Island, she then marched onward to promote the idea to several neighboring communities and to lobby the local regional and national government. Key promoters like Ida are fundamental to local buy-in. Another key ally of the sanctuary concept is the brother of the main imam on Matemo Island. The WWF park directory asserts that this key contact is invaluable for buy-in and credibility. Lastly, the network of 15-20 Conselho de Desenvolvimento Comunitario (CDC) members per village, including village heads and religious leaders, established with support of AMA, has also appeared to effectively sustain the sanctuary and accompanied fishing regulations.

There appears to be some indirect evidence of how marine conservation has led to improved health. Matemo island villagers agreed that before the sanctuary, birth weights were lower and there was higher child mortality. Child growth is better. Malaria is now the biggest child health problem. Unfortunately we did not have access to any health data for the island – and women reported that although babies used to be weighed at the clinic, this is not happening any longer.

In addition, there was a marked difference in capability to respond to a 2007 cholera outbreak compared to one in 1999. While the entire island was abandoned due to the latter, the former was contained without the need for evacuation due to improved sanitation and communication, both resulting from increased revenues and nutrition from improved fish harvests.

Women on Matemo Island reported that while access to some of the resources they used to collect is more restricted now because of the sanctuary, household income has greatly increased due to improved fishing as well as to local employment at the hotel. This includes direct income to women, through employment and sale of certain marine

products to traders who now come to the island and trade directly with the women. Formerly, men would take the wares to market.

Population outcomes are dramatically influenced by the improved fish catches. Primarily the impact has been through an in-migration rate exceeding 5% per annum following the establishment of the sanctuary. Secondly, mortality has decreased as more babies survive due to improved nutrition and health care access. However, women report that one of their biggest needs is improved health care. They would like a hospital on the island. Currently there is a health post but there is only one nurse and she is frequently inebriated (according to local women). Further, TBAs receive no kits, no payment, and no support from the MoH (although they do call the nurse when they have difficult cases). In the short-term, population is increasing here as a result of environmental conservation. Over the longer term, villagers claim that there are limits to population growth, that they will eventually limit in-migration if it threatens livelihoods, and that people want better education for their children, which could ultimately mean fewer children. WWF PHE message intervention could expedite this process.

2: To increase food security and nutritional status through reduction of human-animal conflict

A specific aim of this objective is to reduce the frequency of elephant raids on settlements and the number of fields destroyed by elephants in villages participating in the project. Up to 90% of people are affected by elephant disturbances in terrestrial villages. WWF has developed a 4 stage strategy: 1) consolidate fields, 2) create a cleared buffer area, 3) conduct vigilance, and 4) create physical barriers. The latter has been attempted with initial but decreasing success using rope greased with coconut oil or vegetable oil mixed with ground hot chili pepper and elephant dung. Johnson and Johnson funds were used almost exclusively for this endeavor during year 2 of the project. This method has now been applied in most of the terrestrial villages affected by elephants in the park following the development of the technology in a few pilot areas.

Following initial success, the effectiveness of the chili ropes and bombs has declined. The park tried early burning of vegetation in sections of the park to draw the elephants away from the settlements, which gave some results. While the chili pepper method remains better than doing nothing, elephants have largely overcome the efforts by felling trees to fall on the ropes or carrying in branches to knock them down. People are visibly frustrated. One person has already been killed by elephants this year; most years around eight are killed in the park area. Elephants are also disrupting villagers in other ways. Women in one village can only collect water at certain times of day, children cannot walk to school in safety, and indeed elephants destroyed a school block. In Ngura village many people have moved out because of the elephant problem and the population has fallen from 3000 to 1500. In Maputene 30 out of 1436 households have left because of elephants. Angry residents lobby to shoot elephants and complain that, to the government and WWF, people are less important than elephants. As a result of these poor outcomes, there is clearly less community goodwill developed towards the park and conservation here than in coastal areas. Creative solutions are necessary to remedy this entrenched problem. This novel idea had some short-term success; its long-term achievement was its role as a necessary first attempt in combating this human-animal conflict. Although the population remains unsatisfied with the chili campaign, PNQ

research programs show that the combination of all methods has led to a decline in 90% of destruction (See table below by S. Nazareli, WWF Mozambique). These results must be qualified by more recent observations suggesting increasing failure of chili fences and dung bombs.

Result				
Season	Riffle	Driving away operation	Elephant shot down	People killed
2005/06	22	312	5	8
2006/07	38	398 (05/07)	2	4 (06/07)

Season	Fields	Fenced	Destroyed	Harvested
2005/06	13786	2884	129	13409
2006/07	24210	15225	23 (05/07)	NR

Several steps could be taken in the continued search for a solution to people-animal conflicts:

1. Improve understanding of elephant movement patterns – which will be helped once satellite collars are placed on Quirimbas elephants – this should be given very high priority.
2. Improve understanding of trends in elephant population growth and age structure – it was suggested that the elephant population is growing now, following a long period when it was relatively low. The Portuguese hunted elephant before independence, and during the last war elephants fled to very remote areas. Now they are increasing. Furthermore, people say they are not only seeing more elephants, they are seeing elephants that look different – maybe coming in from other areas. Problems are said to be largely caused by young males. The population has few older males that might have kept the younger ones in order.
3. Design local land use planning that takes into account elephant movements, locations of settlements and soil types, which will help locate groups of machambas in more appropriate places. Also, design the most appropriate shape and size of farming blocks (maybe this can be tied into district planning).
4. Gather information on approaches to elephant control in other parts of Mozambique and East and Southern Africa that may be facing the same issues.
5. Develop alternative livelihoods where possible.

3: To increase food security and nutritional status through improved agricultural methods

The project has aimed specifically to reduce erosion and increase retention of soil nutrients on agricultural fields while increasing drought resistance through water conservation. This effort also helps consolidate farmer fields, a key part of the process of limiting damage to crops inflicted by elephants. Nutritional security should result from successful implementation of these agricultural intensification techniques through increased maize yields (corn is the single most important staple food), as well as improved production for other vegetables and fruits, including mangoes. Mangoes are a primary target of elephants, and due to some success in reducing elephant intrusions, they are available for the first time in many years. This is important as mangoes are a main source of vitamin C, beta-carotene, vitamin B6, and vitamin E for local communities.

A local sustainable agriculture NGO, associated with the *Asociacao do Meio Ambiente*, has been sub-contracted, with 15-20 technicians working throughout the park on various sustainable farming techniques. Key techniques taught to locals include composting and the creation of “*curvas de nivel*”, a form of mini-terracing that reduces soil erosion and captures soil nutrients and water for reuse. Johnson & Johnson funding has covered the entire salary of a full-time technician to work with WWF target communities on these farming efforts.

We spoke to early adopters of this approach. They were very enthusiastic about their increased yields in the first year, and several other villages are adopting the approach this growing season.

Conclusion and recommendations

A key lesson learned from this project was the importance of flexible seed funding for achieving project goals. Johnson & Johnson funds were well leveraged thanks largely to their flexibility. For example, conservation agriculture would not have been achieved without Johnson & Johnson aid. Now it can grow organically following several years of training so that select promoters in each community could be adequately trained to train others in the techniques. Much more substantial but less flexible French aid can now be leveraged to continue this project to ensure that conservation farming reaches all communities within several years. Similarly, while the marine sanctuaries were initiated before Johnson & Johnson funding, this cash infusion was leveraged during a critical expansion period that catalyzed a rapid and sustained growth within and now outside the park. Lastly, while the elephant conflict remains an important and thus far more intractable problem, efforts to date were a necessary first step towards finding a long term solution. Flexible funds from Johnson & Johnson allowed for this important experimentation. More funds to continue this would be welcome.

There are many positives to report from Quirimbas. The WWF project executant is an intelligent, sensitive, tireless, and persuasive advocate for park conservation, speaks fluent Portuguese, and has an obvious stabilizing influence on park residents, WWF staff, and partners. The staff and partners I observed related to the Johnson & Johnson-funded work were unfailingly passionate and patient under difficult circumstances. However, the ratio of management positions to target conservation area, target population, and villages is unusually low here. Simply, the park and target populations are dauntingly large for

such a small management staff. The project executant badly needs senior staffing for support with administration, financial accounting, grant writing, staff monitoring, and other logistics. This would enhance the achievement of several suggestions for improving the PHE program.

- The PHE message remains largely absent at worst and disintegrated at best. There appears to be little health link with WWF visible to target populations, with the exception of some coastal populations. While health partner Aga Khan Foundation implements health, WWF could forge a stronger relationship with them and leverage the added value of name branding for community good will and, ultimately, conservation outcomes. Similarly, the Education Ministry, already present in the region, could potentially partner with WWF to deliver PHE messages consistent with the community literacy needs, again buying WWF invaluable goodwill. On a more banal note, health needs are acute and encompass much of the basic needs associated with the poorest regions of the planet.
- Continue current education efforts to improve PHE linkages. For example, an infusion of \$25,000 from WWF-US for girls' education will expand on a program that currently funds approximately 50 girls at \$12 per month to continue middle school education. Looking forward this could be expanded by further Johnson & Johnson funds. There is very poor access to education among the communities and this is a watershed determinant for many conservation outcomes. Literacy has the potential to improve the effectiveness of any park community intervention. The Ministry of Education is a willing partner. A well trained education officer could be hired to lead this campaign. This would increase goodwill to WWF and improved understanding of the value of conservation for human health as well as for the integrity of the park. Take measures to convey a PHE message to sensitize locals to the potential problem of population growth and to assert the park's interest in conservation. It is important to develop different messages for the farming and fishing communities since they remain at different stages of demographic transition, and some are more open to messages than others. Indeed, some terrestrial areas are depopulating through out-migration.
- A perverse (from conservation standpoint) outcome of the success of the marine reserves has been very rapid population growth during recent years. Much of this was an initial pulse of island families returning following the establishment of the park and the subsequent return of fish stocks. Yet families continue to move in as friends and families attract them due to the great fishing boon. Further, child mortality is falling due to improved nutrition and transportation, while contraception is scarcely used; meaning fertility is higher than ever before.
- Consider how the success of livelihoods and agriculture and human-animal conflict down the road will relate to population growth in the park. Perhaps relocation incentives would not be a bad idea for some of the 90k people living within the park boundaries. The poor success so far in dealing with animal conflicts has meant that many people have left inland communities.

- Remote sensing, perhaps in collaboration with the US navy and Mozambique Forest Service to detect illegal logging trucks, could make a huge, immediate impact; park guards currently patrolling blind on bicycles would, overnight, target their efforts with the aid of satellite imagery to locate illegal timber logging offenders, a major threat to the park's integrity.

SECTION II: PHE RESULTS AND RECOMMENDATIONS

PHE Project Results

Introduction

The eight PHE sites are located within marine and terrestrial ecosystems in southern and south-east Asia and central and eastern Africa and Madagascar ranging from 80 to over 20,000 square kilometers (Table 1). Quirimbas National Park (QNP) in Mozambique and Kiunga Marine National Reserve (KMNR) in Kenya combine marine and terrestrial systems. The Roxas District project of the Philippines in the Coral Triangle is a marine site. The Indian and Nepalese sites are located on either side of the border from each other south of the foothills of the Himalayas in a region known as the Terai Arc. Madagascar's PHE work is located in the unique dry Spiny Forest. Lastly, the Central African Republic (CAR) and Cameroon sites are nestled deep within the Tri-national Sangha landscape in the Congo Basin humid tropical forest. Each site is home to anywhere from 10,000 to 125,000 people with a typical site having several to thirty communities of approximately a few hundred to a couple thousand people each (Table 2).

Consonant with their remote locations, the development and demographic stage of the regions remains low. However, within this early stage, there is some notable heterogeneity. For example, populations of Roxas District, Philippines have clearly progressed through much of the early demographic and development stages. Fishing communities are integrated into local government policies and health care, desired family size is below three births per woman, and mortality has fallen dramatically. Conversely, the people inhabiting the Dzanga-Sangha forest of CAR and the Spiny Forest of Madagascar remain at the earliest stages of these key transitions. Desired family size is very high, life expectancy remains below 40 years of age, infant mortality in some cases exceeds 50%, and communities survive largely without any reliable government presence. In some instances, different development stages were evident within the same PHE site. For instance, the BA'aka forest people of CAR who had recently settled on the forest edge and the Boni people living as hunters and gatherers and incipient agriculturalists on the Kenyan and Somali border were at the very early stages of the development and demographic transitions, notably lagging their Bantu and coastal Muslim neighbors respectively.

Each site received between \$30,000 and \$139,437 USD annually (2007 figures) for PHE and was in the third, fourth, or fifth year of funding (Table 3)⁷. Budgets often varied from year to year. As explained in greater detail in the country report section, years of project funding appeared to be much less correlated with project effectiveness

⁷ All figures are net of WWF US overhead, i.e. they are the amounts that WWF US sent to the field. USAID funds are for October 2006 – September 2007. Johnson & Johnson funds are for calendar year 2007. All USAID funds are from the Office of Population and Reproductive Health, Global Bureau, except for Nepal which was funded by the USAID Nepal Mission.

than were other factors, primarily relating to development stage and level and quality of partner support. As will also be explained in greater detail in the following section, level and flexibility of support were also variable and notably related to project success. Interventions were prioritized according to the distinct health and environmental conservation challenges facing each area and to funding constraints (Table 4). When comparing funding source to intervention, it is evident that USAID funding was restricted to family planning and maternal and child health and linked environmental activities, whereas the J & J funding was open to the health needs unique to each site. In the very poorest sites, livelihood and basic health care needed to be prioritized. However, for example, in Madagascar, USAID funding restricted this approach whereas in CAR a more organic effort was better tailored to local needs.

1. Geographic and Human Landscapes

<u>Country</u>	<u>Priority Place</u>	<u>Eco-scape</u>	<u>Number in focus meetings</u>	<u>Area (sq km)</u>
Philippines	Coral Triangle	Marine	118	1,174
Nepal	Eastern Himalayas	Terrestrial	64	83
India	Eastern Himalayas	Terrestrial	144	600
Madagascar	Spiny Forest	Terrestrial	4	21,000
Mozambique	Coastal East Africa	Marine & Terrestrial	210	7,500
Kenya	Coastal East Africa	Marine & Terrestrial	74	600
Central African Republic	Congo Basin	Terrestrial	60	3,159
Cameroon	Congo Basin	Terrestrial	80	21,789
Totals			754	55,905

2. Demographics

<u>Country</u>	<u>Priority Place</u>	<u>Target Population</u>	<u>Target Communities</u>	<u>Demographic Stage</u>	<u>Desired no. Children[^]</u>
Philippines	Coral Triangle	22,500	7	Middle	2.5
Nepal	Eastern Himalayas	18,300	32	Early-Middle	2.5
India	Eastern Himalayas	50,000	25*	Early-Middle	2.5
Madagascar	Spiny Forest	20,000	23	Early	7
Mozambique	Coastal East Africa	125,000	130	Early	7
Kenya	Coastal East Africa	21,000	11	Early-Middle	4
CAR	Congo Basin	12,000	7	Early	8
Cameroon	Congo Basin	12,000	20	Early	6
Totals/Mean		280,800	230		4.9375

*7 are the primary target communities

[^]Approximate no. from focus groups with women

3. Funding

<u>Country</u>	<u>Priority Place</u>	<u>2007 Funding</u>	<u>USAID</u>	<u>Johnson & Johnson</u>	<u>Funding Year</u>	<u>Funding per capita</u>
Philippines	Coral Triangle	\$70,000	\$70,000	n/a	3	\$3.11
Nepal	Eastern Himalayas	\$79,993	\$38,231	\$41,762	4	\$4.37
India	Eastern Himalayas	\$30,000	n/a	\$30,000	4	\$1.66
Madagascar	Spiny Forest	\$107,725	\$107,725	n/a	4	\$5.39
Mozambique	Coastal East Africa	\$46,000	n/a	\$46,000	4	\$0.37
Kenya	Coastal East Africa	\$139,437	\$85,000	\$54,437	4	\$6.64
CAR	Congo Basin	\$49,000	n/a	\$49,000	4	\$4.08
Cameroon	Congo Basin	\$45,400	n/a	\$45,400	5	\$3.78
Totals/Mean		\$567,555	\$300,956	\$266,599	4	\$2.02

4. Threats

<u>Country</u>	<u>Priority Place</u>	<u>Main Eco-Threat</u>
Philippines	Coral Triangle	Illegal & over-fishing
Nepal	Eastern Himalayas	Fuelwood collection/cattle
India	Eastern Himalayas	Fuelwood collection/cattle
Madagascar	Spiny Forest	Agriculture/fuelwood collection
Mozambique	Coastal East Africa	Agriculture/illegal fishing
Kenya	Coastal East Africa	Fuelwood/illegal & over-fishing
CAR	Congo Basin	Poaching
Cameroon	Congo Basin	Poaching

5. Interventions

<u>Country</u>	<u>Priority Place</u>	<u>Main Env. Intervention</u>	<u>Main Health Intervention</u>	<u>Est. Reserve</u>	<u>Clean Water</u>	<u>Liveli- hoods</u>	<u>Food Security</u>
Philippines	Coral Triangle	Sanctuaries/fishing regulations	FP/MCH	X		X	X
Nepal	Eastern Himalayas	Fuel-efficiency	FP/MCH/HIV/InfDisease		X	X	
India	Eastern Himalayas	Fuel-efficiency	Infectious Diseases			X	X
Madagascar	Spiny Forest	Forest Protection	FP/MCH/Infectious Diseases				
Mozambique	Coastal East Africa	Sanctuaries/fishing regulations	Nutrition	X			X
Kenya	Coastal East Africa	Sanctuaries/fishing regulations	FP/MCH/HIV	X	X	X	X
CAR	Congo Basin	Hunting Regulations	FP/MCH/HIV/InfDisease		X	X	X
Cameroon	Congo Basin	Hunting Regulations	FP/MCH/HIV/InfDisease		X		

PHE Results

The WWF PHE programs were run within a cost range of 37 cents to \$6.64 US dollars per capita annually. The impressive and inspiring results that were achieved for such a sum challenge two dominant paradigms. The first relates to the demographic transition, and more specifically the urban transition. During the coming decades all the world's several billion net additional people will live in the world's poorest cities. Yet this belies that within and adjacent to key conservation priority areas the demographic transition has scarcely commenced. It also challenges the related notion that has predominated development assistance in recent years: invest in urban areas to achieve greatest yield on investments. While more people can be accessed at the same cost in urban areas, the qualitatively distinct human-environment milieu of ecological priority regions demands a similarly distinct valuation.

The report's results also strongly point towards the importance of investing in livelihoods in tandem with PHE interventions. Invoking livelihoods is key for selling PHE: people think in terms of their livelihoods first and see their relationship with the environment through a livelihoods lens. It is also key for doing PHE: People struggling to make ends meet in priority eco-zones don't enjoy ample leisure time to practice conservation as a hobby; it must be integrated seamlessly into how people survive and thrive. Investing in livelihoods is also imperative for the first point above, which is in stimulating demand for FP.

Some PHE interventions built capacity or infrastructure. Others were aimed for direct impacts on outcomes. Among these were direct interventions such as saving turtles. Others were preventative, such as preventing human impacts on turtles by seizing illegal fishing gear. Similarly, some population and health outcomes were indirect, others direct. How successful were the WWF PHE programs in improving population, health, and environmental outcomes in target sites?

While little is available in the way of data supported by standardized data collection methods, this is not to say that data do not exist. In some cases they were done at varying levels of quality but were either not communicated to the WWF Washington DC office or were not available for our retrieval during our short field visits.

The results of the PHE projects qualitatively appear to amply outpace the quantity and quality of data collected to corroborate the results. While some may argue that success is more dependent on how messages are communicated rather than how much data is collected, as PHE remains in an embryonic stage, it is extremely useful to communicate specific data to WWF, partners, donors, and scientists in order to convince them of the benefits and deficiencies of integrated PHE projects. The following section reports on specific results from the WWF PHE projects relative to population, health, and environmental outcomes.

Population

I have discussed infrastructure and capacity building in the health section above which is largely pertinent to this section as well. Regarding population outcomes, the projects have had mixed success because of several problems. First, the poorest sites, such as the BA'aka in CAR, and those in Mozambique and Madagascar, have relatively low demand for family planning. Relatively great demand exists for basic health care and nutrition, to prevent deaths, largely among infants, and to combat easily controllable

infectious diseases. In these places little progress in family planning indicators may be observed in the first several years of a project. However, this is highly appropriate for populations in early stages of the demographic transition. In these areas mortality must fall and subsistence must be ensured first before there is demand for family planning. Working first on mortality and subsistence is almost certainly a more sustainable path to ultimately reducing family size through family planning adoption. Unfortunately, in some sites where this would be a more appropriate way to proceed, e.g. Madagascar, such an approach is not undertaken because USAID funds are restricted to family planning within a rather literal framework. Where this is the case an argument can be made that USAID funds are worth pennies on the dollar relative to J & J funds.

Despite these restrictions, Contraceptive Prevalence Rate among Women of Reproductive Age (CPR) has shown variable but notable changes since the inception of the PHE projects (Table 6).⁸ For example, CPR has increased dramatically in the Kiunga district in Kenya (though a reporting error from 2003 likely understated users) nearly doubled in Madagascar's Spiny Forest, increased by nearly 20% from 2006 to 2007 in Nepal's Khata region, and increased slightly in Roxas district in Philippines (the site of most reliable data on this variable). Adequate data on CPR is not available for other sites. This is unfortunate since CPR - a more immediate proxy for fertility reduction as opposed to the many years needed to measure fertility rate change - may be the most appropriate short-term indicator for progress within the population component of the PHE projects.

6. Population: Contraceptive Prevalence among Women of Reproductive Age

Kenya	Years reporting	2003	2007	Percent Change
Kiunga District		7%	68%	871%
Madagascar*		2004	2006	
Mad Spiny Forest		6%	11%	83%
Philippines		2006	2007	
Roxas District		32%	33%	3%
Nepal		2006	2007	
Khata Corridor		43%	50%	16%

Source: From WWF PMP 2007 and Tal Nepal Annual Report 2007

* Note: These CPR values represent data from only one of two regions where the WWF PHE Project works. At the beginning of the project, data was unavailable for the other region (Tulear). In 2006, Tulear data became available; after that date, in both areas combined, CPR went from 10 to 19%.

Health

As observed in Table 7, modest financial infusions have had the effect of literally turning infant mortality around in a matter of months in several sites. Some quantitative evidence of this is provided from Kenya, the Philippines, and Cameroon. I distinguish

⁸It should be noted that the reference for most of the PHE variables presented here prior to project inception was 0.

here between process results, measured by the more short-term rubrics of infrastructure and capacity, and outcomes. The former are more appropriate measures as short-term proxies for the ultimate health outcomes.

Infrastructure and Capacity

Key to project success, and antecedent to any sustainable outcomes that can be attributable to the project, is the successful development of local health infrastructure and capacity-building. As the PHE sites are found in poor, remote locations, with little existing foundations for sustainable health work, important first steps in these projects include training locals in basic health care and in how to build and sustain health infrastructure.

In regard to local health training, results vary according to number of years the projects have been funded, existing infrastructure, and the education level of locals. Where some existing infrastructure exists and where at least some locals are literate, training has happened rapidly and impressively. These sites include Philippines, Kenya, and Nepal. For example, from 2005 to 2007 the number of community-based health volunteers trained in Kenya has expanded from an initial group of 47 to over 80.

In the Philippines, trained health volunteers swelled from 29 to 50 during the same period. Conversely, CAR has had difficulty training local volunteers. Among the BA'aka, for example, it is rare to find even one literate person among many clans. This makes it very difficult to garner local buy-in to the need for health volunteers in the first place and further hampers the effective communication of skills and knowledge necessary for the position.

Nevertheless, two BA'aka play important roles in the CAR PHE project. One is a trained nurse who is the community health liaison for the local WWF PHE project. Another is a trained health volunteer from a local community who works as a volunteer nurse in the local health clinic. She is largely cited as the reason that the BA'aka attend the clinic. Without her presence, WWF staff argues, it is likely that the BA'aka would be distrustful of the clinic.

Two exceptions here are India and Madagascar. The locals in India's Terai are largely literate and enjoy at least elementary education. Yet, despite excellent relations between WWF and locals and their desire and ability to become more involved with improving health in their communities, local capacity has remained undeveloped. Conversely, in Madagascar, despite low literacy and education among locals and less flexible USAID funding, nearly 100 people have been trained.

Another way to build local capacity is through training locals to build their own infrastructure, the proverbial giving fishing lessons rather than fish. An excellent example of this is the pit latrine project from Cameroon. After initial training on how and why to build them, pit latrines have increased in number, dramatically reducing diarrhea and helping to prevent cholera. Another example comes from Kenya where locals have begun to organize on their own volition to clear brush and areas where water collects to help prevent malaria. In each case, knowledge, predicated first on effective message transmission based on trust in the project, was all that was needed to achieve significant results.

A last issue regarding sustainability is the value accrued to health services when people must pay for them. In Nepal for example, forest user groups already existed with a revolving fund. Revenues raised from use of natural resources and deposited in the

revolving fund are used to run the community clinic; people also pay a small fee for clinic services. Similarly, in the Philippines health promoters have made money from their services after only one year. This is quite an achievement given the recent history of the project. With USAID providing contraceptives free of charge several years ago, CPR plummeted the year after USAID ceased providing free commodities. The WWF PHE project had to build value into the commodities through successful PHE message communication among local users. The user rate has now begun to rebound.

Outcomes

Life expectancy in the developing world remains largely predicted by infant mortality. It is among children under five where mortality is concentrated in the poorest countries. And it is here where investments have the biggest yield in outcomes. This is true not only for mortality outcomes, but also fertility. Notable and very credible anecdotal evidence shows great progress in reducing childhood mortality in the PHE sites.

Pennies per child save lives. Sometimes, as described above with latrine construction in Cameroon (reducing childhood deaths from gastrointestinal infections) and with malaria prevention efforts in Kenya, death is averted with trust, teaching, knowledge, and the volition to change. However, without doubt, even modest financing can make a dramatic impact. It appears that the distribution of malaria nets and anti-malarial pills in most of the sites has notably lowered malaria rates. While numerical data is not readily available for each country, interviews corroborate noticeable reductions in infections, in some cases dramatically. This is especially salient where, for example in Kiunga Reserve, several methods are used in tandem to combat malaria, including malaria nets, anti-malarial drugs, covering wells, and clearing stagnant water sources. Similarly, anti-bacterial drugs, vitamins, and other basic medicines, while provided only sporadically in some instances (for example with monthly health camps) have apparently had important positive effects on childhood survival. Lastly, sanitation campaigns, including the construction of latrines, and the development of clean water sources, have helped to lower several diseases, most notably childhood gastrointestinal infections, which are a leading cause of infant death.

Importantly, more flexible J & J funds, as opposed to USAID funding which myopically focuses on the proximate determinants of fertility, enable more successful population and health outcomes. Reducing child mortality is, as far as historical demography can inform us, a precondition to falling fertility. In areas where mortality has yet to experience a significant decline, it is highly unlikely (possibly even unheard of) that desired family size will decline and that, in turn, FP demand will be created – let alone sustained. In this way, J&J funding facilitates health interventions that target reducing infant mortality. This is done at very little cost relative to lives saved. In addition to the proximate outcome of reducing infant deaths, it has several ripple effects. First, this is the most appropriate intervention for ultimately reducing fertility among communities that remain in the early stages of the fertility transition. Secondly, saving children's lives has profound impacts on goodwill towards WWF, which enhances the WWF mission for conservation directly and indirectly, through increasing potential buy-in now or down the road for FP services.

Vaccination campaigns represent a specific and measurable example whereby childhood mortality has been dramatically reduced. For example, estimates from the

WWF director and health partners in Kenya’s Kiunga Marine National Reserve suggest that vaccinations for children under 5 have increased from approximately one-third coverage to complete coverage. Similarly impressive results apparently were achieved elsewhere yet none is supported by standardized data collection methods.

7. Health

		2005-06	2007	Percent Change
Kenya	Children under 5 immunized	<30%	100%	NA
	Community Based Distributors (CBDs) trained	17	46	171%
	No. of persons trained in health service delivery	47	81	72%
Philippines	No. of persons trained in health service delivery	29	50	72%
Madagascar	No. of persons trained in health service delivery	91	96	5%
Cameroon	Pit latrines built	0	800	NA
	Percent of children under 5 with diarrhea	7%	1.40%	-80%

From WWF PMP 2007 and data collected in the field by Carr & Oglethorpe, 2007

Environment

To elaborate on the litany of environmental conservation results from each site is beyond the scope of this report. WWF has long experience measuring conservation outcomes and a whole research staff dedicated to this endeavor. I will, however, comment on some key environmental outcomes that are related to the integrated PHE program. Table 8 reports on several of these measurable (and measured) environmental outcomes.

First, communities in Kenya have established 6 “no-take” marine sanctuaries in collaboration with WWF. Locals report that in less than two years since the marine conservation zones were implemented, fish volume and species diversity has increased. This anecdotal evidence is purportedly corroborated by KWS data. These sanctuaries have had immediate impacts not only on conservation outcomes but also on fisher family wellbeing and nutrition. Also in Kenya, 72% of marine turtle nests were recently reported by communities, a 22% increase from 2005. Further, 123 turtle nests were reported this year, a noticeable increase over the 82 nests reported in a prior year.⁹

Similarly, in Mozambique, marine sanctuaries supported by Johnson & Johnson and partners have increased quantity and diversity of marine biodiversity while reversing a trend of over-fishing. Furthermore, the increase in marine richness within the

⁹ Nevertheless, footnote 12 in the latest PMP states: “Turtle nesting analysis shows an upward trend compared to the previous year, however this indicator must be considered over a period longer than the year cycle of this project; the upward trend could be attributed to turtle nesting remigration cycles, which occur every 2-3 years for the green turtle species (which is the dominant species) or to more female turtles coming to nest for the first time (population/colony recruitment).”

sanctuaries has had the spillover effect of enhancing fish catches outside of the sanctuaries. Human population outcomes have also been influenced by the increased fish catches. Contrary to conservation outcomes in the short-term, the impact has been through an in-migration rate exceeding 5% annually following the establishment of the sanctuary. Secondly, mortality has decreased as more babies survive due to improved nutrition and health care access. While population in the short-term is increasing as a result of environmental conservation, over the longer term a successful PHE message could help to limit in-migration where it threatens livelihoods. As well, it could support an increasing demand for FP as people wish to improve education for their children, and thereby increase investments in fewer children.

Madagascar has done an admirable job of documenting numerous environmental successes associated with the PHE project. For example, in the PHE project area, there was an 8% increase in the number of households using fuel-saving stoves in the first phase of the project, and a 4% increase during the second phase of the project.¹⁰ Further, the project has catalyzed the increase in tree nurseries from 3 to 7 and the number of tree plantings from 2,160 to 106,250 accompanied by government recognition of almost 98,000 ha. of new area under community forestry management.

Lastly, in Mozambique efforts to increase food security also promise important environmental conservation impacts. A local sustainable agriculture NGO, associated with the *Asociacao do Meio Ambiente (AMO)*, is collaborating with WWF on sustainable farming techniques. During this fiscal year, locals have been trained in composting, and in the creation of “*curvas de nivel*” (trench and dyke), a type of mini-terracing. Both practices should reduce soil erosion and capture soil nutrients and water for reuse. Early adopters are demonstrably enthusiastic about increased yields observed in their first harvest year with the new techniques; several other villages have adopted the approach and results should be observed in the next harvest. Results from Nepal are also encouraging. In Khata the percentage of households using clean energy (ICS or biogas) increased from 11.3% in 2006 to 13% in 2007 (projected target = 25% by 2008). As a result of this increase, an additional 225 metric tons of firewood were saved this year (projected target = additional 682 metric tons saved by 2008). In addition, CFCC promoted and installed 1,029 solar lamps in the project site this year, which is another form of clean energy and savings for poor households (saves kerosene).

8. Environment

	Indicator	Years Reporting		Percent Change
		2004-05	2007	
Kenya	No. of turtle nests reported	98	123	25%
	Percent of turtles nests reported by community	50%	72%	22%
	Percent of registered fishermen in the KMNR using sustainable fishing gear*	89%	100%	11%

¹⁰ At the end of 2006, the Spiny Forest, Madagascar PHE project changed some of its target sites. The first phase refers to the period prior to this change and the second phase to the period following this change.

Madagascar

Percent of households using fuel-saving stoves	approx. 0**	10%	NA
Tree nurseries	3	7%	133%
Trees planted	2160	106,250	4819%

Philippines

	2005	2006-07	
No. of boat patrols conducted for illegal fishing	0	70	NA
No. of apprehensions & cases filed in court for illegal fishing activities	0	8	NA
KG fish caught per man-hour (CPUE)	0.7 to 2.4	1 to 3	NA

*All fishermen have some sustainable gear, but not all their gear is sustainable

**This value is approximate because in 2006, this project changed some of its targets sites and data was less reliable before the change. Since the change, the project increased fuel-saving stove use from 6% of households to 10%.

Recommendations for data collection

In the USAID funded sites admirable efforts have been made to establish continuous monitoring plans. Johnson & Johnson will now invest in monitoring as well. Funding programs jointly should help to streamline the process. There remain, however, areas of potential improvement both in the central planning of monitoring and in its local implementation.

Central USAID and WWF efforts appear to have mixed utility in the field and to donors. Conceptual chains have been useful in central efforts to identify key relationships, processes, and proximate, distal, and synergistic relationships. These conceptual chains are a prerequisite to developing indicators consonant with these hypothesized realities. They have also helped local WWF PHE directors and staff to understand PHE linkages. While these conceptual diagrams remain crude sketches of complex processes, they seem to strike a relatively good balance between user-friendliness and fidelity to process. Perhaps a better balance would be two-fold. First, flesh out the diagrams with more nuanced sophistication. Second, reduce these complexities to: a. an overall simplified diagram and b. sub-diagrams describing in detail binary components of the larger system.

The indicators are largely appropriate for local conditions but there could be more clarity in several areas. One is the presentation. They are listed in an awkward table in word rather than in a spreadsheet. This reduces readability and flexibility. Also, while the population variables are well standardized, the health and environment ones are too localized. Undoubtedly this is no small challenge. But it can be done and doing so would enhance the PHE mission. Indeed, while there appears to be some consensus among PHE practitioners on health and population indicators, metrics for environmental outcomes have remained largely distinct in each eco-region and incompatible with related outcomes in cognate regions. Although environmental variables tend to be more diverse and difficult to measure, the value of attempting to collapse them into major categories may exceed the cost of not doing so. For example, despite nuanced and heterogeneous human-environment dynamics that are largely site-specific, environmental outcomes,

nonetheless, can be distilled to the following human impacts on terrestrial systems, - logging, agriculture, poaching, and on marine systems –illegal and unsustainable fishing. This has rich implications for the potential to scale-up monitoring through the establishment of comparable indicators across sites globally through extant survey mechanisms such as the DHS, or through crafting novel ones to serve WWF monitoring specifically.

Locally, it is difficult to collect the data requested centrally for several reasons. First is a lack of capacity to collect, clean, and interpret data. Yet we know that Demographic and Health Surveys are carried out with very high standards and sophistication in equally difficult circumstances. We also know that WWF doesn't do health, or so goes the mantra, so why is WWF trying to do population-environment science? An argument could be made that they have as much credibility in the former as they do in the latter. Here, partnering with the science community has the potential to vastly improve data collection, cleaning, standardization, and interpretation at very likely a reduced cost when internalizing all investment inputs relative to the PHE outcomes. A second related issue that could also be ameliorated by outsourcing data collection is the lack of will or ability of local partners to successfully carry out data collection.

Outsourcing how and to what degree? Complete outsourcing of data collection is not recommended. Indeed, close collaboration with local WWF and partner staff is key to crafting an appropriate research instrument that strikes the ideal balance between cross-comparability and fidelity/reliability. For example, it is important for outsiders to recognize the problem of asking sensitive questions to illiterate and semi-literate people in remote areas. Questions developed from standardized questionnaires must be crafted so that locals will understand both the content and the measurement and wish to answer honestly. Unless their wording reflects sensitivity to local socio-cultural conditions, the questions may jeopardize WWF conservation efforts.

PHE Synergy and Value Added:
Health-Goodwill-Environmental Conservation

-Doing health/nutrition work helps us do everything else we do better. WWF Director of Quirimbas National Park, Mozambique

-Why would we hurt the animals and trees? God tells us to take only what we need and to help those who help us. WWF helps make us well and heals us with medicines. We are then obliged to help them protect the environment. Village elder in India's Lagga Bagga.

Overwhelmingly, it is evident that WWF's population and health work buys goodwill for environmental conservation outcomes. An example of this is in Kenya where the number of turtle nests and percent of turtle nests reported by locals increased even as payments for these observations were decreased. Similarly, the rapid and near universal adoption of more sustainable fishing nets in the region was likely influenced by goodwill towards WWF for their health work.

The goodwill garnered from health work is both indirect and direct. Indirectly, community commitment is fostered through an understanding of linkages between health and the environment. While the understanding was facilitated by goodwill for WWF's messages because of the health work, the volition of people is genuine, sustainable, and

based on an understanding of environmental linkages to health. These cases have been reported above and include, for example, the natural adoption and vigilance of marine reserves in the Philippines, Kenya, and Mozambique, the eagerness to learn sustainable farming techniques in Mozambique, and the adoption of wood-saving stoves in Madagascar.

In other cases the barter is more direct. Such was the case in India where health interventions are largely “top-down” and unrelated to the environment. The quote above by a village elder in Lagga Bagga captures this sentiment. The barter works in the short term. However, to nurture a sustainable and synergistic PHE landscape over the long term, locals need to understand PHE linkages if they are to champion environmental conservation for the benefit of their own health and wellbeing.

Health-Enabled Conservation

A second environment-health linkage is more direct. Improved health enables increased quantity and quality of working hours which can in turn allow for better (or worse) stewardship of the environment. It can be argued that gains in health lead to gains in conservation efforts, such as boat patrols and apprehensions. These gains were facilitated by an increase in understanding the importance of sustainable development and of goodwill towards WWF and its goals. Ultimately, it would be useful to measure these trends over time to produce convincing quantitative data related to this theory and the qualitative observations behind it.

Lastly, a potentially positive feedback loop exists where conservation efforts lead to increased resource availability. This leads to better nutrition achieved in fewer hours of work, which ultimately enables more time to spend on conservation efforts such as boat patrols and apprehending conservation violators. A related direct health-environmental conservation link is reported by shamans from Cameroon. They recount that improved health has also apparently decreased pressure on forest resources through a decrease in the need to collect medicinal plants.

Whether or not such synergies are having a substantial impact on the environment is not cogently measurable with available data. What is certain, however, is that such synergies are possible and that qualitative evidence supports their existence. Another certainty is that *how* the PHE message is conveyed matters.

The PHE Message

PHE outcomes have been achieved with different approaches in different places. Some could be usefully replicated elsewhere. A good example of this is the seminars conducted in the Philippines. Developed by Save the Children, they involve direct active participation in a role-playing game where couples are added onto a small green piece of paper representing an island (it could easily represent a town in another context) until they fall down because they cannot all fit. The metaphor of human population growth's limits on finite resource bases is thereby graphically internalized by participants. However, some messages are best crafted at local levels. For example, in Kenya's Kiunga district on the topic of family planning, Muslim men range from tacit approbation to staunch opposition. More effective messages in such a context are framed in terms of child spacing for education and economic reasons. Further, a system of community and facility distributors allows women to access and use family planning without the knowledge of their husbands. As a result, it is estimated that more than half of the women

in the Kiunga WWF target villages use contraception – the majority of them without their husband’s knowledge.

The PHE Message Conveyed

I described above a very effective way to convey the PHE message used in the Philippines. I also described how the WWF director in Kiunga, Kenya, navigates Muslim norms to introduce and proliferate the PHE message. What else has worked and why? One lesson learned regarding the effectiveness of the PHE message is that interactive messages are the most effective. In addition to the example of the Philippines, the most effective message from another site was likely from CAR’s films produced on several PHE topics. The films are produced by WWF staff with locals as actors/participants. They are then opened to packed crowds during a community “movie night”. This method is innovative and effective for several reasons. First is the key interactive component.

The effectiveness of this message has a temporal aspect as well. *When* a certain message is appropriate is an important consideration. In the CAR, most people in the region have never seen a television and are mesmerized by seeing themselves in a film. Lastly, in such a remote area with a large fraction of the population illiterate, the message from their own villagers speaking to them in their own language is invaluable. A second positive effect is that locals are more apt to believe what their neighbors tell them than what outsiders tell them. In other words, the message of spacing rather than population reduction is effective in Kenya not because of an early demographic/development transition but because of *where* it is located – in this instance in the Muslim world – whereas the same message is appropriate for Madagascar and Mozambique because of *when* they are: in stage 1 of the demographic transition.

Lastly, in addition to when and where a message is appropriate, *to whom* a message is directed is also important. In this vein, women of childbearing years when their infants are being immunized are an ideal audience for the FP message. Similarly, in Kenya, the message by a Kiunga health volunteer to men regarding the importance of fewer children is appropriate as well. Because the majority of the population in the PHE sites is young, targeting youth is highly appropriate. This is done successfully in Cameroon where the PHE project works with public school PHE clubs. This cohort is particularly effective as a vehicle for PHE messages not only because they are the majority and future of their communities, but also because, not yet set in their ways; they remain open to new messages.

Partners: Win-Win?

A common denominator of success in all sites is effective collaboration with health partners. Building capacity in locals and health partners is necessary for effective outcomes and their sustainability. Is such a relationship a win-win? What do partners get? Where partnership investment is low, as is the case of India’s Ministry of Health in Lagga Bagga, not much. In such a case one must rely on goodwill and altruism. Conversely, where partnerships are more developed, partners yield benefits from the relationship as well, such as the Philippines and Kenya, where both NGO and MoH involvement is present.

Another common theme is that it is essential to have local community members involved and trained as health partners. There are numerous examples of the effectiveness of these collaborations. Locals can be an immediate catalyst to more

complete health care. Family Health International (FHI) and African Medical & Research Foundation (AMREF) in Kenya trained both locals and Ministry of Health workers. Now on the part of locals, CBDs have very good reach within communities, and clinics provide supplies given by the MoH because their training has enabled them to be part of the MoH commodity distribution list. On the part of the MoH, more integrated training in HIV/AIDS, vaccination, general health care, maternal and child health (MCH), and reproductive health (RH), has proven to be more effective than earlier splintered efforts. Similarly, in Madagascar, Association Santé Organization Secours (ASOS) has integrated the CBDs such that the MoH now recognizes them as auxiliary members of the MoH system.

A last recurrent theme of note is the importance of regular coordinated meetings among partners, WWF, and locals in order to maximize positive synergies. As people become more aware of benefits, their involvement increases. As the WWF PHE director for Madagascar stated “each role should be clear and formalized and should master all procedures they are in charge of at all levels. And they need to meet regularly to promote synergy”. Indeed, buy-in is higher when communities feel they have benefited from the project. For instance, less work is necessary for women when less firewood is used with fuel saving stoves. Income is increased, and livelihoods sustained with improved farming techniques. Another WWF PHE director notes that “when they are aware of those benefits, they are automatically owners of the PHE focus...this is a big point in the success of the project...”

Partnership sustainability

For the sustainability of partnerships it is imperative that the partners come into the agreement with equal authority and interest invested in the projects. There are several examples that support this assertion. For example, in Kenya former WWF health partner AMREF was subcontracted and was thus an unequal partner to WWF. AMREF staff were constricted by WWF logistics in the form of transportation and geographic scope of the health interventions. As a subcontractor they nonetheless operated largely in parallel to, not in concert with, WWF. An integrated PHE message and delivery system was never successfully developed.

Kenya learned from this and has since partnered with FHI in a collaboration of coequals. FHI, already accomplished in integrated health work, leads the health and population interventions, piggybacking on WWF’s contacts and transportation logistics in the area. Further, WWF has institutionalized the PHE partnership in Kiunga by further folding the Ministry of Health into the FHI-led PH team and by occupying a seat on the District Health Committee.

Another key to partnership sustainability is the persistence of partner staff. Because the PHE sites are in remote, poor locations, it has been a challenge to maintain qualified staff. In Kenya USAID is supporting a program that will place nurses in remote rural areas and will provide monetary incentive for them to remain. WWF-Kenya should avail itself of this program to fill the lacuna left by the departure of the nurse from Mkokoni Dispensary. Similarly, in other sites salary “top offs” are provided to add incentives for qualified health personnel to remain on board.

Ultimately, the Ministry of Health needs to be involved to ensure the greatest chance of sustainability. In some cases, such as in India, MoH involvement is largely absent. In other cases MoH involvement is present but is of little help to the PHE

projects and, in some instances, exacerbates existing problems. In CAR, for example, the questionable professionalism of the local health director and the frequent inebriation of the hospital manager cause locals to distrust the government's role in health. In other instances, such as in the Philippines, Madagascar, and Kenya, MoH involvement is relatively strong and increasing, offering promise for sustainability. The Kenya case is described above. In Madagascar's Spiny Forest, the majority of CBDs are now consistently receiving health supplies completely from the MoH with the cooperation of Population Services International. All of the CBDs are now officially registered with MoH clinics and established as remote auxiliaries for FP distribution. (WWF Ridge to Reef 2007).

Champions

-local champions are people who are a model of PHE activities....they give testimony to activities and can teach people effectiveness and benefits of PHE. Madagascar PHE WWF director.

A last recurring theme among project successes was the identification of one or more champions who are prepared to put their interests before those of the project and who have the passion, credibility, and charisma to be major catalysts for project success and expansion. Among those champions cited in the country sections are:

-Dona Aida, whose tireless advocacy of marine sanctuaries in Mozambique launched a national adoption of them,

- Muhammad, a volunteer health worker for two decades and currently Health Worker at Mkokoni. He convinced the men of his Kenyan village to support FP. Thus, through his own will, he catapulted his village far ahead of the demographic transition curve relative to neighboring villages.

-Lastly, the French missionary nurse who established a hospital where the MoH was not present. Where would the Cameroon project be without her?

To quote a WWF Project leader "focus on opinion leaders...once they adopt PHE focus, everyone in the community follows." Indeed.

Cost Effectiveness: Bang for Buck

Geography

An important, perhaps underappreciated, aspect of a successful PHE program is the selection of an appropriate geographical target for integrated PHE interventions. As noted in Table 2, with the exception of Mozambique, all PHE programs target between five and fifty thousand people in five to thirty villages within ecological priority zones. Whether there was much care taken in this selection process or it was intuitive, this order of magnitude appears appropriate for the combination of resources currently available given the desired PHE outcomes. Mozambique is a heuristic counterexample. In Quirimbas there are nearly 100,000 people within the park living in nearly 100 communities. The Mozambique J&J funded project has made remarkable progress given these geographic and demographic constraints. Nevertheless, while this large landscape provides natural opportunities for scaling up successes, its very size also hampers geographic continuity of interventions and manageability.

Priority places for PHE work should include the added value of doing one for the other two. The potential is great for conservation, development, and health stakeholders

to yield unusually high benefits in ecological priority areas from such combined forces. The co-occurrence of great poverty, high population growth, poor health, high and fragile biodiversity, and environmental degradation in ecological priority areas is not a coincidence at all. PHE programs are nascent and may not show synergistic outcomes in the short term. They will. Stick with them. Where does high population growth and underdevelopment threaten precious ecosystems and human wellbeing? To the extent that these vicious cycles are most acute, PHE interventions are most demanded. Where they will succeed is another question better addressed by other sections of this report. To date it seems that WWF has done a good job selecting sites based on these needs and on the relative ability of the sites to partner with health institutions in implementing interventions.

It should also be noted that geography is a comparative advantage of WWF in PHE partnerships. There is a reason that poor health care exists in WWF PHE sites. It is the same reason that there remains wildlife to conserve: the regions are remote and hard to access. Where WWF consistently played an important role in PHE partnerships was in the conceptually simple but empirically key logistical support of providing transportation to partners to their remote conservation regions.

Should funders concentrate investments in a reduced suite of PHE sites or diffuse them to more sites in smaller installments? There is no right answer. However, the ethical contradiction of protecting animals but not people is a raw wound that won't be solved by lip-service salve but only by earnest PHE (and livelihood) interventions. The modest results from this report are highly suggestive of ample success of funding efforts within an order of magnitude of 37 US cents (Mozambique) to 6.64 US dollars per person (Kenya) per year (2007 figures). While sites with more favorable sustainability potential will require less funding annually for fewer years, these sites are also generally less needy of funding and will therefore pay fewer dividends over time. For example, the CAR PHE project is many years from sustainability and is currently the most costly per capita. However, early investments in people (it works the same with stocks) ultimately have a larger impact. In the CAR population, the total fertility rate exceeds seven births per woman. Their habitat is centrally nestled within the most bio-rich areas of the second largest tropical forest in the world. Not investing in these people would over time have much higher ecological costs than would transferring funds to, for example, the Roxas project in the Philippines. While the latter is much closer to sustainability, the potential demographic and environmental conservation payback is also lower. On the other hand, perhaps the Philippines site is under greater threat from overuse and habitat destruction than Dzanga Sangha in biological terms.

Leveraging

In addition to the internal synergistic effect of the PHE programs described above, external synergy has also been accomplished through leveraging PHE resources to acquire further funding. Several examples of this have achieved significant results and are documented in WWF's 2007 Ridge to Reef report. In the Philippines the WWF PHE project leveraged an additional \$21,638 USD in the form of money, time, labor and equipment from partners. These resources were employed for activities such as Family Planning Action Sessions and coral reef monitoring. A second example comes from Madagascar where PHE funding from USAID enabled WWF and health partner ASOS to secure \$26,350 USD from various national and international sources for the Spiny Forest.

This project also received a time commitment from the Ministry of Health to monitor Community Based Distributors of FP commodities. Lastly, a third example of successful leveraging result comes from Kenya's Kiunga Marine Reserve. Here WWF convinced the MoH to provide staff time for the establishment of health posts/ dispensaries and a permanent nurse for a previously unserved area of the reserve. In the model of a successful fundraising office, perhaps USAID and J&J funds should be allocated specifically to identifying and advocating partnerships which would bring human, financial, and logistical capital to the PHE mission.

Technical support

Technical support appears to provide additional value for PHE projects. Where technical support was high, for example through ADRA in Nepal and Save the Children in Philippines, project interventions were generally more cost and outcome effective. There are plenty of cases where local projects overcame a lack of technical support through creativity and ingenuity. Such is the case with the highly effective movies made in CAR and the PHE clubs formed with public schools in Cameroon. However, the materials developed by ADRA and Save the Children could be used in virtually all the other PHE sites. In the near future, all sites should receive a copy of these materials as well as lessons learned from other project sites so that a best-practices manual can be assembled. Similarly, where PHE technical support was provided personally in Nepal and the Philippines, results are better. One or two people trained in PHE best practices could nurture the PHE projects by visiting each site and training WWF staff and partners in lessons learned from other sites that could help them. This is a segue for another point regarding technical support.

A challenge to the sustainability of technical support to the WWF PHE projects is that PHE technical advisor, Cara Honzak, works only part-time. Although planned, Cara's reduction from 90% to 60% is difficult for the WWF PHE portfolio to absorb, especially as the projects aspire to scale-up. The PHE suite of projects has recently increased to include a second project in Nepal and one in China. Furthermore, existing projects in Philippines, Kenya, Cameroon, and elsewhere aim to expand their current PHE target regions. Although WWF-US has made efforts to overcome this deficiency, it is an inopportune time to reduce the PHE technical director's work schedule. WWF-US reports that they have already had to spend additional time on USAID legal compliance issues. While this situation will be partly relieved through a PHE Fellow for Nepal, a second technical advisor or more time from one advisor is needed for PHE to scale-up in existing and in new sites (see WWF *From Ridge to Reef* 2007). It is also important to note that until recently the J&J projects received no technical assistance from WWF. So now WWF has gone from 3 projects to nine (including China). In the next phase WWF hopes to count on one and a half full-time equivalents plus perhaps 10% of Oglethorpe's time.

Johnson & Johnson vs. USAID funding

There are several examples in this report that illustrate how the more flexible J&J funding provided greater value compared to USAID money. The main problem with USAID funds is the restriction of terms to a narrow and proximate definition of family planning. As mentioned above, since the PHE sites are located in remote rural regions in early stages of the demographic transition, other health interventions, most significantly

child health interventions, are themselves the most appropriate interventions for the ultimate USAID goal of family planning. Demand for family planning has recurrently and ubiquitously been enhanced and, indeed, predicated on the assurance that those children who are born will survive to adulthood. More value would be added to USAID projects if a broader definition of family planning, which included key underlying determinants of fertility such as infant mortality, were included, indeed championed in contract terms of agreement.

Contraceptive Methods

While it is imperative for PHE programs to offer couples as broad a suite of contraceptive options as possible, it is clear that injectables and pills are the most popular means. They are easy to take and administer and they largely elide the involvement of husbands who invariably are indifferent to, or even curse, family planning. Condoms are important for HIV and STD transmission reduction and have been successfully marketed as such in Nepal where male labor migration puts families at risk for both, and among youth in Cameroon. However, in other sites with similar risks, condoms are underutilized, e.g. in CAR. A combination of factors -the lack of involvement of men in family planning, the relative powerlessness of women, the incorrect knowledge of use, and decreased male sensitivity- prevent wider adoption of condoms. Nevertheless, particularly where HIV and STD are problems, men need to do their part in promoting good reproductive health. Lessons can be learned from Nepal on how to achieve this.

Sustainability and scaling up

Have you ever tried to learn a third language without first having perfected a second language? If you have you will know that the result is often unfavorable: you speak both languages poorly. Scaling up a PHE project before it is sustainable is tantamount to the trap of the overzealous linguist. I posed the question about whether funding should be focused on fewer sites rather than more. Earlier I argued for more sites. I now argue for the imperative of maintaining funding in existing sites until they can speak the PHE language fluently. The PHE sites evaluated here run the gamut of preparedness. Roxas may be a year or two away while CAR is very possibly over a decade away from sustainability.

The ingredients for sustainability:

1. A broad-based understanding of PHE linkages shared by WWF staff, partners, and locals that leads to changes in behavior commensurate with the PHE message and
2. Certain conditions at each level:
 - Household: Sufficient human, logistical, transportation, and provision capacity along with volition to behave in concert with the PHE message.
 - Village: Village volunteers such as trained health volunteers, midwives, and conservation regulators and advocates, who can facilitate health, population, and conservation outcomes.

- Site: Sustained health partner presence in the form of, e.g., continually stocked hospitals and health clinics staffed round the clock by trained nurses and/or MDs.
- Regional: Sustained government and institutional support.

Recommendations

PHE Basics

- In the poorest sites that remain in early stages of the demographic transition, e.g. in CAR, Mozambique, and Madagascar, invest in broader health interventions first, namely infant mortality. Mortality must fall and subsistence must be ensured before there is demand for family planning.
- Invest in livelihoods in tandem with PHE. It is key for selling PHE: people think in terms of their livelihoods first and see their relationship with the environment through a livelihoods lens. People also don't have ample leisure time to practice conservation as a hobby. It must be integrated seamlessly into how people survive and thrive. Livelihoods are also important for the first point above in stimulating demand for FP.
- Continue to invest in training locals in basic health care and in how to build and sustain health infrastructure. Some places have much greater challenges to overcome to achieve sustainability, e.g. CAR and Mozambique, but should continue with this necessary effort. Madagascar may prove a useful example for how to achieve this in areas of very low literacy.
- Challenge people to pay for services (even if modestly) to ensure higher perceived value for the services, and enable payment to community based distributors.
- Achieve PHE outcomes, investing first and continuously in trust, teaching, knowledge, and the instilling of volition towards change. These are free yet highly effective and necessary measures.
- Ensure that even modest financing covers the basics first: e.g., malaria nets and anti-malarial pills, vaccinations, basic equipment, clean water, sanitation, antibacterials, medicines, vitamins, and food security.
- Support injectables, pills, and condoms. They are easy to take and administer and they largely sidestep the involvement of husbands who are sometimes indifferent or even opposed to family planning. Condoms are important for HIV and STD transmission reduction and have been successfully marketed as such in Nepal where male labor migration puts families at risk for both. As previously stated, in other sites with similar risks, condoms are underutilized. Nevertheless,

particularly where HIV and STD are problems, men need to do their part in promoting good reproductive health. Lessons can be learned from Nepal and Cameroon on how to achieve this.

- Be patient. PHE programs are nascent and may not show synergistic outcomes in the short term. They will. Stick with them. Where does high population growth and underdevelopment threaten precious ecosystems and human wellbeing? To the extent that these vicious cycles are most acute, PHE interventions are most demanded.

Monitoring and Data Collection

- Flesh out PHE linkages with more care and nuance. Then reduce these complexities to a simplified, user-friendly meta-diagram that nests within it sub-diagrams describing in detail binary components of the larger system.
- Create health and environment variables that can be applied across sites. While population and health metrics are consistent across WWF target regions, environmental outcomes can be reduced to a handful of key outcome variables which can be standardized for cross-site comparison.
- Partner with local and international scientists. This could vastly improve data collection, cleaning, standardization, and interpretation at very likely a reduced cost when all investment inputs relative to the PHE outcomes are internalized.
- Maintain local expertise and WWF input in the research process. This is very important in order to ensure that the right questions are asked in the right way. Potential problems are minimized by asking sensitive questions to illiterate and semi-literate people in remote regions.
- Impress on local partners the importance to them of successful monitoring.

The PHE Message

- Seize opportunities to promote the WWF brand when partners do population and health work. This buys goodwill for environmental conservation programs and also can ultimately increase the volition of people to become genuine, sustainable conservationists for the benefit of their own health and wellbeing.
- Conceptualize, monitor, and teach how improved health and the concomitant increase in quantity and quality of working hours allow for better stewardship of the environment.

- Replicate the most successful PHE approaches where appropriate. Interactive learning is highly effective. The seminars conducted in the Philippines developed by Save the Children, the PHE movies produced in CAR, and the crafting of PHE in terms of economic advancement and wellbeing in Kenya are models.
- Be aware of *where* and *when* a certain PHE message is appropriate. The language of spacing as opposed to population reduction is effective in Kenya not because of an early demographic/development transition but because of *where* it is located – in this instance in the Muslim world – whereas the same message is appropriate for Madagascar and Mozambique because of *when* they are: in stage 1 of the demographic transition.
- Target PHE messages to certain cohorts. *To whom* a message is directed is important. For example, it makes sense to deliver the FP message to women of childbearing years when their infants are being immunized. Similarly, because the majority of the population in the PHE sites is young, targeting youth is highly appropriate (see Cameroon).

Partnerships

- Continue to build capacity in locals and health partners for effective outcomes and project sustainability. With the Philippines and Kenya, where both NGO and MoH are involved and partnerships are more developed, partners yield benefits from the relationship as well.
- To sustain partnerships, bring partners into the agreement with equal authority and interest invested in the projects. One example is Kenya where former WWF health partner AMREF was subcontracted and was thus an unequal partner to WWF. AMREF staff was constrained by WWF logistics in the form of transportation and geographic scope of the health interventions.
- Provide incentives to maintain partner staff. Because the PHE sites are in remote, poor locations, it has been a challenge to maintain qualified staff. In Kenya USAID is supporting a program that will place nurses in remote rural areas and will provide monetary incentive for them to remain. In cases such as Kenya, these incentives can be obtained from external support.
- Ultimately, the Ministry of Health needs to be involved to ensure the greatest chance of sustainability.

Champions

- Identify of one or more champions who will put the interests of the project before their own and whose passion, credibility, and charisma will serve as major catalysts for project success and expansion (see Mozambique and Kenya).

Geography

- Select an appropriate geographical target for integrated PHE interventions. With the exception of Mozambique, all PHE programs target between five and fifty thousand people in five to thirty villages in human-environment “hot spots” within ecological “priority areas”. This order of magnitude appears appropriate for the combination of resources currently available given the desired PHE outcomes.
- Pledge that priority places for PHE work will add symbiotic value among population, health, and environment outcomes independently. The potential for conservation, development, and health stakeholders to benefit from such joint projects is great in ecological priority areas. The co-incidence of great poverty, high population growth, poor health, high and fragile biodiversity and environmental degradation in ecological priority areas is not a coincidence at all.
- Concentrate investments not in a reduced suite of PHE sites but rather do so more broadly. The ethical contradiction of protecting animals but not people is a thorn that can be removed by earnest PHE and livelihood interventions. The modest results from this report are highly suggestive of ample success of funding efforts within an order of magnitude of 37 US cents (Mozambique) to 6.64 US dollars per person (Kenya) per year (2007 figures). While the latter is much closer to sustainability, the potential demographic and environmental conservation payback is also lower.

Leveraging

- Increase external synergies through leveraging PHE resources to acquire further funding (see, e.g., Kenya and Nepal).
- Network nationally to ensure the greatest potential leveraging of human, logistical, technical, and financial capital.
- Work with WWF, DC to access international resources. Improved monitoring, as tirelessly advocated by the WWF PHE technical advisor, could greatly help the success of such endeavors.

Technical Support

- Enhance technical support to achieve greater value-added. Where technical support was high, for example through ADRA in Nepal and Save the Children in Philippines, project interventions were generally more cost and outcome effective.
- A second technical advisor or more time from one advisor is needed for PHE to scale-up in existing and in new sites.

Sustainability and Scaling up

- Expand USAID funds to a broader definition of family planning. As mentioned above, since the PHE sites are located in remote rural regions in early stages of the demographic transition, other health interventions, most significantly child health interventions are themselves the most appropriate interventions for the ultimate USAID goal of family planning. Demand for family planning has recurrently and ubiquitously been enhanced and, indeed, predicated on the assurance that those children who are born will survive to adulthood. More value would be added to USAID projects if a broader definition of family planning, which included key underlying determinants of fertility such as infant mortality, were included, indeed championed in contractual terms of agreement.
- Necessary ingredients for scaling up (improving services in an existing site; expanding the geographical coverage in a project; replicating projects by WWF or partners; working at national policy level; etc.) will include:
 1. A broad-based understanding of PHE linkages shared by WWF staff, partners, and locals that leads to changes in behavior commensurate with the PHE message
 2. Sufficient human, logistical, transportation, and provision capacity at the household (e.g., volition to behave in concert with the PHE message), village (village volunteers, such as trained health volunteers, midwives, and conservation regulators and advocates, who can facilitate health, population, and conservation outcomes), site (sustained health partner presence in the form of e.g., continually stocked hospitals and health clinics continually staffed by trained nurses and or MDs), and regional levels (sustained government and institutional support).
- Maintain and increase support. The WWF PHE programs were run at 37 cents to 6.64 dollars per capita annually. The impressive and inspiring results that were achieved for such a sum challenge two dominant paradigms. The first relates to the demographic transition, and more specifically the urban transition. During the coming decades all the world's several billion net additional people will live in the world's poorest cities. Yet this belies that in key conservation priority areas the demographic transition has scarcely commenced. What about these areas? It also challenges the related, predominant notion in development assistance in recent years: invest in urban areas to achieve greatest yield on investments. While certainly more people can be accessed at less cost per person in urban areas, the

qualitatively distinct human-environment milieux of ecological priority regions demands a similarly distinct valuation.

Coda

After having accepted the WWF contract to evaluate the progress being made in the sites included herein, I was determined to carry out this task with the least bias and greatest objectivity possible. All humans are subjective, and I need to add to this report the extent to which I was personally and professionally impressed by WWF and partner personnel with whom I interacted. They do not engage in this work because it is easy, they do it because it is necessary. Their commitment, courage and caring in the face of overwhelming obstacles should be acknowledged. In my mind they are all champions.

Annex: Individuals consulted during the evaluation

NAME	POSITION	ORGANIZATION	COUNTRY
Djogo Toumouksala	Conservateur	Parc National de Lobeke	Cameroon
Dr Paul Tonkoug Iyawa		Ministry of Health, Moloundou	Cameroon
Dr. Leonard Usongo	Jengi Regional Coordinator, Jengi Forest Program, South-East Cameroon	WWF CARPO	Cameroon
Genevieve Aubry	Director	Hopital Prive Catholique de Salapoumbe	Cameroon
Laurent Some	Subregional Representative	WWF CARPO	Cameroon
Louis Ngono	Collaborative Management Officer, Jengi Forest Program, South-East Cameroon	WWF CARPO	Cameroon
Martin Tchamba	Technical Director	WWF CARPO	Cameroon
Pegue Manga	Communications Officer	WWF CARPO	Cameroon
Zacharia Nzoo	Jengi Scientific Advisor	WWF CARPO	Cameroon
Christian Bassom	WWF Bayanga - Communications	WWF CARPO	CAR
Erica Cochrane	Project Executant, Dsanga Sangha	WWF CARPO	CAR
Jean Pierre Molzungo	Director of Bayanga Health Center	WWF CARPO	CAR
Jim Hocking	ICDI Director and Founder	Integrated Community Development International	CAR
Mathias Heinze	Géologue, Conseiller Technique Principal	GTZ	CAR
Pastor David		Baptist Church, Bayanga	CAR
Valerie Pentchoanje	WWF Bayanga - Communications	WWF CARPO	CAR
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Diwakar Sharma	Associate Director	WWF India	India
Harish Guleria	Coordinator, Terai Arc Landscape	WWF India	India
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Ravi Singh	Secretary General and CEO	WWF-India	India
Sejal Worah	Program Director	WWF India	India
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Dr. Taye Teferi	Conservation Program Director	WWF EARPO	Kenya
Emma Mwamburi	Program Management Specialist (HIV/AIDS), Office of Population and Health	USAID Kenya	Kenya
Frank Mwangemi	Senior Technical Officer	Family Health International	Kenya
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Hussein Athman	Community Based Distributor	Mkokoni Dispensary	Kenya
Michael A. Strong, Ph.D.	Senior Health Program Manager, Office of Population and Health	USAID Kenya	Kenya
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Mwanalima Omari Nyahi	VCT Counselor	Lamu District Hospital	Kenya
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Benjamin Andriamitantoa	Reproductive Health/Family Planning, Child Survival, and Nutrition Program Manager	USAID Madagascar	Madagascar
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Harinesy Rajeriharindranto	Director	ASOS Southern Region	Madagascar
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Kommu Paudel	Midwife, Khata Clinic	CFCC	Nepal
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