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Appreciating the Complexity and Dignity of People's Lives: Integrating Population-Health-Environment Research in Petén, Guatemala

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From 1997-1999, a team of researchers developed a new environmental module for Guatemala's Demographic and Health Survey (DHS) that analyzed the rapidly changing population-environment dynamics in Petén, a frontier region in the northern part of the country. Anthropologist Liza Grandia (1) presents the context and history of the module's development; (2) discusses the lessons learned; (3) describes programs based on the survey that reduced Petén's total fertility rate from 6.8 to 5.8 children per woman in just four years; and (4) concludes that integrated research is an important part of respecting the humanity of the poor.[1]

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INTRODUCTION

At the heart of ancient Mayan civilization, the Petén region of northern Guatemala was home to millions of people at the height of the late Classic period (600-900 AD). Then, following a political and demographic decline, Petén's once-great cities like Tikal and Yaxhá faded into the forests. Today, the ruins of stone temples peeking out of the dense tropical canopy serve as reminders of the ebb and flow of civilization—and how quickly things can change on our fragile planet.

Once again, Petén has emerged as one of Latin America's most dynamic and endangered frontiers. Before 1960, the largely isolated region had only 15,000 inhabitants, whose "enclave" economy was based on extracting non-timber forest products (Schwartz, 1990). Petén's skyrocketing growth can be traced to Guatemala's military dictatorship, which, after gaining power following the 1954 CIA-orchestrated coup, encouraged colonization of the region. While the planners envisioned only 150,000 settlers by 2000, new roads and agrarian pressures spurred uncontrolled migration by poor peasants, and today, the population surpasses 500,000 (Grandia & Fort, 1999).

The migrants—*ladinos* (mestizos) from the Oriente, Guatemala's arid eastern ranchlands, and Q'eqchi' Maya from south of Petén—settled along dirt roads that timber and oil companies blazed into the northern forests. Given the poor quality of Petén's soil, cattle ranchers bought up or seized the migrants' land, and thus pushed the agricultural frontier further north (Grandia, 2004). By the 1990s, more than half of Petén's forests—approximately one and a half million hectares—had been lost.

To stem the tide, in 1991 the Guatemalan government created the 1.6 million-hectare Maya Biosphere Reserve, the largest protected tropical forest north of the Amazon and twice the size of Yellowstone. When created, thousands of subsistence farmers already lived in the reserve, mostly in the buffer zone. But by 1998, a government-sponsored census found 87,100 people—and the number was growing quickly (Grunberg & Ramos, 1998). In addition, absentee cattle ranchers cleared thousands of hectares of Laguna del Tigre National Park and other parts of the reserve with impunity.

In the early 1990s, USAID/Guatemala supported the establishment of several Petén-based conservation projects, including ProPetén, formerly the Guatemalan branch of Conservation International and now an independent NGO.[2] Initially, ProPetén worked to develop economic alternatives to slash-and-burn farming, such as sustainable forestry, ecotourism, and harvesting non-timber forest products, to mitigate the impacts of settlements inside the reserve's Multiple Use Zone, an 848,400-hectare region where residents are permitted to extract forest products and raise some crops.

By the mid-1990s, however, ProPetén's local leadership realized that conservation efforts must also address population growth, which was estimated at 10 percent annually (see Graph 1). Ecotourism, for example, can encourage conservation, but it only employs a limited number of people. Even without further immigration, the male population of the reserve (a proxy for the amount of farmland required) is expected to double within twenty years (Grandia, 2000). Aside from one private gynecologist, no NGO or government agency offered family planning services in Petén, even though both women and men expressed interest in them. Although population is not traditionally part of the conservation agenda, ProPetén's leadership felt the organization should address the need for family planning services in order to help alleviate future pressures on natural resources and improve family health in general.[3] ProPetén got involved in population because, at the time, no one else was willing to do it.

Piggybacking on the Demographic and Health Survey

For safety and budgetary reasons, Guatemala's 1987 and 1995 Demographic and Health Surveys (DHS)[4] excluded Petén, so the region lacked the baseline fertility data needed to build stakeholder support for a major population-environment initiative. Known for its methodological rigor and respected by donors and policymakers, USAID's DHS was selected as the best instrument to collect fertility and contraceptive data in the region. In addition, these surveys explore linkages between maternal-child health and fertility indicators, on the one hand, and on the other, women's economic status, education, and other social factors. Strict standardization criteria in DHS questionnaires enable international policymakers to compare data on regional and international scales. Now comprising more than 200 surveys in 75 countries, the DHS program exerts tremendous influence on international and national health policy.

The idea to integrate environmental questions into the Petén DHS arose synergistically. Luis Flores, then vice president of Guatemala, expressed concern to the sponsors of the 1995 DHS report about its omission of Petén. In response, USAID/Washington staff allocated $90,000 of seed funding for Macro International, Inc., to carry out a separate survey of Petén; ProPetén suggested that a bonus module exploring linkages among population, migration, and natural resource management could be added with little additional cost. ProPetén also provided staff time and travel resources to mobilize financial and institutional support for the survey, which involved extensive fundraising and consultation with local government agencies and NGOs.[5]

In the spring of 1998, the Guatemalan government, United Nations Population Fund, and USAID/Guatemala's health and education office unexpectedly announced that together they would sponsor a smaller, interim DHS to evaluate the midterm fulfillment of Guatemala's Peace Accords. Signed in December 1996 after nearly four decades of civil war, the peace accords set ambitious goals, such as lowering infant and maternal mortality by 50 percent within four years. At that time, the Petén DHS had been on the political table for more than a year, and local and national politicians were growing concerned at the delay. In response, USAID/Guatemala agreed to fund a complete Petén DHS as part of the interim survey.[6] And so, the integrated Petén survey was "piggybacked" upon Guatemala's 1998 interim DHS.

Public workshops with NGOs and governmental organizations working in Petén helped Macro International, Inc., prioritize six thematic areas for the new integrated survey, which sampled 1,000+ households. After receiving training in land and environmental concepts, the regular DHS interview team surveyed male heads-of-household in March-April 1999 in their mother tongue (either Spanish

Agronomist Eric Mena explains homemade, plant-based pesticides to Q'eqchi' farmers and their wives (Photo: Ericka Moerkerken)

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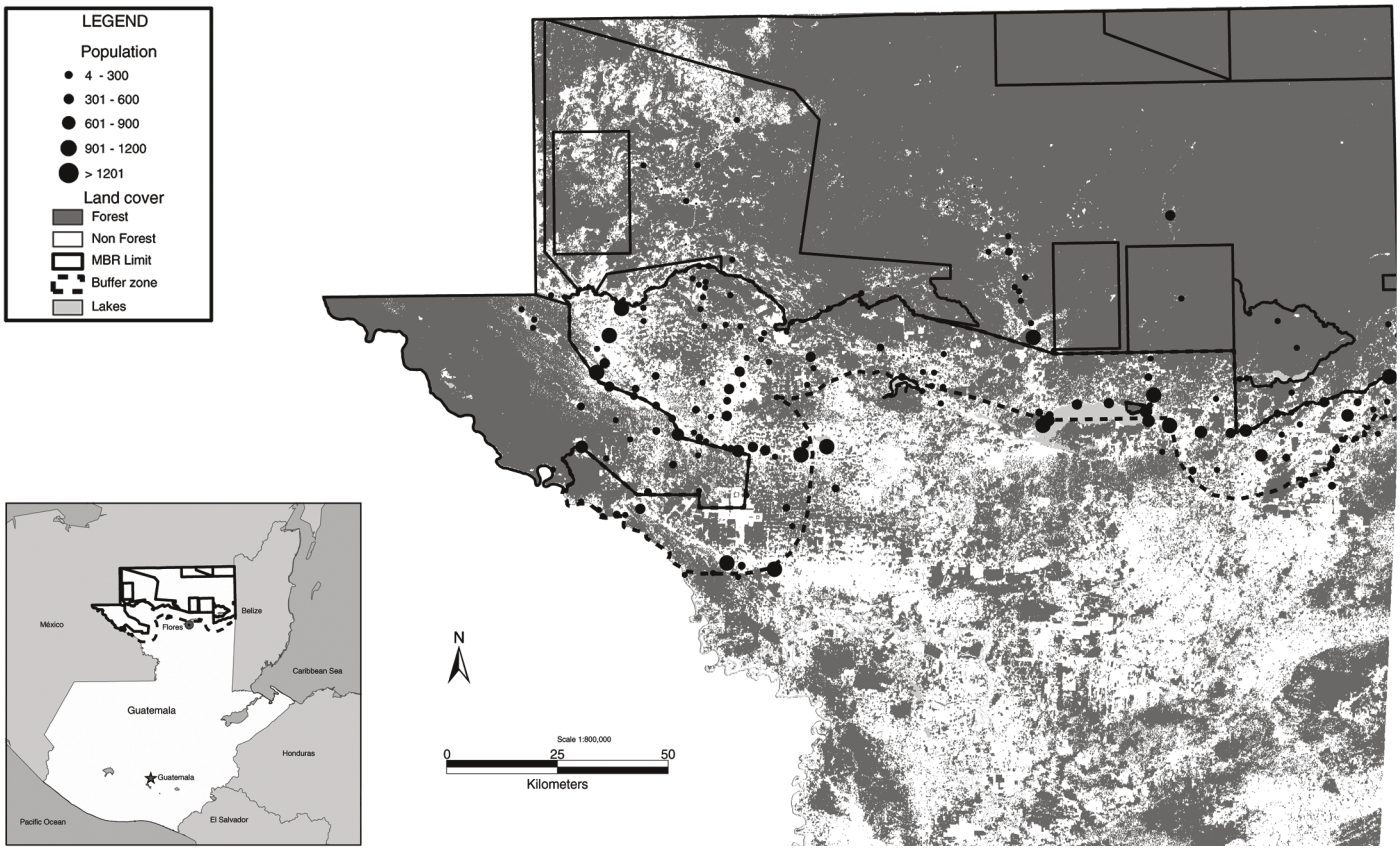


The Maya Biosphere Reserve (solid line) in Petén, Guatemala, encompasses both core areas and multiple use zones. The dotted line marks the boundary of the buffer zone. Source: Forest cover from LANDSAT images 2001; population data from Census 2002, Instituto Nacional de Estadistica de Guatemala. Map courtesy of Edwin Castellanos and Jorge Roldan, GIS and Remote Sensing Laboratory, Universidad del Valle de Guatemala.

or Q'eqchi', the main Mayan language in Petén), asking 81 questions on these themes:[7]

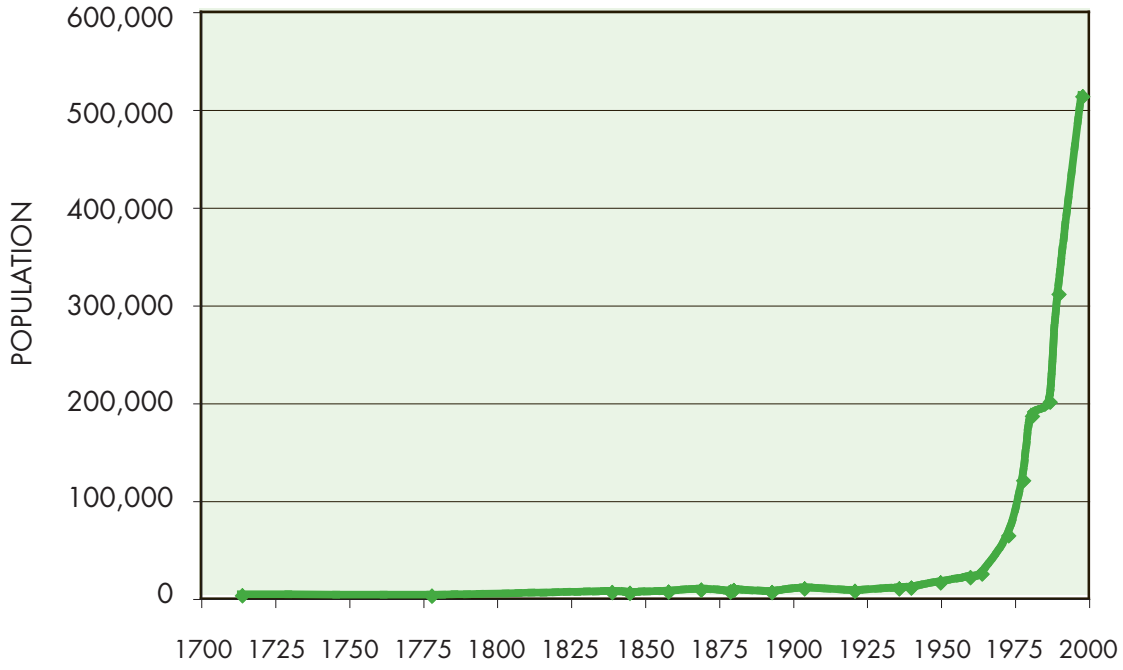
- Migration;
- Agriculture;
- Wage labor and non-timber forest products;
- Land extension and tenure, with special categories for protected areas;
- Conservation/environmental opinions; and
- Population perceptions.

Putting the "E" in DHS: Lessons Learned From the Survey Process

While multidisciplinary research like the integrated DHS offers many benefits, the devil is in the details. The lessons learned while conducting the DHS, listed below, might help future integrated surveys.

1. Explore other population-health-environment connections beyond linking family planning to conservation initiatives.[8] The survey, for example, produced the most accurate land data for Petén in decades, which indicated that landlessness—one-

Graph 1. **Petén's Population Growth, 1714-1998**



Petén has grown by around 10% annually since 1960. Roughly 2/3 of that growth has been from in-migration and 1/3 from natural reproduction. Sources: Schwartz (1990); Grandia (2000); Grunberg & Ramos (1998); SEGEPLAN et al. (1993).

third of farmers reported they had to either rent or borrow land—was more serious than anyone envisioned. The 2004 agricultural census confirmed these conclusions, demonstrating that though primarily a health survey, the DHS could also provide a "back door" for collecting preliminary data on thorny issues such as land distribution.[9] Other relevant health-population-environment themes might include:

a. Relationship of family size to land inheritance patterns;
b. Speculatory pressures on land markets, especially those arising from (re)concentration of land ownership;
c. Environmental justice issues, like use of pesticides and other occupational work hazards;
d. Traditional medicine versus government health services;
e. Links between nutrition and agricultural diversity (anthropometry);
f. Women's work in natural resource management;
g. Life-cycle approaches to migration analysis;
h. Future perceptions, including views on environmental sustainability, the impact of population growth, and aspirations for their children and grandchildren; and
i. Relationships between infectious diseases and forms of environmental degradation such as deforestation.

2. Tailor integrated surveys to the local context, due to the nature of environmental problems. For example, measurements of farm size and agricultural harvests can be particularly idiosyncratic [see Schwartz (1990) on the peculiarities of Petén measurements]. However, environmental data may present fewer opportunities for standardization than health data, which could make it difficult to compare results across countries or regions.

3. Hire bilingual local people as enumerators—at least for the pilot survey. If, for budgetary reasons, the regular DHS survey staff must be employed, the schedule must include additional time for training and debriefing. Data entry workers must also be trained, as they may encounter difficulties in coding "other" responses.

Table 1

From the 1998/99 Petén DHS	Indigenous	Ladino
Total Fertility Rate (children per woman)	8.6	6.1
Ideal Family Size (children per woman)	4.4	3.7
Percentage of women who do not want more children	37.4%	42.0%
Percentage of women who would be "happy" about another pregnancy	24.2%	14.3%
Percentage of women who would be "sad" about another pregnancy	59.8%	48.8%

4. Take into account logistical problems presented by remote, environmentally sensitive areas; for example, schedule fieldwork according to the variable road conditions during the rainy season.

The integrated DHS has been a critical part of developing ProPetén's programs linking health and population with the environment.

5. Consider the highly gendered division of labor in rural areas, where men do most of the farming. If the survey focuses on agriculture, then it should be carried out consistently with men (or vice versa, if women are primarily responsible for subsistence agriculture). If men are surveyed, then establish a coding plan for correlating the male survey with the female health survey. Surveying men does have a practical advantage: a different team of local enumerators can survey men while female enumerators survey women for the regular DHS. Also, the survey could be combined easily and cost-effectively with a male reproductive health survey.

6. Utilize enumerators' downtime for qualitative research (e.g., recording life histories of key informants) that could provide nuance to information gleaned from the standard closed-ended questionnaire. This opportunity is not unique to an integrated DHS, however, and could offer benefits for all surveys.

7. Budget extra time for preparing data tables and exploring interesting, unexpected patterns. Standardized data processing of regular health indicators (e.g., total fertility rate, infant mortality, birth attendants) can produce preliminary reports within months. Processing data from an experimental environmental module may be more difficult, however, since some of the potential correlations between health and environmental variables may not be immediately apparent.

8. Disseminate results widely to expand awareness and interest in DHS data among new constituencies. These surveys are one of the best sources for not only health data, but also for other socioeconomic indicators. By adding new variables, this multisectoral data analysis will interest professionals outside the traditional health sector.

The cost of expanding the DHS to include environmental data need not be prohibitive. Even if developing a separate environmental module is too expensive, adding a few such questions to the gen-

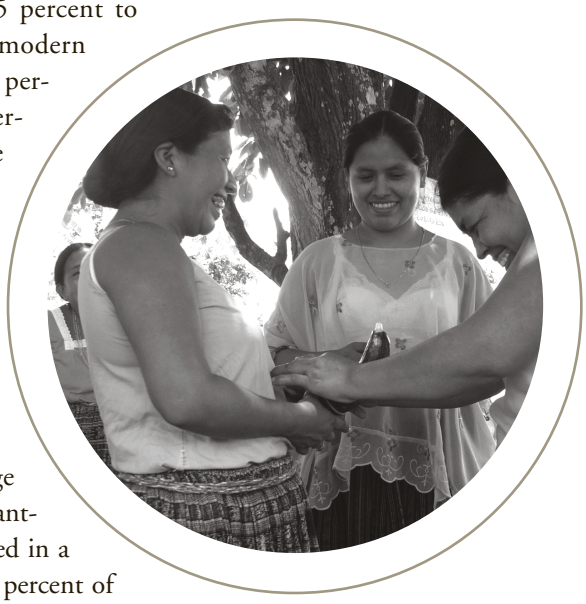
eral household questionnaire could be productive. For example, cross-country analysis of existing environmental indicators (e.g., water collection and sanitation) gathered in previous surveys might prove valuable.[10] Other ways to make integrated survey modules more cost effective include partnering with local research institutions and individuals (NGOs, universities, independent researchers, and graduate students), which could produce additional benefits such as building local research capacity and generating interest in the data.

Survey Results: Impact on Health and Family Planning

While most health experts predicted that fertility in Petén was high, no one expected the survey to reveal that the total fertility rate was 6.8 children per woman, rising to more than 9.0 children in rural indigenous areas. These shocking numbers catalyzed Guatemala's Ministry of Health to work with ProPetén's new population and environment program, Remedios, to train government health workers to provide reproductive healthcare across the region. The results also inspired APROFAM, Guatemala's leading NGO provider of reproductive health care (and International Planned Parenthood affiliate), to invest its own resources in opening the first reproductive health clinic in Petén, along with rural extension programs.[11]

The survey found that Petén's teenage pregnancy rate was the highest in the country, with 37 percent of adolescents aged 15-19 already mothers, compared to 22 percent nationally. This discovery spurred the establishment of adolescent sexual education programs now run by Tan Uxil, an NGO that ProPetén helped Family Planning International Assistance start in 2002.[12] In addition, ProPetén and its partners established an inter-institutional Reproductive Health Commission, whose collaborative projects address cervical cancer (the most common cause of death in women in Petén), domestic violence, emergency contraception, and family planning education.

By 2002, only four years later, the national DHS revealed that Petén's total fertility rate had dropped from 6.8 to 5.8 children per woman (Klein & Hidalgo, 2003). Contraceptive use for all methods increased from 23.5 percent to 33.9 percent, while use of modern methods increased from 19.8 percent to 28.2 percent. The percentage of women who have heard about or used a contraceptive method increased even more dramatically, from 77.2 percent to 93.9 percent, surpassing the national average of 91.5 percent. By 2002, 91.9 percent of Petén residents were aware of AIDS, surpassing the national average of 85.6 percent. Most significantly, these improvements occurred in a primarily rural area, where 60 percent of the population are farmers.



At the mobile education center, women demonstrate how to use a condom (Photo: Ericka Moerkerken)

ProPetén's Remedios Program: Phase One

From its start in 1997, ProPetén's Remedios program has sought to respond to constantly shifting conservation threats by making population-health-environment connections in the local context. ProPetén builds alliances, catalyzing and nurturing projects as long as necessary before passing them on to capable partners in the health field. Then ProPetén seeks new ways to connect population-health-environment issues or fill niches overlooked by other organizations.

The integrated DHS has been a critical part of developing ProPetén's programs linking health and population with the environment. In addition to

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helping establish APROFAM and Tan Uxil in Petén, over the past five years, Remedios has successfully initiated a number of other programs based on the integrated DHS data:

- Trained 90 midwives and health promoters from remote communities inside the Maya Biosphere Reserve to become community-based distributors of contraceptives for APROFAM; lined up continuing training with Concern America, a network of primary health promoters in Petén.[13]
- Initiated a network of traditional healers to document and exchange knowledge of medicinal plants; an indigenous partner organization, the BioItzá, is continuing these efforts to revitalize Itzá Maya medicinal plant traditions. In addition, the Ministry of Health invited ProPetén to help sensitize their staff to the roles of traditional healers.[14]
- Launched the first organic agriculture and domestic-animal breeding programs in Petén in five keystone communities inside the Maya Biosphere Reserve, in response to the alarming data on pesticide use discovered by the Petén DHS. Since 2000, ProPetén has been working with Heifer International to systematize and scale up this prizewinning program. ProPetén also trained more than 80 agricultural extensionists, using a curriculum—planned in conjunction with Guatemala's national university—that ranges from family planning to organic mulches.[15]
- Worked with the Ministry of Health to train 220 public health workers, stock 60 health centers with educational materials on the national Information, Education, and Communication (IEC) strategy, and equip 30 government clinics to improve reproductive healthcare, such as IUD insertions and cervical cancer screening.[16]

ProPetén's Remedios Program: Phase Two

Now that strong family planning services have been established in Petén, the Remedios program is turning its attention to educating the public, with support from USAID/Washington (2004-5).[17]

DHS data revealed that the indigenous groups in Petén, mainly Q'eqchi' Maya, suffered from lower levels of knowledge and access to good reproductive healthcare (see Table 1).

The Remedios program is addressing these inequities with two bilingual projects:[18]

- Like an old-time medicine show, the traveling "Mobile Biosphere" brings integrated agriculture, health, and family planning education to communities in and around the Maya Biosphere Reserve.[19]
- Launched in August 2005, the year-long radio soap opera "Entre Dos Caminos," broadcast in both Q'eqchi' and Spanish, integrates family planning, agrarian issues, conservation themes, and women's issues. While the program is extremely popular, its immediate future is endangered by recent USAID budget cuts.

Also on the horizon may be a new education program for men (e.g., soldiers, transportation workers, evangelical preachers, park guards, and forest workers) based on in-depth ethnographic research that identifies the best way to reach them. If it proceeds, ProPetén would begin with a small but strategic pilot project directed at evangelical preachers, who can block or facilitate other people's interest in family planning.

The Power of Interdisciplinary Research

While there are many reasons for interdisciplinary research, the few listed below demonstrate its power to challenge received wisdom and broaden the population and reproductive health fields, in addition to providing important information for developing programs.

The specter of Chayanov: People—donors, NGO staff, interested observers, journalists—tend to

assume that farmers want large families for additional labor, as Aleksandr Chayanov (1986) brilliantly showed in 1920s Russia. Yet, Guatemala's rural labor situation today is quite different. Severely inequitable land distribution and few off-farm employment opportunities may lead Guatemala's rural people to want fewer children, not more. Indeed, the Petén DHS reported that desired fertility was 4.0 children per woman, significantly less than the actual fertility of 6.8. Farmers had no greater preference for male children than urban families. Contrary to the idea that frontier settlers have large families to claim more land, the Petén DHS showed that women in families with secure land tenure were happier about the possibility of another pregnancy than women in families without land. Without integrated background research, service providers may mistakenly assume that rural areas are less fertile grounds for family planning services.

Cairo linkages: Integrated research reminds us of the importance of improving reproductive health by enhancing women's education and economic empowerment, as widely discussed at the 1994 UN Conference on Population and Development in Cairo. Indeed, the integrated Petén DHS showed many linkages between women's status and fertility preferences (see Grandia et al., 2001, chap. 7).

Knowledge/Attitudes/Practice (KAP): The assumption that more and better information will change attitudes and behavior underlies much of the methodology in the reproductive health field. The KAP hypothesis does not seem to fit as well in the environmental field, where poor people degrade resources out of need, rather than greed, regardless of their environmental knowledge. Nonetheless, environmental education also has an impact on behavior. Cross-fertilization with the compelling debates in the environmental field could perhaps help facilitate positive reproductive health change as well.

Qualitative research: Integrated research often calls for qualitative data and analysis, which can help move reproductive health programs beyond the limitations of "objective metric measures." As Schwartz (2004) has argued, some projects may have failed quantitatively but succeeded in other ways, by building community capacity, for example. Likewise, other projects might achieve short-term numerical goals, but fall into oblivion once the organizing institution moves on.

School children flock to the Mobile Biosphere when it arrives in their village in northern Petén (Photo: Ericka Moerkerken)

"Studying up": Integrated research may also challenge project managers and policymakers to broaden the focus beyond project subjects (e.g., family planning users and subsistence farmers) to consider the power of outside forces—such as corporations and the government—that influence subjects' behavior. Researchers can no longer assume that communities are isolated from the world, as Nader (1972) argued in her prescient call for "studying up." Today, a vibrant anthropology looks at the dynamic relationships between the poor and the powerful. In the family planning field a similar shift has occurred, from a primary focus on user behavior to a broader concern about quality of services and products.

Policy: If for no other reason, integrated DHS research can be powerful because the DHS is a known and proven research mechanism and policymakers pay attention to DHS findings. Even small interventions with policymakers, like a demographic training held in conjunction with the Futures Group for representatives of government ministries in Petén, have had rippling impacts. The national park service was so impressed by the software that they

launched their own two-year demographic research project, which provides detailed population projections and their relationship to natural resource use.

Conclusion

This morning, thousands of poor settlers got up in the dark, with only the light of a homemade kerosene candle, to prepare for a long walk to their farms. Their wives rose even earlier to light the hearth and pat out corn tortillas, which were probably eaten with salt and chili because they had no other food for breakfast.

Perhaps a man just spent the last of his money on bus fare to the hospital to find out that his wife has cancer, possibly caused by a dangerous pesticide exported to Guatemala by a U.S.-based corporation (see Grandia, 2001). A mother watches over a child sick with malaria from mosquitoes bred by increased deforestation and settlement. A girl stays home from school because she has no shoes; her family's corn crop failed in last year's drought, which many believe was due to the massive deforestation of Petén.

A thousand interrelated tragedies occur every day in the lives of Petén's rural setters. Yet, in some corners of Petén, life may be getting a little easier. Couples can now decide the number and spacing of their children. Or a village might get a new school, because the education department has used demographic data to build schools where the population is growing fastest. A traditional healer hangs a diploma on her wall, with renewed faith in her work because she has met other people like her and no longer feels ostracized as a "witch." A farmer treats his tomato crop with an organic pesticide made of chili peppers, garlic, and certain forest leaves, and he thinks about how to spend the $30 he saved from spending on a store-bought chemical. His wife and their breastfeeding baby are healthier, too, because she no longer has to wash pesticide-laden clothes.

Having witnessed scenes like these, I know that DHS reports and projects matter, often in ways that can never be fully evaluated by metrics. Rather than reducing the many facets of human behavior into limited sectors, we can improve our understanding of the complexities of people's problems through integrated research. We can move beyond bandages to develop better, more holistic projects that not only seek to ameliorate poverty but also work for justice and demonstrate respect for the dignity of people's lives. •

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Notes

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2. After 10 years as Conservation International's Guatemalan branch, ProPetén separated from its parent organization and became an independent NGO in June 2002. For more information about ProPetén's work, please see http://www.propeten.org.

3. Managers who understood the importance of integrated population-environment projects were critical to both the success of the DHS survey and the programs based on it. In particular, I acknowledge the support and influence of Carlos Soza, ProPetén's late executive director; Jim Nations, then Conservation International's vice president for Mesoamerica; and Norman Schwartz, ProPetén's advisor.

4. DHS Surveys provide large sample data for a wide range of monitoring and impact evaluation indicators in the areas of population, health, and nutrition. DHS is now part of a broader USAID program called MEASURE. Since its inception, the DHS program has been managed by Macro International, Inc., a for-profit USAID contractor located in Calverton, Maryland. For more information, see http://www.measuredhs.com/

5. This included presentations before Petén's governor's council (composed of municipal mayors, regional ministry representatives, and NGO delegates) in July 1997 and March 1998, which resulted in an official resolution calling for the survey. For a detailed account of the survey development process, see Schwartz and Grandia (2000).

6. In recognition of our voluntary work on the module's conceptual design and efforts to generate political and financial support for the project, Macro International, Inc., hired Norman Schwartz and me to design the questionnaire and analyze the survey results.

7. See http://www.measuredhs.com for the survey results.

8. See, for example, two reports by Population Action International, "Plan and Conserve" and "Planting Seeds, Meeting Needs"(available at http://www.populationaction.org/issues/environment/index.htm).

9. The integrated DHS can also provide a means to collect integrated data for planning. Recognizing its comprehensiveness, the Petén governor's regional planning council passed a resolution in 2002 recommending that all the mayors and government representatives use the integrated DHS as a basis for municipal project and development planning.

10. Thanks to Vinod Mishra for this suggestion at a meeting following my presentation at the Woodrow Wilson Center on October 12, 2004.

11. See http://www.aprofam.org.gt/ for more information.

12. See http://www.tanuxil.org/ for more information.

13. Supported by the Summit Foundation (see http://www.summitfdn.org/foundation/index.html).

14. Supported by International Development Research Centre, Cabot Foundation, and a medium-sized grant from the Global Environment Facility.

15. Supported by Heifer International and the Toyota Foundation.

16. Supported by the Compton Foundation (see http://www.comptonfoundation.org/).

17. The second phase of the Remedios program is being led by University of Michigan Population-Environment Fellow Ericka Moerkerken; ProPetén's executive director, Rosa María Chan; and their multiethnic staff.

18. See http://www.propeten.org/projects.htm#remedios for more information on these projects.

19. This project seeks to build a "critical mass" of family planning users. A 2000 baseline study of contraceptive prevalence rates (before the mini-pharmacies were established) showed that average contraceptive use rates belie wide variations in rural areas. Some villages have high rates of contraceptive use, while others have virtually no knowledge that methods even exist. Moreover, in rural areas where secrets are hard to keep, building a "critical mass" of family planners can encourage hesitant couples to try a contraceptive method. When a couple hears that their cousin, or their cousin's cousin, has tried a method without any complications, they are more likely to try it themselves. The key to building critical mass is a successful multiplier. For example, a village called El Cruce a Dos Aguadas, the largest community in the Multiple Use Zone of the Maya Biosphere Reserve, had an estimated contraceptive prevalence rate of less than 5 percent (close to zero among Q'eqchi' families). The training of bilingual multipliers in that village dramatically increased use of contraception: use of temporary methods is now estimated at 40 to 50 percent.

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