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# Technological (Mis)conceptions: Examining birth control as conservation in coastal Madagascar

Merrill Baker-Médard[a,*], Jade Sasser[b]

[a] Environmental Studies Program, Middlebury College, Franklin Environmental Center at Hillcrest, 531 College Street, Middlebury, VT 05753, United States
[b] Department of Gender and Sexuality Studies, University of California, Riverside, 2033 CHASS Interdisciplinary Building, Riverside, CA 92521, United States

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ABSTRACT

Population-health-environment (PHE) initiatives theoretically serve as a holistic and integrative solution to health problems, biodiversity degradation, and resource scarcity. In the past few decades increasing amounts of official development assistance and private funding have been funneled towards PHE initiatives in biodiverse developing countries. Here we draw on fieldwork in Madagascar to show how PHE initiatives reinforce a problematic politics of scale, framing environmental degradation as a local environmental problem amenable to global population solutions, while inadequate attention is given to non "local" drivers of natural resource change such as the structure and orientation of the country's political economy, the broader socio-cultural context and resource tenure constraints, the influence of colonial policies and economic reorganization, and current natural resource management strategies. We argue, that while local population growth is not absent from the complex dynamics influencing environmental changes in these biodiverse regions, situating resource use practices in relation to policies and practices at multiple scales not only more accurately addresses drivers of resource scarcity, but also pushes against abstracting relations between population and natural resources from their specific context in ways that insert global discourses and interventions into local contexts and communities. Additionally, we argue that while the language of "gender equality" and "women's empowerment" has been taken up by conservation organizations advancing PHE programs in Madagascar, these terms have been hollowed of their intellectual and political weight, reinforcing rather than challenging gendered inequality.

"*Overpopulation here is the primary threat to successful marine conservation*"

– British conservation NGO worker, male, southwestern Madagascar March 31, 2011.

"*Yes, the [mobile family planning] clinic is a nice thing, but they won't heal my baby daughter*[1]"

– Malagasy fisher, female southwestern Madagascar June 12, 2011.

## 1. Introduction

In a small village in southwestern Madagascar, it is opening day of a temporary and rotational octopus reserve. Dozens of boats, full of fishers of all ages, head out to the reef to catch their share of octopus, sea cucumbers, and fish. Standing on the beach with binoculars is a field agent from a U.S. conservation non-governmental organization (NGO) that has been working for the past four years to establish the temporary reserve, as well as a permanent marine reserve just beyond the reef crest. The field agent, peering through his binoculars, marvels at the sight: "Lots of people out there. Imagine in ten years it might be triple the number. They will destroy everything."[2] (pers. comm. September 1, 2011). Earlier that week, the same agent shared that they were partnering with Blue Ventures, a UK-based marine conservation organization working in the region to bring family planning services to the village. When asked to confirm that he did not mean a health organization, he laughed and said that he was excited about conservation organizations leading family planning efforts, asserting that "the people here need it, and we, the [conservation] NGOs need it for our work."[3] This win-win framing lies at the heart of integrated population-health-environment (PHE) initiatives that have rapidly expanded in the past

* Corresponding author.
*E-mail addresses:* mbakermedard@middlebury.edu (M. Baker-Médard), jades@ucr.edu (J. Sasser).

[1] *"Eka soa le klinika, fa tsy mitsabo anak'ampelako rozy"*
[2] *Il y a beaucoup de gens là-bas, imaginez que dans 10 ans, le nombre peut tripler. Ils vont tout détruire.*
[3] *Les gens ici en ont besoin, et nous, les ONGs, en avons besoin pour notre travail.*

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decade across the island.

Blue Ventures is a leading actor in PHE work in Madagascar[4], and is well integrated within international population and family planning networks. In program documents and presentations, Blue Ventures outlines PHE as "a holistic response to the interconnected challenges of poor health, unmet family planning needs, environmental degradation, food insecurity, gender inequality and vulnerability to climate change in southwest Madagascar" (Robson 2014), situating the approach as a panacea for many of the problems facing rural coastal communities in the country. Program documents identify these problems as stemming largely from unrestrained population growth, high fertility rates among local women, and unsustainable resource use. Further, these reports present women's issues, specifically women's fertility and reproduction, as both a threat and an opportunity to save vulnerable ecosystems and people.

For example, in one presentation, a staff member framed the relationship between gender, fertility, and resource conservation through a population pressure approach:

> "*Rapid population growth is creating an unsustainable strain on natural resources. The average total fertility rate in [our conservation site] is 6.7 children per woman, according to our data. On average women are only 15 years old when they first conceive…Without enabling these coastal communities to stabilize their population growth, efforts to improve the state of marine resources and the community's food security are considerably hindered (*Erdman, 2010*).*

In another program publication, a section titled "Women's Empowerment" frames women as central to the PHE framework: "As women gain access to family planning services, they report acquiring a greater sense of self-efficacy, and being able to spend more time engaging in income-generating and marine resource management activities" (Robson and Rakotozafy, 2015). PHE programs target communities living adjacent to areas of "high conservation interest" (e.g. protected areas) based on the premise that stemming local population growth through the distribution of condoms and other forms of contraception will help protect a fragile and deteriorating ecosystem such as the coral reef fringing parts of Madagascar, even when in certain coastal villages over half of the marine products harvested are internationally exported (Baker-Médard, 2017).

At the same time, Blue Ventures frames their PHE interventions as providing families with reproductive choices (the program is called *Safidy*, which translates to "choice"). While all informants interviewed were indeed happy to have access to different forms of birth control, the tensions inherent in the connection between family planning and natural resource management were not lost on fishers in the coastal regions where PHE programs exist. For example, responding to a question about condoms, one young male fisher observed, "Why do they [the conservation organization] distribute condoms here? If people use condoms, then they won't have children, then they won't ruin things in the ocean. What do they [the conservation organizations] call it… …sustainable management"[5] (pers. comm. June 6, 2011).

In this article, we explore PHE strategies advanced by conservation organizations to understand how neo-Malthusian[6] logics shape both conservation practice and reproductive health service delivery in Madagascar. We argue that, while local population growth is not absent from the complex dynamics influencing changes in Madagascar's environment, its ideological and material prominence in approaches to conservation prevents a more systematic engagement with broader drivers of natural resource change, including the political economy, socio-cultural context, resource tenure constraints, and current natural resource management strategies. Further, we argue that as the language of gender equality and women's empowerment have been taken up by conservation organizations in Madagascar, their narrow focus on contraceptive access serves to reinforce, rather than challenge, entrenched gendered inequalities.

We assert that these dynamics reflect a problematic politics of gender and scale. Our analysis of the dynamics of PHE programs in Madagascar illustrates a broader set of concerns in which neo-Malthusianism operates as a global development narrative that shapes and is shaped by local conditions on the ground. It operates globally in that neo-Malthusian approaches to population have long organized forms of knowledge production, policymaking, and program intervention in development across the global South (Connelly 2008). However, the global and local do not interact in a unidirectional way. Local conservation politics, population dynamics, and gendered social relations, long refracted through the lens of neo-Malthusianism, also shape how Madagascar is positioned within global conservation and family planning population networks. In other words, our study of this multidirectional interaction of the global and local, or, to borrow a phrase from Swyngedouw (2004), the "glocal", sheds light on how hyper-localized conditions shape the organization and application of global development interventions.

First, we situate our analysis in the broader literatures linking gender with critical approaches to population, environment, and development. We then examine the historical context of population and natural resource management at a global scale (from pro-natalism to birth control), followed by an outline of the socio-political and environmental contexts giving rise to the current emphasis on population and environment in Madagascar. We return to an exploration of the contemporary framings of population and resource scarcity as a problem endemic to primarily poor Malagasy women by PHE programs in southwestern Madagascar, highlighting the tensions between local PHE efforts, global development narratives, and drivers of environmental change in southwestern Madagascar. Lastly, we demonstrate how community members strategically re-purpose contraceptive technologies in ways that reveal the disjunctures between PHE program interventions and the realities of everyday life for local Malagasy people.

## 2. Methods and regional context

This work draws on over 13 months of participant observation conducted in two rural villages in southwestern Madagascar from 2010 to 2015. It also draws on interviews with governmental and non-governmental workers in Toliara and Antananarivo. It is based on data from 14 oral histories, and 22 semi-structured interviews conducted in Malagasy by Baker-Médard with male and female villagers, marine product collectors, and conservation and development organization personnel. Years of rapport and trust built with the communities observed and interviewed enabled interviews to be conducted in dialect with sensitivity to cultural norms, and the ability to navigate known family tensions and the desire for secrecy around the research topic. We also draw on catch data from two coastal villages gathered in collaboration with local marine product collectors from 2011 to 2015.

Baker-Médard has long term ethnographic and other research engagements spanning eight years in the two selected sites, and since 2002 in other areas of Madagascar. Sasser also has significant ethnographic research experience focused on population and reproductive politics in Madagascar from 2000 through today. We selected our sites in southwestern Madagascar based on our previous relationships with people in these sites, and because the region is the first in Madagascar to have a marine conservation-focused PHE program.

Southwestern Madagascar harbors an expansive network of coral

[4] Other than family planning, Blue Ventures has a vast portfolio of activities including aquaculture, protected area management, environmental education, blue carbon certification programming, and the distribution of goods such as mosquito nets and water-purifying equipment. See blueventures.org.

[5] *"Ino ty antony mizara kapoty rozy? Laha mampiasa kapoty ty olo, de tsy miteraka, de tsy maniba raha andriake. Ino ty anarany, le anarany volan'-drozy….fitantanana maharitra, gestion durable."*

[6] Here, Neo-Malthusianism refers to the idea that population growth is a direct, linear driver of resource shortage and environmental degradation.

reefs, shoals, and islands, with an immense diversity of marine life (Allnutt et al., 2012). The coastal areas of this region are home to the Vezo, united by a way of life more than a singular shared ethnic history (Astuti, 1995), and rely almost exclusively on the sea for their livelihood and income. Periodic food shortages among the Vezo occur primarily due to weather, which prevents them from fishing and thus the ability to sell or trade fish for staple items such as rice, corn, bean and tubers (Tucker et al., 2010). Although marine products such as sea cucumber, shark fin, dried fish, pearls, and sea turtle shells were regularly exported in the 19th Century (Baker-Médard, 2019), the 1990s marked a shift from primarily subsistence and regional trade of marine products, to an emphasis on exports (Le Manach et al., 2011; Cripps and Gardner, 2016). Commercial extraction of marine products now defines the region's political economy (Cripps and Gardner, 2016; Grenier, 2013). Given fishers' increasing reliance on income derived from exported marine products, fluctuations in the price of commodities such as sea cucumber, shark fin, octopus and fin fish, can negatively impact the ability for fishers to meet their basic needs (food, clothing, house repairs, etc.) (pers. comm. fisher focus group March 22, 2015).

## 3. The gender-environment-population nexus

Development narratives and interventions that reduce "gender" to "women" tend to exclude analyses of uneven power relations among and between genders; as a result they often fix women in static, ahistorical relationship to the environment (Leach, 2007); represent women alternately as victims or potential saviors of the planet, their families, and communities (Arora-Jonsson, 2011); and reproduce essentialist discourses ascribing women's identities and environmental experiences to fixed, uniform traits (Resurrección, 2013). This has, in part, been strategic: the simplification of more complex ideas and realities has historically been necessary to place gender issues on the development agenda. However, such narrow framings of women and environment reduce women's roles to that of development target groups or recipients of interventions, rather than as agents in environmental management and resource conservation. Other discourses reduce women's agency through promoting intensification of gendered labor in the household, characterizing women as more efficient, harder workers who conserve more resources, and whose income has a greater impact on children's well-being. Such framings, particularly those focused on ideas about good motherhood/womanhood, obscure the role of patriarchal inequality in producing gender inequality (Wilson, 2011).

Population is central to these concerns. While capitalism operates as a key driver of global crisis based on economic instability, worsening poverty, violence, insecurity, and environmental destruction, these problems are usually attributed to population growth among the poor (Bandarage, 1997). Further, population itself was an early entry point for attention to women's issues in development. Following the 1950s and 1960s focus on economic growth and modernization, population growth was commonly believed to inhibit economic growth and drain state resources through welfare and social services. As research agendas in the following decades turned increasingly toward women's status in the context of high fertility, scholarship on food, population, and economic issues facilitated women's incorporation into development projects (Kabeer, 1994). However, as Bashford (2014) argues, problematizing population this way is incomplete; the global history of population in the 20th century has not been solely or primarily about reproduction or reproductive health, but rather about three variables: birth, death, and space. Population concerns initially arose as geopolitical questions about sovereignty over land, which over time were transformed into biopolitical solutions entailing sovereignty over bodies—specifically, women's bodies. Both these biopolitical solutions, the systems of power-knowledge they represent; cf (Foucault, 1978), and the geopolitical contestations from which they arise, are embedded in contemporary logics and projects designed to manage bodies and fertilities in space (Ojeda et al., 2019).

Following decades of development interventions focused on demographic strategies designed to manage, manipulate, and control the size and movement of populations through space and time (Connelly, 2008), women's reproductive rights activists were successful in effecting a shift in the focus of international family planning efforts toward women's empowerment, as defined by development institutions for the purpose of achieving strategic institutional objectives (Halfon, 2007). However, this approach is not without its challenges. Focusing on women's empowerment via family planning and contraceptives reduces complex socio-cultural, political-economic, and bodily processes to technological solutions (Sasser, 2014). It also facilitates the expansion of narratives that position women as responsible for managing complex ecological crises through regulating their fertility (Sasser, 2018).

Development encounters also operate as sites through which difference and identity come to matter, particularly in encounters of struggle and negotiation over resource conservation. Sundberg (2004) identifies how everyday, contingent practices and encounters at conservation sites that produce "conservation-in-the-making" are also productive of "identities-in-the-making." What kinds of identities are produced at the nexus of conservation and family planning in Madagascar? What happens in the moments of encounter between conservation and development interventions and longstanding social and cultural practices in Madagascar?

As anthropologist Eva Keller's work (Keller, 2008; Keller, 2015) demonstrates, the attitudes toward fertility and population growth embedded in international conservation projects often come into direct conflict with Malagasy values. Keller identifies a widespread Malagasy ethos of life based on continuation and growth of family and kin networks through both the production of living descendants and the expansion into new lands that can later be established and maintained as ancestral lands. Producing descendants and expansion of access to land are central to this ethos, and are crucial to a sense of purpose in life for Malagasy people. On the other hand, the significantly more powerful "canonical conservationist ethos" (2008, p. 651) is based on the idea of a static equilibrium between species that positions human population growth as a threat. Restricting human mobility, surveilling local populations' behavior, and intervening to slow population growth are central to this conservation ethos. Keller's analyses reveal the opposition between these approaches, and the operation of power among international conservation project authorities, which produces a sense of defeat among Malagasy people who face restricted access to areas enclosed by conservation projects. This opposition is a key component in the successes and failures of local conservation, and particularly family planning, projects.

The dynamics Keller analyzes point to a larger set of debates with which we engage. We are concerned with how the population-environment-development nexus in Madagascar is shaped by questions of scale, whereby hyper-local drivers of environmental change are framed as problems to be solved by global capital and expertise. Political-economic restructuring and rescaling of authority under neoliberal capitalism, or 'glocalization' (Swyngedouw, 2004), enables transnational resource managers (e.g. international conservation and development organizations) to define local ecological crises in ways that legitimize population interventions developed in global context. We will return to these questions of scale later in the paper, but first, we turn to the historical trajectory of population debates in Madagascar.

## 4. Historicizing the population-resource scarcity debate in Madagascar

In Madagascar, connections between population, nature and development emerged during the colonial period, when growing populations were seen as the avenue by which nation building could occur. Pronatalism, an approach encompassing attitudes and policies that encourage reproduction, was a popular component of colonial policy

during the late 1800s. One of the first and most consistent policies of French officials, after the conquest of Madagascar in 1895, was to promote population growth to solve their pressing need for workers (Andersen, 2010). The French colonial administration used medical, political and fiscal measures to promote population growth, yet paradoxically population rates declined during colonization, and Madagascar was seen as a "civilization of death" (Feeley-Harnick 1995, p. 47). Similarly, in the post-independence 1960s, the new Malagasy government pursued pronatalist policies in order to modernize and develop the country (Feeley-Harnik, 1995).

In the late 1960s, however, a powerful movement for population control began to gain traction in American academia and international development. The discourse shifted rapidly from population growth as a positive economic engine, to a Malthusian concept of population growth as a threat to scarce and dwindling natural resources. For example, in 1959, President Eisenhower stated that "The Government has no… positive political doctrine in its program that has to do with this problem of birth control. That's not our business" (Dwight D. Eisenhower, December 1959, The President's News Conference); however, just six years later, President Johnson made the opposite statement, declaring that he would "seek new ways to use our knowledge to help deal with the explosion in world population and the growing scarcity in world resources" (Lyndon B. Johnson, January 1965, 2nd State of the Union).

Johnson was likely influenced by a network of private donors and scholars that worked to institutionalize and legitimize demographic science as an academic discipline in the 1950s (Connelly, 2008). With funding from the Ford and Rockefeller Foundations, a number of American universities created demographic centers to train scholars from around the world, and the number of global and regional studies of demographic trends proliferated. However, these studies were presented in a more dramatic—and frightening—light when they were taken up and popularized alongside concerns about threats to national geopolitical security, food, and other natural resources. This approach was epitomized by Paul Ehrlich[7]'s 1968 *Population Bomb* book, which sold over two million copies in the first two years it was published (Ehrlich and Ehrlich, 2009), and was heavily influenced by the work of conservationists such as Fairfield Osborn,[8] and William Vogt.[9] In 2009, approximately 40 years after the publication of Ehrlich's Population Bomb, the Journal of Sustainable Development published a piece by Paul and Anne Ehrlich called "The Population Bomb Revisited," in which they reaffirmed conclusions made in the original Population Bomb:

> "*The essential point made about population growth is as valid today as it was in 1968: [quoting their 1968 work] 'Basically, there are only two kinds of solutions to the population problem. One is a 'birthrate solution,' in which we find ways to lower the birthrate. The other is a 'death rate solution,' in which ways to raise the death rate – war, famine, pestilence-find us" (p 10)*

The Johnson presidency marked the launch of a complicated and fraught era of the U.S. Government grappling with its role in birth control and reproductive service delivery at home and abroad. With the Johnson administration's support, Congress passed the Foreign Assistance Act in 1966, including a provision earmarking funds for the U.S. Agency for International Development (USAID) to implement population control abroad under their newly formed Population Program (Sharpless, 1995). Development aid to some foreign nations in these early years was made contingent on their governments' willingness to implement population control measures, despite the fact that the U.S. did not have national population-reduction targets (Hartmann, 1995; Sharpless, 1995).

The U.S. began sending population program assistance to Madagascar after the Malagasy Government reversed their pronatalist stance on population growth in the late 1980s (Shyner, 1999). USAID, the United Nations Population Fund, and the German Corporation for International Cooperation were key architects of Madagascar's National Population Policy, the first policy to limit the country's population, which went into effect in 1991 (Shyner, 1999; Feeley-Harnik, 1995). Intervention mandates laid out in this policy specifically targeted populations within the buffer zones of protected areas, drawing a distinct connection between international funding for population control and interest in environmental preservation.

Biodiversity conservation scholars were instrumental in propelling birth control funding and programming in Madagascar to the next level in the early 2000s. Shortly after the journal *Nature* published "Global Biodiversity Hotspots for Conservation Priorities" (Myers et al., 2000) and "Human Population in the Biodiversity Hotspots" (Cincotta et al., 2000), funding for family planning in Madagascar spiked. Madagascar was labeled one of the top three "hotspots facing elevated risks on the basis of rapid population growth alone" (Cincotta et al. 2000, p. 991). In 2001 the U.S. Congress passed the Foreign Operations Bill, which mandated that 368.5 million USD be allocated to "family planning, including in areas where population growth threatens biodiversity or endangered species" given that "managers are concerned about logging, poaching, and other development harmful to the environment in regions where population pressures threaten biodiversity and endangered species" (H.R., 2001: 4).

Funding for conservation via population control found a receptive audience with the new Malagasy President, Marc Ravalomanana, in 2002. Several PHE projects were launched shortly after Ravalomanana took office, with USAID as a key backer. One such project, the Madagascar Green and Healthy Communities Project, served 88,000 people across 33 communes (Robson, 2014). Although outcomes from the PHE projects were somewhat mixed, there were deemed positive enough to launch a larger initiative that extended beyond USAID, UNFPA and GTZ to include key international environmental organizations such as the World Wildlife Fund for Nature Conservation, Conservation International, and the Wildlife Conservation Society (Pielemeier et al., 2007).

In 2006, Ravalomanana launched a new campaign to drum up support for international development funding in the arenas of environmental conservation and public health. In a speech titled "Madagascar Naturellement: Birth Control Is My Environmental Priority" Ravalomanana outlines his logic:

> *I have developed a far-reaching plan to free Madagascar from a cycle of poverty that harms the people and destroys the island's rich biodiversity. My dream, which I call "Madagascar Naturellement," is that we can build a strong economy, invest in our people, and maintain the nation's precious natural treasures. Family planning lies at the heart of all of these efforts.*

Ravalomanana's "Madagascar Naturellement" framework emphasized the connection between family planning, health projects and infrastructure, and environmental protection. This large-scale initiative was strategically positioned to appeal to a wide number of programmatic mandates and thus garnered widespread support from economically and politically powerful national and international actors (Corson, 2016). As a result, funding for population interventions in Madagascar steadily increased in the intervening years (Fig. 1), with a significant and increasing proportion coming from the United States. For fiscal year 2018, the U.S. Congress allocated $14 million in family planning and reproductive health assistance for Madagascar (ForeignAssistance.gov).

[7] Also, written by Anne Ehrlich but credited solely to Paul Ehrlich.

[8] Biologist and the President of the NY Zoological Society who wrote *Our Plundered Planet* in 1948.

[9] Ecologist and U.S. representative to the International Union for the Conservation of Nature, who wrote *Road to Survival* in 1948.

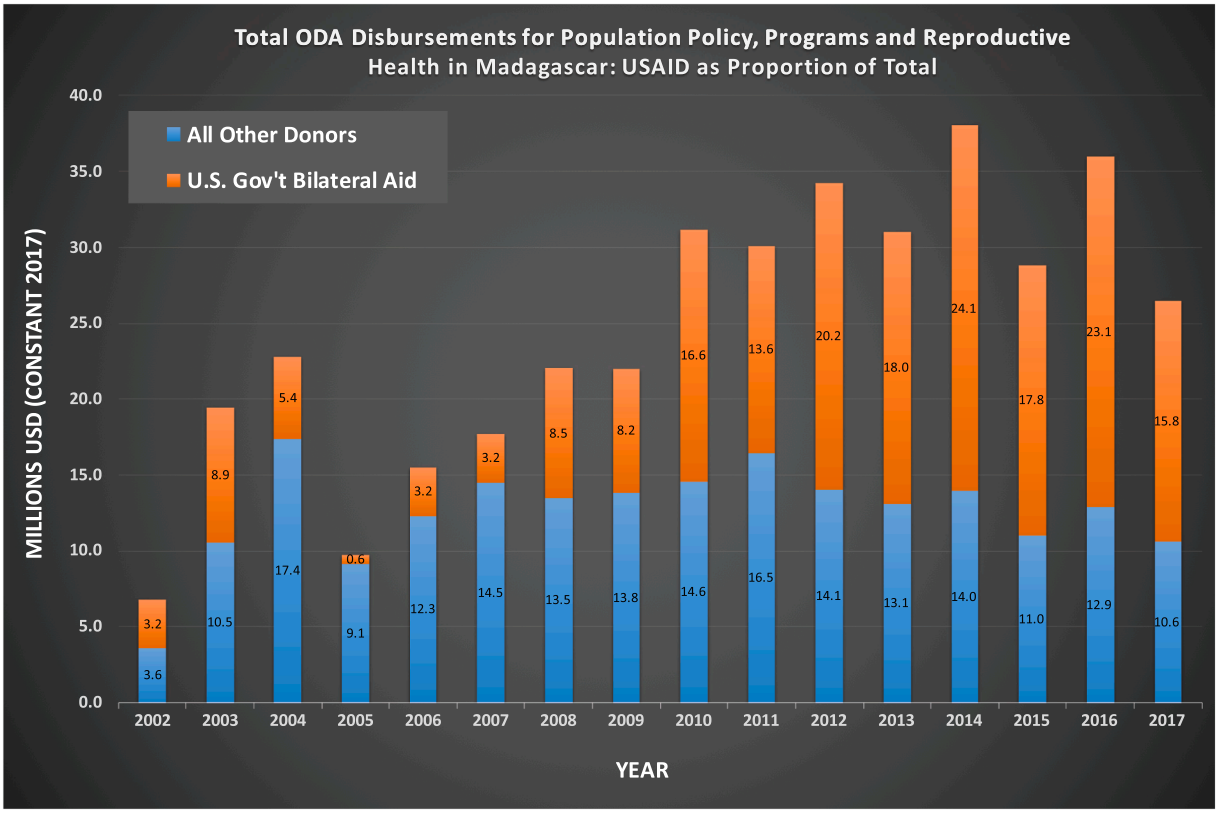


**Fig. 1.** Total Official Development Assistance Disbursement (in millions of USD) for Population Policy, Programs and Reproductive Health in Madagascar. USAID as proportion of total aid (sourced from stats.OECD.org).

## 5. PHE and the politics of the "Local"

While the link between population growth and environmental degradation is advanced by networks of powerful conservation organizations and foundations in North America and Europe (Sasser, 2018), the targets of PHE programs are primarily poor women in the global South (USAID, 2019). In the past two decades, dozens of PHE programs have been established in Latin America, Africa, and Asia; the vast majority are in East and Southern Africa (Population Reference Bureau, 2017).[10] We argue that the current implementation of PHE illustrates a problematic politics of scale, framing environmental degradation as a local environmental problem caused primarily by individuals in the global South amenable to global population solutions.

PHE programs are rapidly expanding in Madagascar. As of 2014, seven such projects were active, and were operated by conservation organizations such as the World Wide Fund for Nature, Conservation International, the Wildlife Conservation Society, Blue Ventures, and the Duke Lemur Center (Robson, 2014). These projects align with broader global efforts to slow population growth, particularly in the poorest and least developed regions of the world, in the name of climate change mitigation, resource restoration and sustainable development (Sasser, 2017; Hartmann, 2014; Foster, 2014). The expansion of PHE into Madagascar also reflects a broader international development strategy led primarily by U.S. development institutions. The first PHE program was developed in the 1950s when the NGO World Neighbors, at the request of local community members, began to integrate reproductive health interventions into a food and agriculture program in Nepal (USAID EH Project, n.d.). The PHE model began to expand into an integrated service delivery approach in the 1990s, incorporating participation from international development NGOs working in the areas of environmental conservation, public health, and population. These multi-sector partnerships are designed to integrate public health and family planning interventions with those focused on resource management and conservation, in part to ensure women's participation in conservation as well as to meet the broader health needs of local communities. The early 1990s also marked the rise of a decentralized approach to conservation across many countries in the global South (Brosius et al., 2005). Ideologically breaking from top-down (e.g. state-led) models of resource management, community-based conservation was premised on the idea that populations living adjacent to highly biodiverse areas are more knowledgeable about and motivated to protect the natural resources they rely on every day (Brosius et al., 2005).

While early PHE projects focused on meeting community-driven demands for contraceptives and other health services, over the years project successes and failures have been translated through the narrowed lenses of contraceptive acceptance rates (Oldham, 2006). Further, as Sasser (2017, 2018) argues, PHE programs are predicated on conceptions of women as sexual stewards: good population-environment-development subjects whose use of contraceptives is symbolic of a form of embodied environmental responsibility.

Excitement for the expansion of the PHE model in Madagascar led to the creation of the Madagascar Population-Health-Environment Network in 2015. Comprised of over 35 international and national conservation, development, and donor organizations, the network is committed to a "multifaceted approach to sustainable development, combining health education and services with natural resource management and biodiversity conservation" (Robson, 2014, p. 4). This network frames the PHE nexus as a holistic and efficient solution to health problems, biodiversity degradation, resource scarcity, and gender equality. The approach is deemed both efficient in terms of

[10] Current projects are focused in Kenya, Democratic Republic of Congo, Madagascar, Tanzania, Uganda, Cambodia, Nepal, and the Philippines. Past PHE projects include 10 countries in Africa, 14 in Asia, 8 in Latin America, and 1 in Oceana. See http://ehproject.org/phe/phe_projects.html for more detail.

institutional resources, and an "easily replicable model" given that conservation organizations, already working with communities in highly biodiverse and ecologically threatened region, are strategically positioned to deliver family planning materials and services to these communities (Pielemeier et al., 2007; Robson and Rakotozafy, 2015; Mohan et al., 2013b, 2013a). Most PHE programs are funded by the U.S. Agency for International Development (USAID) and their aim is to be "cost efficient, generate added value and…create synergies not found in vertical programs and projects" (D'Agnes and Margoluis, 2007).

PHE programs have undoubtedly increased access to birth control in numerous regions of Madagascar. In the early 2000s the contraception prevalence rate in Madagascar was less than 10%, but now is closer to 30% (Ramahavory, 2015). In one region of southern Madagascar serviced by Blue Ventures, the proportion of women using contraception increased from approximately 25% in 2009 to 59% in 2013 (Robson et al., 2017b). While we want to emphasize the importance of establishing and maintaining voluntary access to comprehensive family planning options (Beaubien, 2017),[11] we are concerned about the broader frameworks used to justify efforts to increase access to birth control in Madagascar. In the case of PHE initiatives, a central goal of increasing access to birth control is to protect the environment (Pielemeier et al., 2007), thus there is a clear and direct relationship between population reduction goals and biodiversity conservation. For example, a report written by the Safidy Community Health Programme, a Blue Ventures PHE program in Madagascar, includes a table equating "live births averted" and "unintended pregnancies averted" to "ecological footprint prevented." The table concludes that 556 live births equals 1045 global hectares saved (Mohan et al., 2013b).

Two other field-based agents working for World Wildlife Fund and Wildlife Conservation Society echoed similar arguments, stating that "if there are too many people living in the area, it will deteriorate our conservation projects," and adding that overpopulation is of the more "fundamental problems Madagascar faces," (pers. comm., April 8, 2011). A prominent conservation biologist working in Madagascar expressed similar views in an interview published online by Mongabay. When answering the question, "How would you recommend tackling poverty in Madagascar, while at the same time safeguarding its ecological treasures?" he answered, "Increased village level efforts to assist in family planning, such as birth control, are needed in the…region which has one of the highest population densities in Madagascar" (Hance, 2009, p. 3).

These framings are based on a narrative asserting that environmental degradation is primarily a local issue amenable to local solutions, which shifts attention away from the broader (non-local) political-economic drivers of poverty and environmental change. In addition, they play on gendered and racialized global discourses wherein population growth among black and brown people of the global South is blamed for resource depletion (Peluso and Watts, 2001; Hartmann, 2014), a corollary framework that works to hyper-localize the drivers of resource degradation. These framings demonstrate a "hegemonic production and representation of 'the local'" (Mohan and Stokke 2000, p. 249) to advance the logic of birth control as conservation- which is based on international development paradigms that operate globally.

Swyngedouw explains how in the past few decades an increased focus on "the local" as a site of intervention has been accompanied by a simultaneous scaling up of governance authority. He explains this dynamic, called "glocalization," as the "twin process whereby, firstly, institutional/regulatory arrangements shift from the national scale both upwards to supra-national or global scales and downwards to the scale of the individual body or to local, urban or regional configurations" (Swyngedouw, 2004, p. 25). This reorganization of institutional arrangements creates "geographies and choreographies of inclusion/exclusion and domination/subordination which empower some actors, alliances and organizations at the expense of others, according to criteria such as class, gender, race/ethnicity and nationality" (Brenner 2001, p. 608). This dynamic is apparent in conservation intervention in Madagascar and beyond. Conservation efforts have moved away from being solely under the purview of centralized state institutions, and into the hands of international conservation organizations or private institutions[12] that work at the regional or local level with resource users. The shrinking role of the state has allowed conservation organizations to financially and discursively define conservation and development agendas with networks of other international conservation organizations, industry actors, and donors, as well as strongly orient the strategies and tactics of conservation on the ground (Corson, 2016; Brockington et al., 2008).

The simultaneous scaling up and scaling down of institutional and regulatory arrangements is explained largely by the narratives and discursive frameworks conservation and development organizations use to justify their work. As Sievanen et al. (2013) argue, these scale-specific frameworks lead to funding particular resource management activities (such as family planning) over others (such as restrictions on marine product exports or foreign industrial fishing), and privilege the natural resource management knowledge of those who are already politically and economically powerful.

Women feature prominently in hyper-localized conservation interventions focused on family planning in southwestern Madagascar. Although social marketing campaigns also targeted boys and men to increase the use of condoms locally, PHE actors view working with women as a way to "get more bang for your buck" (pers. comm. July 3, 2015). One PHE program manager explained that "condoms last once, but those [used by women] last for years." This focus on time-related efficiency is echoed in PHE program reports, which translate contraceptives issued to "couple years," or the total number of years of protection associated with each contraceptive type.

While birth control pills are still the most widely used contraceptive method associated with PHE programs in southwestern Madagascar, there has been a marked increase in long acting and reversible contraceptives (LARCs) administered to women (Robson and Savitzky, 2014). Program administrators prefer LARCs not only because they increase the overall "couple years" of protection, but also because they "reduce the risk of contraceptive failure through inadequate compliance…the frequency that clients would need to be followed up… [and] the workload of our staff" (Mohan, 2008). Yet, LARCs have a global history of significant controversy in population and family planning programs. Depo Provera (now packaged as the self-injectable Sayana Press) initially met with strong resistance from women's health advocates when it was distributed in programs in the global South due to side effects such as prolonged and irregular bleeding, weight gain, and depression. Further, there has been considerable controversy over whether it is linked to HIV acquisition (Ralph et al., 2015). Implant-based LARCs have faced international controversy both because of users' negative reactions to side effects, and because of inadequate training of medical providers in implant removal (Bendix et al., 2019). Yet, an emphasis on distributing and promoting LARCs is a key component of the global Family Planning 2020 (FP2020) strategy,[13] which

[11] For example, in 2017 under the "Mexico City policy," which restricts foreign aid to groups if they perform or actively support abortion, USAID cut funding to Marie Stoppes, one of the main providers of family planning in the country. USAID, however is now funding family planning through other groups. See: Beaubien (2017) U.S. Slashes Funds For Family Planning In Madagascar. Weekend Edition. NPR.

[12] For an excellent overview who the key players are in this arena see Corson (2016). *Corridors of Power: The Politics of Environmental Aid to Madagascar,* New Haven, CT: Yale University Press.

[13] FP2020 is a global partnership of donor and recipient governments, non-

Madagascar joined in 2015.

Women's bodies are thus presented as the primary conduits through which population focused measures will work to improve environmental outcomes in Madagascar. As such, women are the primary targets for monitoring the progress of contraceptive interventions, aiding conservation organizations to count the number of live births averted relative to their work administrating contraceptives (Robson et al., 2017a). Focusing on the status of women's coital and conjugal relations allows their broader economic, educational and political status to remain obscured. For example, extreme poverty in Madagascar is higher among female-headed households in which women are either widowed (40%) or separated (34%), and has worsened in the last decade (World Bank, 2014). Women's earnings are consistently lower than those of men across all classes, educational levels, and ages. Literacy rates in southwestern Madagascar are among the lowest in the country, and according to our survey in southwestern Madagascar, women stop going to school on average 1.2 years earlier than men.

At the same time, broader shifts in globalization and neoliberal economic reforms across the island are impacting sexual and gender dynamics among Malagasy youth. Jennifer Cole's 2004 study of a coastal tourist town reveals that young women's participation in transactional sex and other intimate relations with foreign men forges new practices of marriage, kinship, and other gendered relations between Malagasy people. Access to the sexual economy, facilitated by globalization, in turn facilitates young women's access to consumer goods, increased social status, and worldly knowledge, including knowledge of western contraceptives and abortion. As a result, these trends are shifting gendered hierarchies between young Malagasy women and men, particularly in places where young men are increasingly experiencing financial precarity.

### 5.1. Birth control as marine conservation

The problematic politics of scale of family planning as a form of marine conservation in Madagascar is brought into sharp relief when one analyzes other important drivers of marine resource use and ecological change, such as the structure and orientation of the region's political economy, the ongoing influence of colonial policies, and resource tenure dynamics.

First, to analyze the broader political economy in which PHE programs associated with marine conservation function in southwestern Madagascar, we draw on longitudinal catch data from local marine product collectors in our two research sites. These data show that the majority (78.8%) of small-scale fisheries catch was sold for non-local consumption (Baker-Médard, 2017), a finding that closely correlates with other research in the region (Westerman and Benbow, 2014; Barnes and Rawlinson, 2009). Beyond small-scale fisheries contribution to the export economy, hundreds of foreign owned industrial boats[14] extract shrimp, tuna and a variety of both demersal and pelagic fish in Madagascar's exclusive economic zone for export (CSP, 2010; Le Manach et al., 2013). While some operate with permits, unreported and illegal catch is high. For example, Asian long-line fleet illegally harvest upwards of 50,000 tonnes of fish and shark per year (Le Manach et al., 2012). Major recipients of Malagasy marine produce include the European Union, Thailand, Singapore, China, Japan, and some products (specifically crab and octopus) make it as far as the U.S (Le Manach et al., 2012; Panjiva, 2019). The export-oriented nature of marine resource use in the region, underscores the importance of non-local consumers in driving local marine resource use and change.

Second, understanding the influence of colonial policies (Jarosz, 1993) helps us understand a weaknesses of the current PHE frameworks endorsed in Madagascar. During colonization, pronatalist policies were advanced in order to build a robust labor reserve for the colonial state (Feeley-Harnik, 1995; Andersen, 2010), a prerequisite for bringing resources into capitalist production (Sodikoff, 2012). Strategies endorsed to advance pronatalism during colonization included improving prenatal and postnatal care, and criminalizing contraception and abortion (Andersen, 2010; Gastineau and Rajaonarisoa, 2010). Colonial rules continue to shape the legal landscape of reproductive rights in Madagascar. The current abortion law in Madagascar's penal code was inherited from the French colonial Government, with the exception of a small change in the mid 1990s when abortion was legalized in order to save the life of the mother (UN Population Policy Data Bank, 2015). Similarly, the French colonial Government anti-contraception law established in 1920 is still technically on the books, however this law has been *de facto* overridden by the efforts of conservation, development and health organizations working in Madagascar that distribute highly subsidized or free contraception (UN Population Division, 2001; Gaffikin, 2008). Only recently has there been a cohesive and focused effort to overturn colonial policy with the Government of Madagascar committing in 2015 to the global FP2020 initiative to revise all the country's penal code and legal documents to be more "favorable" to family planning including the disbursement of birth control (Gouvernement du Madagascar, 2017).

Third, an understanding of resource tenure in the region helps elucidate how birth-control became a key strategy endorsed by conservation organizations to protect and manage marine resources. Underlying the logic of population control as a marine conservation strategy is the notion that fisheries decline is a result of "too many people chasing too few fish," or that "the fish have nowhere [protected] to go" (pers. comm. Regional director of marine conservation, SW Madagascar, June 22, 2011). Most conservation organizations working in the marine realm in Madagascar consider Malagasy fishers' conceptualization of the marine environment as open access, thus prone to overexploitation. While formal claims to private property or even community territory in the marine realm are difficult to find in Madagascar, informal claims do exist. Fishers use the word "*mahazatra*" to describe their relationship to a given spot in the ocean. The word *mahazatra* roughly translates to "to be accustomed to" or "to be familiar with" and is broadly used as a way to describe a reciprocal relationship a fisher has to an area of the ocean. For example, fishers assert that a given place in the ocean "provides" specifically for the individual if the fisher "respects" the ocean. While there are no formal claims to areas where one is *zatra*, fishers know the areas where other fishers (and often family lineages) have these intimate relations, thus representing a form of customary tenure (Diver et al., 2019). Far from an open-access situation, fishers have clear patterns of use and connections with particular areas in the ocean.

We argue here that inadequate attention has been made to these important drivers of marine resource use and ecological change, ultimately leading to the problematic politics of scale in which population control focused programming prospers.

### 5.2. Decolonizing consent in service delivery

Another subtler aspect of a colonial legacy in relation to reproductive strategies relates to the fact that most of the PHE programs

(*footnote continued*)
profits, and for-profits, pharmaceutical corporations and private donors, organized around a shared goal of 120 million new users of modern contraceptives by the year 2020. While FP2020 draws heavily on the language of rights and empowerment for women and girls, scholars and advocates have raised concerns about its strategic focus on contraceptive distribution targets to the exclusion of more comprehensive reproductive health services, and particularly its strong emphasis on the promotion of LARCs. See: Bendix and Schultz (2018) and Hendrixson (2019).

[14] The majority of permitted vessels function under a fishing agreement with the European Union (see Le Manach et al., 2013). Some of the larger single companies operating in Madagascar's waters include Japan Tuna (Japan), Dae Young (Korea), Intertuna (Seychelles), and Cobrepêche (France) (see CSP, 2010).

are directed primarily by non-Malagasy actors. While Malagasy workers conducted the day-to-day work of PHE outreach, education, and clinic work, most doctors and program directors were not Malagasy. This reality is clear to many of those who receive reproductive services from these organizations. As one elder woman described "There are Malagasy there [in the organization], but only foreigners are the directors of it. Foreigners lead everything.[15]" (pers. comm. May 4, 2011). In interviews, local Malagasy people referred to the outreach campaigns, educational initiatives, pills provided, shots administered, etc. as those of the *vazaha* (white people). For example, during one interview, three young women, all sisters, described their experiences obtaining birth control thus: "We went by foot to a village far from here, there are foreigners [an international marine conservation organization] working there. The two of us got shots, but she [the eldest sister] is brave and so she got the implant in her arm [she said while pointing to her upper arm]. The foreigner told us to not be scared of the things, it will make us healthy."[16] The youngest sister, who was 16 years old, said that she received the shot even though she had never had sex, and had no plans to be sexually active in the near future, because "it lasts a while, and I might need it."[17] The middle sister chimed in that "Her [youngest sister's] boobs are bigger now. Strong young men want to sleep with her, maybe soon they will catch her at night."[18] The youngest sister nodded and said "Yes, I don't like problems, I want things to be taken care of."[19] The eldest sister, who already had 2 children, noted "I don't want any more children now, but maybe I will when the thing (implant) wears off next year."[20] She did not understand that she would have to have the implant removed in order to have another child the following year.

While these women accepted the administration of birth control, their interest and willingness were driven in part by the fact that a foreigner, whom they saw as an "expert," advised them to do so. The sentiment that *vazaha*, especially *vazaha* doctors, know best and have "the best medicine" is common in Madagascar. Additionally, while the three sisters consented to the procedures, it is clear that they were not adequately informed about the birth control they received, a finding that echoes practices of birth control disbursement elsewhere on the island (Harper, 2002).

Fully informed, ongoing consent is a principle theoretically endorsed by all the conservation and development organizations working in family planning. However, the broader historical context in which birth control distribution operates in these regions, complicates the process of consent. Similarly, given that these organizations are providing services to individuals who sometimes live far away from the clinic where they receive birth control, the notion of "ongoing" or "fully informed" consent is also difficult to achieve. If an individual cannot easily return to the provider to ask follow-up questions and receive more information about the birth control they received, the chances of misinformation and possible complications increase.

In addition, the other public health services offered to local communities as part of PHE projects proved grossly inadequate. In one makeshift clinic housed at a school in a rural coastal village, the health provider visited approximately every 2–3 months. During these visits, the clinic became a focal point for people with a variety of problems, yet the provider was ill equipped to meet their needs. During two days observed at this particular clinic, multiple people who came into the clinic–including a woman suffering through a painful pregnancy, a man needing a consultation for STI symptoms, parents concerned about their sick children, and a woman with an infected birth control implant needing removal–were referred to the hospital, the nearest of which was a full day trip away, involving a journey that cost approximately one months' wages.[21] As the pregnant woman explained "I'm too pregnant. It's not good to go by bush taxi on the bad road. It's far. I might give birth on the way there."[22]

These observations beg the question, how do PHE projects actually provide "family planning" services if broader public health services are not provided? It is clear that family planning programs designed primarily to reduce birth rates are not the same as those premised on holistic reproductive care, and as feminist scholars have shown, development strategies that fail to provide contraceptives within a broader system of health care provision may do more harm than good (Hartmann, 1995; Silliman and King, 1999; Correa and Reichmann, 1994).

### 5.3. Technological (mis)conceptions: re-purposing interventions

Currently, the main form of contraception Malagasy people in rural areas have access to are condoms. While there is a concerted effort to expand the range of contraceptive options offered in rural settings, at clinics and small shops, the availability of oral contraception, injectable contraception, contraceptive implants, and intra-uterine devices is still very limited (Gaffikin, 2008; Robson and Rakotozafy, 2015; Ramahavory, 2015; PSI, 2011). The health clinics associated with PHE programs are among the few places where people living in these rural areas can access longer-lasting forms of contraception.

One of the key distributors of condoms in Madagascar is USAID-funded Population Services International (PSI). PSI reports distributing approximately 16 million condoms each year (PSI, 2017). Approximately half of these condoms were distributed for free (USAID, 2008) with the goal of reducing the prevalence of HIV and STIs as well as decreasing population growth in ecologically sensitive areas (H.R., 2001; Ramahavory, 2015; Praz et al., 2013; Pielemeier et al., 2007).

Despite efforts to increase condom use in rural and biodiverse areas of the island, a subversive re-appropriation of reproductive technology is actually working to undermine the very premise of PHE projects. This repurposing of condoms by rural Malagasy shows the critical importance of understanding the broader social and economic context in which family planning intervention occurs.

For example, during a conversation with four local men, when asked what they think of contraceptives being distributed, a line fisher in his 30s and father of two answered "I don't like it, it makes women sick." He went on to explain that "There are side effects from the shots. Pills have effects too, because with the pills some [women] get moody and become mean, some get hot. With the pills, if someone takes a lot, they get sick. The pills do not dissolve and just spread out, and that's another side effect noticed. People have started to be scared, and so they don't take pills anymore."[23] (pers. comm. July 3, 2015). Another man in his 50s nodded his head but said nothing. The youngest of the group, an 18-year old known for his skin-diving ability, responded "I don't know, but

[15] *Misy gasy miasa ao, fa vazaha avao no tompon'le raha. Vazaha mitariky raha aby.*

[16] *Nandeha tomboky an-tana lavitry zahay, misy vazaha miasa. Mana hopitaly rozy. Nahazo pikira zahay, fa ie masakisaky, le nahazo kisisiky…raha anaty tananе [pointing to her upper arm]. Aah, ianareo hoy asan'ity vazaha ro ity, tsisy raha atahora raha toy, mahasalama.*

[17] *Maharitry raha toy, mety mila'antegna.*

[18] *Lasa bevata nono ie. Pamaraky etoa te hanao amy e, mety tratry alina tsy ela.*

[19] *Eka, tsy tia probleme fa mila raha milamy.*

[20] *Tsy mila zaza, fa mety mila antegna amy tao hoavy raha lany daty le raha.*

[21] Theoretically, hospitalizations or medical procedures addressing problems related to birth control enabled by USAID funding should be covered at no cost to the recipient. This information was not shared during the clinic visit observed, nor is this information widely understood in the sites included in this research.

[22] *Bevohoka mare zaho. Tsy soa ty mandeha taxiborosy amy lala raty. Lavitsy. Mety hiteraka andalana e!*

[23] *Tsy tikao. Mamparary ampela io. Misy fiantraikany le pikira. Le pilily misy fiantraikany koa satria le pilily, misy voan'ny kizitina zay zany, tegna masitsiaky, misy misofysofy. Pilily koa zany, lafa tegna misy mamely maromaro, tsy salama, de mivongana zany mivoraky le fanafody. La fa jereva amizay koa zany igny. Fa, manoboka mahataotsy zany le olo, efa tsy manao pilily le olo.*

maybe it's good."[24] When pressed to explain why, he smiled and said "they hand out condoms, I got a lot."[25] He then stood up, walked over to a small dresser and opened the top drawer. He plunged his hand into a stock pile of several hundred condoms, brought a handful out for us to see, their metallic wrappers glinting in the light. He then explained "You can get condoms by the packet, and that's what fishers take into the ocean, they wrap the flashlight with a condom so it doesn't get wet."[26] When asked if he bought all those, he and the others in the group laughed, and then the line fisher, practicing his French, said in a long drawn out and funny tone *gratuit* (free).

This common practice of repurposing condoms is in part fed by a general aversion towards using condoms during intercourse. As one fisherman in his early 20s explained "Here in the rural areas, people really don't like condoms. Young men especially don't like condoms, because [when you wear one] you can't really taste the um…the thing [his sentence trailed off in laughter as he signaled down towards his groin]"[27] (pers. comm. March 21, 2015). This sentiment was echoed by a fisher in his 30s, who similarly used a food metaphor, explaining that "you don't eat fried dough through a plastic bag, it wouldn't taste delicious"[28] (pers. comm., June 16, 2015).

While one might consider new condoms being used for something other than sexual intercourse a "misuse" or inefficient deviance, repurposing of unused condoms demonstrates how local people use these technologies to address issues they deemed valuable. In the villages included in this study, condoms are being used in variety of innovative ways including the following:

1. *Miaro torse*: Waterproofing flashlights for nighttime fishing. Waterproofed flashlights help fishers capture nocturnal marine species especially while diving.
2. *Fleso*: 4–6 condoms braided together to make the elastic portion of a sling-shot. Used to kill birds and other small animals.
3. *Taly*: Flexible strap (e.g. used to hold two sides of a music tape together, or hold a bandage to a cut leg).
4. *Kapoty*: condom for sexual intercourse. Used during sexual intercourse to prevent pregnancy and STDs.
5. *Balom*: Balloons that children use to play.
6. *Pira/Elastik*: Hair tie, especially for younger girls. Its use in older, especially wealthier women, is however frowned upon.
7. *Miala mony*: Pimple removal. The lubricant inside condom is thought to help decrease the size and duration of a pimple.
8. *Mampaniry volo vajihy*: The lubricant inside the condom is thought to help grow older people's hair at the top of their foreheads.
9. *Silgoma*: Chewing gum. This is seen mostly with very young children who enjoy the rubbery texture of pieces of condoms that have been used as balloons.
10. *Filokana*: Gambling. Children bet on how much water they can put in the condom before it breaks (~20Ar per participant)

Ironically, the two primary uses of condoms were directly tied to facilitating or increasing access to natural resources. Waterproofing flashlights helps extend fishing hours as well as the efficacy with which fishers can obtain their catch at night. Many lucrative reef-dwelling species such as sea cucumber, octopus, and squid are nocturnally active, therefore shining a light underwater enables fishers to improve their chances to capture these species. Similarly, while less effective and not as long-lasting as commercial-grade rubber available in cities, condoms enable some of the youngest and poorest hunters to continue hunting for lizards, birds, and other small animals through the construction of sling shots constructed from condoms.

This creative appropriation demonstrates the kind of "bottom-up" initiative and opportunistic design that development practitioners so often seek (Leigh and Blakely, 2013), and serves to illustrate how conservation initiatives are embedded in a complex web of social, political and economic decision-making. The creative repurposing of condoms also shows that some family planning initiatives ironically increase peoples' use of the natural resources the initiative aims to protect. The technological repurposing of condoms demonstrates the importance of situating strategic conservation and development intervention in the broader economic context and social values of those targeted by PHE programs.

## 6. Conclusion

In this paper, we have highlighted the problematic politics of gender and scale at work in relation to population-health-environment initiatives in Madagascar. Focusing narrowly on stemming local population growth in Madagascar reflects neo-Malthusian logics that neglect more systematic and holistic understandings of local resource use and ecological change. Chief among these factors include the structure and orientation of political economy, the legacy of colonial pronatalist policies, and marine property dynamics in relation to broader marine conservation strategies. As argued elsewhere, a hyper-local framing stems from a tendency for conservation and development organizations to pick the metaphorical "low-hanging fruit" (Baker-Médard, 2017). Working at a local scale, these organizations exert financial and political power to influence reproductive behaviors, a far simpler task than addressing the complex drivers of marine resource use and broader ecological changes on the island.

Troublesome framings of population as a necessary environmental intervention have helped facilitate important access to reproductive services in Madagascar. At the same time, contraception is not a stand in for holistic reproductive care. Further, when contraceptive programs are positioned as serving external goals, such as environmental protection and resource conservation, the importance of individual consent is de-emphasized and the possibility of coercion increases. This is clear both at the clinical level and at the level of government participation in global partnerships, such as FP2020, that promote LARCs that have been implicated in both population control schemes as well as in HIV acquisition. Disseminating LARCs in the absence of comprehensive reproductive health service provision raises particularly troubling questions about whether family planning clinics contribute to reducing voluntarism and bodily autonomy for women.

We urge that closer attention be paid to the complex and diverse socio-ecological relations underpinning resource use and ecological decline. Situating resource use in multi-scalar context not only provides more nuanced and accurate understandings of the causes of resource scarcity, it also refuses the move toward abstraction that often structures global understandings of the population-environment-development nexus.

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[24] *Tsy haintegna, fa vasa soa avao.*

[25] *Mizara kapoty rozy, nahazo maro antegna.*

[26] *Maka kapoty amy pake, de ie amizay zany alain'ny mpiandriaky reo mande andriaky. De misy torche zany, lampe de poche, fonosy amy kapoty zany lampe de poche igny tsy ho lena rano.*

[27] *Ambanivolo eto zany, kapoty, tena tsy tian'olo. Tena tsy tian'johary, satria tsy misy goût amy le eh…le raha!*

[28] *Tsy homa bokoboko anaty sachet, tsy mahare les deliceux!*

## Declaration of Competing Interest

The authors declared that there is no conflict of interest.

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