Is there a Link between Population, Health and Environment (PHE) and Climate Change Adaptation?

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Climate change is upon us and over the coming years more frequent floods, droughts, extreme weather events, and changes in temperature will affect everyone. Households and communities that rely directly on local natural resources for their food and livelihoods, however, will be most affected. Community-based approaches to climate change adaptation seek to enable these households to effectively plan for and cope with changes in water availability, agricultural production, and extreme weather events that are brought about by changing temperatures and precipitation patterns. Such community-based approaches are in their infancy in terms of planning and implementation. While integrated Population, Health and Environment (PHE) projects have not been designed to respond to climate change specifically, might PHE experiences and approaches have lessons to offer community-based approaches to climate change adaptation?

This paper explores theoretical links between population and climate change adaptation and whether population should be addressed through community-based adaptation approaches. In addition the paper looks at similarities and potential links between PHE efforts and current

approaches to community-based climate change adaptation. The paper ends with a call for stronger connections between PHE experiences and emerging practices for community-based adaptation, suggesting that both would gain from sharing experiences and lessons.

Introduction

There is growing recognition that climate impacts are unavoidable and that in addition to mitigating further climate change we will also need to develop strategies to adapt to the changes that are already "locked in" to our climate system. Various definitions of adaptation exist. The Intergovernmental Panel on Climate Change (IPCC) defines adaptation as "Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects."[1] According to the United Nations Development Program (UNDP), climate change adaptation is "a process by which individuals, communities, and countries seek to cope with the consequences of climate change, including vulnerability," with the end goal being the reduction in both the vulnerability to and losses from climate change impacts. Hence, understanding vulnerability is essential to developing adaptation programs. The IPCC defines vulnerability as "the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes" (IPCC 2007). This definition allows for a broad interpretation of the system that is impacted by climate change, which includes physical or ecological systems (such as water, land, and food resources) and human systems with their cultural, socio-economic, and demographic dynamics, as well as their institutions and governance. The IPCC goes on to state that "vulnerability is a function of the

1 http://www.ipcc.ch/pdf/glossary/ar4-wg3.pdf

character, magnitude, and rate of climate change and the variation to which a system is exposed, its sensitivity, and its adaptive capacity" (IPCC 2007). Thus, vulnerability is defined by three underlying factors -- exposure, or the extent to which a part of a system is faced with a climate stress; sensitivity, the degree to which a climate stress affects the system; and adaptive capacity, or the ability of a system to prepare or adjust to deal with the climate stress.

Linking Population, Vulnerability, and Adaptation

The size, composition, and spatial distribution of human populations are constantly changing and in some areas of the world are changing rapidly; yet assessments of climate change vulnerability rarely include population trends. As Schensul and Dodman (2010) argue, "a very basic inclusion of population issues (as an input to vulnerability), particularly in the form of deterministic lists of vulnerable groups, can coincide with lack of consideration of future direction and pace of change." Adaptation plans developed without consideration of how a community is changing in terms of size, space, and age structure will constantly be responding to yesterday's problems rather than tomorrow's challenges. In a rapidly growing population, for example, the growth in the proportion of youth may change vulnerability as children's health and development are more susceptible to fluctuations in food and water availability. Similarly, rapidly aging communities may become more vulnerable as they are less capable of the labor and innovation necessary for adaptation.

Much of the current population and climate adaptation discourse focuses on population dynamics such as population size, distribution, and migration. Little has been written on fertility and in

particular how large population size and rapid growth due to high fertility are underlying factors that create and exacerbate vulnerability. Better examination of the conceptual link between high fertility and the three factors that make up vulnerability – exposure, sensitivity and adaptive capacity (IPCC 2007) – will improve understanding of population and climate change links, and help identify appropriate strategies for adaptation.

Exposure describes the extent to which a part of the system is faced with a climate stress. Population growth interacts with climate change in various ways that directly increase the number of people exposed to climate risk. The simplest example of this is how high fertility and the resultant population growth increase the number of people exposed to climate risk in areas prone to climate impacts, such as floodplains and coastal zones. In the most basic terms, this means high fertility will result in more people in harm's way. The majority of the world's population growth over the next 40 years will occur in the world's least developed countries, many of which face great exposure to climate stress. Population density is already high in low elevation coastal zones, which comprise 2% of the world's land area but contain 10% of the world's population—a population that is increasingly exposed to extreme weather events and coastal flooding that will worsen with projected sea level rise. High fertility and migration result in even greater human exposure to climate risk in these areas. In Bangladesh and China, for example, populations living in low elevation coastal zones grew at almost twice the national population growth rate from 1990-2000 (McGranahan et al, 2007).

Water scarcity, as another example, is already acute in many areas where populations are growing. Changes in precipitation patterns due to climate change as well as the rapid melting of

glaciers due to rising temperatures make the availability of water in these areas less predictable. At the same time population growth, economic development, and increased water consumption are increasing water demand from homes, industry and agriculture, and thus increasing the exposure of already stressed water systems to climate related changes in the hydrologic cycle (Myers and Bernstein, 2011). For example, a recent study on climate related glacier melt in the Himalayas (Malone et. al 2010) indicates that nearly 500 million people and over 200 million people live within the Ganges and Indus river basins respectively – both of which depend on glacier meltwater. The Ganges River Basin receives approximately 10% of its water from glacier meltwater, and the report states that even small changes in the amount of water supplied by receding glaciers may cause water stress and other hardships for the communities and ecosystems along the Ganges River Basin simply because of the sheer number of people who depend upon the river for water and irrigation. In addition, the report notes that high fertility rates of 3.0 and over in central Indian states and Nepal mean that population growth is inevitable in the near term. Hence an increasing number of people will depend on the glacier fed Ganges and will be exposed to climate stress. The report examines scenarios of water stress conditions in 2030 under climate change only, under population change only, and then with both climate change and population change. In the latter scenarios, where both population and climate change are interacting, water stress conditions are projected to spread to Pakistan, India, and most countries of Southeast Asia.

Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change. Population growth can both increase the sheer number of people and households exposed to climate risk while also making human and natural systems more

sensitive to climate variability and change. Increasing temperatures and shifting precipitation patterns are expected to negatively affect agricultural production in the tropics and subtropics, where many crops already exist at the top of their temperature range. Most countries in sub-Saharan Africa are projected to experience declines in agricultural production over the course of this century, while population is projected to continue to grow. While adaptation measures and food aid will surely play an important role in addressing these challenges, this alignment of demographic trends and climate change impacts will to contribute to growing numbers of people exposed to food insecurity (Nelson et al, 2010). For example, in Rwanda high fertility, large households, and finite agricultural land have led families to subdivide their farm land into smaller parcels for their children. As a result the average household farm size has decreased over time. Climate change in Rwanda is anticipated to result in an intensification of rainfall during the rainy seasons alternating with prolonged droughts which is expected to further decrease food production on small household farms already suffering from low productivity. One expected result is inadequate food production (Rwanda Ministry of Lands, Environment, Forestry, Water and Mines, 2005). In Kenya, the 2008 Demographic and Health survey revealed that already more than 2/3rds of households that own agricultural land report that their land is inadequate to support their family. Thus by reducing the size of farms, population growth is making agricultural systems more sensitive to climate change stress.

Finally, high fertility and population growth may affect adaptive capacity, the ability of a system to prepare or adjust to deal with climate stresses. The simplest illustration of the relationship between fertility, population, and adaptive capacity lies in the case of women, especially those from developing countries. Women are disproportionately affected by climate change and face

disadvantages in understanding, surviving, and adapting to climate stresses (UNFPA 2009). Among the many gender and social constructions that increase women's vulnerability are their traditional roles as child bearers and family caregivers. Women in the developing world have large families and often start childbearing at a young age. Among the 49 least developed countries, the total fertility rate remains very high at 4.5 (PRB 2010). High levels of fertility are due to a combination of low usage of modern contraceptives (23%) among women of childbearing age, early onset of childbearing, and fertility desires.

Almost universally across these countries, however, women do want to have fewer children than they are currently having. In 2008, 215 million women had an unmet need for family planning, meaning they were sexually active and didn't want to become pregnant but were not using any form of contraception. In Africa in particular one in five married women of childbearing age (22%) have an unmet need for contraception (Guttmacher 2010). Early childbearing, high parity and short birth intervals are associated with poor maternal and child health outcomes (Lancet 2006), which directly impede women's and thus households' ability to participate and invest in adapting to climate change. Furthermore, early child bearing and high fertility are associated with girls' early departure from school and lower educational attainment, and education is viewed as one of the key determinants of individuals` adaptive capacity. High fertility also limits women's ability to participate in the labor force and earn an income, which also might limit adaptive capacity as research consistently indicates that women's income is more likely than men's to be invested back in the family and their livelihoods (UNFPA, 2009). Finally, high fertility is also correlated with maternal death and disability. If unmet need for family planning were met, an additional 90,000 women's lives would be saved. These are 90,000 women,

caregivers, and essential providers of a family's food and water who would otherwise not be alive to help their children, families, and communities adapt to climate change and its impacts on their lives (Guttmacher 2010).

Given the important implications of high fertility and population growth for vulnerability to climate change impacts, it is clear that population trends and specifically issues of high fertility and gender equity should be considered in both assessments of vulnerability and vulnerability research. Unfortunately, however, there are very few empirical studies that specifically examine climate change vulnerability in terms of population, fertility, family planning, and climate adaptation. One case study from Ethiopia (Kidanu *et al*. 2009) does explore these links at the community level and reveals that people do relate fertility and reproductive health to a change in vulnerability. People made the connection between unmet need for family planning, local population growth, land shortages, deforestation and agricultural adaptive capacity. As one young woman in the study put it, "… if a family has limited children, he will have enough land for his kids and hence we can protect the forests….In earlier years we had a lot of fallow lands, but now as a result of population growth we don't have adequate fallow land. Therefore, limiting number of children will help us to cope with the change in climate." There is clearly a need for more research on the topic.

At a national level despite a lack of empirical research, population growth and adaptation connections are clearly identified in National Adaptation Programs of Action (NAPAs), which have been developed by Least Developed Countries and Small Island States under the UN Framework Convention on Climate Change (UNFCCC). Analysis of NAPAs found that 37 out

of 41 identified population growth as a factor exacerbating the effects of climate change (Mutunga and Hardee 2009). A few countries went so far as to propose family planning among projects within the program of action but to date none of these has been funded under climate change assistance.

The failure of the NAPAS to address population and family planning issues begs the question, when climate change adaptation assessments do reveal vulnerabilities that are related to high fertility and resultant population growth, what can be done to address these aspects of vulnerability? Adaptation to climate change will certainly require technological responses, including the construction of dykes and seawalls, the development of new seed varieties that can better withstand erratic rainfall patterns, and the establishment of early warning systems for extreme weather events. At the same time adaptation requires more effective approaches to human systems in the form of community development that can strengthen individual, household, and community resilience and coping capacity in the face of both the sudden and gradual impacts of climate variability.

Community-level interventions, often referred to as community based adaptation, offer perhaps the best opportunity to address population-related vulnerability, particularly when such vulnerability is connected to women's unmet need for family planning, their inability to achieve desired family size, and the resulting impacts on exposure, sensitivity, and adaptive capacity. Thus meeting women's expressed needs for family planning, should be one strategy in a toolkit of community based adaptation measures considered for improving community resilience and

adaptive capacity, and in the following section we assess the degree to which current community level adaptation strategies have incorporated population-related vulnerability.

Community-based Adaptation

Community-based adaptation (CBA) is the collective name for adaptation approaches that focus on locally specific solutions and target communities as the level of appropriate intervention. CBA has recently arisen as a means of meaningfully engaging the poorest communities that are highly reliant on natural resources for their livelihoods and who live in countries most vulnerable to the effects of changing climate. The hallmarks of CBA are that it is a community-led process based on communities' priorities, needs, knowledge, and capabilities. CBA is a process that empowers people to plan for and cope with the impacts of climate change, and projects are developed based on climate science and local knowledge about weather changes. According to a 2009 International Institute for Environment and Development (IIED) report, Reid and colleagues note that, "CBA projects look a lot like development projects—the difference is that CBA work attempts to factor in the potential impact of climate change on livelihoods and vulnerability to disasters by using local and scientific knowledge of climate change and its likely effects (Reid *et al.* 2009)." The process of CBA is designed to help experts engage with communities to develop adaptation projects. "Once a community's vulnerability has been established, using the best available science on climate change impacts, the process of engagement with the communities can begin (Huq and Reid 2007)."

CBA has been embraced by multilateral organizations, including UNDP and non-governmental organizations (NGOs) such as CARE, Practical Action, and Oxfam. UNDP is implementing CBA projects in 10 countries through funding from the Global Environment Facility (GEF) small grants programs. These projects recognize that adaptation requires attention to management of ecosystems, so that they can continue to provide critical services that support human communities even as the climate changes. Thus, they take a natural resource management approach and "will build resilience to climate impacts into resource-based livelihoods while generating global environmental benefits in GEF focal areas." The 10 countries (Bangladesh, Bolivia, Guatemala, Jamaica, Kazakhstan, Morocco, Namibia, Niger, Samoa and Vietnam) represent a range of ecosystems and socioeconomic contexts, in addition to varying impacts of climate change. UNDP's CBA project activities are designed to increase the resilience of land and biodiversity resources to the impacts of climate change, and diverse types of projects are currently in the planning or implementation stage. For example, Bolivia's CBA project seeks to build community capacity to adapt to climate change by integrating climate change risk management practices into community management of agricultural ecosystems, water, soils, and crop genetic resources.

One of the key tools UNDP uses in developing CBA projects is the vulnerability reduction assessment or VRA. The VRA is a form of participatory assessment that measures communities' perceptions of climate change risk and adaptive capacity, and in addition provides CBA projects the ability to qualitatively and quantitatively measure the impact of their efforts.

CARE has also developed a framework for CBA and produced the Climate Vulnerability and Capacity Assessment (CVCA) handbook. CARE's CBA approach includes reducing the risk of disasters, making livelihoods more resilient, strengthening local capacity and supporting social mobilization and policy engagement. CARE's advocacy efforts focus on empowering women and on enabling vulnerable groups to participate in local decision-making and governance and ensuring equitable access to resources and services vital to adaptation.

Studies indicate that women and girls face greater vulnerability to the impacts of climate change because their lives tend to be more intimately tied to the environment. Women make up the majority of the world's farmers and are the primary collectors of water for their families. In addition, women are more likely than men to live in poverty (UNFPA 2009). At the same time, women are recognized as key agents of change in developing adaptive mechanisms to climate change in vulnerable areas. As such, UNDP's Gender Team has developed a guidebook to ensure that new CBA projects integrate a gender perspective and promote gender equality and women's empowerment in all aspects of project planning, implementation, and monitoring. The guidebook goes as far as specifically suggesting questions within the community VRA that integrate gender awareness.

Entry Points for Population or Reproductive Health in CBA?

Despite the special attention paid to integrating gender into CBA, aspects of vulnerability related to reproductive health, fertility, childbearing, and childrearing do not receive any particular

attention within the UNDP's gender guidebook. Population and reproductive health issues are also absent in CARE's CVCA handbook. Furthermore, none of the CBA projects implemented through UNDP include components related to health and reproductive health; nor do they address underlying issues of population growth and high fertility that may contribute to vulnerability and that are a result of unintended pregnancies and unmet need for family planning. Table 1 shows in the 10 countries in which UNDP is implementing CBA activities, the total fertility rate as well as the percent of married women who are able to get pregnant and want to postpone childbearing, but who are not currently using a contraceptive method . The table illustrates that in several countries where CBA projects are being implemented, women face challenges related to family planning that impact total fertility rates and population growth – Bangladesh, Bolivia, Guatemala, Namibia, and Niger, and Samoa stand out either in terms of fertility or unmet need or both.

Table 1: Unmet Need for Contraception in 10 Countries with CBA Projects

Country	Unmet Need Among Married Women (Percent)	Total Fertility Rate
Bangladesh	17.1	2.4
Bolivia	20.2	3.5
Guatemala	27.6	4.4
Jamaica	11.7	2.4
Kazakhstan	8.7	2.7
Morocco	10	2.4
Namibia	6.7	3.4
Niger	15.8	7.4
Samoa	45.6	4.2
Vietnam	4.8	2.1
Source: National surveys, various years.		

Since 2005, four international conferences have been held on CBA. All four conferences have highlighted the potential impacts of climate change on communities and how to enable communities, including the most vulnerable groups such as women and children, to strengthen their resilience in the face of climate variability and change. Again, absent from these conferences has been dialogue on how population trends should be incorporated into vulnerability assessments, whether these trends impact vulnerability, and if so whether CBA should include voluntary family planning as a means of addressing high fertility and population growth.

PHE and CBA

The pathway for better integrating population and family planning issues into CBA, however, has precedent. Over the last decade, many organizations—recognizing the complex linkages between population, health, and environment—have developed integrated approaches to addressing these challenges. These diverse efforts—often referred to collectively as the population, health, and environment (PHE) approach—aim to simultaneously meet the health and development needs of remote underserved communities while sustaining the natural resources, environmental services, and biodiversity upon which they depend. A key component of the integrated PHE approach has been the explicit focus on addressing women's unmet need for reproductive health care, including family planning. In PHE project areas, communities have specifically identified lack of access to family planning services as a priority due to the impact

that unintended pregnancies and larger-than-desired family size have on women, their families, their communities, and the local environment.

Could PHE be considered a special case of CBA in which particular attention is paid to an often-overlooked aspect of women's vulnerability—i.e., enhancing women's ability to plan the number and spacing of their children? Comparing CBA and PHE approaches, one finds that they have several similarities, although they generally differ in their main objective (improving communities' ability to cope with climate change vs. improving communities' health status and livelihoods while sustaining local resources).

Both approaches prioritize the poorest communities that are highly dependent on natural resources and underserved by government, the private sector, or NGO services. CBA and PHE efforts engage communities in participatory processes to identify their own needs and priorities and to select and implement appropriate approaches that will meet those needs. Both also tend to be multi-disciplinary and cut across traditional sectoral boundaries. Both approaches seek to enable community stewardship and sustainable use of forests, soils, watersheds, coastal areas, and other climate-sensitive resources.

Of particular interest to CBA practitioners might be the integration results that PHE efforts have achieved. Operations research in the Philippines comparing integrated health and environment project sites to similar sites implementing only activities in a single sector, found that integrated PHE projects performed better than or equivalent to single sector projects for all health and ecological indicators examined (citation for Heather and Leona paper here). Thus, PHE experiences help refute those who say that CBA projects are too complicated or attempt to address too many challenges.

Institutions implementing a PHE approach, however, are just now beginning to factor into their projects the future impacts of climate change on health, livelihoods, and ecosystems, and few NGOs implementing a PHE approach are specifically examining local and scientific perspectives of climate change and the likely effects in their local areas. While some such as World Wildlife Fund (WWF-US) have made steps to adapt existing NGO tools such as CARE's CVCA to specifically assess vulnerability and adaptive capacity, these efforts are not yet explicitly linked to existing PHE projects.

While PHE could be strengthened through more intentional incorporation of CBA approaches, the lessons learned from more than a decade of PHE efforts would also be useful for implementers of CBA. Among the defining hallmarks of PHE are building local awareness of the connections between environmental conditions, human health, and behavior; as well as strengthening community capacity to plan and manage resources in the context of those connections. PHE approaches also offer lessons in assessing ecosystem values and function that could provide a useful bridge between CBA and efforts to advance adaptation through an ecosystem-based lens. In the Philippines, Nepal, Cambodia, Vietnam, and throughout Sub-Saharan Africa, PHE projects have shown that it is feasible to integrate services to simultaneously improve management of fisheries, improve agricultural practices, conserve biodiversity and at the same time address health needs. Recent research on a PHE project in the Philippines demonstrates that integrated PHE approaches result in more impact on reproductive health, environment and community development outcomes than approaches solely focusing on environmental or reproductive health interventions (D'Agnes et. al 2010). These successes suggest that CBA projects in their current form are more narrow than necessary, and perhaps are

not taking advantage of cost and program efficiencies that can come through integration of various health components.

CBA is new and most programming is in the pilot phase. CBA and other adaptation approaches do not currently consider population dynamics in assessments of community vulnerability, nor do they consider meeting unmet need for family planning as one strategy to pursue when designing approaches to assist communities adapt to climate change. Yet, in order to address one of the factors underlying human and community vulnerability, they should. In that regard, PHE approaches should be considered as models for CBA and should also be able to qualify for funding under CBA programs. To qualify, PHE projects, which have not been planning interventions nor measuring their impact in relation to climate change adaptation, should begin doing so. Incorporation of CBA tools such as the VRA into current PHE efforts is a logical step toward planning and measuring the climate change adaptation benefits of PHE projects, thus perhaps rendering them an effective approach for addressing vulnerability, building resilience and contributing towards adaptation to climate change.

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