Hɛn Mpoano

OPPORTUNITIES FOR INTEGRATING FAMILY PLANNING, HEALTH AND NUTRITION INTERVENTIONS INTO COASTAL-FISHERIES GOVERNANCE AGENDAS FOR IMPROVED FOOD SECURITY IN WESTERN REGION, GHANA

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I. EXECUTIVE SUMMARY

Ghana is one of the most populous countries in West Africa. One-fourth of its estimated 24 million people are concentrated on the coastal belt, which comprises only 6.5% of the country's total land area of 88,811m^2 (230,020km^2). The density of human settlements in coastal Ghana exceeds 1,000 persons per square kilometer in some urbanized areas – ten times the level associated with biodiversity loss. Moreover coastal populations are growing more rapidly than the country as a whole, due to high fertility and internal migration. Increasing population pressure together with widespread poverty, environmental degradation and depletion of fisheries resources contribute to a vicious cycle that negatively impacts the quality of human life in the coastal belt and the sustainability of coastal-marine resources upon which people depend for food and income.

In response to these challenges, the Coastal Resources Center (CRC) of the University of Rhode Island and its partners are implementing an Integrated Coastal and Fisheries Governance (ICFG) project in all the six coastal districts of Western Region (2009-2013), with funding from USAID Ghana. The goal of the ICFG Program is to support the government of Ghana in achieving its fisheries development objectives of poverty reduction, food security, sustainable management and conservation. CRC recognizes that it will be difficult to sustain the project's gains in the long run, however, because of the country's high rate of population growth. Thus it is assessing the feasibility of linking Family Planning and Reproductive Health (FP/RH) interventions with ICFG's strategies. Experiences from other developing countries show integrated population-health-environment (PHE) approaches can create synergies and results that surpass sectoral management strategies both in terms of impact and sustainability[1 2].

At the request of CRC, the BALANCED[3] project sent a PHE specialist to Ghana in June 2010 to meet with ICFG stakeholders and visit project field sites in Western Region to explore needs, opportunities and possible mechanism of integration. This report summarizes the consultant's findings and recommendations for integrating FP/RH and other health, nutrition and food security interventions into the ICFG framework. It builds upon a PHE concept that was drafted by CRC's local implementing partner – Friends of the Nation (FoN) following an exposure visit to the Philippines where local communities have been implementing family planning in

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[1]Castro & D'Agnes (2008). Fishing for families: Reproductive health and integrated coastal management in the Philippines. *FOCUS* (**15**). ECSP, Woodrow Wilson Center for International Scholars, Washington, DC. USA.

[2] Pielemeier, J. et. al (2007) Assessment of USAID's population and environment projects and programming options. Washington D.C. USA: Global Health Technical Assistance Project, USAID.

[3] Building Actors and Leaders for Advancement of Community Excellence in Development (BALANCED) is a global project of USAID's Office of Population and Reproductive Health that seeks to advance the use of evidenced-based approaches to population-health-environment (PHE) worldwide. CRC-URI and its partners – PATH Foundation Philippines and Conservation International are implementing BALANCED strategies and activities in collaboration with other USAID partners and local institutions in selected countries in Asia and Africa.

conjunction with coastal conservation strategies since 2001[4]. Examples of activities that would respond to immediate needs of coastal communities in Western Region and which BALANCED could facilitate include, but are not limited to, the following:

- Advocacy communication initiatives to increase decision makers' and the public's awareness of the interrelationships between population-health-environment (PHE) and food security dynamics in coastal areas with the aim of mobilizing their support for problem solving approaches that incorporate population and reproductive health (RH) perspectives into coastal and fisheries governance agendas.

- Interventions targeted to young adults (15-24 years) in coastal communities to simultaneously encourage pro-environment and responsible sexual and reproductive practices, and to address gaps in access to information and youth-friendly services for prevention of unintended pregnancy, abortion and sexually transmitted infections (STIs).

- Activities targeted to men in coastal communities to desensitize condom use and increase male involvement in condom distribution to other men and dissemination of information about correct and consistent use of condom for dual protection against unintended pregnancy and STIs, including HIV/AIDS.

- Pilot activities to test the concept of using organized grassroots groups in communities (i.e., fishmonger associations, fisheries management committees etc.) to plan, implement, and monitor community-based family planning (FP), health and nutrition activities in conjunction with conservation and coastal-fisheries governance strategies for improved food security.

- Monitoring and evaluation activities to track the effectiveness of the abovementioned PHE interventions and to measure progress towards stated intermediate objectives.

Additional interventions that could help to improve the health status of coastal residents and enhance food and income security were also identified by the consultant. However, it should be noted that these interventions go beyond the funding scope of the BALANCED project. Because it is also important to tackle the diseases of the poor in coastal areas, CRC and FoN are encouraged to explore other avenues of funding to integrate one or more of the following interventions into their PHE model for Western Region:

[4] FoN personnel, Mr. Kwesi Johnson, participated in a BALANCED-sponsored South-to-South PHE Study Tour to Philippines (February 2010) and field visits to IPOPCORM project sites in coastal areas of Bohol Province to gain understanding, learn lessons and best practices from local government-NGO implementers.

- Combined malaria and hook worm interventions targeted to vulnerable groups at heightened risk of tropical anemia, which afflicts 71% of pregnancy women in Western Region and 80% of children under age five. Men also suffer from anemia which negatively affects their health and ability to work. Combined treatment for malaria and hookworm is inexpensive and can be delivered by trained individuals in the community.

- Promotion of neglected and under-utilized tree species that are drought resistant and can reduce hunger and improve food security and soil conservation. Two such multi-purpose trees include the moringa (*Moringa oleifera*), whose biomass can be used as food for people and livestock, and the neem (*Azadirachta indica*), whose natural pesticide properties holds potential for increasing agro-forestry yields.

- Examination of the patterns of food distribution and protein consumption in the household, with a view towards identifying factors that contribution to malnutrition among under-fives that could guide intervention design. Such activity could be undertaken by a local NGO that enjoys good working relationship with target communities e.g., Life Relief Foundation.

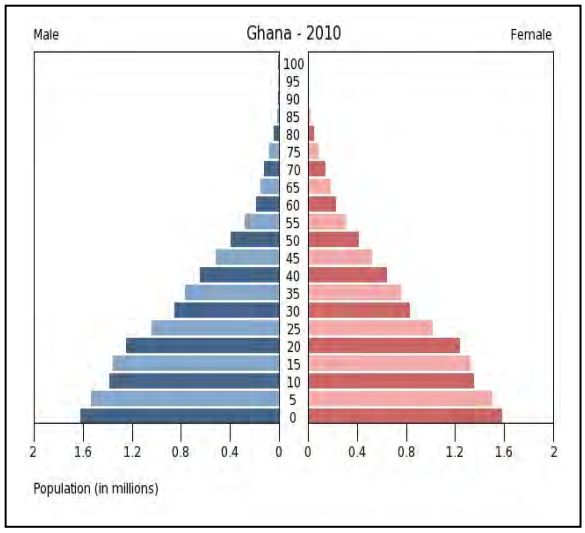
- Dissemination of information to coconut farmers about the symptoms of Cape St. Paul's Wilt disease so they can cull trees at an early stage to control the spread of this lethal yellowing disease (LYD). Coconuts are an important food crop and source of income for coconut-growing communities which rank among the poorest of the poor in Ghana. More effort is needed to assist small-scale farmers to manage the disease spread and to replant their small holdings with naturally resistant varieties of coconut palm i.e., Sri Lanka green dwarf variety (SGD) and Vanuatu fall variety (SGD-VTT) both of which have been successfully tested and applied in Ghana[5].

- Introduction of better methods for processing coconut oil to improve quality, shelf-life and utilization in supplementary feeding programs for malnourished children and elderly people.

Adding family planning, health, nutrition and agriculture interventions to ICFG's mix of interventions will create tangible and immediate benefits for communities in W. Region that could act as incentives for people to more readily adopt and uphold good fisheries practices. By easing population pressure and anthropogenic stress, the recommended FP and RH interventions will also enhance the sustainability of ICFG's gains in the long run.

[5] Information provided by Mr. Robert Quaicoe, Acting Coordinator, Coconut Program, CSIR, Sekondi, Ghana

BACKGROUND AND RATIONALE



Ghana is one of the most populous countries in West Africa, second only to Nigeria. Since 1957, its population has nearly trebled in size – an outcome of high fertility which until recently remained fairly constant, and declining mortality. This combination of high fertility and declining mortality is also the cause for the young age structure of Ghana's population (see population pyramid) with 39 percent under 15 years of age[6][7]. This "youth bulge" is a predictor of continued high growth and increasing anthropogenic stress on the natural resource base. It also suggests potential political issues. For example, the rapid growth of a young adult population unable to find employment can lead to unrest. At last census (2000), Ghana was growing at an average annual rate of 2.7% but more recent estimates[6] suggest a possible slowing to 2.2% which is still high compared to the average rate for the world as a whole (1.17%) and for less developed countries[7].

Twenty-five percent (25%) of Ghana's estimated 24 million people reside in the coastal belt, which comprises only 6.5% of the country's land area. The distribution of the coastal population is uneven with the highest density of human settlements found in the urban coastal centers of Accra (national capital) and Sekondi-Takoradi (capital of Western Region) where population densities exceed 1000 persons per square kilometer[8] - five-times the human density associated with biodiversity loss. Coastal populations also are expanding at a faster pace than the national average figure. Sekondi-Takoradi, for example, registered a population growth rate of 4.2% in the 2000 census[9].

Ghana's economy is dominated by agriculture (including fishing), which employs 60 percent of the working population (formal and informal sectors). According to estimates of the Fisheries Department of the Ministry of Food and Agriculture, 10 percent of Ghana's people rely on the country's fisheries for sustenance and livelihood (*fishermen, fish vendors, processed food sellers etc*). Despite progress towards democracy and economic development in recent decades, the

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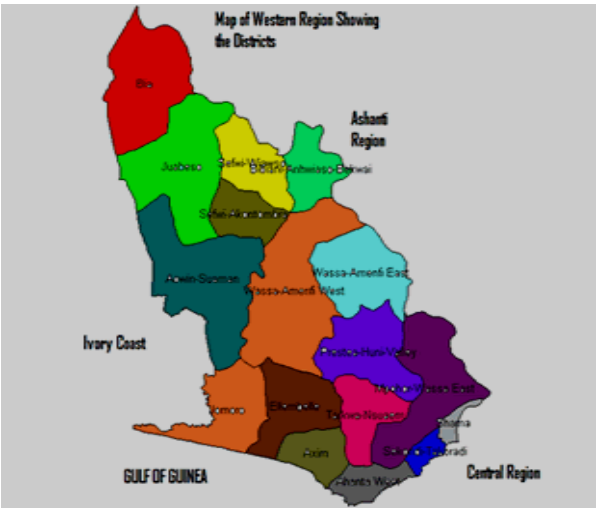
[6] 2010 World Report, PRB. Washington, DC.
[7] 2008 World Bank
[8] Compared to the national average rate of 78.9 persons per square kilometer
[9] Owusu, G (2005). Small towns in Ghana: Justifications for Promotion under Ghana's Decentralization Programme. African Studies Quarterly Volume 8. Issue 2, Spring 2005.

majority of Ghanaians (54%) live on less than US$2.00 per day, with more pronounced poverty found in rural areas. Pervasive poverty undermines people's health and life expectancy which, in Ghana, averages 60 years for both sexes compared to 67 years for less developed countries[10].

Ghana's fisheries, which are an important source of dietary protein and livelihood for coastal dwellers, have been severely over-fished due to increasing demand of the growing population and large-scale poaching by foreign vessels in Ghana's 200-nautical-mile (370 km) maritime Exclusive Economic Zone.[11] This has caused major government concern and new responses from development assistance agencies including USAID, which recently provided its first assistance to the fisheries sector for a program entitled Integrated Coastal and Fisheries Governance (ICFG) that supports the government in achieving its fisheries development objectives of poverty reduction, food security, sustainable management and conservation[12].



Western Region

The Western Region is situated in the southwestern part of Ghana. It shares borders with Cote d'lvoire on the West and Gulf of Guinea in the South (see Map). Its coastline spans 192km and land area totals 23,760 sq, km, (about 10% of Ghana's total area). Six of the region's seventeen districts are coastal. Western Region has the highest rainfall in Ghana (1,600mm per annum)[13], lush green hills and fertile soils. The region is endowed with considerable natural resources that give it a significant economic importance within the context of national development. It has the highest concentration of mines in the country and oil production is about to begin in fourth quarter 2010. It is also the country's largest producer of cocoa, rubber and coconut[14]. About 20% of the rural communities in coastal Western region depended on the coconut palm for their sustenance. The economic and social importance of coconut in the

[10] Population Reference Bureau (PRB) Data for the 2009 and 2010 World Population Data Sheets.

[11] Clark, Nancy L. "Agriculture" (and subchapters). *A Country Study: Ghana* (La Verle Berry, editor). Library of Congress Federal Research Division (November 1994

[12] Coastal Resources Center (CRC), University of Rhode Island. http://www.crc.uri.edu/projects.php

[13] The two rainfall peaks fall between May-July and September/October. In addition to the two major rainy seasons, the region also experiences intermittent minor rains all the year round. This high rainfall regime creates much moisture culminating in high relative humidity, ranging from 70 to 90 per cent in most parts of the region. *www.travel-to-discover-**ghana**.com/**western-region**.html*

[14] Ghanadistricts.com Western Region http://www.ghanadistricts.com/region/?r=5&sa=143

livelihoods of poor communities is frequently understated by international and national statistics that tend to focus on a small number of traded commodities.

About 2.5 million people reside in Western Region (2010 estimate), which registered one of the highest annual rates of growth (3.2%) in the 2000 census. Migration, high fertility and declining mortality account for the rapid expansion. These factors, together with the above-average proportion of young people in Western Region (42%) are expected to result in the doubling of its population by 2022[9].

On average, women in Western Region have higher total fertility (4.2 children per woman) compared to the national figure (4.0). Also, they are less likely to plan their births, use modern contraception and practice exclusive breastfeeding (up to 6 months) – all of which can reduce fertility, slow population growth and improve maternal and infant health. In the 2008 DHS, Western Region registered a higher rate of unmet family planning need among married women (39%) compared to several other regions and nationally (35%). Misconceptions and concerns about potential health risks and side effects of contraceptives deter many women from practicing family planning (FP) despite their desire for *no* more children. Access constraint to government post-partum FP services also contributes to unmet need and low contraceptive use[15]. USAID-Ghana is assisting the decentralized health services in Western and other regions to improve the delivery of FP and safe motherhood services (including malaria treatment during pregnancy) via a program entitled FOCUS. Other USAID funded activities are expanding the role of NGOs and the private sector in community-based family planning (CB-FP) service delivery. These and other programs represent opportunities for PHE integration and resource leveraging.

Other data indicate *one in two* adolescents has unmet need for contraception in Ghana, which often results in unwanted pregnancy and abortion whose incidence is highest among females aged 20-24 followed by those in the 15-19 age group[16]. A recent nationwide school health survey[17] showed 25% of teens aged 13-15 are sexually active, which is considerably younger than the age of sexual debut reported by women in the DHS (18-19 years). Both male and female students reported similar levels of recent sexual intercourse which also is different from previous trends showing boys were more apt to be sexually active at a younger age. These data support anecdotal reports about increasing teenage reproduction cited by community leaders, parents and school administrators interviewed in Western Region and underscore the need for adolescent sexual and reproductive health (ASRH) interventions targeted to youth aged 13-15 as well as older cohorts (16-19 years). This could be one of the innovations that PHE schemes set out to model and evaluate. Results of operations research in Philippines showing youth were

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[15] Ross, J. Maternal and Neonatal Program Effort Index (MNPI): GHANA. Futures Group for USAID and Policy Project.

[16] Sedgh G (2010) Abortion in Ghana, In Brief, New York: Guttmacher Institute, 2010, No. 2

17 Owusu, A. (2007) Global School-based Student Health Survey: Ghana 2007 Fact Sheet. Middle Tennessee State University

more apt to delay sex and use contraception when such behavior was promoted together with pro-environmental behavior suggest reason for using PHE approaches to tackle this issue[1].

Implications of Demographic Trends in Western Region

One implication of the "youth bulge" is the impact it has on the level of dependency, with fewer people working to cater for more people. New jobs also have to be created for an ever-increasing number of new entrants into the labor force, thus putting a severe strain on the economy, and the development of the region. Another source of concern is the impact which the Region's rapidly growing population has on the environment. In trying to cope with an ever-increasing number of people, virgin forests in the Juabeso-Bia and Sefwi-Wiawso areas, for example, are being increasingly converted into agricultural lands, thus further depleting the already threatened forest cover of the region.[8]

Increasing population pressure and density in the coastal belt also compromise the integrity and biological diversity of coastal ecosystems upon which people rely for sustenance and livelihood[18]. Still other concerns center on the region's poor water and sanitation infrastructure. Only 32 per cent of houses in the region have access to treated pipe-borne water (only 8.5 per cent having this available within the dwelling place). In rural districts, most households use rivers, streams, dugouts, springs or rain water as their main source of water. Moreover, 40% of dwellings in the region have no toilet facilities or use public toilets (many just pit latrines). In coastal districts, people habitually use the beaches and outlying bushes for such purposes with the same environs used for disposal of solid and liquid waster.[8] These and other forms of ocean pollution (i.e., industrial and agricultural runoff into the Gulf from Ghana and Cote d'Ivoire) have been linked to elevated levels of algae bloom ('green-green") and reduced fish catch rates.

A water and sanitation (W&S) program called WASH-UP is targeting some coastal communities in Western Region for facilities installation and hygiene promotion with assistance from the Gates Foundation and USAID. PHE advocates may want to prioritize the same communities and build upon these interventions which are also important for environmental security.

[18] Coastal Resources Center - (2009). Integrated Fisheries and Coastal Governance (ICFG) Project report. University of Rhode Island.

Challenges to Human Health and Development in Western Region

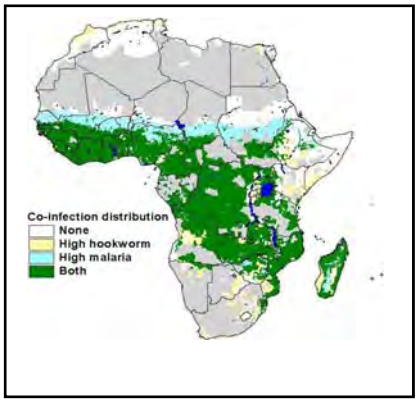
Poor environmental conditions induce the spread of malaria - which is hyperendemic in all parts of Ghana. Malaria is both a root cause and consequence of under-development and the # 1 cause of morbidity in Ghana. Thirty-three percent (33%) of all deaths among under-fives are attributed to malaria which also plays a prominent role in maternal mortality in Ghana. Malaria is also the leading cause of work days lost to illness and, as such, a major challenge to socio-economic development in Ghana.

Prevalence of malaria ranges from 10% to 20% in Western Region where the main vector, *Anopheles gambiae,* is found in mangrove swamps and in rural and peri-urban areas where socio-economic activities lead to the creation of breeding sites. The US President's Malaria Initiative (PMI) is providing assistance to Ghana to prevent and control the spread of malaria and build health worker's capacity in case management and treatment. PHE implementers in coastal areas could help with social mobilization and promotion efforts to assure that interventions penetrate down to the grass roots level, reach the intended target groups and are used correctly and consistently.

Other tropical diseases that mainly afflict people in poor, rural communities in Ghana but have received less attention (called Neglected Tropical Diseases or NTDs) include Lymphatic Filariasis, (elephantiasis) Onchocerciasis, Schistosomiasis, Trachoma, Guinea Worm, Cutaneous Leishmaniasis and Soil Transmitted Helminths, including hookworm whose transmission is highest in coastal areas. NTDs impair physical and cognitive development, cause adverse pregnancy outcomes, and limit adult productivity in the workforce. As a result, they cause lost wages, all but ensuring that those at risk of infection remain trapped in a cycle of poverty.

Available data indicate a high distribution of hookworm and malaria *co-infection* in Ghana (see map on following page). Co-infection has an *additive* impact on hemoglobin, exacerbating anemia-related malarial disease burden. Anemia affects 80% of under-fives and 71% of pregnancy women in Western Region who, as a consequence, are at heightened risk of mortality.

Anemia also affects men and their ability to work but little data exists on prevalence in the male population. Single dose drugs that can treat both malaria and hookworm are available and inexpensive (about US$0.50/person/year). Large-scale use (by an entire community) can decrease the ability of infected persons to infect others, therefore conferring immunity on the whole endemic community. The Global Network for NTDs is providing assistance to Ghana's national and regional Health Service Administration to combat NTDs. PHE implementers in Western region could forge linkages with the government's NTD



program and explore opportunities to collaborate on community-based treatment schemes particularly for malaria-hookworm co-infection.

See Annex 1 for more detailed information about these and other population and health issues in Western Region ***and Annex 2*** for information about the Region's health systems and services.

Other Development Issues and Opportunities relevant to PHE

Ghana is rich in tree and plant genetic resources that have high nutritional, medicinal, ecological and economic value but remain under-utilized in programs designed to combat malnutrition, food insecurity and poverty. Foremost among these are two multipurpose tree species: the Moringa (*Moringa oleifera*) - dubbed the "Miracle Tree" because it's a natural source of food and medicine; and the Neem (*Azadirachta indica*) – labeled the "tree for solving global problems" by the US National Research Council[19] because its natural pesticide properties hold prospective for increasing agro-forestry yields in developing countries[20]. While used in other parts of Ghana and/or West Africa, these trees are under-exploited in Western Region which is something that PHE programs could advance to improve food security at the household level.

Moringa oleifera

For centuries, the natives of northern India and many parts of Africa have known of the many benefits of ***Moringa oleifera*** also called the clarifier tree, horseradish tree and drumstick tree (referring to the large drumstick shaped pods). The East African refer to it as "mother's best friend" because virtually every part of the tree can be used. Native only to the foothills of the Himalayas, it is now widely cultivated in Africa, Central and South America, Sri Lanka, India, Malaysia and Philippines. The immature **pods** are the most valued and widely used of all the tree parts. The pods are extremely nutritious, containing all the essential amino acids along with many vitamins and other nutrients. The immature pod can be eaten raw or prepared like green peas or green beans, while the mature pods are usually fried and possess a peanut-like flavor. The pods also yield 38 - 40% of non-drying, edible oil known as Ben Oil. This oil is clear, sweet and odorless, and never becomes rancid. Its nutritional value most closely resembles olive oil.

The **leaves** are eaten as greens, in salads, in vegetable curries, as pickles and for seasoning. They can be pounded up and used for scrubbing utensils and for cleaning walls. Leaves and young branches are relished by livestock. The **bark** can be used for tanning and also yields a coarse

[19] Veitrneyer, N. 1992. Neem: A Tree for Solving Global Problems. Report on Ad-Hoc Panel of the Board on Science and Technology for International Development, National Research Council, National Academy Press, Washington, D.C.

[20] Saxena, R.C. 1994. The neem tree: Its Potential for Developing Countries. Global Pesticide Campaigner, Vol. 4, No.2, Kenya.

fiber. The **flowers**, which must be cooked, are eaten either mixed with other foods or fried in batter and have been shown to be rich in potassium and calcium.

In developing tropical countries, Moringa trees have been used to combat malnutrition, especially among infants and nursing mothers. Three non-governmental organizations in particular - Trees for Life, Church World Service and Educational Concerns for Hunger Organization - advocate Moringa as "natural nutrition for the tropics." Moringa is especially promising as a food source in the tropics *because the tree is in full leaf at the end of the dry season when other foods are typically scarce*. Scientific research confirms that their leaves are a powerhouse of nutritional value. Gram for gram, Moringa leaves contain: SEVEN times the vitamin C in oranges, FOUR times the Calcium in milk, FOUR times the vitamin A in carrots, TWO times the protein in milk and THREE times the Potassium in bananas.

PHE initiatives could promote the cultivation and use of Moringa at the household and community level as a strategy for reducing poverty and building resilience to climate change impacts. Also, they could measure and document the co-benefits that Moringa generates for human and animal health, food and income security, and environmental conservation and rehabilitation, which is needed to elevate its priority national and regional development planning.

Azadirachta indica (Neem)

Neem - a tree in the mahogany family Meliaceae, is noted for its drought resistance. It can grow in many different types of soil, but thrives best on well drained deep and sandy soils. It is a typical tropical to subtropical tree that can tolerate high to very high temperatures. Neem is a life-giving tree, especially for dry coastal environs. It is one of the very few shade-giving trees (see photo) that thrive in drought-prone areas on the merest trickle of water. Neem is considered an invasive species in many areas where it is non-native, including West Africa. In India, the tender shoots and flowers of the Neem tree are eaten as a vegetable while in Senegal other derivatives of the tree are used to treat malaria. Neem oil has been found to be an effective mosquito repellent that provides a much-needed alternative for people sensitive to DEET. As such, demand for Neem oil in growing in the West. Women's cooperatives in Nepal and India are capitalizing upon the products export potential with many selling directly to consumers via the internet.

Neem derivatives neutralize nearly 500 pests worldwide, including insects, mites, ticks, and nematodes, by affecting their behavior and physiology. Neem does not normally kill pests right

away; rather it repels them and affects their growth. As neem products are cheap and non-toxic to higher animals and most beneficial insects, they are well-suited for pest control in rural areas[21]. Besides its use in ayuvedic medicine, the Neem tree is of great importance for its anti-desertification properties and possibly as a good carbon dioxide sinks. As such, it represents an ideal intervention for promotion via PHE effort in Western Region.

Cocos nucifera

The coconut palm (*Cocos nucifera*) is another multipurpose tree species that holds potential for reducing hunger, food insecurity and poverty in Ghana. It is a very important cash crop along the coastal belt, particularly in Western Region where 20% of rural communities grow coconut in small holdings (05 -5ha) for their sustenance. An important characteristic of coconut cultivation is its ability to spread wealth and generate employment in rural areas where few other employment opportunities exist. Farmers use the palms and nuts for food and shelter and process the copra into oil for cooking and other uses. Byproducts of coconut oil production (i.e. the chafe) are sold to local piggeries for livestock feed while the coconut and palm kernel shells are sold as fuel. Activated carbon, which Ghana imports in large quantities, can also be made from coconut and palm kernel shells – for which the Institute of Industrial Research is currently developing local capability.

Cocos nucifera is one of the oldest trees on the planet. For centuries cultures around the world have revered and relied upon coconut for its nutritional powers and infinite practical uses – which is why it is called the 'Tree of Life'. Its health benefits are linked to the favorable fats found in coconut which consist of medium chain fatty acids (MCFA). Scientists have long recognized MCFAs such as lauric[22] and capric acid for their anti-viral and anti-microbial properties[23]. Lauric acid also occurs naturally in human breast milk and plays a vital role in nourishing and protecting babies from infections[24] . The body utilizes MCFAs as energy instead of storing them as fat, which promotes weight maintenance without raising cholesterol levels[25]. These and other attributes of coconut oil have yet to be fully appreciated in Ghana although coconut water is widely recognized as a natural oral dehydrate and promoted as a home remedy for management of diarrheal-dehydration – a major killer of infants and under-fives in Ghana.

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[21] Kausik Biswas, Ishita Chattopadhyay, Ranajit K. Banerjee Biological activities and medicinal properties of neem (*Azadirachta indica*) *CURRENT SCIENCE*, VOL. 82, NO. 11, 10 JUNE 2002

[22] Lauric acid exists abundantly in coconut and plays a fundamental role in building our body's immune system. Once in our system it transforms into an antibacterial and antiviral substance called "monolaurin" which destroys viruses and diseases

[23] Goh, John "Take Lauric Acid for a Strong Immune System." Nov. 19, 2006. EzineArticles.com.

[24] Fife, Bruce C.N., N.D., 'The Coconut Oil Miracle' Penguin Group, New York, NY 2004

[25] St. Onge, Marie-Pierre PhD and Peter J.H. Jones PhD "Journal of Nutrition" 1999-2002.

The potential exists to introduce improved technology for processing coconut oil which currently fetches a low price in the market because of its inferior quality. Cold-press methods for producing virgin coconut oil (VCO) are used in many developing countries in Asia-Pacific, which are profiting from growing domestic consumption and international demand for VCO that fetches high prices in natural food stores in USA. Processing equipment for small-holder operations is available at relatively low cost ($6000 per unit) from Australia and other sources suggesting potential application in PHE projects. Researchers at CSIR reportedly have also perfected the traditional process and produced batches of VCO that are still undergoing testing. The spread of Coconut Lethal Yellowing Disease (LYD)[26] in Ghana, however, raise concerns about the viability of investments in VCO production in Ghana.

LYD, which is caused by a phytoplasma, has been in Ghana since 1932. Spread of the disease for the past 5 years has mainly been the expansion of existing foci in the Volta region. However, new outbreaks have occurred in Central region and some districts of Western region. Control is best achieved by planting of resistant cultivars. Given the low input subsistence nature of coconut cultivation in Ghana, the use of tolerant ecotypes is the most promising and economic method of bringing the disease under control.[27] PHE initiatives, therefore, should first prioritize activities to increase farmers' awareness of the early symptoms of LYD[28] and capacity to manage the spread via rapid culling. Micro-financing might also be needed to enable farmers to replant their holdings with naturally resistant varieties such as Sri Lanka green dwarf variety (SGD) and Vanuatu fall variety (SGD-VTT) both of which have performed well in Ghana[29].

[26] Also called Cape St. Paul wilt disease (CSPWD)

[27] EU Data Sheets on Quarantine Pests: Palm lethal yellowing phytoplasma

[28] An early symptom is the drying up of developing inflorescences. In coconut palms the spathes enclosing the flowers become discoloured and the tips blacken. The youngest leaves next to the buds show water-soaked streaks which spread until there is a terminal rot of the growing point. After the first symptoms there is a progressive leaf discoloration, beginning with the older leaves and spreading rapidly to the younger ones. The foliage turns light-yellow and eventually orange-yellow. This symptom coincides with the death of root tips. Death occurs in C. nucifera about 4 months after the initial symptoms appear.

[29] Information provided by Mr. Robert Quaicoe, Acting Coordinator, Coconut Program, CSIR, Sekondi, Ghana

III. OPPORTUNITIES FOR INTEGRATING POPULATION, HEALTH AND NUTRITION INTERVENTIONS INTO ICFG

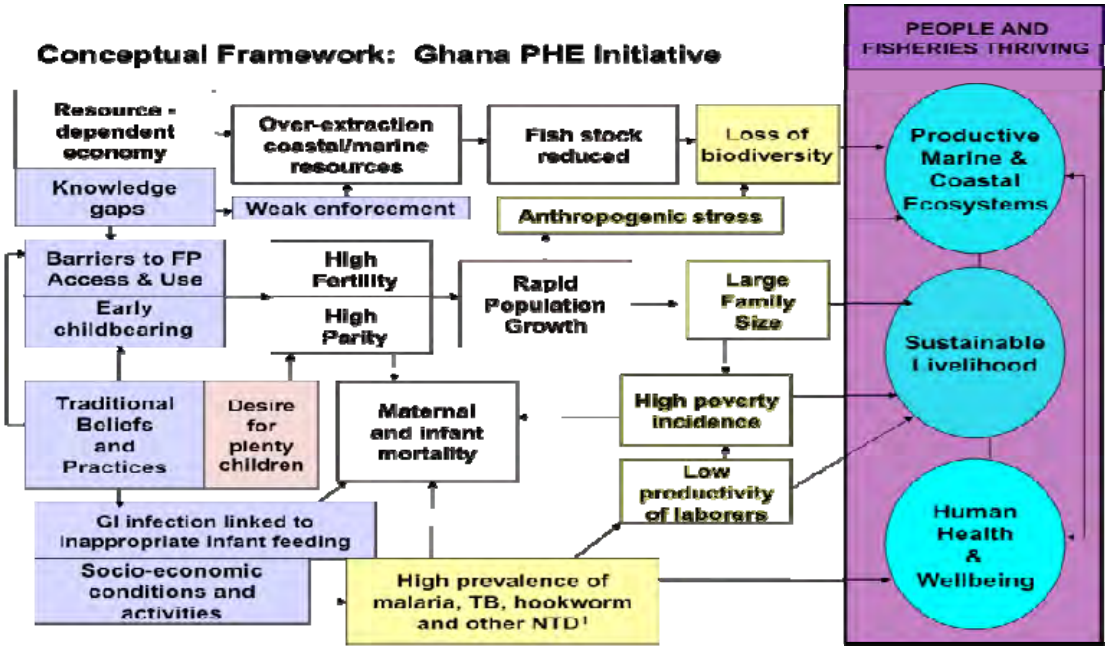
ICFG provides an ideal platform for promoting integrated approaches to population-health-environment (PHE) within the context of the Government of Ghana's fisheries development program and objectives e.g., poverty reduction, food security, sustainable management and conservation. ICFG is helping the Government to put in place the enabling conditions (1st order results) and good practices (2nd order results) requisite to reverse deteriorating trends in the fisheries sector. Assuming the necessary enabling conditions and good practices are implemented effectively and sustained over the long term, it is expected that ICFG will also generated improved social and environmental outcomes (3rd order result). In the short term, ICFG is contributing to improved food security by reducing post-harvest losses and creating opportunities for resource-dependent households to diversify their income sources.

Recognizing that is will be difficult to sustain ICFG's gains in the face of unbridled population growth; CRC is assessing the feasibility of linking population and family planning interventions with ICFG's strategies. At the request of CRC, the BALANCED project sent a PHE specialist to Ghana in June 2010 to meet with ICFG stakeholders and visit project field sites in Western Region to explore needs, opportunities and possible mechanism of integration. The scoping visit identified unmet need for family planning (FP) and adolescent sexual and reproductive health (ASRH) as well as other health and food security concerns and offered recommendations for linking specific interventions with ICFG strategies. Such effort could generate tangible and immediate benefits for communities in Western Region that could act as incentives for people to more readily adopt and uphold good fisheries practices. By easing population pressure and anthropogenic stress, it would also enhance the sustainability of ICFG's gains in the long run.

Conceptualizing the PHE Approach

PHE designers often find that it is useful to graphically illustrate the population/health and environment dynamics ongoing in a target location and the inter-relationships among the factors. Drawing on lessons learned from the Philippines PHE Study Tour, personnel of FoN drafted a concept for integrating population and health interventions into the framework of ICFG. Using information presented above and in Annex 1, the PHE consultant worked with FoN to refine the concept which is still a work in progress (see graphic below). The right-hand column of the graphic presents the long term vision of the initiative ("People and Fisheries Thriving") and the requisite conditions to achieve the goal (blue circles) and the interdependencies among those conditions (arrows). The yellow boxes to the immediate left depict the direct threats to the targets while the pink boxes identify the indirect factors or root causes (pink) of which some also offer opportunities for intervention (blue boxes) with the arrows showing the inter-relationships among the various factors. Given the limitations of the graphic format, it was not possible to include all of the issues mentioned earlier in the diagram. Those that pertain to reproduction and

maternal and child health were afforded top priority so as to guide the next investments of the BALANCED project in Ghana.

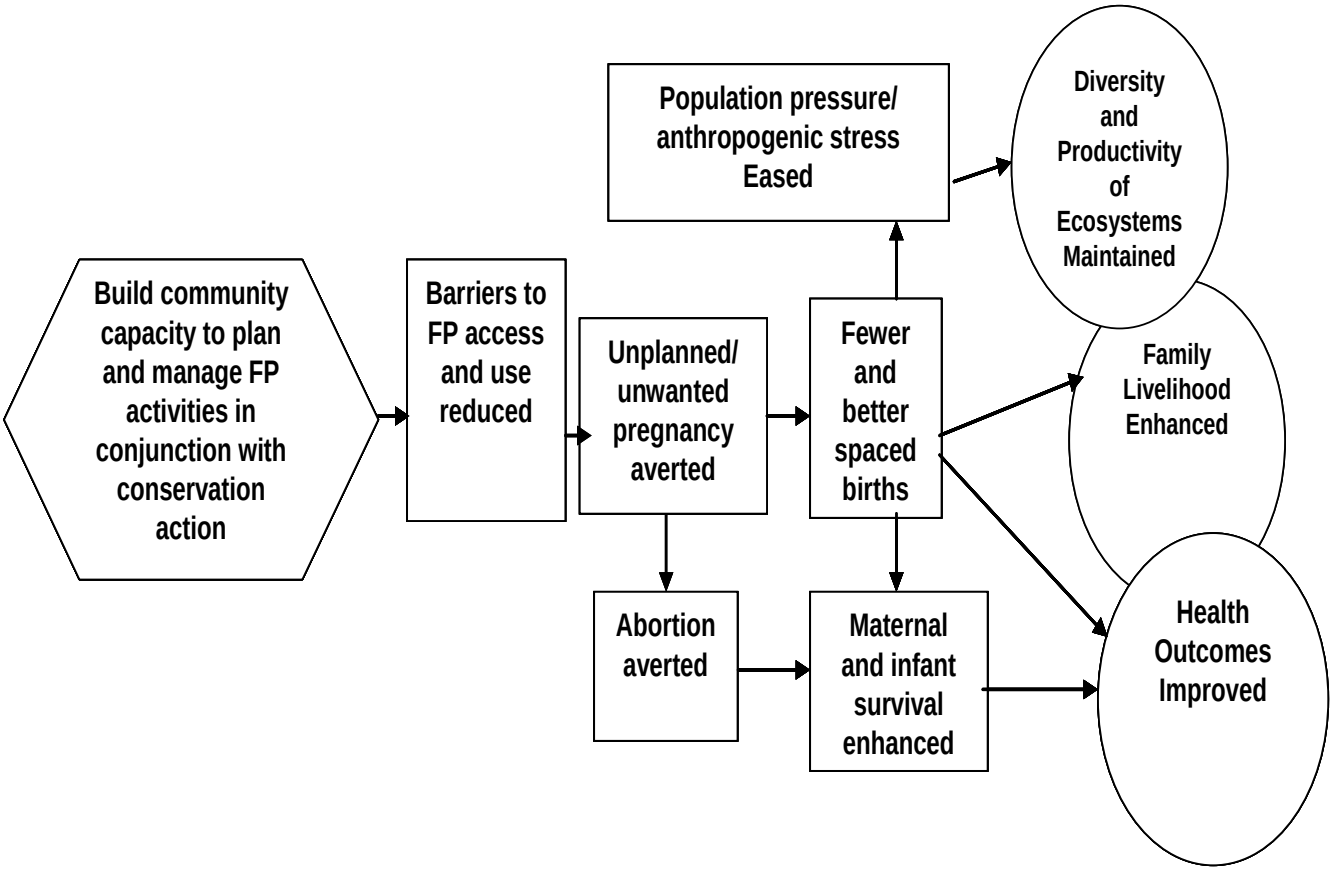


Reading the diagram from left to right relates some of the root causes of biodiversity loss which is having a negative effect on the integrity and productivity of Ghana's fisheries and coastal ecosystems e.g., lack of conservation know-how, weak enforcement of existing environmental laws (and lack of civic engagement in enforcement effort) and over-reliance on extraction of natural resources for economic development and livelihood. Another driver is mounting anthropogenic pressure on ecosystems driven by rapid population growth caused, in part, by high fertility grounded in traditions (preference for many children and early marriage) and barriers to access (geographic, financial etc.) and use of family planning (fears about infertility, misconceptions about side effects etc).

Traditional beliefs and feeding practices (i.e., withholding colostrum, early introduction of supplements) also undermine the health of newborns and the natural contraception effects of lactation thus contributing to morbidity and mortality among infants and mothers, which directly impacts human wellbeing. Other socio-economic conditions such as high prevalence of malaria, hookworm and other tropical diseases directly impact human health and indirectly influence sustainable livelihood via reduced productivity and ability to work.

Strategies for remediation can then be tested by teasing out the individual causal chain and making assumptions about the results they could produce in the short-term (boxes) and how

these contribute to the desired outcome or target (oval) in the long run. The example depicted below shows how community based family planning can contribute to three different sectoral outcomes which in turn reinforce each other (overlapping ovals) in a synergistic fashion.



IV. PHE DESIGN AND RESULTS FRAMEWORK

Using the above conceptual model, causal results chains and other information, FoN and BALANCED jointly developed a Results Framework for the PHE initiative in Ghana, which is summarized below. It is important to emphasize that this initiative, herein referred to as ICFG-*PLUS*, is *not* a stand-alone project. Rather, it is a complementary set of activity within an existing integrated project that will augment the mix of interventions and strategies needed to effectively mediate the complex PHE interrelationships in coastal Ghana that undermine food security and exacerbate poverty. As with ICFG, this initiative will also embrace issues of biodiversity, ecosystem services and climate change although, for the task at hand, the following results framework focuses on the anticipated FP/RH results which, subsequently, can be merged with ICFG's framework.

Vision: People and fisheries thriving in harmonious balance in coastal Ghana
Goal: Improved welfare of coastal families and ecosystems in Western Region
Objectives:

1. Stakeholders collaborating across the fisheries, health and agriculture sectors to promote approaches to development coastal-fisheries governance that incorporate human health perspectives, particularly improved reproductive health of adolescents and young adults who comprise over half of the Region's population
2. District Assemblies' (DAs) supporting and enabling the implementation of integrated approaches to coastal-fisheries governance and reproductive health management
3. Local institutions delivering FP/RH and PHE services in conjunction with conservation activities
4. Reproductive health outcomes improved in target coastal communities
5. Food security improved in target coastal communities

Intermediate Results (IR) Indicators (recommended):

IR1: Number of plans or policies that integrate cross-sectoral approaches to PHE
IR2: Value of resources leveraged from DAs and other stakeholders for implementation of PHE activities in Western Region (cash and inkind)
IR3**:** (a) Number of local institutions delivering PHE and FP/RH services
(b) Average household distance/time to FP service point
(c) Number of PHE organizations addressing non-traditional audiences (audiences different from those that the organization typically addresses
IR4: (a) Number of new users of family planning
(b) Proportion of women (15-49 yrs) currently using modern methods of FP
(c) Proportion of infants exclusively breastfeed up to age 6 months
(d) Number of youth (12-19 years) reached with ASRH information
IR5: Percent of respondents agreeing with the statement "our family always lacks for food."

Role of CRC and FoN

The PHE initiative will work with and through the same local partners as ICFG, particularly Friends of the Nation (FoN), and well as other local institutions that have established presence in coastal areas and expertise in community organization and social mobilization. Friends of the Nation (FoN) are a strong advocate of FP and reproductive health with relevant hands-on experience (promoting female condom use and HIV prevention strategies; sensitizing men to use the male condom consistently) and credibility in coastal communities. FoN will serve as the entity through which the BALANCED Project will transfer know-how for PHE integration and implementation. Key personnel of FoN have already been exposed to successful models of PHE integration operating in coastal areas of the Philippines (i.e., IPOPCORM) via participation in a South-to-South study tour organized by BALANCED in February 2010.

Field implementation of FP/RH activities will be financed via ICFG's Small Grants Program and by leveraging resources from other sources, particularly training and IEC materials from other USAID project operating in the region and commodities from the Regional Health Administration and/or via collaborative working arrangements with other NGOs implementing CB-family planning project in the Region i.e., Health Keepers Network (HKN) and Precision.

FoN will catalyze and facilitate activities designed to increase awareness of PHE and access to FP/RH methods and services (1st order result) with a focus on young adults (15-30 years) both male and female. Among other strategies, ICFG-PLUS will employ community outreach, peer education, behavior change communication (BCC) and social marketing approaches to achieve this objective. ICFG-PLUS will also create opportunities for teens (15-19 years) to emerge as role models and promoters of pro-environment and responsible sexual behaviors among their peers with the aim of preventing unplanned pregnancy, abortion and illegal environmental practices, which reportedly are increasing in coastal communities.

Role of BALANCED

BALANCED will continue to strengthen the capacity of FoN to catalyze PHE initiatives in Ghana by providing planning, technical assistance, monitoring and evaluation (M&E) support and continual coaching and mentoring inputs to incrementally build their capacity to capacitate other local NGOs and community based organizations (CBOs) to implement FP/RH strategies and activities in conjunction with integrated coastal-fisheries governance activities. BALANCED will also support CRC's and FoN's efforts to coordinate the PHE effort with relevant government agencies at regional and district levels, and to develop partnership arrangements with local institutions (i.e., schools, cooperatives, CBOs) and organized grassroots entities in coastal communities (i.e. associations of fishers, fishmongers, coconut farmers, women/youth clubs etc.) for delivery of the FP/RH interventions to target groups in selected coastal districts of Western Region.

BALANCED will also assist CRC and FoN to establish systems and the means to monitor progress towards the stated objectives and intermediate results. To the extent possible, the PHE metrics should be merged with the ICFG monitoring and evaluation plan and use the same methods of data collection and analysis.

Site Selection Considerations

To avoid duplication and maximize synergy of effort, ICFG-*PLUS* activities must be closely coordinated with other USAID-funded family planning and health projects ongoing in Western Region, which also present opportunities for resource leveraging. These projects are discussed in detail in ***Annex 1.***

Of the six coastal districts in the region, four offer the best prospects for catalyzing PHE integration in the immediate future – due either to the presence of other USAID family planning and health projects and/or local institutions that offer mechanisms through which ICFG-*PLUS* activities can be implemented in the communities. These districts include (are) Ahanta West, Shama, Ellembelle and the Sekondi-Takoradi Metropolitan Administration (STMA).

STMA presents opportunities for developing and testing models of PHE integration in collaboration with urban slum communities and USAID partners that are working to improve access to safe water/sanitation or to delivery interventions for malaria (bednets, treatment) and HIV/AIDS (prevention, care and support) or to promote change in behaviors for prevention of child malnutrition, unwanted pregnancy, etc. Ahanta West and Shama present opportunities for working collaboratively with rural communities and two USAID partners (Health Keepers Network and Precision Dx) on the development of mechanisms in the private sector to promote wider use of FP and bridge gaps in access to short-term FP methods, and with other USAID partner (Marie Stopes) on referral mechanism for long-term FP methods (IUD, implants, etc).

The dearth of adolescent sexual and reproductive health (ASRH) projects in Western Region suggests a niche program area for ICFG-*PLUS*. Consultations with community leaders and health workers indicate teenage pregnancy is a growth problem in both urban and rural communities in W. Region. Other information presented in *Annex 1* indicates youth are having sex at an earlier age in Ghana,, which supports this assumption. Anecdotal reports of young unwed mothers being harassed at ante-natal clinics underscores the need for youth-friendly ASRH information and services if Ghana.

The district of Ellembelle offers an unique opportunity to develop and test a ASRH model by working with and through an existing training institute for community health nurses (World of Life Institute) whose graduates perform two years of service in the same region before becoming career public health workers. Existing ASRH materials that incorporate PHE (developed in Philippines) could be quickly adapted for use in Ellembelle with participation of the nursing

student who could then use the materials to educate youth in the community during outreach practicums (year 2 students). Western Region has a large number of institutions for training nurses and health assistants as well as a number of youth organizations that represent potential audiences and future users of the ASRH modules.

Possible FP/RH Interventions and Activities

The following table presents some potential FP/RH interventions and activities that could be implemented at district and community levels to reduce barriers to FP/RH and promote wider acceptance and use of methods to prevent unwanted pregnancy, STIs and morbidity and mortality associated with inappropriate infant feeding practices. Cost estimated for these activities still need to be prepared and will depend on the numbers of communities/district and groups within those communities targeted for assistance. FoN and CRC will assume primary responsibility for budget preparation with inputs from BALANCED as needed.

Barriers	Possible PHE interventions
Male attitudes	• Peer-mediated behavior change communication using trained male peer educators (PEs) who also are members of community based fisheries management committees (CBFMC) or community environmental monitoring and advocacy groups (CEMAG). Empower the same PEs to desensitize condom use and distribute condoms to other males • IEC messages and media geared to the preferences of male audience in W. Region (men learn differently than women; thus its important to first identify media that appeals to males)
Misconceptions and concerns about contraceptives and side effects	• Interpersonal communications and counseling (IPC) through trained female PEs who also are members of CBFMC, CEMAG, Fishmongers' Groups etc. • IEC campaign that uses print and interactive media to promote FP and address these rumors (use/adapt materials developed by the Behavior Change Support Project and/or develop new materials with integrated PHE concepts)
Poor access to FP methods due to: 1) lack of supplies, 2) lack of functioning community health posts, 3) price of FP methods, and 4)social issues related to asking for pills or condoms	• Collaborate with the Health Keepers Network; tap and train their providers on PHE (Sharma) • Collaborate with Precision Dx; tap and train their providers on PHE (Ahanta West) • Build/strengthen referrals to GHS facilities (all districts) and Marie Stopes' static and mobile health clinics (Shama and Ahanta West)
Lack of youth-friendly ASRH services	• Empower local CBO partners will RH-rights knowledge and skills to advocate effectively with the GHS for improved services for youth • ASRH training and outreach experience for future community-health nurses via collaboration with World of Life Institute • Identify and train indigenous leaders among youth in the community to serve as PHE change agents and promoters of responsible reproductive and sexual behavior • Establish mechanisms of referral between youth PHE agents and government and private providers of FP/RH services
Low level of appreciation for family planning among decision makers and religious leaders	• Advocacy communication targeted to formal and informal leaders in the communities (including religious leaders) to increase awareness of the inter-relationships among population-environment and food insecurity dynamics in coastal Ghana and the co-benefits that FP can generate for human health, food security and conservation.
Traditions that undermine infant survival	• Empower CBOs, CBFMC, CEMAG, Fishmonger groups etc. with knowledge and skills to promote exclusive breastfeeding and to manage common breastfeeding problems.

Possible Health and Food Security Interventions

While BALANCED is unable to fund technical services for the integration of health, nutrition and agro-forestry interventions, this report nevertheless recommends that CRC and FoN pursue other sources of funding to add such interventions into ICFG to redress the negative impact that malaria, anemia and hookworm infection, among others, are having on the health and productivity of fishers and their families. CRC could utilized the same partnerships and community-based service delivery mechanisms developed for family planning to simultaneously deliver combined treatments for malaria-hookworm co-infections. Assuming availability of funds, it would also be important to measure the impact of such treatment on the nutrition status of children and productivity of adult laborers (fishers). Similarly, interventions to promote awareness and use of multi-purpose and drought resistant species of trees (Moringa, Neem) to improve food and income security could also be promoted along with FP and health interventions.

Approach to Information, Education and Communication (IEC)

To the extent possible ICFG-PLUS will utilize, and amplify the reach of, IEC messages and campaign materials developed under a previous USAID project i.e., Sustainable Change Support Program (SCSP), and ongoing projects i.e., the Behavior Change Support (BCS) and FOCUS Regional Health (FRH) projects. FoN has already begun the process of posting print materials (provided by USAID Ghana OPHN) targeted to men in ICFG project sites ("Real Men Plan Their Families") whose key messages underscore five good reasons why men should practice family planning themselves or support their partners' use of FP methods. BALANCED will assist FoN to incorporate PHE concepts into existing IEC and to develop and pretest new messages and materials as indicated.

Timing and Resource Mobilizations for Implementation

Experience from other countries indicates that 36 months of field implementation is required to develop and refine PHE approaches that yield sustainable impact. This implies a need for at least three-years of support for communities that undertake PHE activities. NGOs in the Philippines, Nepal and other countries have demonstrated ways in which PHE effort can be co-financed and sustained by leveraging resources from other projects and by mobilizing counterpart contributions (cash and in-kind) from domestic sources e.g., government, the commercial sector, and partner CBOs and the communities themselves. To secure counterpart contributions from government and other sources, some NGOs execute formal agreements i.e., Memorandum of Understanding (MoU) with local collaborators that clearly define the role and contribution of each party. Such counter partnering for activity financing resulted in higher levels of community buy-in and ownership that helped to sustain PHE effort beyond the project's

life. As such, it is recommended that CRC and FoN encourage its local partners to adapt similar strategies for mobilizing resources to support PHE activity implementation in Western Ghana.

Coordination and Collaboration

FoN and CRC will coordinate the PHE effort with the Ministry of Health (MoH), the Ghana Health Services (GHS) in the Western Region and the offices of the 2 Districts Directors of Health Services (Shama and Ellembelle) as well as with the Environmental Protection Agency (EPA) and the Fisheries Department of the Ministry of Agriculture (MoFA). For activities pertaining to agro-forestry, it will coordinate with the Council for Scientific and Industrial Research (CSIR), particularly staff working on the coconut sector in the Western Region (Jomoro, Ellembelle, Nzema-East and Ahanta-West Districts).

Annex 1

POPULATION AND HEALTH PROFILE
WESTERN REGION, GHANA

High Fertility and Unmet Need for FP in Western Region

Data from Ghana's 2008 Demographic and Household Survey (DHS) [30] provide insights into some of the determinants of high fertility among married women in Western Region, where parity averages 4.4 and ranges as high 7.1 (children/woman) in some areas (e.g. the district of Mpohor-Wassa East). Contributory factors include the Region's *below*-average rates of female literacy (48% vs. 67% nationally) and contraceptive use (13% vs. 17%) and *above*-average rate of unmet need for family planning (39%) compared to the national figure (35%[31]) and the African continent as a whole (22%). Married men in Ghana also have high levels of unmet need for FP that are comparable to, although slightly lower than, those for women[32]. Concerns about health risks or side effects associated with contraceptives account for much of the unmet need[33]. In rural areas, access constraints to post-partum FP services comprise another important factor[34]

The benefits of family planning extend beyond slowing the pace of population growth. By using contraception, women can avoid the high risk of poorly timed pregnancies that jeopardize their health and that of their children. FP also reduces woman's exposure to unintended pregnancies, reducing the number of abortions and abortion related complications. Limiting and spacing the number of births also helps to ease a couple's financial burden and risk of food insecurity at the household level. Realization that family planning constitutes one of the most cost-effective and practical interventions to reduce maternal and infant mortality was not readily evident in our discussions (albeit limited) with government health officials and workers at both regional and district levels suggesting a need for additional awareness-building inputs to strengthen commitment to FP among key constituents in Western Region.

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30 Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF Macro (2009) Ghana Demographic and Health Survey 2008. Key Findings.

[31] 22% of unmet need is for spacing and 13% for limiting the number of births.

[32] Ngom, P. (1997) Men's unmet need for family planning: Implications for African fertility transitions. Studies in Family Planning Vol. 28, No. 3. pp. 192-202. Population Council, NY, NY

[33] USAID (2006) Ghana's Development Agenda and Population Growth: The Unmet Need for Family Planning . National Population Council with support of The POLICY Project.

[34] Ross, J. Maternal and Neonatal Program Effort Index (MNPI): GHANA. Futures Group for USAID and Policy Project.

Adolescent Reproduction and Unmet Need for Contraception

One of the determinants of high fertility in Ghana is early onset of childbearing. Although the practice of child marriage has diminished over the decades, a large proportion of females (49%) become mothers by age 20[15]. Adolescent reproduction brings a number of health risks to young mothers and their newborn infants – which have a 73% higher mortality rate than infants born to older mothers[35]. Early onset of childbearing also shortens the length of a generation and accelerates population growth[36]. An analysis of data from DHS and AIDS Indicator Surveys (AIS) conducted between 2001 and 2005[37] indicates 23% of teenage (15-19 yrs) girls in rural Ghana have ever been pregnant compared to 10% of their counterparts in urban areas. Adolescent pregnancy was also more common among the less educated and those with limited access to media. More recent DHS data (2008) suggest a declining trend in adolescent pregnancy and childbearing in rural areas (16%) with slight increase in urban settings (11%).

The 2007 Ghana Global School-based Student Health (GSSH) Survey present new insights into the sexual behavior of girls and boys aged 13-15 yrs. Twenty-five percent (25%) of students reportedly engaged in sexual intercourse within the 6 month period preceding the survey, with boys and girls reporting comparable levels of sexual activity[38]. This reflects a much earlier age at first sex compared to previous generations (18 years), portending the likelihood of increasing incidence of teenage pregnancy. The same data, however, documented a relatively high level of recent condom use (60%) among sexually active students, which gives cause for hope.

Nearly one-in-two adolescents in Ghana has unmet need for contraception, according to the National Population Council (NPC)[39]. Unmet need frequently results in unwanted pregnancy. In time of need, some women turn to unsafe abortion providers or try to induce abortion themselves. More than one in ten maternal deaths is the result of such practices[40]. Data from the 2007 Ghana Maternal Health Survey (GMHS) indicate abortion incidence is greatest among females aged 20-24 yrs (25 per 1,000 women) followed by girls aged 15-19 yrs (17 per 1,000). Governmental and private agency efforts to institute sex education and contraceptive service

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[35] Levine, R. et. al (2008) Girls Count: A Global Investment and Action Agenda.. The Center for Global Development, Washington DC, USA,

36 Early onset of childbearing shortens the length of a generation, i.e., the number of years after birth when a woman replaces herself with female children. The length of a generation affects the rate of growth of a population independently of the number of children born. This is so because the more rapidly a generation replaces itself, the more rapidly it will add new members to the population.

37 Khan, Shane, and Vinod Mishra. 2008. Youth Reproductive and Sexual Health. DHS Comparative Reports No. 19. Calverton, Maryland, USA: Macro International Inc.

38 Owusu, A. (2007) Global School-based Student Health Survey: Ghana 2007 Fact Sheet. Middle Tennessee State University.

39 Pav Govindasamy and Emmanuel Boadi (2000) A decade of unmet need for contraception in Ghana: Programmatic and Policy Implications. Ghana National Population Council Secretariat and Macro International Inc.

40 Sedgh G (2010) Abortion in Ghana, In Brief, New York: Guttmacher Institute, 2010, No. 2.

programs for adolescents, have, thus far, been inadequate. Prevention of unwanted pregnancy (and all of its detrimental consequences) must be a high priority item on the development agendas of both national and local governments – for the sake of both human wellbeing and sustainable development.

PHE activities targeted to youth in the Philippines resulted in statistically significant improvements in responsible reproduction behavior and pregnancy prevention practice in a relatively short period of time (3 or less years)[41]. By linking FP with conservation and food security objectives, the project was able to deflect opposition from religious and conservative groups in society that oppose modern contraception and youth's access to sexual and RH information and services. The Philippines model has since been successfully adapted and applied among teens in Nepal and likewise offers potential for Ghana.

Maternal and Infant Mortality

The rate of maternal mortality (MMR) is a subject of much debate in Ghana. WHO reported the country rate for year 2000 as 540 deaths per 100,000 live births[42] while other estimates range as high as 750. Region-specific MMR data is even more difficult to locate. One proxy indicator used in DHS in the proportion of births assisted by a skilled provider. Western Region registered a slightly higher rate (62%) than the national average figure (59%) in 2008.[11] Nonetheless, one in four deliveries are occurring under less than ideal conditions.

Direct medical causes of maternal mortality in Ghana include hemorrhage, infection, hypertensive disorders, obstructed labor and unsafe abortion.[15] Conditions such as anemia, diabetes, malaria, and sexually transmitted infections (STIs) increase a woman's risk for complications during pregnancy and childbirth, and, thus, are indirect causes of maternal mortality and morbidity. Other indirect causes include early childbearing and failure to effectively use contraception. Assuming that unmet FP need in Ghana is achieved by 2015, the NPC estimates that 4,419 maternal deaths would be averted by the reduction in unwanted pregnancies over the period, 2000 to 2015[14]. Improved breastfeeding practice would also contribute to better health outcomes among both women and their infants. 63% of mothers in Ghana reportedly practice exclusive breastfeeding (EB) until their infants reach 6 months of age[11]. Available information, however, reflects much lower EB practice among mothers in Western Region (22%)[43]. Nonbreast milk substances, which are often introduced within weeks after birth, are more likely than breast milk to carry infections to the infant.

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41 PATH Foundation Philippines and Demographic Research and Development Foundation (2005). Results from the evaluation of the Integrated Population and Coastal Resource Management (IPOPCORM) Project. PFPI. Manila, Philippines.

42 WHO Mortality Country Fact Sheet 2006. Ghana

[43] Ghanaweb. Health News (Aug 2005) http://www.ghanaweb.com/GhanaHomePage/health/artikel.php?ID=87137

A recent investigation of the associations between early infant feeding practices and neonatal mortality in Ghana documented a strong association (5.7-fold adjusted risk) between partial breastfeeding and infection-specific neonatal death[44]. This study also provides "the first epidemiologic evidence of a causal association between early breastfeeding and reduced infection-specific neonatal mortality in young human infants," according to the researchers of this ground-breaking study. This valuable information needs to be translated into simple but persuasive messages and disseminated widely to policymakers, the general public and young people in Western and other regions of the country where EB practice in languishing. Such effort could lead to improvements in the rate of infant mortality (IMR) in Ghana which, for over a decade, has persisted at nearly the same high level[45]. An analysis of IMR determinants showed that while mortality among older infants had declined considerably, the effect (on the metrics) was offset by an increase in neonatal mortality during the same period[46]. The implications of this finding point to EB, and other evidence-based interventions that reduce neonatal mortality risk, as being of paramount importance for IMR reduction in Ghana. PHE projects offer new platforms and avenues for advancing EB practice, particularly among hard-to-reach groups in remote rural areas. Western Region represents an ideal place to model such an approach.

Tropical Disease Burden in Western Region

Malaria is hyperendemic in all parts of Ghana, with the entire population of 23.8 million at risk[47]. It is both a cause and consequence of under-development and a major deterrent to socio-economic progress. According to the Ghana Health Service (GHS), malaria is the number one cause of morbidity, accounting for about 38% of all outpatient illnesses and 36% of all admissions. Thirty-three percent (33%) of all deaths among under-fives are attributed to malaria[21] which is also the leading cause of workdays lost due to illness in Ghana[48].

Malaria also plays a role in tropical anemia which afflicts 71% of women in Western Region (highest prevalence rate in the country) and 80% of under-five children.[23] The consequences of anemia are particularly severe for children and pregnant women. Chronic anemia during childhood is associated with impairments in physical growth, cognition and school performance, while severe anemia contributes to 21.6% of malaria-attributable deaths among

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44 Edmond, Karen M., Charles Zandoh, Maria A. Quigley, Seeba Amenga-Etego, Seth Owusu-Agyei, and Betty R. Kirkwood. "Delayed Breastfeeding Initiation Increases Risk of Neonatal Mortality." Pediatrics 117 (2006): 380-86.

[45] IMR in 1998= 50 deaths/1000 live births while in 2008 = 57/1000

[46] Harper, G. (2009) The lost decade: Infant Mortality in Ghana. University of Florida, Journal of Undergraduate Research: Volume 10, Issue 4, Summer 2009

47 USAID. President's Malaria Initiative: Malaria Operational Plan Year Three (FY 2010) GHANA

48 Asante and Asenso-Okyere (2003) Economic burden of malaria in Ghana. A Technical Report Submitted to the World Health Organization (WHO), African Regional Office (AFRO)

children in Ghana[49]. Maternal anemia is associated with low birth weight and increased maternal morbidity and mortality.

Prevalence of malaria ranges from 10% to 20% in Western Region where the main vector, *Anopheles gambiae*, is found in mangrove swamps and in rural and peri-urban areas where socio-economic activities lead to the creation of breeding sites. These rates are relatively low compared to Northern Ghana where malaria prevalence exceeds 90% particularly in savannah areas[25]. Yet tropical anemia is more prevalent among women in Western Region (71%) compared to Northern Region (59%) [23]. Other etiological factors such as hookworm disease[50] and dietary deficiencies could account for the discrepancy. Data showing high distribution of hookworm and malaria *co-infection* in Ghana[51] support this assumption (see Figure 1). Hookworm (and other helminthes) cause anemia through direct blood loss, while malaria contributes to anemia by hemolysis or destruction of parasitized cells and causes shortened red cell survival. Because the mechanisms *differ* by which malaria and helminthes cause anemia, their impacts on hemoglobin are *additive*, exacerbating anemia-related malarial disease burden[52]. A recent study among 746 pregnant women that delivered in two hospitals in Kumasi, Ghana,[53] for example, reported a higher rate of stillbirth among women co-infected with P. falciparum and helminthes compared to women with a single infection or no infection.

The additive impacts of plasmodium-helminth co-infection suggest the potential additive *benefits* of combining malaria control with anthelminthic treatment. Some of the highest rates of hookworm transmission occur in the world's coastal regions, where infective third-stage larvae can migrate freely in sandy soils and where temperatures and moisture are optimal for viability of larvae[54]. Because the intensity of hook worm increases with age, school-age children are more vulnerable to co-infection (plasmodium-hookworm) compared to pre-schoolers. Among women, researchers in Kenya and other countries report that the association between hookworm infection and tropical anemia is greatest in multigravidas women[55] [56]. As such, combined interventions would be particularly relevant for school-age children and multigravidas women living in coastal areas of Western Region

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49 Brabin et al. (2001). An analysis of anemia and child mortality. Journal of Nutrition. 2001;131:636S-648S
50 The term "hookworm disease" refers primarily to the iron-deficiency anemia that results from moderate or heavy infection
51 Hotez PJ, Molyneux DH (2008) Tropical Anemia: One of Africa's Great Killers and a Rationale for Linking Malaria and Neglected Tropical Disease Control to Achieve a Common Goal. PLoS Negl Trop Dis 2(7): e270. doi:10.1371/journal.pntd.0000270.
52 Brooker, et.al. (2009) Effects of deworming alone or in combo with SH. Am J Trop Med Hyg.
53 Yatich et.al. (2009). Malaria, Intestinal Helminths and Other Risk Factors for Stillbirth in Ghana Infectious Diseases in Obstetrics and Gynecology Volume 2010 (2010), Article ID 350763, 7pp
54 Hotez et.al (2004) Hook Worm Infection. New England Journal of Medicine. 351:8
55 Guyatt et.al (2000) Hookworm and anaemia prevalence. Lancet 2000;356:2101
56 Shulman et al. (1996) Malaria is an important cause of anaemia in primigravidae: evidence from a district hospital in coastal Kenya. *Trans R Soc Trop Med Hyg* 1996;90:535-9.

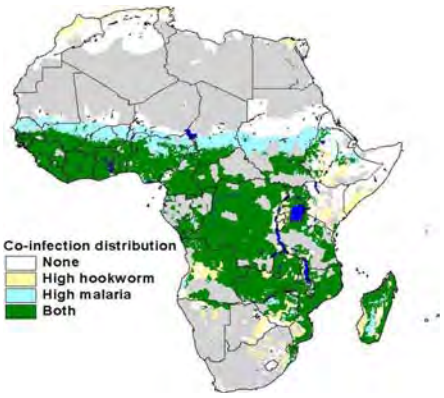

Figure 1. Distribution of Hookworm and Malaria Coinfection. Geographic overlap of moderate-high hookworm infection prevalence (greater than 20% prevalence of infection among school-aged children) and transmission of falciparum malaria transmission (based on a map of climactic suitability for Plasmodium falciparum malaria transmission, adjusted for urbanization). Source: (Hotez and Molyneux 2008)

Other Neglected Tropical Diseases (NTD)

In addition to hookworm infection, Ghana has a high prevalence of other soil transmitted helminthes (ascariasis, Trichuriasis) and other neglected tropic diseases (NTDs) including Lymphatic Filiariasis (LF), Onchocerciasis, Schistosomiasis and Blinding Trachoma. NTDs pose direct threats to the reproductive health status of women and girls of childbearing age as shown in Table 1 below. As such, the control of NTDs represents "an enabling mechanism for advancing women's reproductive and maternal health," according to the Global Network for Neglected Tropical Diseases[57]. The same report notes that combined treatment for NTDs cost as little as US$0.50 per person/year. The role women, who are ''key agents of change in developing countries", could be expanded to further promote social mobilization, including ensuring compliance in community-based NTD treatment programs as well as in vector control. Such action could be catalyzed via PHE initiatives in Western Region in collaboration with other agencies that are supporting efforts to eradicate NTDs in Ghana.

[57] Hotez,P. (2009) Empowering women and improving female reproductive health through control of neglected tropical diseases. *PLOS Neglected Tropical Diseases* November 2009, Volume 3, Issue 11 e559. www.plosntds.org

ANNEX 1 Continued

Health and Development Concerns of Coastal Communities in Western Region

Discussions with community leaders, chief fishermen, queen mothers and other members of two urban coastal communities in STMA were conducted during 19-23 July 2010 to gain insights into priority health and development concerns of the community. The following issues were mentioned:

- Poverty is the main problem; other than smoking fish, there are no jobs for women who often go idle
- People suffer from multiple episodes of malaria (more than 4 times/year/person)
- Fishing is becoming harder and fishers are too weak (bodily) to keep up with the work
- Young people have few options other than fishing
- Paralysis is a growing problem even among young fishers (could be due to the use of cyanide and/or compressors in fishing)
- Promiscuity and pregnancy among teens is increasing with most pregnancies occurring within the same age-groups (unlike in the past when girls were more apt to be impregnated by older males).
- "Girls are the ones chasing the boys these days." They rent porno films and watch them with boys.
- Some girls trade sex for fish because they are hungry
- There's a lack of family planning services at the level of the community; before there was a small clinic operated by Sister Cecilia (PPAG) but the funding ran out. As a result, pregnancy has increased.
- Condoms and pills should be readily available in the community - just like bednets which are cheap and easy to get right here in the community.
- Men are very shy to ask for condom from health workers or even at drugstores
- Toilets are not available in this community
- We also need more refuse containers
- Government health workers only come to the community to weigh children
- Even though we go to the hospital, the health insurance does not cover needed drugs. "It's a waste."
- It is against our religion for Moslem women to use chemical methods of FP

ANNEX 2

HEALTH RESOURCES AND USAID-FUNDED PROJECTS IN W. REGION

There are seventeen (17) Administrative Districts in the region. The region has eighty nine (89) Health Sub districts as shown below:

Administrative Districts and Health Sub Districts 2009

District		Population	Area Of Districts Sq. Km.	No. Of Health Sub District
1.	Sekondi-Takoradi	367,621		4
2.	Shama	122,541	337	3
3.	Mpohor Wassa East	162,776	2,628	5
4.	Ahanta West	126,322	576	4
5.	Axim municipal	85,364		5
6.	Ellembelle	104,334	2,149	5
7.	Jomoro	147,842	1,344	4
8.	Tarkwa Nsuayem	148,304		8
9.	Prestea Huni Valley	160,663	1,832	7
10	Wassa Amenfi East	116,999	1,502	7
11	Wassa Amenfi West	194,205	3,164	5
12	Aowin Suaman	158,179	2,699	5
13	Bibiani Ahnwiaso Bekwai	137,098	835	5
14	Sefwi Wiawso	108,773		5
15	Sefwi Akontombra	88,996	2,518	3
16	Juabeso	159,419	1,807	7
17	Bia	165,926	2,296	7
Regional total		*2,555,363*	*23,760*	*89*

Health Infrastructure

There are total of 325 health facilities made up of 26 Hospitals, 2 Polyclinics, 55 Health Centers (HC), 92 Clinics, 114 functional CHPS compounds and 36 maternity homes (MH). The breakdown is as follows:

HEALTH FACILITIES BY OWNERSHIP & TYPE 2009 WESTERN REGION

OWNERSHIP	HOSP.	POLY. CLINIC	HEALTH CENTER	CLINIC	CHPS	MAT. HOME	TOTAL
GOV'T.	12	2	53	35	114	0	**216**
MISSION	4	0	2	17	0	1	**24**
QUASI -GOVT.	3	0	0	1	0	0	**4**
PRIVATE	5	0	0	39	0	35	**79**
INDUSTRIAL	2	0	0	0	0	0	**2**
REGION	**26**	**2**	**55**	**92**	**114**	**36**	**325**

Access to Health Services

The official national norm is that no citizen should be more than 8 kilometers away from the nearest health facility. Many communities, however, do not enjoy such easy access. In the coastal district of Nzema East, for example, over half of all communities are located further than 31 km from nearest hospital. The poor road networks – particularly in the riverine area, makes it virtually impossible for inhabitants to travel the distance. In other districts, government plans to establish health posts at sub-district level have stalled due to funding and other constraints. This has postponed the deployment of community health nurses, many of whom are still based in the District and use public transport to periodically outreach to nearby communities. Their numbers, however, are relatively small in relation to the number of communities and people to be served. Travel time cuts into time for service delivery with the result that outreach workers are unable to delivery the multiple services for which they have been trained. During our field visits, community leaders complained that government outreach workers mainly vaccinate children in the community while other needs, particularly family planning, go unattended. Some specifically requested assistance with community based FP to help stem the rising tide of teenage pregnancy particularly in the densely populated poor urban communities of Sekondi-Takoradi Metropolitan Administration (STMA).

Traditional healing centers and traditional healers, reportedly are ubiquitous in Western District. Herbalists, spiritualists, homeopaths and other nonconventional health service providers are in almost every community in the region and in every district. Over 90% of the population can reach them within a radius of 5 kilometers[8]. As such, traditional healers should not be overlooked when exploring avenues for promoting PHE concepts and practices.

USAID-funded FP and Health Projects in Western Region

USAID is supporting a number of family planning and health-related projects in Western Region whose coverage overlaps with some of the 6 coastal districts where ICFG operates (Table 1).

Table 1: Matrix of USAID Partners and Projects (FP and Health) in Western Region

USAID PARTNERS (FP and Health)	WESTERN REGION					
	COASTAL DISTRICTS					
	Ahanta West	**Ellembelle**	**Jomoro**	**Nzema East**	**Sekondi Takoradi**	**Shama**
Marie Stoppes Inc.Ghana (MSIG) (Long-term FP methods)						
Precision DX [a] (CB-based FP)						
Health Keepers Network (HKN)[b] (CB-based FP)						
Behavior Change Support (BCS) Project [c] (FP, MCH, Nutrition etc.)						
Exp Social Marketing managed by JSI (subsidized commodities)						
FOCUS Regional Health Project – JSI (government MCH services)						
SHARP-FHI via Life Relief Foundation (AIDS prevention & support)						
PRoMPT (malaria prevention & control)						
WASH-UP (water, sanitation & hygiene)						

a=Precision Dev.Xperts is private company with grant funding from AID/World Learning for CBFP activities in Ghana
b= HKN is an independent NGO (formerly affiliated with Freedom from Hunger) with grant from AID/WL for CBFP
c= BCSP is managed by Johns Hopkins University-School of Communication; CARE International is lead partner in W. Region

These projects offer opportunities for coordination, collaboration and resource leveraging for implementation of PHE activities in target communities, particularly in the districts of Ahanta West, Shama, and STMA where four or more USAID projects currently operate e.g., FOCUS Regional Health Project (strengthening MCH services of government), Exp Social Marketing Project (subsidized commodities), PRoMPT project (malaria prevention via residential spacing and promotion of insecticide bednets) and Behavior Change Support (BCS) Project (campaigns using the electronic media, mass and small media and interpersonal channels to disseminate messages on 5 thematic areas: FP, MCH, supplementary feeding, malaria and TB). ICFG-*PLUS* could leverage training, IEC materials and commodities from these projects and forge linkages with re-skilled government health personnel for referral of clients for long-lasting FP methods (implant, IUD insertion), malaria treatment during pregnancy (SP) and other health services.

Three private sector organizations are operating smaller FP projects with USAID funding in the same 3 districts. Marie Stopes Inc. Ghana (MSIG) is working in Ahanta West and Shama to promote long term FP methods delivered via static and mobile health clinics. The Health

Keepers Network (HKN) is gearing up to implement its Community-based Family Planning (CB-FP) project in Shama while another private sector partner - Precision DX, is in the formative stages of developing its CB-FP initiative in Ahanta West. HKN and Precision both use market-based approaches to increase demand for and access to short-term FP methods (condoms and pills).

The greatest overlap of USAID projects is found in Sekondi-Takoradi Metropolitan Administration (STMA) which is home to 20% of the Region's total population. In addition to the four large projects mentioned earlier, the SHARP project is working in urban slum communities on HIV/AIDS issues while the WASH-Up Project is expanding demand for and access to safe water/sanitation technologies. FoN is also install latrines in some of the same slum areas under a project called Scale-Up (precursor to WASH-UP). All of these USAID projects run in parallel with no apparent operational linkages. Each, however, promotes behaviors/practices that can lead to improved health/wellbeing and, in that respect, are conceptually linked to BCS project whose central organizing theme is "The Good Life: Lead It."

Other Opportunities (unrelated to USAID Projects)

The district of Ellembele offers a unique chance for working with and through an existing training institute for community health nurses (World of Life Institute) to address these issues. The school enrolls 320 students/year into its two-year program. Majority of students are girls; all have completed secondary education. The school is one of 9 training institutes in the country for community health nurses. It is partly financed by the Government and a Christian mission. It uses the government's standardized curriculum which spans four semesters. Second year students do outreach work in the community under the supervision of teaching staff. The principal of the school expressed interest in collaborating with CRC and BALANCED on activities of mutual interest, particularly orientations and lectures for faculty and students on PHE and adolescent sexual and reproductive health (ASRH) topics. The students, who otherwise receive no sex education, could benefit from such input directly. Those interested in becoming PHE Youth Peer Educators could also be trained to facilitate dialogue and encourage responsible behavior among youth during their outreach activities to neighboring communities. The PHE model develop for Ellembelle could be adopted for use in other schools for nurses health assistance for which there are several in the same district and other districts in W. Region.