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# Chapter One

## Introduction

## General Introduction

Women's knowledge of medicinal plants has largely been understudied in the field of ethnobotany (Pfeiffer and Butz 2005; Howard 2003). In many societies, men have greater access to public spaces, resources, and recognition than women from the same population (Iyam 1996), resulting in an over-representation of men's knowledge by ethnobiologists (Phillips et al. 1994). In *Contribution aux études ethnobotaniques et floristiques en République Populaire du Bénin* (Adjanohoun et al. 1989), for example, only 13 participants out of the 800 informants interviewed for the study were women. The lack of female expertise in ethnobotanical studies can also be attributed to the more intentional exclusion of female knowledge by men due to taboos and cultural norms surrounding sexuality and reproduction (Newman 1985; McClain 1989; Schiebinger 2004). In addition to this gender bias, most ethnobotanical work has focused on the expert knowledge of traditional healers (van der Geest 1997; Vandebroek 2013), overlooking the domestic knowledge of women in their childbearing years (McDade et al. 2007) as well as those women who have entered the "third age" or post-fertile period of life. Both generations of women are major players in the health and well-being of women and children in their communities (Voeks 2007; Miller 2011; Tanner et al. 2011). Recent literature has highlighted the contribution of women of the third age to childcare in Africa (Bezner Kerr et al. 2008), and more generally to human survival as a whole (Hawkes 2004).

The continued under-representation of female botanical expertise in scientific studies has not only systematically excluded half of the world's population, it also limits the understanding of variation in cultural knowledge systems and practices (Camou-Guerrero et al. 2007). This is a particular concern for women's knowledge in reproductive health and childcare, since gynecological morbidity and infant mortality are among the most severe health problems in developing countries (Horton 2010). Doctors and anthropologists have expressed their concerns about the frequent use of herbs as menstrual inducers, child enemas and vaginal drying agents (Low et al. 2011; Bland et al. 2004), but much of the available literature on the culture surrounding women's health practices (Martin Hilber et al. 2012) and the care of young children (Gottlieb 2004) provides little information on the plants or public health implications associated with these practices.

An interdisciplinary approach is needed in order to unravel the relationship between women and medicinal plants, combining the fields of ecology, botany, medical anthropology, international public health, and economics. Drawing upon literature in each of these disciplines, this study focused on capturing women's medicinal plant knowledge and plant use practices for reproductive health and childcare in Bénin, West Africa and Gabon, Central Africa. This introduction includes a general background of the study and field sites, a brief synopsis of major themes addressed in the research, an overview of research aims and hypotheses, and a general outline of the thesis.

## Background and field sites

This study is part of a larger five-year research project comparing plant use patterns between descendants of the trans-African slave trade in Suriname with ancestral groups in Western Africa (van Andel 2009). The five-year project is composed of a team of researchers, including principle investigator Dr. Tinde van Andel (Leiden University), PhD student Diana Quiroz (Wageningen University), research associate Sofie Ruyschaert (Ghent University, Belgium), research associate Sandra Eyi (Centre National de la Recherche Scientifique et Technologique, Gabon), MSc student Lieke Guinee (Utrecht University), MSc student Esther van Vliet (Utrecht University), BSc student Lucrece Atindehou (Université

d'Abomey-Calavi, Bénin), and BSc student Raoudath Bouraima (Université d'Abomey-Calavi, Bénin). All research was conducted according to the Code of Ethics of the International Society of Ethnobiology (International Society of Ethnobiology 2006). We worked with the existing scientific network established by Wageningen University, especially the close collaboration with professors at the herbarium at Université d'Abomey-Calavi in Bénin and research staff at l'Institut de Pharmacopée et de Médecine Traditionnelles (IPHAMETRA), le Centre National de la Recherche Scientifique et Technologique (CENAREST), and the Agence Nationale des Parcs Nationaux (ANPN) in Gabon.

In particular, this study focuses on women from the Fon and Yoruba-speaking ethnic groups of Bénin and the Bantu-speaking ethnic groups of Gabon. Although Bénin and Gabon vary tremendously in terms of population, level of economic development, and ecological diversity, both countries have well-established systems of plant-based medicine, creating a botanically, culturally, and socially relevant backdrop to carry out an ethnobotanical study. We worked with a range of women from age 20 through age 90, with an average age of 55 years old. We conducted a total of 172 questionnaires throughout the duration of this study. In Bénin, we carried out 85 questionnaires with women, further divided into 43 for childcare and 42 for women's health. In total 68 individual Beninese women participated, so 20% of women participated both in the women's health and childcare questionnaires. In Gabon, we carried out 78 questionnaires with women, divided into 40 for women's health and 38 for childcare. In total 54 Beninese women participated, so 30% of women participated both in the women's health and childcare questionnaires. These 163 questionnaires were used to address the research questions outlined in Chapters 2, 3 and 4 of this thesis. An additional 9 questionnaires (7 in Bénin and 2 in Gabon) were conducted with men who were identified by their communities as being knowledgeable on women's health and/or childcare. However, data from the questionnaires conducted with men (4 from Bénin and 1 from Gabon) were used only in the women's health analysis described in Chapter 3 and were not a part of the analysis of other chapters.

The first round of fieldwork took place in Bénin from April through October 2011. We worked with women in the eight Beninese departments of Collines, Zou, Plateau, Kouffo, Mono, Atlantique, Littoral, and Ouémè (Fig. 1). Bénin is located in the Dahomey gap of West Africa, a savannah corridor between the Lower and Upper Guinea forests. The Beninese landscape is 50% savannah with high levels of deforestation (Jha and Bawa 2006; FAO 2010a). The remaining forested areas are concentrated in the south of the country, where 20% of the total flora and 64% of its threatened species are located (Neuenschwander, Sinsin, and Goergen 2011). Bénin has a population of just over 10 million people represented mainly by Fon, Adja, and Yoruba ethnic groups (CIA 2013a). According to the United Nations Development Program Human Development Index (UNDP 2013a), Bénin is considered a country of "low human development" on the basis of life expectancy, education, and income. Bénin has an infant mortality ratio of 57 deaths per 1,000 live births and a maternal mortality ratio of 350 deaths per 100,000 live births (CIA 2013a).

We worked in Gabon for the second half of the fieldwork from June through December 2012, in the provinces of Estuaire, Woleu-Ntem, Haut-Ogooué, Ngounié, Moyen-Ogooué, and Ogooué-Ivindo (Fig. 2). Gabon is located in Western Central Africa, between the Republic of the Congo and Equatorial Guinea, and has a population of over 1.6 million people, mainly of Fang, Bapounou, Nzebi, and Obamba ethnic groups (CIA 2013b). The UNDP considers Gabon to be a country of "medium human development" (UNDP 2013b), with per capita incomes four times those of other sub-Saharan African countries (CIA 2013b). Gabon's infant mortality ratio is 47 deaths per 1,000 live births with a maternal mortality ratio of 230 deaths per 100,000 live births (CIA 2013b). In stark contrast to Bénin, Gabon is covered by up to 80% forest (Sosef et al. 2006). Although 65% of the forest is considered primary, Gabon is currently losing primary forest at the highest rate in Africa (FAO 2010b).

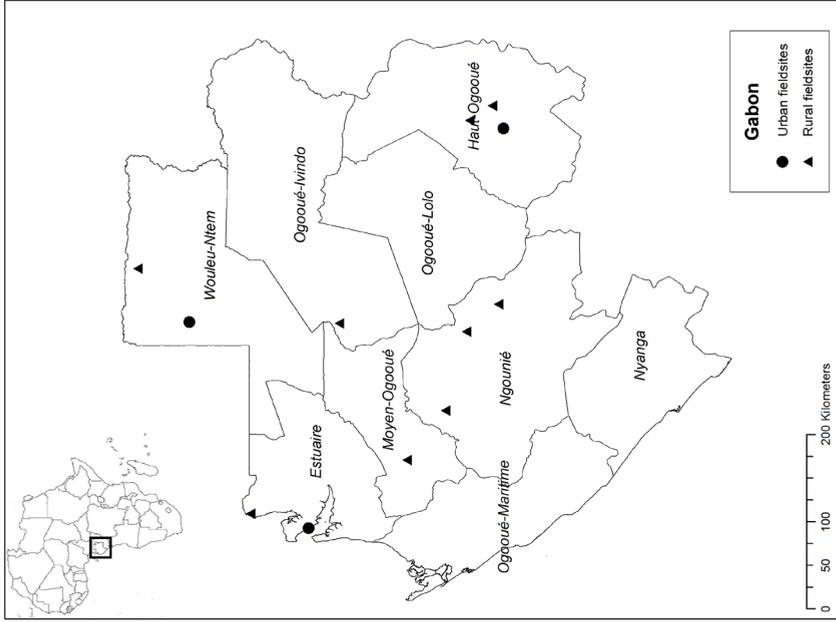


Fig. 2: Gabon field sites 2012

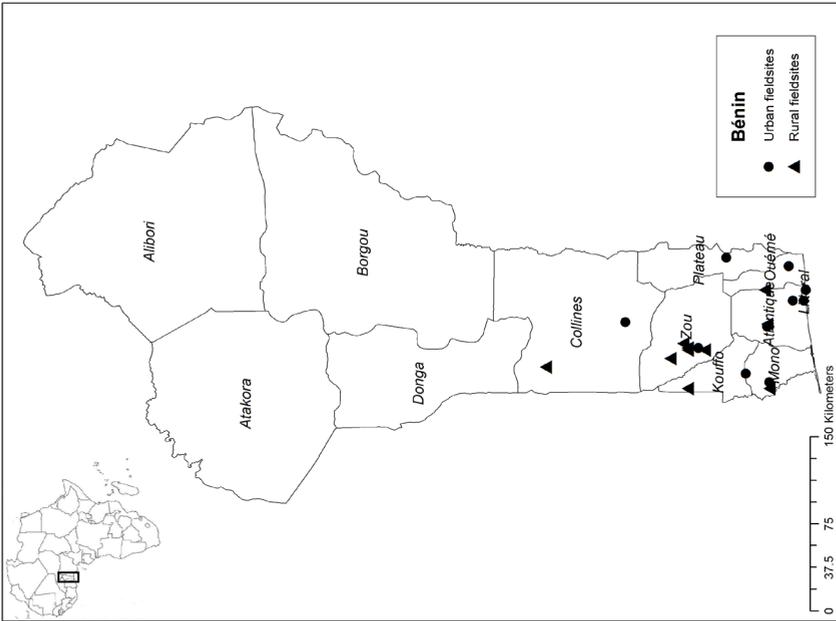


Fig. 1: Bénin field sites 2011

## **Ecology, natural resource management, and conservation**

In several countries across Africa, conservation research has focused on the sustainability of medicinal plant harvesting (Gaoue et al. 2013; Stewart 2003), particularly the commercial extraction of plants (Hamilton 2004). Given the frequent use of plants (Anyinam 1995) from mainly wild populations (Schippmann, Leaman, and Cunningham 2002), overharvesting of these resources is a common concern (Cunningham 1993; Dold and Cocks 2002). Research in Madagascar (Lyon and Hardesty 2012) and Ivory Coast (Malan and Neuba 2011), however, have shown that women use mainly human-altered vegetation, which would have far greater regeneration ability and less vulnerable species than relying on old growth vegetation (Brown and Lugo 1990). Yet few studies are available in West and Central Africa, particularly those that assess variations in harvest patterns across different ecological zones and among community members. Identifying these differences, especially between the sexes and those who harvest for personal versus commercial use, can help prioritize species for conservation and design appropriate natural resource management programs.

## **International health, local perspectives, and treatment-seeking behavior**

Gynecological morbidity is among the most severe health issues in Africa, mainly caused by hemorrhage, sepsis, and hypertensive disorders (Khan et al. 2006). In spite of widespread international and national commitment to achieving improved reproductive health (Bhutta et al. 2010), little information is available on the local management of reproductive healthcare, including the use of medicinal plants (Abdillahi and Staden 2013; Njamen and Mvondo 2013). This scenario is a startling contrast to the daily lives of Africans, as traditional medicine is the main form of healthcare for the majority of African populations (Anyinam 1995). What is needed is an understanding of how women experience and manage their own health, particularly through the use of herbal medicines.

In the case of children's health initiatives, many programs are designed and measured by biomedical responses to treating and preventing the statistical causes of infant mortality- diarrhea, malaria, and respiratory problems (Bryce et al. 2005). Research has largely focused on mothers' abilities to access biomedical remedies to these illnesses (Rutherford 2010), overlooking the full range of treatment options in pluralistic healthcare systems. Little information is known specifically on mothers' knowledge of plants or how mothers make treatment decisions (Colvin et al. 2013; Beiersmann and Sanou 2007). In order to have a comprehensive understanding of mothers' decision-making behavior, it is essential to identify local perspectives and treatments of children's health ailments, including special consideration for folk illnesses.

## **The informal economy and plant trade**

The trade of medicinal plants is a part of the informal economy in many African countries. The commercialization of herbal medicines generates income for plant vendors, many of whom are women (Dold and Cocks 2002; Jusu and Sanchez 2013; Quiroz et al. 2014), and contributes to the availability of healthcare for urban populations who commonly use plant-based medicines. Medicinal plant markets have recently been studied in West, South, and East Africa, yet little quantitative data is available on the medicinal plant trade in Central Africa. Studying the medicinal plant market can contribute to improved decision-making in sustainable land management and livelihoods, as well as identify commercially important species and salient health concerns of the community (van Andel et al. 2012).

## **Research aims and outline of the thesis**

As evidenced by the diverse themes described above, ethnobotanical research is by nature interdisciplinary. For this thesis, the common thread across the chapters is an exploration of the relationship that women have with plants. The research aims and hypotheses described below aim to disentangle this multidimensional relationship.

In **Chapter 2**, I investigated the conservation concern of overharvesting of medicinal plants by assessing which types of vegetation women utilize for medicinal plants. I expected all women to harvest predominantly from secondary forest and disturbance vegetation on the basis of women's specific knowledge of plants from human-altered vegetation in other parts of Africa. I also expected rural women to use more vulnerable and primary forest species than urban and market women due to the proximity of rural communities to primary forest vegetation. Together with the research team, I carried out 85 questionnaires in Bénin and 78 questionnaires in Gabon, and collected approximately 1500 corresponding botanical vouchers. Using a Detrended Correspondence Analysis (DCA) in PC-ORD (McCune and Mefford 2006) and Kruskal-Wallis tests, I determined the most commonly utilized vegetation types by women in each country and further assessed harvesting variation between urban, market, and rural women.

In **Chapter 3**, I examined how closely Beninese and Gabonese women's health perspectives, medicinal plant knowledge, and plant use practices reflect the statistical causes of maternal mortality identified by international health organizations. I expected the local perspectives, knowledge, and practices to closely parallel the international statistics. Using data gathered in the field from 87 questionnaires and over 800 botanical vouchers, I sought to determine women's most salient health concerns through free-listing analysis, citation frequency and species counts. I also interviewed 18 biomedical healthcare providers in national hospitals and local clinics in order to capture the local biomedical healthcare perspective on women's health and medicinal plant use.

In **Chapter 4**, I aimed to identify which infant illnesses Beninese and Gabonese mothers knew to treat with medicinal plants and for which illnesses they sought biomedical care or traditional healers. Through ethnobotanical questionnaires with 43 Beninese and 38 Gabonese mothers and the corresponding collection of over 800 botanical specimens, I calculated the number of species cited per illness and the proportion of participants knowledgeable on at least one herbal remedy per illness. In addition, I used qualitative data to describe folk illnesses and preferences for each of the three healthcare options.

In **Chapter 5**, I aimed to fill the gap in knowledge on the trade in herbal medicine in Central Africa by identifying the species, volume, and value of medicinal plant products sold on the major domestic markets in Gabon. Given Gabon's low population density and higher standards of living than other African countries, I hypothesized that the Gabonese medicinal plant markets would be smaller in volume and floristic diversity than those in West Africa, Tanzania and South Africa. The research team and I conducted a systematic quantitative survey of 21 market stalls at 14 major markets regional cities across the country. From this data, I extrapolated our results to the entire Gabon market. Our market survey enabled a comparison with other medicinal plant markets across sub-Saharan Africa.