

Title: Women in the National Program for Adaptation Actions to Climate Change in the villages bordering the Biosphere Reserve of Hippos Pool in Burkina Faso, West Africa

Joséphine YAMEOGO^{1,*}, Mamounata BELEM¹, Marie Claire MILLOGO^{1,2}, Abdoul Karim OUEDRAOGO¹

1= CNRST/INERA/DPF, 03 BP 7047 Ouagadougou 03, Burkina Faso

2= Ministère de La Promotion de La Femme. Ouagadougou 03, Burkina Faso

*= Corresponding author; email = finayame@yahoo.fr

ABSTRACT

Women have been identified as an essential link in the actors chain of Burkina Faso National Adaptation Program of Action to climate change (NAPA). The objectives of the present study financed by UNESCO-MAB, were to identify women adaptation actions in the sectors of forestry, health and food security at the Biosphere Reserve of Hippos Mare.

Some surveys were conducted with women from 6 villages, using the Participatory Analysis of Poverty and Livelihood Dynamic method and individual interviews.

The results revealed that women reduce entropic pressure on woody species by promoting 20 species in agroforestry and riverbanks protection. Women in traditional medicine contribute to treat 16 childhood and maternal diseases related to childbirth, winds, high and low temperatures. For food security, 26 plant species are more involved in alimentation. Women are working in income generating activities and cereal banks. They combat on large scales the adverse effects of climate change.

Key words climate change, women, adaptation, Biosphere reserve, Burkina Faso

INTRODUCTION

In Burkina Faso, over a dozen policy documents and sectoral strategies were written and adopted officially between 1995 and 2004 for the national resources management. Among these documents we retain the National Action Program to Combat Desertification (PAN/LCD, 2003) which is an implementation of the Rio conventions; the National Strategy and Action plan for Biodiversity Conservation (CONAGESE, 2001); the national strategy to implement the Convention on Climate Change, the Strategic Framework to Combat Poverty (CSLP, 2000);• the National Action Plan for the Environment (NAPE,) and the Plan of Action for Integrated Water Resources Water (PAGIRE, 2003). The National Program of Adaptation to Climate Variability and Change adopted in November 2007 (NAPA, 2007) is currently the core document that guides the actions of Burkina Faso on climate change.

All of the climatic zones of this country are affected by the adverse effects of climate change. The Biosphere Reserve of Hippos Pool in the western Burkina Faso is an entity subject to these adverse effects. One of the characteristics of the UNESCO-Man And Biosphere program is to adopt positions and take decisions to find a balance between current conflicting needs of biodiversity conservation, mitigation and adaptation to climate change.

Under the guidelines for developing strategies mentioned above and the establishment of national action plan for adaptation (UNFCCC, 2002), the gender aspect was taken into account. Men, women, Youth, adult and old men have been heavily involved in the investigations. As it has been underlined by Ribot (2009) the world's poor people are disproportionately vulnerable to climate variability and change effects. Thus living with multiple risks, poor and affected people must act to combat the causes of their livelihood difficulties. In Burkina Faso women are the most

vulnerable group suffering from poverty and climate change impacts (CSLP,2000; NAPA, 2007). Consequently, at all levels of sustainable environmental and natural resources, women are identified as an essential link in the chain actors. Sometimes rural people have indigenous knowledge that is not known or valorized.

Therefore, this work was done in the framework UNESCO-MAB-CNRST activities, with the main objective to examine the importance and contribution of women in the implementation of NAPA, its recommendations in three main sectors which are forestry, traditional medicine, food safety. The specific objectives are to identify actions taken by women in the reduction of antropic pressure on woody species; to identify the assets of local women in the plants uses to treat diseases related to climate change ; to identify actions for food security and poverty reduction.

SITE OF STUDY

The Biosphere Reserve of Hippos Pool initially known as classified forest of the Hippos Pool is located between 11 ° 30 'and 11 ° 45' N and 04 ° 05 'and 04 ° 12'W in western Burkina Faso (Figure 1). It covers 19,200 ha with a relative permanent pool of 660 ha permanent. The reserve, with its central zone, buffer zone and intermediate zone, has a great diversity of landscapes and environments. Thus there are many parklands at the bordering areas whose importance interested this study. The climate is characteristic of South Sudanese (Guinko, 1984) with rainfall ranging from 1000 mm to 1200mm. Even though the reserve boasts a wide variety of landscapes and environments it is subject to climate change effects.

The RBMH is bordered by 10 villages bordering. The six most accessible villages have been the subject of this work: Bala, Bossora, Sokourani, Tiérako, Fina and Padéma.

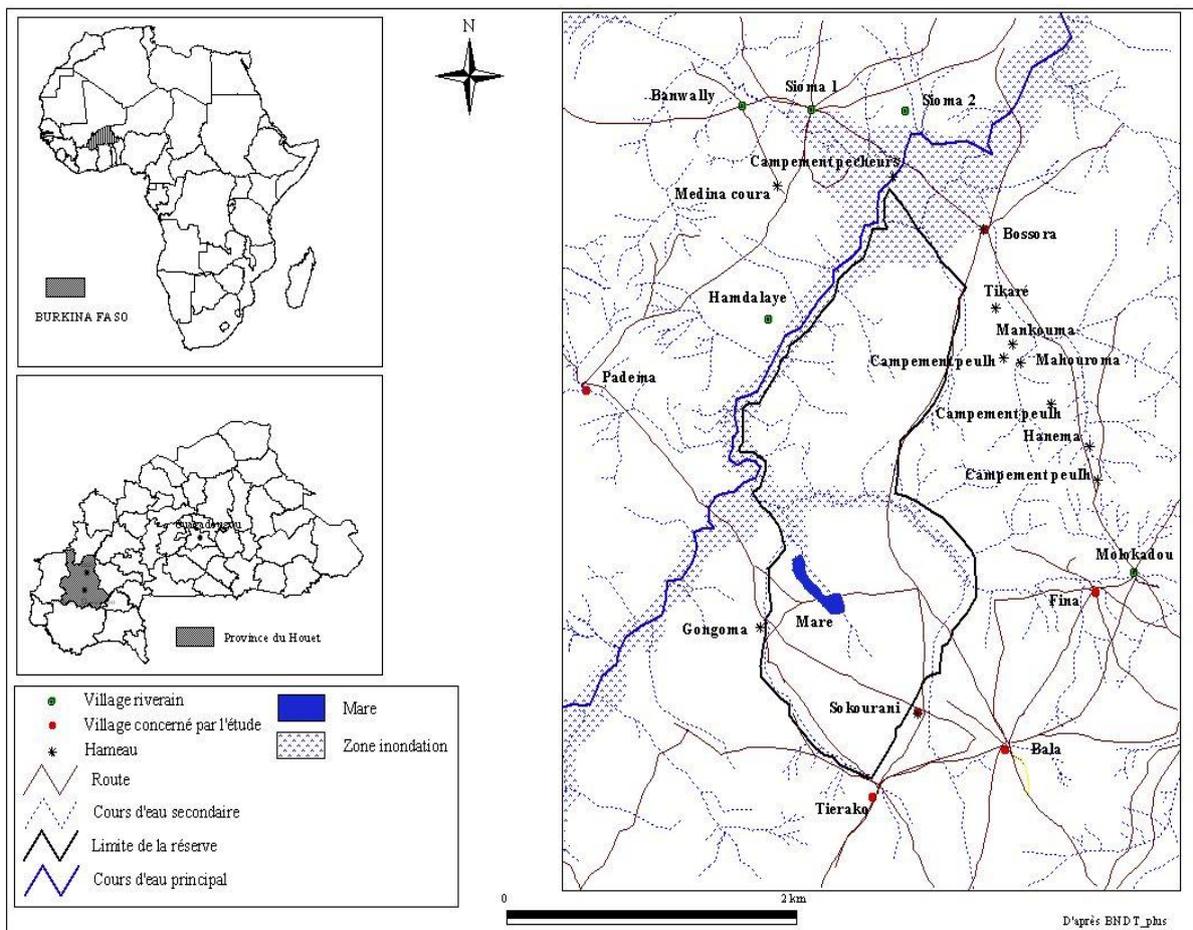


Figure 1: localization of study sites

MATERIAL AND METHODS

The surveys

The PAPoLD method (Participatory Analysis of Poverty and Livelihood Dynamics) was developed by the Project Safeguard (safeguarding the rights of the poor to critical land and water), to analyze the dynamics of the farmers socioeconomic status ie versus time (ICRAF, 2005). This method is a tool for assessing the socioeconomic conditions of farmers after an event related to climate change. The producer could evolved from prosperity to poverty and vice versa. In each village, women identified the events that impacted their lives. The impact on their health, food and forestry

have been identified. Then an interviewed questionnaire was submitted to women to identify adaptation practices in these areas. The interviewed people were the women of all age groups, old, and young adults. Individual interviews were conducted to identify traditional knowledge on adaptation in areas covered by the study.

Data analyses

To appreciate the intensity of the shocks of climate change risk indices were calculated:

Risk ratings

The risk indices were calculated in a participatory method proposed by Smith *et al.* (2001) and Quinn *et al.* (2003). Then the indices of vulnerability to shocks were calculated for each village from the following equations:

$$\text{Severity Index SI} = 1 + (r-1) / (n-1)$$

r = rank of the threat (in order of importance according to the participant)

n = total number of threats listed by the participant

The average indices were determined for all participants who listed the shocks. Regarding the severity of shock (ranging from 1 to 2), a low value reflects a greater severity.

Information on adaptation strategies summarized in the tables take into account the common actions in the six villages.

RESULTS AND DISCUSSION

The main impact of climate change at the RBMH according to women

The table I shows the main shocks felt by the women of the Biosphere Reserve of the hippos pool. These shocks can be classified into three groups:

- The first group concerns the most severe shocks with a severity index between 1 and 1.3. In this group are droughts, degradation of the vegetation, poverty, early drying up of the rivers, important temperature variation, floods, bad distribution of rainfall. This group relates to natural shocks considered severe by the women of the RBMH, excepted the poverty. The rainfall deficits act negatively on vegetation and temperatures. The bad distribution of rains explains the floods. These shocks are being experienced across Burkina Faso where actually, the temperatures can increase to more than 42°C. The projections give the whole country, an increase in average temperatures by 0.8 ° C by 2025 and 1.7 ° C by 2050. The temperature increases are coupled with seasonal variation, the months of December, January, August and September, becoming significantly warmer than usual while the months of November and March experience small increases in heat (NAPA, 2007). About poverty women are the most vulnerable. In difficult livelihoods they are the social group suffering more from poverty (CSLP, 2000).

- The second group of shocks is characterized by an average severity index between 1.4 and 1.5. This group concerns famines, diseases, medicinal plant disappearance, difficulties in wood access, decrease of agricultural diversification, decrease of soil fertility, decrease of fisheries, violent winds, animal mortalities, degradation of the river banks, occurrence of predator insects of crops. They are shocks felt in the human health, agricultural and pastoral practices. The rainfalls are again the main cause of these shocks. The high temperatures are accompanied by skin problems. There is a recrudescence diarrheal disease, respiratory problems. Gynecological

problems are experienced by women. They recognized some difficulties in the period of pregnancy and after childbirth.

- The third group of less severe (1.6 to 2) impacts takes into account the human mortality and the fragility of the social cohesion. The human death is noticed particularly with children. Some epidemical diseases appear because of high temperatures. Women noticed also that the climate change contribute to decrease social cohesion. In general African societies and families are cohesive. The mutual aid between individuals of the same country or society is very important. Nowadays in some families the solidarity practices are disappearing with the high living costs. With climate change that leaves people, especially women in food insecurity, poverty and disease, this social value is decreasing. Banditry is developing even in rural areas leading people to mistrust each other.

Table I: Shocks listed Women, their severity in the six villages of the Biosphere Reserve of Hippos Pool, Burkina Faso

N°	Shocks felt according to women	Severity
01	Drought	1.2
02	Degradation of vegetation	1.2
03	Poverty	1.1
04	Early early drying up of the rivers	1.3
05	Famine	1.4
06	Important temperature variation	1.3
07	Resurgence of diseases	1.4
08	Medicinal plant disappearance	1.4
09	Difficulties in wood access	1.5
10	Decrease of agricultural	1.5

	diversification	
11	Bad distribution of rainfall	1.3
12	Decrease of soil fertility	1.5
13	Weakening of social cohesion	1.7
14	Decrease of fisheries	1.4
15	Violent winds	1.4
16	Animal mortalities	1.4
17	Human mortalities	1.6
18	Degradation of the river banks	1.4
19	Occurrence of predator insects of crops	1.5

In many african rural societies women are considered inferior to men. Their primary role is to contribute effectively to the well-being of families and children. However they are considered to be a actor in the sustainable management of natural resources (UNESCO, 1987). Facing the above different shocks women act according to the recommendations of the NAPA for climate change effects mitigation and adaptation

Roles of women in the plant heritage renewal

The deterioration of the living condition of women in the villages bordering the Biosphere Reserve of the Hippos is associated with plant resource and aquatic resource degradation. The women interests to the plant heritage renewal are different to men interests. The table II presents the list of plants concerned by women activities of restoration. Their actions are conducted either in parklands, in the forest and / or banks, or in both places simultaneously. Women prefer to invest in parklands

because of difficult access of RBMH, ie forest laws on the exploitation of the Reserve.

Table II : List of species restored by women of the Biosphere Reserve of Mare aux Hippopotammes

N°	Espèces	Lieu de restauration	
		Parcs agroforestiers	Forêt et berges de la RBMH
01	<i>Adansonia digitata</i>	X	
02	<i>Azelia africana</i>	X	X
03	<i>Anogeissus leiocarpus</i>	X	X
04	<i>Bombax costatum</i>	X	
05	<i>Ceiba pentandra</i>	X	
06	<i>Cola cordifolia</i>		X
07	<i>Detarium microcarpum</i>	X	X
08	<i>Elaeis guineensis</i>		X
09	<i>Diospyros mespiliformis</i>	X	
10	<i>Khaya senegalensis</i>	X	
11	<i>Lannea microcarpa</i>	X	
12	<i>Maerua angolensis</i>		X
13	<i>Paullinia pinnata</i>		X
14	<i>Parkia biglobosa</i>	X	
15	<i>Piliostigma reticulatum</i>	X	X
16	<i>Saba senegalensis</i>		X
17	<i>Sclerocarya birrea</i>	X	

18	<i>Strychnos spinosa</i>	X	X
19	<i>Tamarindus indica</i>	X	
20	<i>Vitellaria paradoxa</i>	X	

The plants choice depends on their uses. All of the women recognized that climate change has negative impacts on forest products availability. So according to the Strategic Plan for the Conservation of Biological Diversity and the recommendations of the NAPA their actions are oriented in twenty major useful and disappearing species or subjected to entropic pressures. Woody species in parklands or in the forests supply the local population through a wide range of products for home consumption or sale, including food, medicines, fodder, timber and environmental services and social such as soil fertility, conservation of soil moisture and border demarcation (Boffa, 2000; Franzel et al., 2001). Prioritization of multi-purpose timber is based on age, sex and nutritional habits (Belem et al., 1996). Climate change affects human behavior. The women of the RBMH chose to restore parkland to reduce human pressure in the forest. The International Center for Research in Agroforestry recommends the plant biodiversity conservation in the parklands (ICRAF, 2004; Abbeg et al., 2005) to reduce entropic pressure on the forests.

The various methods for the plant heritage renewal practiced by women in the six villages are planting (PL), direct seeding (DS), assisted natural regeneration (ANR)(Figure 2). The plantations are mainly done with *Eucalyptus camaldulensis*, *Anacardium occidentale* and *Mangifera indica*. Assisted natural regeneration concern *Parkia biglobosa*, *Vitellaria paradoxa*, *Adansonia digitata*, *Elaeis guineensis*. While 3% of women surveyed admitted they had not taken action to restore, there are women who engage in plantings, assisted natural regeneration and direct seeding.

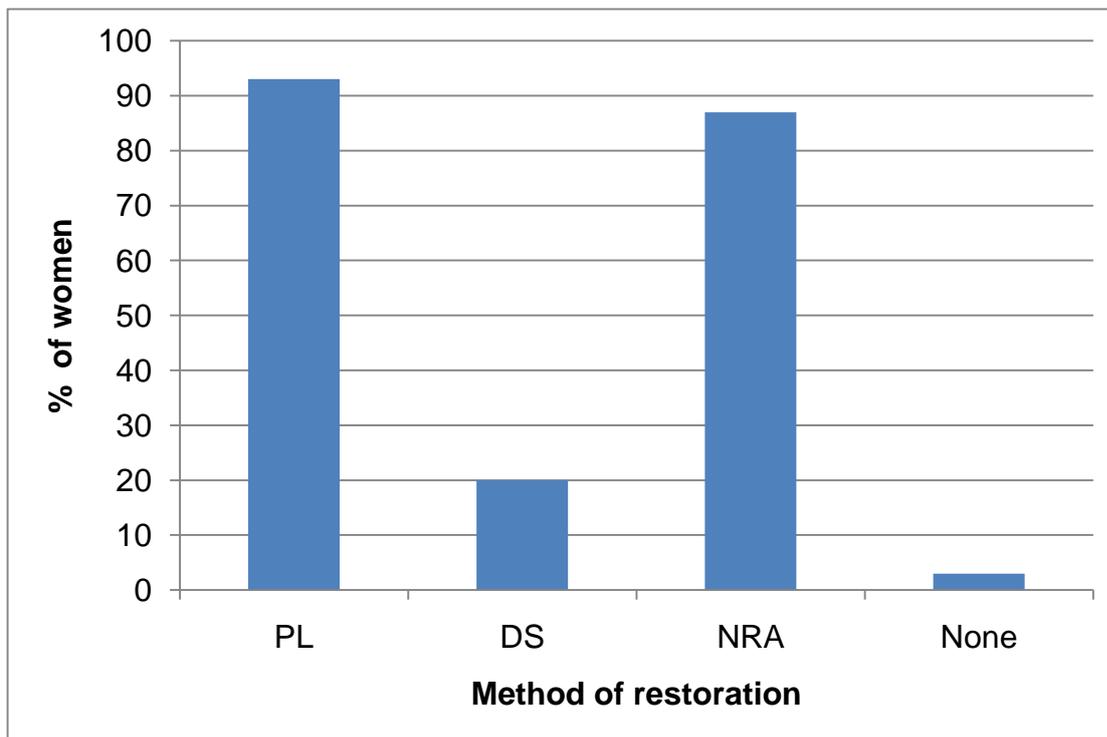


Figure 2: Methods of the plant heritage renewal practiced by women in parklands and riparian forest in the RBMH

Adaptation by traditional medicine

Tables III, IV and V present the main diseases and the adaptation measures about child health, adult diseases during the periods of strong winds and high / low temperatures. We noted that all the respondents said that illnesses are more frequent and painful today than they were during the last three decades. These results indicate that traditional medicine is essentially based on the uses of plant products although for some diseases animal products are used (Guinko, 1993). Therefore the question on the sustainable management of these species is to be considered. For most of these plants and their physicochemical properties are confirmed (Nalcoulma, 1996). But in treating the disease, traditional medicine uses incantations, rituals, prohibitions and sacrifices.

Table III : Adaptation to childhood and maternal diseases

Disease	Plant species	Local name <i>(Bobo)</i>	Part used	Disposition
Edema	<i>Parkia biglobosa</i>	Noù	Leaves	Bath with the decoction Drink
Diarhea	<i>Faidherbia albida</i>	Bakané	Gousses ou Barks	Pound the cloves ; Concentrated in water for 15 mn ; Drink the substance
	<i>Saba senegalensis</i>		Immatur fruits	Pound the cloves ; Concentrated in water for 15 mn ; Drink the substance
Skin diseases	<i>Securidaga longepedunculata</i>	Siessa	Leaves	Take bath and drink the decoction
Emaciation	<i>Parkia biglobosa</i>	Noù	Leaves	Take bath and drink the decoction
Stomach pain after childbirth	<i>Cassia sieberiana</i>	Kakana	Leaves	Boil Drink Take a bath
Purification of the genital tract of women after childbirth	<i>Combretum glutinosum</i> +	Wabadara	Branches with the leaves	Boil Drink

	<i>Tapinanthus spp</i>			<i>Take a bath</i>
		<i>Telmamonè</i>		

These actions aim to obtain the consent of the ancestors or appease the anger of the gods (CAPES, 2006). But most childhood diseases are treated just on the basis of physico-chemical plants.

Table IV: Diseases related to winds and high temperatures

Disease	Plant species	Local name (Bobo)	Part used	Disposition
Meninges	<i>Detarium microcarpum</i>	Kikiré	Fruits Leaves	Suck the fruit pulp ; drink the decoction of the leaves
Measles	<i>Burkea africana</i> + <i>Pteleopsis suberosa</i> + <i>Azadirachta indica</i>	Kolosio + Popossi + Niim	Leaves	Sprinkling the powder of dried leaves on the skin Take bath at the last step of the disease
Varicella	<i>Azadirachta indica</i> <i>Detarium microcapum</i>	Niim Kikiri	Leaves	Sprinkling the powder of dried leaves on the skin
Eyes aches	<i>Tapinanthus dodoneifolius</i> (sur	Tèbè-mamonè	Branches with Leaves	Wash the eyes with the decoction

	Piliostigma reticulatum)			
Yellow fever	<i>Terminalia macroptera</i>	Kogli-sini	Roots	Boil the shoots, drink the decoction and take bath

Compared to diseases driven by winds and low temperatures (Table IV), *Eucalyptus camaldulensis* is nicknamed King of respiratory diseases for its effectiveness against colds, bronchitis, flu and asthma. It is commonly called "écalitis or Calita" which is a deformation of *Eucalyptus*.

Table V: Diseases related to winds and low temperatures

Disease	Plant species	Local name (Bobo)	Part used	Disposition
Cold	<i>Blighia sapida</i> + <i>Cassia sieberiana</i>	Kùh + Kinakina	Leaves	Decoction, drink and take bath
	<i>Eucalyptus camaldulensis</i>	-	Leaves	Decoction, take bath, inhalation
Cough	<i>Faidherbia albida</i>	Sòn	Bark	Drink the bark decoction
Asthma	<i>Eucalyptus camaldulensis</i>	-	Leaves	Decoction, take bath,

				gargle, inhalation
Bronchitis	<i>Eucalyptus camaldulensis</i>	-	Leaves	Decoction, take bath, gargle, inhalation
Flu / Grippe	<i>Eucalyptus camaldulensis</i>	-	Leaves	Decoction, take bath, gargle, inhalation

Women are involved in traditional medicine. They have knowledge in plant uses and this is an advantage for them to face climate change effects particularly on children and adult health. In many rural markets they are selling medicinal plants (Figure 3). The old women used to train the youngest one. But there are some families who have ancestral knowledge and they are not allowed to vulgarize it unless you are a member of the family.



Figure 3 : A woman selling medicinal plants

What is important to note is that each phase of climate change is accompanied by a variety of illnesses and rural populations are at the forefront by their traditional skills. Adaptation measures are taken for each period.

Strengthening food security

Food species are recorded in Table VI below. The 26 food plants identified are used either raw or in the preparation of soups, couscous, cakes, such as juice, drinks and marmalade. The harvest period varies depending on the availability of the plant products. These differences in the period of products availability of products are an advantage opportunity to cover the population food needs. Their uses are intensified especially in times of drought or poor crop. Their chemical composition shows a certain energetic balance consumption (Millogo and Guinko, 1996; Zoungrana et al., 1992). The wild fruit play a crucial role in the diet of these rural populations. They contribute to combat food insecurity and poverty in rural areas (INERA-IDRC, 2009). The dietary importance of all these species is confirmed by the literature search. Most non-wood forest products from species listed contain iron, calcium and vitamins B1, B2, B3 and C in significant proportions whose importance has been scientifically demonstrated (Ouédraogo, 1994). The role of fruits, also leaves and young shoots is to provide vitamins A, B1, B2, C, and PP. They are sources of calcium, phosphorus and iron. The fruits are the only sources of vitamin C in the diet (Bergeret and Jesse, 1990). The leaves of *Adansonia digitata* hold the absolute record of calcium and phosphorus. Iron is always present in the picked leaves and a lesser extent in fruit. For example, fruit pulp of *Tamarindus indica* is rich of vitamin C, *Parkia biglobosa* one is rich in vitamin A, B1, B2, C, PP and contain 60% sugar (Zoungrana et al. 1992). The pulp of the fruit of *Vitex doniana* is very rich in vitamin A, which makes it effective against night blindness (Tiquet, 1985). Due to the ethnic mix and exchange, consumption of flowers *Bombax costatum* became common in several regions of the country. We agree with Pale (Cited BOGNOUNOU, 1993) that food plants

participates in the normal balance of the scheme by their intake of vitamins and trace elements, in lean seasons they contribute significantly to the regime maintenance and its balance, in periods of famine, they ensure survival.

Table VI: Uses of twenty-six species promoted for food security in villages bordering RBMH

Species	Family	Availability				
		Fe	Fr	Fl	Kind of food	Period
Adansonia digitata	Bombacaceae	X	X		Soup, bouillie	Fe :SP ; Fr :SS
Annona senegalensis	Annonaceae	X	X		Fr. Raw; soup (Fe)	SP
Psidium guajava	Myrtaceae		X		Fr. Raw	SP
Bombax costatum	Bombacaceae	X		X	Soup	SS
Ceiba pentandra	Bombacaceae	X	X			SS
Crateva religiosa	Capparaceae	X			Soup	SS
Detarium microcapum	Caesalpiniaceae		X			SS
Diospyros mespiliformis	Ebenaceae		X		Fr. Raw	SS
Ficus sycomorus	Moraceae		X		Fr. raw	SS
Gardenia erubescens	Rubiaceae		X		Fr. Raw	SS
Grewia bicolor	Tiliaceae		X	X	Fr. Raw	SS

Landolphia heudelotii	Apocynaceae	X	X		Juice, couscous	SP
Lannea microcapa	Anacardiaceae		X		Fr. Raw	SS
Leptadenia hastata	Asclepiadaceae	X			Soup, Couscous	SP
Parinari curatelifolia	Chrysobalanaceae	X	X			SS
Parkia biglobosa	Mimosaceae		X		Powder, cakes, bouillon	SP
Saba floribunda	Apocynaceae		X		Juice, sucettes	SP
Saba senegalensis	Apocynaceae		X		Juice, sucettes	SP
Sclerocarya birrea	Anacardiaceae		X			
Elaeis guineensis	Arecaceae		X		Huile, soup	SP
Strychnos spinosa	Loganiaceae	X			Couscous	SP
Tamarindus indica	Caesalpiniaceae	X	X		Juice, bouillie	Le : anytime(Le) ; Fr : SS
Vitellaria paradoxa	Sapotaceae		X		Fr raw ; butter	SP
Vitex doniana	Verbenaceae		X		Soup	SS
Ximenia americana	Olacaceae		X		Sucettes	Anytime
Ziziphus mauritiana	Rhamnaceae		X		Sucettes, cakes	SS

SP = rainy season; SS = dry season; Fr=Fruit; Le=leaves

CONCLUSION

Many studies like this one concluded that the climate variability and change affect negatively human health, natural resources, agriculture practices, livestock. These effects affect disproportionately the people from the same society. Women are among the most vulnerable group. In many areas like in the villages bordering the Biosphere Reserve of the Hippo pool, the rural populations recognize that they must be the main actors to combat the effects of the climate change. Traditional societies have knowledge which needs to be known, improved and vulgarized for its best use. Scientific researchers, actors of rural development, policy makers have to take into account the knowledge and the point of views of women and marginalized people in order to elaborate useful and effective programs for the societies development. The development actors should support at all levels the women participation climate change activities and decision.

REFERENCES

ABEGG C., BAYALA J., BELEM O. Mamounata, 2005 – Facteurs socio-économiques influençant la biodiversité ligneuse des parcs agroforestiers de deux villages du plateau central du Burkina Faso, *Journal Forestier Suisse*, PP 17-23PP.

BELEM O.M., BOGNOUNOU O., OUEDRAOGO S.J., MAIGA A. 1996. Les ligneux à usages multiples dans les jachères et les champs du plateau central du Burkina Faso. *Journal d'Agriculture Traditionnelle et de Botanique Appliquée*, 38 : 251-272.

BOFFA J.M. 2000. *Les parcs agroforestiers en Afrique subsaharienne*. Ed. FAO, Rome, Italy, 258 p

- Etat des lieux des savoirs locaux au Burkina Faso. Ed. CAPES/RGC-B, Ouag
CAPES/RGC-B. 2006adougou, Burkina Faso, 379 p.
- CSLP. 2000. Cadre Stratégique de Lutte Contre la Pauvreté au Burkina Faso.
Ministère de l'Economie et des Finances.65 p
- FRANZEL S.,COE R., COUPER P., PLACE F., SCHERR S.J. 2001. Assessing the
adoption potential of agroforestry practices in Sub-saharan Africa. *Agricultural
Systems*, 69 : 37-62.
- GUINKO S. (1993): Plants and traditional medicine in Burkina Faso. International
Symposium of the research project SFB 268: 47-53
- GUINKO S. 1984. *Végétation de la Haute - Volta. Thèse de Doctorat d'Etat. 2
Tomes.* Université de Bordeaux III, France, 394 p.
- ICRAF 2005. Enrichment of biodiversity in the parklands and improve well-being of
rural poor in the Sahel, a cooperation project to reduce poverty and enhance
biodiversity through the use of agroforestry trees on farms. ICRAF. Nairobi, Kenya.
21p.
- ICRAF/ KALANGANIRE A. DAKOU J. TRAORE D. BAYALA J. KAYA B. NIANG A.
RUSSELL D. SAMAKE O. BATIONO B. A. BELEM M. 2004. Enrichissement de la
biodiversité dans les parcs agroforestiers et amélioration du bien-être des
populations rurales démunies au Sahel: Méthodologies. 50p.
- INERA-IDRC. 2009. Conservation and utilization of plant biodiversity and the fight
against poverty in Africa
- J. SMITH, B. LAVENDER, SMIT B. and I. Burton, 2001. Adaptation strategies to
reduce the vulnerability of Canadians to climate change. 13p.
- JESSE C. RIBOT 2009. "Vulnerability Does not Fall From the Sky: Toward multi-
scale pro-poor climate policy" in Robin Mearns and Andrew Norton (eds). Social

dimension of climate change. Equity and Vulnerability in a Warming World:
Washington, DC: The World Bank

MILLOGO-RASOLOUDIMBY J., GUINKO S. 1996. Woody plants spontaneous
culinary uses in Burkina Faso. *Berichte Sonderforschungsbereich of 268, Band 7*,
Frankfurt aM 1996: 125-133

NACOUKMA O, G. (1996) Medicinal plants and traditional medicinal practices in
Burkina Faso, where the central plateau. Ph.D. thesis State University of
Ouagadougou, Burkina Faso, 261 pp

NAPA/ BURKINA FASO, 2006. Vulnérabilité et adaptation aux changements
climatiques au Burkina Faso. SP-CONEDD / MECV. 72 p.

NAPE. National Action Plan for the Environment. Ministry of Tourism and
Environment of Burkina Faso. 1983 p

OUEDRAOGO S.J. 1994. *Dynamique et fonctionnement des parcs agroforestiers
traditionnels du Plateau Central burkinabé. Influence des facteurs biophysiques et
anthropiques sur la composante arborée*. Thèse de l'Univ. Paris 6. 222 p.

PAGIRE. 2003. Plan d'Action pour la Gestion Intégrée des Ressources en Eau du
Burkina Faso. Ministry of Agriculture and Water Ressources. 87p.

PAN/LCD. National Action Program to Combat Desertification. Ministry of
Environment and Forestry of Burkina Faso. 90 p.

SP / CONAGESE, 2001. National Strategy for Implementation of the Convention on
Climate Change. National Communication in Burkina Faso. Convention United
Nations Framework Convention on Climate Change. 132p.

TIQUET 1985 - Les arbres de la brousse au Burkina Faso, Centre d'études
économiques et sociales d'Afrique occidentale (Bobo-Dioulasso)

UNESCO. 1987. Rôle des femmes dans la sécurité alimentaire : contribution des femmes à la production alimentaire et problèmes concernant leur participation aux plénières au développement rural au Burkina Faso. 33 p

ZOUNGRANA I., C. ZOUNGRANA, MILLOGO-Rasolodimby, J. (1992): The food plants and useful plants of Burkina Faso and their food preparations. UNU-Inst. Res. Nat. in Africa.

ZOUNGRANA I., ZOUNGRANA C., MILLOGO-RASOLODIMBY, J. (1992): Les plantes alimentaires et les plantes utiles du Burkina Faso et leurs préparations alimentaires. UNU-Inst. Res. Nat. en Afrique.