



universität  
wien

# DIPLOMARBEIT

Titel der Diplomarbeit

**„Gender dimensions of rainwater and livelihoods  
management in rural crop-livestock systems.  
Practices and innovations in the Nakanbé river basin  
in Burkina Faso“**

Verfasserin

**Karin Neumayer**

angestrebter akademischer Grad

**Magistra (Mag.)**

Wien, 2014

Studienkennzahl lt. Studienblatt:

A 057 390

Studienrichtung lt. Studienblatt:

Individuelles Diplomstudium Internationale Entwicklung

Betreuerin:

Univ.-Prof. Dr. Sigrid Schmitz











## **Acknowledgements**

In conducting this research and writing this thesis I received valuable support in various ways by many different people. I am very grateful for their support, guidance, patience and interest that immensely contributed to the accomplishment of the rewarding and challenging task of writing this diploma thesis.

First of all, my most sincere gratitude goes to the women and men in Bogoya, Boussouma, Koura-Bagre and Toeghin for open-heartedly welcoming my research partner Aly and me to their communities and homes and for openly sharing their thoughts, observations, perceptions and life experiences, including their precious time with us. A dearest “Barka woussogo!” goes to them for their great support, understanding, patience and input.

Most sincere thanks also go to Aly, whose support by far exceeded translation. He supported me in multiple ways, from providing organisational and logistic solutions to contributing to increased insights with his valuable and honest knowledge sharing and, more generally, with his generous patience and understanding. His social sensitivity and blithesomeness contributed to positive open atmospheres during the research activities and made this research’s application possible.

I am also very grateful to the project staff in Ouagadougou for their generous and honest support, multiple introductions to contact persons, their prompt and detailed feedbacks and for many precious guiding comments throughout my research stay.

Furthermore, without supporters and supervisors in Vienna, at the BOKU’s CDR, who built the connection to the CPWF program and who provided me with early support, with valuable theoretical and methodological inputs, this research would not have been possible in this way. I am also very much thankful to my family and to my boyfriend Lukas for their continuous unconditioned support, patience and understanding and most of all for their belief in me and my abilities, partly reminding me about this throughout various phases of this research’s process.

While I am thankful for patience, interest and support by various friends, I want to thank Robert in particular, with whom I went through my University studies and, most importantly, through the writing process of this thesis. I could not thank you enough for your continuous mental and practical support, valuable inputs and for backing me up throughout the intense writing process.





## Contents

1. Introduction.....	4
2. Research context.....	5
2.1 Development challenge.....	7
2.2 Rainwater management in Burkina Faso .....	9
2.3 Research challenge.....	11
2.4 Justification and project background .....	14
3. Objectives .....	16
3.1 General objective .....	16
3.2 Specific objectives and research questions .....	16
4. Conceptual framework.....	18
4.1 Sustainable Livelihoods Approach .....	18
4.2 Smallholder agricultural systems .....	21
4.3 Gender concepts .....	23
4.4 Empowerment .....	29
5. Methodology.....	32
5.1 Design .....	32
5.1.1 Ethical considerations.....	33
5.1.2 Gender considerations .....	34
5.2 Sampling .....	34
5.3 Data collection .....	35
5.3.1 Semi-structured interviews.....	36
5.3.2 Focus groups and participatory methods.....	37
5.3.3 Direct observation .....	38
5.4 Data management.....	39
5.5 Data analysis .....	39

6. Research sites .....	40
7. Results .....	42
7.1 Dynamics of rainwater management – practices & innovations .....	42
7.2 Dynamics of crop & livestock farming – practices & innovations .....	54
7.2.1 Land access .....	55
7.2.2 Water access and use.....	63
7.2.3 Working in fields and gardens .....	71
7.2.4 Keeping livestock.....	84
7.2.5 Access to input resources and services .....	94
7.2.6 Processing and marketing .....	103
8. Discussion .....	106
8.1 Gendered vulnerabilities .....	106
8.2 Gendered capabilities – gender dimensions of livelihood assets.....	109
8.2.1 Access to & control over natural capital .....	110
8.2.2 Access to & control over physical capital.....	113
8.2.3 Access to & control over human capital .....	116
8.2.4 Access to & control over financial capital .....	118
8.2.5 Social capital.....	121
8.3 Influences of structures & processes on women and men.....	123
8.4 Effects of innovations on livelihood strategies & outcomes of women, men & households .....	126
9. Methodological reflections.....	131
10. Conclusion.....	132
11. References .....	135
12. List of figures .....	140
13. Abbreviations .....	142
Appendices/Annex .....	143
Abstract .....	146



Zusammenfassung .....	147
Curriculum Vitae .....	148

## **1. Introduction**

Agriculture and livestock keeping are central to rural livelihoods in the Nakanbé river basin of Burkina Faso. Therefore, various related dynamic practices and innovations are crucial to local livelihood strategies in the context of environmental, economic, and social changes that provide both opportunities and constraints for women and men. In particular, climatic changes and their effects on essential natural resources such as water and land are of influential importance, while social aspects, people's perceptions and experiences are placed in a dynamic interdependence with their vulnerability context.

To understand gender-differentiated practices in agricultural production, access to and use of land, water, knowledge, necessary input resources, and markets as well as respective innovations, this study draws on an empirical qualitative research conducted in the context of the *Challenge Program on Water and Food* (CPWF) in the West African Volta river basin, which includes the Nakanbé basin.

My personal interest in interactions between people and their environment, in changing environmental conditions and human (re)actions in the face of resource scarcity led me to apply for this research opportunity offered by the *Centre for Development Research* at BOKU (University of Natural Resources and Life Sciences, Vienna) as they were looking for diploma or master students to research several topics in and around the CPWF's program activities. In the course of my research internship at the "research for development" program CPWF-Volta, based at the Volta Basin Authority in Ouagadougou, I conducted a qualitative mixed-method research. This included semi-structured personal interviews and various participatory methods in the course of focus group discussions, conducted during my field stays from May to July 2013 in four selected villages in two different research regions in the Burkinabe Nakanbé basin.

This thesis will first provide necessary background information about the wider development and the more specific research challenge, the basics and evolvement of rainwater management in Burkina Faso as well as a brief description of the project background, before presenting this study's particular aims and objectives. It goes on in presenting the conceptual framework, the theories and concepts most essential to this study such as the Sustainable Livelihoods Framework and various important concepts regarding smallholder agricultural systems, gender, and empowerment. After a detailed description of the applied methodology, which will illustrate how the research data were

collected, managed, and analysed, the selected research sites are presented before more in-depth information about local livelihoods is provided in the results section, structured according to the research questions. These results are then discussed in relation to the concepts and theories presented in the conceptual framework. The structure of this chapter follows the various elements of the Sustainable Livelihoods Framework. It discusses the local vulnerability context, gender-differentiated possibilities of access to and control over interdependent livelihood assets, influences of structures and processes on women and men – in particular project initiatives and markets – as well as effects of various innovations and changes on women's and men's livelihood strategies and outcomes. Finally, this thesis concludes with reflecting the implications and limitations of applied methods on research outcomes before summarising the most important results and findings.

## **2. Research context**

This study is based on research on development in the West African Volta river basin. This area is mostly made up of the countries of Burkina Faso and Ghana (80% to 85% of its 395,098 km<sup>2</sup>). Smaller parts of Benin, Côte d'Ivoire, Mali, and Togo are also part of the basin, which is drained by the three main tributaries of the river Volta, namely the Black Volta, the White Volta, and the Oti Rivers. In the northern, Burkinabe part of the basin, those rivers and their sub-basins are referred to as Mouhoun, Nakanbé, and Pendjari, respectively (Douxchamps, Ayantunde, & Barron, 2012, p. 5; Kirby, de Condappa, Mainuddin, Eastham, & Thomas, 2010; Lemoalle & de Condappa, 2010, p. 655; Terrasson & Mojaisky, 2008, p. 6).

The Volta basin can be roughly divided into four climatic zones, according to the amount of average annual rainfall. From the lowest rainfalls of below 500 mm in the North to more than 1,100 mm in the South, these cover the Sahelian, the Sahelo-Sudanian, the Sudanian, and the Guinean area (Barry, Obuobie, Andreini, Andah, & Pluquet, 2005, p. 16ff.; Terrasson & Mojaisky, 2008, p. 5f.). Rainfalls are subject to distinct seasonal variations, with one wet season in the northern part peaking around July and August, and two wet seasons in the South. In addition to that, rainfall and flows vary considerably from year to year (Kirby et al., 2010, p. 7ff.; Lemoalle & de Condappa, 2010, p. 659).

Around 85% of the basin's land is grassland, which includes shrubland and barren land. These areas take up 81% of the basin's mean annual input water by precipitation. Rain-fed cropland, the next most extensive land use, accounts for 14% of the basin's land and uses 8% of its available water. Furthermore, woodlands, including forests, wooded wetlands, bare and urban ground, account for 1.5% of the basin and 2% of the regional water use (Kirby et al., 2010, p. 19).

Agriculture is an important economic sector and source of livelihood for the approximately 20 million people living in the Volta basin. The average population density is around 48 persons per km<sup>2</sup>, and 64 to 88% of the basin's population live in rural areas, where poverty is especially high (Lemoalle & de Condappa, 2009, p. 655).

This applies particularly to landlocked Burkina Faso, despite its rising real GDP growth of over 5% in the last few years. This economic growth was essentially driven by the mining sector, though the primary and the tertiary sectors still dominate the local economy “with their respective shares of GDP at 35% and 38% in 2011” (AfDB & OECD et al., 2012, p. 4). The agricultural sector, including forestry, fishing, and hunting, accounted for 35.4% of GDP in 2011, after declining from 39.2% in 2006 (AfDB & OECD et al., 2012, p. 3f.). Still, the agricultural sector is the most important employer, and accounted for 92.4% of total employment and even 93.5% of female, as compared to 91.4% of male employment, in the 1990s (Andah & Gichuki, 2005, p. 9). Even though these percentages have dropped during the last decade, along with changes in means of production, market access, and other employment opportunities, agriculture continues to be extremely relevant for local livelihoods, especially rural ones.



Figure 1: Agroecological zones in Burkina Faso (Source: FAO)

About 33% of Burkina Faso's total land is arable, of which only 49%, or 4,700,000 ha, are cultivated. Popular food crops in the rain-fed agriculture of Burkina Faso are sorghum, millet, and maize. Additionally, cotton, groundnuts, sedentary livestock, and mobile herds, consisting of sheep, goats, and cattle, contribute to local cash income (Amankwah et al., 2012, p. 2; Kirby et al., 2010, p. 12; Lemoalle & de Condappa, 2010, p. 659).

## **2.1 Development challenge**

Water is the most essential resource for flora, fauna, and human life. But growing competition and climatic changes increase water insecurity and as a result, one third of the world's population is experiencing physical and economic water scarcity in one way or another (Wahaj, Hartl, Lubbock, Cleveringa, & Nepveu, 2007, p. 2). The Sahelo-Sudanian area of the Volta river basin, which includes most of Burkina Faso, receives between 500 and 900 mm of annual rainfall while the Sahelian climate zone further north receives only between 300 and 600mm per year. But the actual rainfall is very variable, both at large and small scales as well as in the course of one day or one year. Dry spells – dry periods of just a few days during the rainy season – may occur at critical periods of the vegetative cycle and thus have a strong negative impact on the harvest (Lemoalle & de Condappa, 2009, p. 17). These problematic variabilities, resulting in seasonal water scarcity and the probability of a failed growing season of 24%, are further intensified by a changing climate, by environmental degradation like the loss of soil fertility, and by demographic pressure resulting from an annual national population growth rate of 3.4% (Andah & Gichuki, 2005, p. 24; Douchamps et al., 2012, pp. 1, 5; Lemoalle & de Condappa, 2010, p. 659; Terrasson & Mojaisky, 2008, p. 8).

Current water resources are already insufficient to meet the needs of the growing population in the region and water availability is further crucially affected by changes in the region's climate (McCartney et al., 2012), and also by human activity such as overuse and misuse of water resources. Out of the necessity to meet their own and their livestock's nutritional needs, smallholder farmers overexploit natural resources like water or land. This practice leads to a vicious circle of overuse, degradation, and reduced agricultural productivity, leaving the rural population even more vulnerable and

insecure (Samari, 2011, p. 4). Other activities such as massive deforestation, forest destruction, and the removal of vegetative land cover threaten biodiversity, reduce the soil's rainwater retention, increase soil degradation and droughts, and as a consequence also dry up rivers, leading to unsustainable water resource use (Andah & Gichuki, 2005, p. 35; Samari, 2011, p. 4). "Water scarcity arises largely as a result of diminishing precipitation, reduction in river flows, falling water tables, and an increase in the amount of evapotranspiration" (Andah & Gichuki, 2005, p. 35). This is especially problematic in northern Burkinabe regions, where rivers do not flow year-round and some wells and groundwater boreholes dry up during certain months (Andah & Gichuki, 2005, p. 29). But almost all rivers in Burkina Faso, including the Nakanbé or White Volta, as it is called further south in Ghana, except for the Mouhoun or Black Volta, are dry for about two months a year (Andah & Gichuki, 2005, p. 2).

To combat seasonal water scarcity, the government built more than 400 water reservoirs with large surface areas and shallow depth throughout Burkina Faso, mainly since the 1960s. Additionally, the government, non-governmental organisations (NGOs), and local people built more than 600 small dams in the Nakanbé sub-basin alone. They are used for irrigation, hydropower generation and fishery and provide a watering source for animals. Major incentives for their construction were the severe droughts in the 1970s and 1980s that caused food insecurity and disastrous hunger incidences (Andah & Gichuki, 2005, p. 35; Barry et al., 2005, p. 13). Even though these artificial water reservoirs can be used to irrigate fields close by, irrigation is still low in Burkina Faso compared to other countries in the Volta basin. This is the case even despite irrigation's rapid expansion of about 934% in the years between 1987 and 2002 (Andah & Gichuki, 2005, p. 36).

Rain-fed agriculture is the rural smallholder population's main activity (Lemoalle & de Condappa, 2009, p. 72) and rain-fed mixed crop-livestock systems account for the main providers of food in the Volta basin. These factors, in addition to relatively low agricultural productivity, compromise the achievement of food and water security and hence also that of economic, environmental, and political dimensions of human security, which are necessary for poverty reduction, health, and human development opportunities.

The causes of current local poverty are multiple and dynamic. Whereas the mentioned low productivity of rain-fed agriculture can be understood as one major obstacle, it in turn is limited by sparse and variable rainfall (CGIAR Research Program 5, 2011, p. 52)

and degraded lands. One important factor that contributes to land degradation is the growing population pressure, which reduces possibilities for crop rotation and for practices that allow croplands to regenerate essential nutrients. Both land degradation and population pressure also limit the availability of farmland, a problem that is already observed but has not extended to a crisis yet (Andah & Gichuki, 2005, p. 24). Population pressure is especially high in central Burkina Faso, while in the northern part of the country draughts also lead to land degradation (Barry et al., 2005, p. 53). Other factors contributing to local poverty are limited access to markets, unstable market prices, and insecure land tenure (CGIAR Research Program 5, 2011, p. 51).

Keeping in mind the high proportion of the rural population, and the subsequent importance of agricultural production for local livelihoods, agricultural water management is of pressing relevance. Therefore, as the lack of access to enough good quality water can be identified as a major development issue in the basin, research on agricultural innovation systems focusing on the improvement of local rainwater management strategies has the potential to improve rural livelihoods of women and men in the region – but only if it seriously considers locally perceived problems and solution preferences in a participatory research process.

## **2.2 Rainwater management in Burkina Faso**

This study considers rainwater management in a broad sense that incorporates strategies to collect rainwater in fields and plots during the rainy season, which is the agricultural season for crop production, as well as the management and use of important water sources, which are affected and indeed determined by rainfall patterns, such as water reservoirs, dams, and wells.

Early research on water management strategies in the Burkina Faso and the wider Volta river basin was dominated by Burkinabe and French researchers from the 1960s throughout the 1980s, while regional development institutions and individual initiatives were also active in the 1970s and 1980s. The focus was on technology transfer and the promotion of earth bunds surrounding the crop fields. In the 1960s, this technique was supposed to control erosion and to contribute to cash crop production. In the 1970s, these concepts underlying local rainwater management research were replaced by the broader aim of soil and water conservation and the focus on staple food production.

While still promoting the technology of earth bunds, the construction and management of small water reservoirs have received increasing attention since the early 1970s droughts (Douxchamps, Ayantunde, Andah, & Barron, 2011). As already mentioned in the last chapter, there is a high and growing number of small reservoirs, which are mainly used for irrigation, fishery, and livestock watering.

Following other serious droughts in the early 1980s, the promotion of stone bunds and of an improved version of the local ancient *zai* technique was added to the small reservoirs. This correlates with a conceptual shift from technology transfer to participatory approaches (Douxchamps et al., 2011). Burkina Faso is unique in that it incorporated endogenous methods of mitigation and adaption to a locally changing climate, such as the *zai*, into formal national strategies. As such the *zai*, stone bunds, and other techniques have been formalised, promoted, and distributed by policymakers, research centres, and NGOs (Samari, 2011, p. 3). Stone bunds, or *cordons pierreux* in French, are usually constructed on a hilly surface using stones to make small barriers, which prevent erosion from washing away nutritive substances. In doing so, this area can be used to plant seeds. *Zai* can be described as an ancient local technique of organic fertilisation and improvement of soil structure and water infiltration that was developed in the northern Burkinabe province of Yatenga. It consists of digging small holes that are filled with rainwater and then with organic products such as manure or compost, before the seed is placed inside (Douxchamps et al., 2012, p. 10; Samari, 2011, p. 3). Improved *zai* are a variation of this technique where holes are dug in rows with an alternating structure (Field notes 2013).



Figure 2: Improved *zai* technique applied on a household's field in the northern Yatenga province (Source: photo by author).



From the late 1980s onwards, NGOs and farmers' organisations, regional directions, bilateral and multilateral cooperations, as well as international research organisations have dominated rainwater management research in the region. Adding to the rainwater management strategy of the small reservoirs, small-scale irrigation has been brought forward since the late 1990s. While improved *zai* are still perceived as important and have even been developed further into mechanised *zai* in the late 2000s, another technique, the so-called "half moon", has been promoted to collect rainwater around the crops in the field (Douxchamps et al., 2011). For the half moon, or *demi-lune* in French, one digs a hole in the shape of a U, which should face the water flow direction. Constructed on hilly soils, it should face the direction of the water flow. It helps retain rich nutritive substances in the hole where the seeds are placed, so that erosion and rain cannot remove them (Samari, 2011, p. 3).

In the new frame of ecosystem research, the dominant aforementioned institutions and cooperations focused on integrated natural resources and sustainable land management until the early 2000s and, after that, have focused on natural resources and livelihood management as well as land husbandry. Another important shift is the integration of gender issues into applied participatory approaches in the region's rainwater management research (Douxchamps et al., 2011).

### 2.3 Research challenge

"Advancing gender equality is not only the right thing to do, and it's more than an economically-smart thing to do. It's also necessary in order to unleash agriculture's full potential for improving lives in developing countries" (CGIAR Fund, 2013). While the gender gap in agriculture – women's and men's different opportunities in meeting their various responsibilities and livelihood needs – is increasingly recognised as a significant development obstacle on an official level, gender roles and relations still account for major challenges in natural resources management, development, and poverty reduction initiatives (Amerasinghe & Van Koppen, n.d.; Douma, 2012, p. 8f.; The World Bank, 2009; Wahaj et al., 2007).

Especially in the context of scarce resources, "[p]ressure on resources due to population growth, climate change, pollution, and a tendency for large-scale interventions can reinforce and aggravate current gender inequalities" (Douma, 2012, p. 8). In the case of

water-scarce regions like Burkina Faso, competition increases inequity in access to limited water resources, whereby poor rural women, who are mostly responsible for local water management, are disproportionately affected (Tandon, 2007, p. 10f.; Wahaj et al., 2007, p. 2). Therefore, the responsibilities, needs, and wants of all members of a society, regardless of their gender or status in the social power structure, have to be taken into account. This will not only enable all women and men to access natural resources and to benefit equally from water management innovations, but it will also have positive effects on the overall well-being of poor households, by reducing poverty as well as food insecurity, improving health and wealth benefits to the household, increasing productivity at farm level, and thus contributing to the agricultural gross domestic product of countries (Amerasinghe & Van Koppen, n.d.; International Food Policy Research Institute, 2000; Wahaj et al., 2007, p. 2).

Socially constructed “[g]ender roles shape men’s and women’s decision making in all areas of household and community life, from agricultural decisions such as what crops to grow or when to harvest, to how to earn or spend income, what foods to eat and how to raise their children” (Nelson & Chaudhury, 2012, p. 8). Furthermore, gender roles result in different, society-specific responsibilities and activities of men and women. In relation to agriculture and water management, men’s fields of work mostly relate to cash crop irrigation and livestock, whereas women are often responsible for water management for domestic uses such as drinking, washing, sanitation and hygiene for good health, but also for productive uses, which include irrigation of staple and food crops, kitchen and home gardens. Additionally, women’s tasks also include the production and provision of food, which makes them largely responsible for families’ and communities’ food security. Despite their important multiple roles in agricultural production, women have limited “access to productive resources such as land, water, fertilizer, credit and other inputs” (Wahaj et al., 2007, p. 7) and also face specific constraints in the control of these resources, especially of those with higher monetary value, that are generally controlled by men or by male-dominated institutions (Douma, 2012, p. 8; Wahaj et al., 2007, pp. 3f., 12ff.).

It is important to recognise that “women are not only farm workers, but also decision makers in crop production, livestock rearing, fisheries and forestry” (Amerasinghe & Van Koppen, n.d., p. 1). This is especially the case in many sub-Saharan African regions, where women are the main producers of food crops and staples, and where, in gender-based farming systems, women and men cultivate separate plots simultaneously

(Alderman, Hoddinott, Haddad, & Udry, 1995; Farnworth, 2012, p. 5; Wahaj et al., 2007, pp. 6, 10). But in many cases, in accordance with societal gender roles, men are responsible for decision making regarding land and water management (The World Bank, 2009, p. 229) and are therefore more often integrated into related associations and projects and profit from information, networks, technology distribution, and trainings, “as women were until now kept out of the projects despite cultivating significant areas of land” (Douxchamps et al., 2012, p. 18). Also from the perspective of Agricultural Innovation Systems, women should be engaged in agricultural innovations, because they are needed to raise competitiveness and to intensify smallholder agriculture, which can provide sustainable livelihoods to a larger percentage of vulnerable rural populations (The World Bank, 2009, p. 265). There is need to recognise both men and women as central actors in the provision and management of water and other natural resources. Especially regarding the provision of household food and food security, the importance of women as major players in the agricultural sector must not be overlooked.

While development actors increasingly emphasise the importance of gender equity for agricultural and rural development to ensure food security and sustainability, there still remains a gendered nature of agricultural science, as research as well as supportive extension services typically focus on male farmers’ production issues and agricultural researchers themselves are oftentimes men. Therefore, women are frequently excluded from access to important resources and technical information, their needs and concerns are overlooked and furthermore, “[...] the lack of attention to gendered divisions of labor on the farm and in households may mean that efforts to increase agricultural production inadvertently expand women’s workloads [...]” (Bezner Kerr, 2008, p. 291f.). On the contrary, the study of neglected areas such as food processing has the potential of reducing women’s burden of work while at the same time improving livelihoods of women and children (Bezner Kerr, 2008, p. 292).

Such an increase in work load and time use for certain individuals can be identified following the introduction of several technological innovations and new farming techniques in agricultural communities. Their adoption can have context-specific gendered positive but also negative effects inside households and across households with different wealth characteristics and accesses to extension services. Furthermore, “the effects of technologies and interventions are assumed to vary among individuals in a household, depending on socio-cultural context, gender, age, religion, skills, abilities,

social relations including kinship ties, and economic and social status” (Beuchelt & Badstue, 2013, p. 712). As technological innovations may affect work habits and workloads of other related agricultural tasks that are allocated to a specific gender or age group, this group may oppose technology adaptation, if they fear disadvantages. One example could be the introduction of fertilizer, which has the potential to increase agricultural production, but also to expand weeding efforts. Therefore, the adoption of fertilizer use depends on gender roles and responsibilities, on questions such as who decides over production output use, who is responsible for weeding, and who has more intra-household bargaining power. Hence, it is necessary to analyse societal structures and dynamics to predict intended and unintended impacts on time use, income possibilities, control of outputs, labour patterns, and the allocation of resources and land between men and women (Beuchelt & Badstue, 2013, p. 710f.; Bezner Kerr, 2008, p. 291f.).

Even though “[t]here is renewed interest in the agricultural sector as an engine of growth and development and greater recognition of the importance of women in agriculture” (Alkire et al., 2012, p. 2), the links between natural resource management and the role of gender, in contrast to the many literature examples on gender in health and education sectors, do not seem to be as extensively explored (Douma, 2012, p. 9). Therefore, a better understanding and acknowledgement of the gender dimensions in the management of rainwater and other important resources in crop-livestock farming are of great significance. Especially as the empowerment of women and the improvement of gender equality contribute to higher productivity and rural development (IFAD, 2012, p. 10ff.), improved insights into gender dynamics affect the ability of development projects to design appropriate agricultural, technological, and market interventions for a sustainable improvement of the socio-economic well-being of both women and men in local crop-livestock systems.

## 2.4 Justification and project background

In general, the *CGIAR Challenge Program on Water and Food* (CPWF) in the Volta basin, the context in which this research was conducted, aims to contribute to increased agricultural production, improved sustainable livelihoods, and hence reduced rural poverty, by using participatory action research and innovation platforms. In this way, it

adds to the realisation of the United Nations' Millennium Development Goals, in particular to the reduction of poverty and hunger, the improvement of access to safe water, of health, of environmental sustainability, and of a global partnership (UN General Assembly 2000).

The research presented in this study was conducted in the course of an internship that aimed to contribute specific local information via research for development to the projects V2 and V5, both part of the CPWF-Volta. While the latter focused on research coordination, stakeholder engagement facilitation, and understanding change processes of the other four projects (VBDC, 2011, p. 3), V2 aimed at the improvement of rainwater management for crop-livestock agro-ecosystems in the Volta basin (Douxchamps et al., 2012, p. 3). As a research for best-fit strategies of integrated rainwater management for multiple uses, V2 included elements of nutrient management, animal nutrition, crop varieties testing, and management of as well as access to input and output markets.

This research was designed to contribute to the topics and issues addressed by both the V2 and the V5 project, whereas its focus on gender dimensions was exclusive to this study, which allowed for a certain amount of independence. This autonomy applied to the study's conceptual framing, to the selection of methods as well as to the concrete research process. However, being embedded in this 'research for development' program considerably influenced the cognitive interest and the specific objectives that guided this research, as well as the selection of research sites and their respective contact persons that further determined the characteristics of the data collected. Some positive effects of this integration into the program included the facilitated access to the research communities and the valuable mentoring during the research process by experienced researchers on the one hand. But on the other hand, it suggested the possible association of my research activities with other mostly unrelated project activities from the standpoint of individuals in the research communities, and it also limited my research opportunities insofar as a critical project evaluation was not possible. This latter issue shifted my research objectives further in the direction of understanding dynamic processes of agricultural change in a broader context of environmental, economic, and social changes because of multiple reasons, without limiting the focus on possible impacts of activities by only one recent project. From an ex-post perspective, I consider this wider focus as more interesting, because it centres more on people and communities themselves instead of on a project, and because "[u]nderstanding the dynamic processes

of change is crucial to better position the [agricultural] sector for faster growth and sustained development, which is vital for food and livelihoods security for millions of men and women worldwide” (The World Bank, 2009, p. 1).

A good understanding of gender-differentiated agricultural activities, roles, and responsibilities in local crop-livestock systems is also crucial for the design and sustainable implementation of innovative practices with equal access to resources (Douma, 2012, p. 11). Therefore, the results of this research are expected to enhance the knowledge on and the recognition of the importance of gender dimensions in dynamic processes for crop-livestock systems in this specific local context. As such, the results of this study could inform and support the design and implementation of future action and innovation research aimed at improving livelihoods in similar settings, amongst others, follow-up projects in the frame of the *Consortium Research Program on Water, Land and Ecosystems* (CGIAR).

### **3. Objectives**

#### **3.1 General objective**

The main goal of the CPWF-Volta, the Volta Basin Development Challenge, is to “[s]trengthen integrated management of rainwater and small reservoirs so that they can be used equitably and for multiple purposes” (CPWF, n.d.). It is further defined as “improving rainwater and small reservoir management in Burkina Faso and Northern Ghana to contribute to poverty reduction, and improved livelihoods resilience while taking account of upstream and downstream water users including ecosystem services” (VBDC, 2011, p. 3).

#### **3.2 Specific objectives and research questions**

More specifically, this study aims at understanding gender-differentiated systems of water uses and needs, agricultural production, access to markets, to knowledge and related resources by using a Sustainable Livelihoods approach. It analyses gender dynamics, namely non-static roles and relations, of rainwater harvesting, cultivation,

livestock keeping, and marketing within specific communities by applying a gender-differentiated target group analysis to determine whether and how ongoing economic, social, and ecological changes, including effects of project activities, have modified these dynamics and impacted women's and men's livelihoods.

This study addresses the following research questions and sub-questions:

Q1: What are the gender dynamics in rainwater management in the Nakanbé basin?

- How are practices and innovations around rainwater management used and perceived among local women and men?
- How are roles in constructing and implementing rainwater management structures in individual or household fields distributed among women and men?

Q2: What are the gender dynamics in crop and livestock farming in the Nakanbé basin?

- How are practices and innovations around agriculture, including livestock, used and perceived among local women and men?
- How is access to land distributed differently among women and men?
- How is access to water constructed and negotiated and how do women and men use available water?
- How are responsibilities and tasks in cultivation distributed among women and men?
- How are women involved differently from men in livestock ownership, raising, and care?
- How is access to input resources and services constructed for and negotiated among women and men?
- How are women and men involved in processing and marketing agricultural produce, including livestock?

Q3: How do changes in rainwater management and agriculture affect the livelihoods of women and men in different situations?

Within the assessment of gender-differentiated agricultural activities within households and communities, underlying perceptions, decision making, and power structures, considerable attention was paid to relative dynamics and aspects of change.

## **4. Conceptual framework**

This study uses a Sustainable Livelihoods approach, as it focuses on individuals, determined by dimensions of social differentiation such as gender, age, class, and ethnicity, and their capitals, assets, and livelihood strategies. The Sustainable Livelihoods framework, which is used for data analysis and discussion, integrates people and their actions in a complex holistic context of institutions, structures, and processes that influence each other and allows for a realistic consideration of dynamics and change. This framework, informed by gender considerations, empowerment concepts, and knowledge on smallholder systems, is considered as best fitting for this study, especially for understanding and analysing the livelihoods of vulnerable rural people in this research's context of water management, development, and poverty reduction initiatives in smallholder crop-livestock systems.

### **4.1 Sustainable Livelihoods Approach**

The Sustainable Livelihoods approach evolved from changing perspectives on poor peoples' lives, recognising the importance of their own agency as well as that of structural and institutional contexts in and with which they interact. The focus on livelihoods became increasingly popular within development studies in the 1990s, whereas the new emphases on opportunities, on the holistic embeddedness of livelihood structures, and on promising bottom-up approaches contributed to its broad popularity. This pro-active and pro-poor approach has been particularly strongly promoted by the Department for International Development (DFID), the British state development cooperation agency (Adato & Meinzen-Dick, 2002; de Haan, 2012, p. 346f.; DFID, 1999; Scoones, 1998), and it has also been embraced by the World Bank, which contributed to an even wider diffusion and popularity (Bohle, 2001, p. 119). Followed by many other similar livelihood-conceptualisations, the DFID designed a first, influential, framework, which presented "the main factors that affect people's livelihoods, and typical relationships between these. It can be used in both planning new development activities and assessing the contribution to livelihood sustainability made by existing activities" (DFID, 1999, p. 1).



While people are placed at the centre of this approach, they are embedded in a context of vulnerability. There is a multiplicity of concepts on vulnerability in social and natural sciences that take into account the intensity, frequency, and pace of natural hazards as well as the environmental, physical, and economic exposition, capacities, coping, and adaption possibilities of a society (Bohle & Glade, 2007; CVTL, 2005, p. 16ff.; Davis, Haghebaert, & Peppiatt, 2004; International Federation of Red Cross and Red Crescent Societies, 1999). In the context of the livelihood approach, vulnerability consists of trends in relation to population, resources, governance or the economy; of natural, social, economic or political shocks; and of seasonality in regard to “prices, agricultural production, employment opportunities, resource availability, or health” (Adato & Meinzen-Dick, 2002, p. 8).

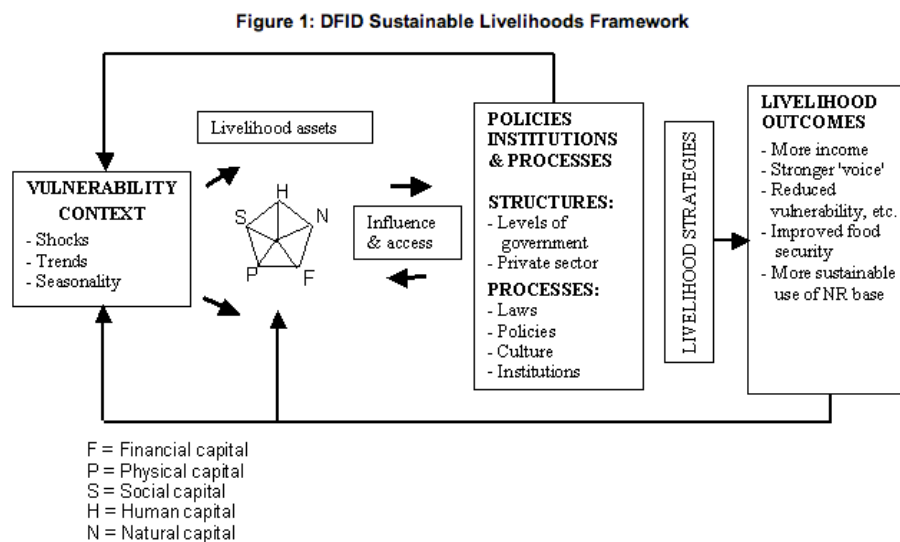


Figure 3: Sustainable Livelihoods Frameworks (Source: FAO).

This vulnerability context is shaped by institutions, structures, and processes and, as such, it influences peoples' opportunities and assets, so-called capitals, which they use to build their livelihood strategies and construct their livelihood outcomes. This asset base can be visualised in a pentagon and theoretically divided into human, social, natural, physical, and financial capital:

- *Human capital*: education, information, knowledge, skills, health, physical capability, and labour power;
- *Social capital*: networks, membership in formal or informal groups and organizations, social relations, social claims, affiliations, (mutual) assistance, access to opportunities, reciprocity, safety nets, and decision making ability;

- *Natural capital*: land, soil, water resource stocks, hydrological cycle, forests, biodiversity, air quality, and erosion protection;
- *Physical capital*: infrastructure, communications, transport, roads, buildings, shelter, water supply and sanitation, food stocks, livestock, energy, machinery, technology, tools, and other farming equipment;
- *Financial capital*: cash, savings, loans, credits, and other inflows (Adato & Meinzen-Dick, 2002; de Haan, 2012; DFID, 1999; Scoones, 1998).

Links and relations between these assets are locally specific, multi-faceted, and complex, as, for example, a lack in one kind of capital could be substituted by others. These relations, and the ones between various people, their roles and actions, are further informed by theory on gender dynamics in smallholder agricultural systems, which are presented in the following chapter.

Possible positive livelihood outcomes in relation to rain-fed smallholder systems in water-constrained river basins like the Nakanbé sub-basin in the Volta basin can include improved representation and voice of farmer groups at the planning-level of initiatives, enhanced agricultural productivity in formerly degraded landscapes, better yields because of improved soil and water management practices, better access to and new investments in supplementary irrigation that support increasing crop and livestock production (CGIAR Research Program 5, 2011, p. 17).

Some of the advantages of the Sustainable Livelihoods Approach include its explicit focus on people, who are incorporated into complex relationships between structures and processes, influenced by institutions. It considers a diversity of determining factors for poverty and livelihood security, including real access conditions and transformations, and therefore helps to increase understanding of livelihood situations particularly of poverty groups (Bohle, 2001, p. 119f.; de Haan, 2012, p. 342).

Nevertheless, this approach has also faced extensive criticism, especially about its focus on the economy and on material resources. Also, its mechanistic and static view of people's livelihood security systems and its ahistorical perspective, neglecting power structures and actual reasons of societal vulnerability, were mentioned and discussed (Bohle & Glade, 2007, p. 104; de Haan, 2012, pp. 348, 351). In order to avoid such an ahistorical and static view by using the Sustainable Livelihoods Framework in this study's analysis of livelihoods, I focused extensively on dynamics and changes, including their reasons, involved actors, and various effects.

In the face of these critiques, the livelihood approach has experienced further development and improvement by various disciplines. Gender studies, among others such as political ecology and the studies on political arenas, “gave an impetus to the conceptualisation of power relations in livelihood studies” (de Haan, 2012, p. 350). Based on Foucault’s theory of power that often underlies the analysis of power relations in gender studies, Rowland’s conceptualisation of power offers a fruitful tool for operationalisation. He distinguishes four interconnected levels of power, namely “power over”, “power with”, “power to” and “power within”. Whereas the first distinction refers to the ability to participate, control and influence, “power with” is understood as “collective power based on mutual support, solidarity and collaboration with non-individual benefits” (de Haan, 2012, p. 350). “Power to” is seen as a generative or productive power that enables someone to exercise agency and change existing hierarchies. Finally, “power within” comes from a change in people’s own perceptions and is about individual consciousness, building self-esteem, respecting, and being respected. These interrelated dimensions of power are important to determine non-material wellbeing and livelihood outcomes that may not be directly visible without the analysis of power structures and their dynamic effect on assets and strategies (de Haan, 2012, p. 350; Kabeer, 2012, p. 6; Luttrell, Quiroz, Scrutton, & Bird, 2009, p. 6f.). These dimensions of power are also intrinsically related to different aspects of people’s empowerment, which offer valuable theoretical inputs to consider in the analysis of gender power relations in agricultural poverty contexts and are therefore further discussed in chapter 4.4.

## **4.2 Smallholder agricultural systems**

Smallholder agriculture is generally associated with rural farming systems, characterised by a small land size, few workers or few capital investments. Smallholders often have limited control over their land, which is mostly acquired through customary rights, and over natural resources. This is particularly important as they heavily depend on well-functioning agroecosystems for their livelihoods, which makes them especially vulnerable to climatic and environmental changes such as degradation of land and water resources. Marginalisation and limited access to resources, assets, capital, technology, information, and innovation add to this crucial

vulnerability. Also, smallholders in developing countries are often disadvantaged in accessing financial inputs and markets, one influencing factor being poor rural infrastructure, another the subventions for large-scale agriculture. As a consequence of these problems, after a bad or failed agricultural growing season, they need to buy food for their own subsistence at too-high international prices, rendering them vulnerable to food insecurity. Their important role in regional and global food production and “the fact that they comprise such a large proportion of the world’s poor indicate that their development significantly helps reduce poverty and hunger” (Walpole et al., 2013, p. 11). These effects are considered as particularly strong in sub-Saharan Africa, even though there is a considerable heterogeneity within this region (Shiferaw, Okello, & Ratna Reddy, 2009; Walpole et al., 2013, p. 10ff.).

In smallholder agricultural systems, with which this research is concerned, households play a particularly crucial role in the construction, provision, and distribution of livelihood opportunities. Gender roles and relations, being shaped in social and economic systems at the household and the community level, determine access to resources, allocation of responsibilities and tasks, and the relevant decision making power to take part in their negotiations (Alderman et al., 1995; Castilla & Walker, 2012; Quisumbing & Smith, 2007; Smith & Chavas, 1999; The World Bank, 2009).

A household can be described as an internally complex economic “unit”, consisting of different individuals, relating to each other, according to Amartya Sen, in “cooperative conflict”, as they form largely separate gender-specific autonomous sub-economies, “linked by reciprocal claims on member’s income, land, goods and labor” (Quisumbing, 2003, p. 6). Household members typically share meals together and are often, but not necessarily, linked to each other by family relations. Different social roles and responsibilities as well as different access possibilities to resources such as land, technology, and cash, contribute to unequal partnerships of various dimensions between men and women within households (Bezner Kerr, 2008, p. 285f.; Castilla & Walker, 2012; Quisumbing & Smith, 2007; Smith & Chavas, 1999; The World Bank, 2009). Those responsibilities are further linked to different, often season-related tasks with specific skill and time requirements (Ilahi, 2000). Intra-household allocation of such tasks is subject to “‘unilateral’ decisionmaking” (Smith & Chavas, 1999, p. 17). Individual household members’ bargaining power in these decisions is in turn influenced by culturally specific meanings and values attached to those activities, but

also by their financial returns and by governance-related outside or exit options (Charusheela, 2003; Quisumbing, 2003).

In the context of rural West Africa, the concept of *hearth-holds* needs to be added to that of a household for a more adequate understanding of lived realities in local smallholder agricultural systems. Nigerian anthropologist Felicia Ekejiuba understands the concept of households as imported from Western and East Asian social contexts and therefore as not adequately capturing “African residence, production, decision-making and consumption patterns” (Ekejiuba, 1995, p. 49). She describes hearth-holds as a more or less independent subset of a household, structured by an extension of mother-child bonds. This female-directed social unit consists of a mother and her dependents, including her children, her co-resident relatives, as well as non-relatives “who, in one way or another, assist her in provisioning, caring for and nurturing members of her hearth-hold who share in the food cooked on her hearth for a significant part of their lives” (Ekejiuba, 1995, p. 51). A woman’s husband can be either fully part of one or a partial member of several hearth-holds, which is especially the case in polygynous societies. In conceptualising hearth-holds as primarily consumption but also as production units, with female hearth-hold heads being linked to male household heads in multiple interactions and reciprocal exchanges, this concept contributes to a deeper understanding of complex patterns of autonomy and dependence among household members (Ekejiuba, 1995, p. 49ff.).

### 4.3 Gender concepts

This study understands gender as a socially constructed category of difference and inequality, which intersects with other dimensions of social life such as age, class, and ethnicity. Gender is „constructed within the social and cultural perception of the people within the society to distinguish between males’ and females’ roles, responsibilities, opportunities, privileges and needs” (Deji, 2011, p. 21). This determines how an individual person is treated by a society on the basis of his or her sex and therefore shapes people’s experiences and livelihood opportunities. While a person’s sex refers to his or her biological attributes,

“a person’s *gender* constitutes a multifaceted set of relations and characteristics that are related to his or her biological sex, but also involve social meanings, positions and relationships to others as a man or a woman. These are, in turn, constructed and interpreted through social interactions and

vary across time, space, and culture, which is why gender is referred to as something that is *socially constructed*” (Bezner Kerr, 2008, p. 282).

The understanding of female and male gender roles and the relations between one another are society-specific, dynamically shaped by different social, cultural, and religious norms, and are constructed by a range of institutions, including families, legal systems, and markets. Women and men are therefore not understood as unitary, but rather as heterogeneous categories, whose individual manifestation is socially and culturally constructed, differentiated locally, and intersected with other social categories (Coates, 1999, p. 2; GWA & UNDP, 2006, p. 9ff.). More specifically, the “study of gender relations explores the different and often highly uneven roles, responsibilities, access to resources, authority, decision-making patterns, and perceptions about gender held between men and women within societies” (Bezner Kerr, 2008, p. 282). It is these gender relations, understood as power relations, with which this study is concerned. To address gender issues in Burkinabe agriculture, it is useful to review some of the many theoretical approaches that inform the study of gender relations.

By asking such fundamental questions about inequality, like on resource access or decision making, the connection of gender with development issues is quickly revealed. Academic interest in the role of rural women in agricultural development has increased since the 1970s and especially from the UN Decade for Women in 1975 onwards. “There is a large and growing literature concerned with gender-based distributional issues and the economic activities of rural women” (Alderman et al., 1995, p. 1). One of the most prominent pioneers in the study of gender relations was Danish economist Ester Boserup, who analysed women’s roles in different sub-Saharan African farming systems and examined interdependencies and effects between cultural practices and women’s economic status. Her book *Woman’s Role in Economic Development*, published in 1970, can be described as seminal for future research. In it, she associated matrilineal societies with abundant and collectively possessed land, and patrilineal inheritance rights with population pressure leading to reduced land availability. In her view, separate economic spheres of operation for women and for men in shifting cultivation systems will

“erode with the intrusion of commodity, labour and land markets [...] [and] as population densities increase and land replaces labour as the scarce factor of production in the long-term transition from shifting hoe cultivation to permanent plough agriculture, women’s participation in agricultural production declines” (Bryceson, 1995, p. 5).

Even though some of her research contributions were and are considered as valuable, her opinions and conclusions have also been widely criticised for being based on a Western evolutionary modernisation model, not taking into account class differences among women on the one hand and also relationships between production and reproduction on the other. Also her use of the term “female farming” for African agriculture, as women’s labour and time inputs were observed to be greater than men’s, was subject to a lot of criticism (Bryceson, 1995, p. 4ff.). A more influential argument of hers was that women’s roles as workers, owners, and entrepreneurs, in subsistence as well as in communal production, were often overlooked by development planners, and that “women were often negatively affected by development, which undermined their access to land and resources” (Pettman, 1996, p. 171). Also, by the 1970s, the fact that development does not just “trickle down” to women, as was commonly believed until then, and that they are specifically affected by changes, was increasingly recognised. To reframe development thinking, influential political critiques emerged, such as the *dependencia* perspective, originating in Latin America in the 1960s, the second-wave women’s movement, and the many organisations, protests, and theories by “third-world” women (Pettman, 1996, p. 171f.).

Following various attempts and initiatives by feminists to raise the profile of development issues specific to women within various international and national bodies, the 1975 *UN Conference on Women* in Mexico City “highlighted the need for enhanced legal rights for women and for their economic empowerment” (Bezner Kerr, 2008, p. 283). One important conference outcome was the *Women in development* (WID) approach, which became a broadly used operating guideline for development agencies throughout the 1970s and 1980s. It “[...]focused on increasing women’s access to training and resources, emphasising women’s individual legal rights to social, economic, and political advancements [...]” (Bezner Kerr, 2008, p. 284), and drew attention on gender inequality issues. According to Moser (1991), several different approaches to women in development can be identified. After dissatisfaction with the *welfare* approach, which treats women as passive “targets” for development programs, the *equity* approach emerged as the first WID perspective. As it aims at reducing inequality between men and women and eliminating legal discrimination, it also requires fundamental transformations of gender relations that can easily face resistance based on contrasting cultural norms. A second WID approach is *anti-poverty*, draws attention to basic needs, but “[...] may reinforce gendered divisions of labour by

building on traditional or imposed western notions of women's work, in sewing and handicrafts, for example" (Pettman, 1996, p. 173). The third WID approach deals with *efficiency*, focusing on women as workers and on gender-aggregated or gender-sensitive approaches (Moser, 1991, qtd. by Pettman, 1996, p. 173f.).

At the end of the 1980s, doubts were raised that the policy-oriented WID approach rather isolated and marginalised women's concerns instead of integrating them into significant development policies. Furthermore, the emphasis on the Western approach of individual rights, and the insufficient challenging of underlying reasons for female subordination, were questioned (Bezner Kerr, 2008, p. 283f.; Luttrell et al., 2009, p. 3).

As the articulation of a women's agenda was mostly procured and dominated by white middle-class women of the northern hemisphere, especially from the early 1980s onwards, women from the "South" and minority "first-world" women "[...] challenged imperialistic feminisms and demanded that power relations between women be attended to, too" (Pettman, 1996, p. 183). With their writings and politics they became visible, influenced and exchanged ideas with women from the North, which led to the recognition of "the different perspectives held by each, their interests and areas of central concern while also establishing common ground, the basis for partnership" (Coates, 1999, p. 3). The growing globalisation of power and its gendered consequences can be seen as part of this common ground (Pettman, 1996, p. 183f.). This rather positive view of the global debates surrounding the conceptualisation of women and their collaboration in challenging existing social power structures is seen as more problematic by other feminist and postcolonial theorists and activists. Since the mid-1980s, the gender perspective gained more influence in postcolonial studies, especially among postcolonial feminists who criticised the ethno- and eurocentrism of white feminism. As theories are always results of emancipation movements and thus their local background, the cultural revolutions of two white women's movements in the northern hemisphere needed to be considered and problematised (Dietze, 2013, p. 475f.). Particularly the universalisation of the category "woman", feminists' structural Occidentalism<sup>1</sup>, the blindness in relation to race-induced differences and consequently the invisible-making of *Women of Color* have been criticised (Dietze, 2013, p. 484ff.). Encompassing these criticisms, the intervention of third-world-, transnational and

---

<sup>1</sup> Occidentalism refers to an implicit feeling of sovereignty and hegemony of the northern/western hemisphere over "others", who are excluded on the basis of their socio-economic and especially cultural specifics (Dietze, 2013, p. 485). This is further discussed in: Dietze, Gabriele/Brunner, Claudia/Wenzel, Edith (ed.) (2009): Kritik des Okzidentalismus. Transdisziplinäre Beiträge zu (Neo-)Orientalismus und Geschlecht. Bielefeld.



decolonial feminism has provoked considerable insights and changes among feminist and gender theorists in the last decades, giving increased impetus for the deterritorialisation of power analysis, for the challenging of gender-dimorphism and for critical self-reflection (Dietze, 2013, p. 490ff.). One important development-oriented initiative is the *Development Alternatives of Women for a New Era* (DAWN) that evolved from small seed planting in Bangalore, India, in 1984, to a group of women from many different countries who exchange their experiences and perceptions of development strategies, policies, theories, and research, and question their various impacts on poor people, especially women. The DAWN committee and contributing women researchers and activists stress the heterogeneity of feminisms, owing to differing concerns and interests of women from different classes, nationalities, regional and ethnic backgrounds, and they call for alternative development processes with emphasis on poverty reduction and on basic survival needs of the majority of the world's people (Sen & Grown, 1987).

In the 1990s, another global approach emerged in reaction to some of the shortcomings and critiques of the WID-approach. Contrary to the aforementioned initiatives, this one does not deal exclusively with women's issues, but with *gender and development* (GAD). The GAD approach highlights the need to integrate men's concerns with those of women and it encourages gender mainstreaming, which aims at incorporating gender perspectives into all development programs, projects, and processes such as policy formulation, budgeting, privileges and resources allocations (Bezner Kerr, 2008, p. 285; Deji, 2011, p. 25; Luttrell et al., 2009, p. 3). It "[...] also emphasizes the diversity of cultural perspectives on gender issues globally and the need to take a participatory, empowerment approach to addressing the needs of poor women from the global South" (Bezner Kerr, 2008, p. 285). Empowerment as a potentially transformative women-centred approach "[...] has grown out of critiques by third-world activists and their first-world allies, building on grassroots experiences and knowledges" (Pettman, 1996, p. 174), and recognises diverse experiences of oppression related to a woman's class, nationality, and ethnicity along with her gender. This approach will be discussed in more detail in the next subchapter.

In line with the GAD approach's gender focus, such above-mentioned needs can be disaggregated based on gender, and, in turn, be sub-divided into strategic and practical gender needs. Strategic gender needs refer to a person's relative position in society and arise from unequal resource access, power, opportunities, and privileges between

women and men including participation in decision making. Practical gender needs are linked to a person's relative condition and include daily relevant resources and support that allow women and men to perform their socially ascribed roles. The provision of the latter can also lead to fulfilling strategic gender needs (Deji, 2011, p. 23), even though this is not always the case, as the underlying societal structure, which determines gendered differences, is not necessarily changed when practical gender needs are fulfilled. The relevance of such resources that are needed on a daily basis is especially obvious in resource-dependent rural communities, where resources such as water, food, health care, shelter, and education, but also land, working tools, and other inputs like fertilizer, are essential for livelihood-generating agricultural activities. Because of gendered access to these significant resources, and also because of gendered decision-making power over them, gender relations have profound influence on agricultural work and outcomes.

To conclude this section on gender concepts, I want to raise the question of "What can Africa do for gender?" as posed by historian Eileen Boris in the transdisciplinary, multigendered, and multiracial book *Africa after gender?* which combines different approaches, methods, and locations to intervene productively in the dynamic North-South relations and to add a critical contribution to a North-South flow of information (Miescher, Manuh, & Cole, 2007, p. 3f.). Boris identifies and discusses three crucial African interventions in the field of feminist research. One is the separation of the biological sex and gender, which is understood as a social position that evolves and changes over a person's lifecycle. Secondly, the focus on gender as it exists in women's studies "overshadows other markers of social identity and individual subjectivity that exist in tandem to form the category 'woman' or 'man' and forge actual women and men" (Boris, 2007, p. 195). Especially social attributes such as lineage, associated with the "hometown", and kinship, including the social position inside a household and a family, are of great significance in several African contexts. A third contribution to gender understandings in Africa stresses gender as an expression of power and a "weapon to reinforce inequalities and hierarchies" (Boris, 2007, p. 197) by dividing the social life of a society into gendered binaries. Thus, it is intrinsically tied to contestations and negotiations with the West, to colonisation, and also to liberation (Boris, 2007).

Reflecting the influence of colonisation, but also of religious norms, governmental regulations, glocal<sup>2</sup> market changes, and dynamic cultural beliefs, the analysis of gender dynamics in Burkinabe villages in the Nakanbé river basin takes into consideration the concepts and critiques of gender as an analytical category.

#### **4.4 Empowerment**

Empowerment is a broad concept that is understood and used in different ways by various writers, depending on concept and circumstances (Alkire et al., 2012, p. 1). This chapter will give a brief overview on some influential understandings and conceptualisations that partly also resulted in frameworks and measuring instruments for development practitioners.

Even though empowerment is not only a gender issue, it is heavily associated with it (Luttrell et al., 2009, p. 3), as the above-mentioned demands for empowerment by feminist activists from the global South in relation to diverse women's issues and development might suggest. Concerns with women's empowerment are rooted in several grassroots mobilisations and have been moved onto the gender and development agenda by feminist scholars, who focused on unequal gender relations that hindered women from participating in and influencing development processes (Kabeer, 2012, p. 5).

Empowerment or disempowerment include the notion of power and are directly shaped and caused by power relations, such as gender relations amongst others. Particularly in this context, power must be understood in a much broader sense than just as "power over", which refers to influence and coercion. Therefore, the multidimensional conceptualisation of power by Rowland (1997) that adds the power relations "power to", "power with" and "power within" to "power over", as already described in the preceding chapter on sustainable livelihoods, offers useful analytical and practical implications for the understanding of power and empowerment (Luttrell et al., 2009, p. 6f.).

Most importantly, the concept of empowerment must be considered as a very personal one as everybody has a unique understanding of its meaning based on his or her

---

<sup>2</sup> The notion of glocal is understood as the dynamic intersection and reciprocal influence of global processes on a trans- and super-local level, and complex local realities (Robertson, 1998).

personality and aspirations, influenced by life experiences, context, and culture (Kabeer, 2012, p. 4). One influential and frequently cited definition was presented by Naila Kabeer (2001) who understands empowerment “[...] as the expansion in people’s ability to make strategic life choices in a context where this ability was previously denied to them” (Kabeer, 2001, p. 19). Others draw on Amartya Sen’s concept of agency, the ability to act according to one’s values, and on an institutional environment allowing to exert this agency, by defining empowerment as “[...] a group’s or individual’s capacity to make effective choices, that is, to make choices and then to transform those choices into desired actions and outcomes” (Alsop, Bertelsen, & Holland, 2006, p. 10).

With regard to these definitions, empowerment can be viewed both as a process and as an outcome. Applying an instrumentalist view and focussing solely on the importance of process, on organisational capacity building and participation of marginalised groups in, for example, development activities, has the potential to neglect effects of such processes on individual and collective empowerment outcomes. On the other hand, the transformative approach has a rather narrow focus on increasing access to economic resources and improving economic outputs. Acknowledging the respective limitations of these two approaches, Kabeer theorises empowerment as consisting of three inter-related dimensions that enable exercising choice. These dimensions incorporate resources as a basic condition, agency as the process of making choices and achievements as their outcomes (Kabeer, 2001, p. 19ff.). As such, they provide a useful incorporation of both instrumentalist and transformative views. Similarly, but in a more detailed chronological order, Longwe’s framework (1991) conceptualises empowerment in five different degrees, while stressing “the importance of gaining *control* over decisions and resources that determine the quality of one’s life and [suggesting] that ‘lower’ degrees of empowerment are a prerequisite for achieving higher ones” (Luttrell et al., 2009, p. 5; comment by a.). Starting by satisfying basic needs in a “welfare” degree, followed by “access” to resources, the “conscientisation and awareness-raising” degree addresses structural and institutional discrimination and the “participation and mobilisation” degree focuses on decision-making abilities. After successful empowerment according to these degrees, “control” over resources, decisions and their effects can be acquired (Luttrell et al., 2009, p. 5).

For an application in this study, the *Women’s Empowerment in Agriculture Index* (WEAI) is also considered as fruitful, as it encompasses several aspects of

empowerment directly related to agriculture. These include issues of access, ownership and decision-making in five important domains, namely agricultural production, productive resources, income, leadership in the community, and time use. The index was developed cooperatively by the United States Agency for International Development, the International Food Policy Research Institute, and the Oxford Poverty and Human Development Initiative in the years 2011 and 2012, to measure and detect change in women's empowerment levels. These five dimensions reflect aspects of empowerment as found in the aforementioned definitions, such as the ability to make choices, relating to production, and the control of assets, income, and time that enable the realisation of these decisions and their enjoyment (Alkire et al., 2012, p. 7; International Food Policy Research Institute, 2012, p. 2f.).

In addition to the WEAI, a considerable number of other indices and measure-tools have been developed by various institutions and organisations to determine and challenge existing power structures, in particular gender relations. To mention some of them, I want to name the Gender-related Development Index, the Gender Empowerment Measure, and the African Gender and Development Index, which in turn consists of the Gender Status Index and the African Women's Progress Scoreboard (ECA, 2011, p. 1f.).

Women's empowerment in an agricultural livelihood context is understood in terms of securing access to water, land, and other inputs and relative innovations, but also as directly related to men and women farmers' capacity "to organize to leverage information, production resources, and marketing opportunities" (The World Bank, 2009, p. 279). It can act as a means to reduce poverty as well as food insecurity, improve health, and ensure overall well-being of poor households through increased productivity at farm level (Amerasinghe & Van Koppen, n.d.; Wahaj et al., 2007, p. 2). Also, the International Fund for Agricultural Development (IFAD) understands the empowerment of rural women and girls as contributing essentially to crucial global challenges such as food security, poverty reduction, and sustainable development, and also to play significant roles in biodiversity conservation and environmental sustainability, hence in climate change mitigation and adaptation (IFAD, 2012, p. 11).

Still, there is also a lot of criticism of the concept and its use from various angles and locations that has to be acknowledged. With enthusiastic embrace and uptake of the concept of empowerment by various NGOs and international organisations, also by the World Bank, the concept ironically became associated with problematic neo-liberal

policies, individualism, and free market ideology. Relating to its recent popularity, tendencies of stereotypes reinforcing populism and the lack of attention to underlying structural causes of disempowerment have brought about wide concerns that it does not tackle any fundamental changes in development practice. Such critiques weakened the concept and its political potency (Luttrell et al., 2009, p. 3f.).

Nevertheless, taking into account these negative potentials, the application of the concept of empowerment as part of a more diverse conceptual framework can generate fruitful insights when used for analysing certain contexts. Especially the empowerment framework's conceptualisation of development as exceeding access to resources and improved welfare, to include elements of non-material wellbeing and empowerment processes of obtaining and sustaining benefits (Deji, 2011, p. 154f.), is considered as precious input for the analysis of rural livelihoods in a development context.

## **5. Methodology**

### **5.1 Design**

To collect the relevant information to answer the research questions formulated in chapter 3.2, I conducted a qualitative social mixed-method research. Gender-differentiated agricultural activities, tasks, and responsibilities in relation to rainwater management strategies and around agriculture and livestock keeping were assessed, whereas special attention was paid to gender dynamics in the context of smallholder crop-livestock agro-ecosystems. Various recent changes were determined and analysed from an ex-post perspective.

The focus lies on understanding production systems and power structures, behaviours, conditions, livelihood constraints and opportunities, as they are perceived among individuals, living in selected villages that participated in CPWF-Volta project activities. Therefore, a non-positivist model of reality, in which “‘detail’ is found in the precise particulars of such matters as people’s understandings and interactions” (Silverman, 2005, p. 9) is applied. In line with the people-centred Sustainable Livelihoods approach, subjective perceptions are used as key indicators for livelihood

strategies and to estimate changes in various livelihood and empowerment opportunities over a timeline of a few years.

Even though, in the selection of study communities and interview partners, considerable attention was paid to village, resource, and livelihood characteristics, this study generates results that are valid at the local level and cannot be generalised for a wider population.

Triangulation was practised between reviewed secondary data for general background information, conceptualisation and methodology, and qualitative data for explorative and detailed local information, collected via several different methods. In a circular research process, data collection and analysis were conducted frequently and regularly in a rotational way, allowing for adjustments of collection methods. Constant critical self-reflection of the researcher in the field as well as critical reflection of the appropriateness of selected research methods were important elements of this process.

#### **5.1.1 Ethical considerations**

Every field research should be considerably influenced by ethical consideration. First of all, principles of good practice in social research need to be respected at any time and the people observed and interviewed in the course of this research were informed about the research objectives as well as possible. Good working practices with local communities included respect for local culture and knowledge as well as valuing any information given. Furthermore, the researcher's role in the field, possible perceptions and power structures, language barriers and other social, cultural, and gender issues arising during the research process, were reflected and analysed consciously and self-critically.

The problematic issue of representation was also reflected. Therefore, the complementary cooperation with diverse local, regional, and wider international program staff of various backgrounds with different knowledge and experiences in relation to theories, methods, and understandings, specifically linked to each person's cultural background, was considered as fruitful. It helped to counteract system-blindness when doing research in one's own country and culture, but also, and probably more importantly, it helped to focus on real issues of concern for local people and to critically reflect and adapt theoretical concepts and categories, so that they were not forced on a local system that was constructed in a different way.

### **5.1.2 Gender considerations**

In addition to these general ethical considerations, gender issues central to this research were extensively reflected. This includes gender dimensions of agricultural production processes and rural livelihoods as well as the role of the researcher herself in the field. Being a young female foreign researcher, I considered the collaboration with a male Burkinabe translator and research partner, also a social science student, as very fruitful, contributing to a positive open atmosphere with both female and male interview and fieldwork partners.

## **5.2 Sampling**

In a first step, after conducting introductory visits to seven research sites of the CPWF-V2 project in the Nakanbé basin, I reduced the number of research sites to four villages to allow for a more comprehensive and in-depth assessment of local livelihood contexts and situations. This selection process was guided by considerations of respective agro-ecological situations, water availability, and agricultural activities. Furthermore, the selected study communities should allow for a worthwhile comparison.

On the site, both female and male interview partners were identified among households engaged in mixed crop-livestock production in these villages. This includes participants in on-farm trials and innovation platforms of the CPWF-V2 project, as well as non-participants. Basically, this selection was subject to purposive or purposeful sampling. For this very common sampling technique in qualitative research, I selected the most productive sample to answer my research questions, considering important variables such as gender, age, primary and secondary activities, and project involvement. Local village authorities, project participants, and other local contact persons made useful recommendations and helped my research partner and me to identify focus group participants and interview partners in their village by drawing on their social networks. Therefore, elements of a snowball sampling strategy were applied, too. Similar to many qualitative studies, this one also contains a certain element of convenience sampling, as we depended on the accessibility of possible interviewees in terms of time and location (Marshall, 1996, p. 523; Silverman, 2005, p. 129f.).

Interview partners in each village consisted of three men and three women who lived and worked in households engaged in agriculture and livestock keeping. All of them



had already started families of their own and were therefore considered to have different responsibility levels compared to persons who did not need to care about their own children yet. But in relation to interview partners' age, the aim was to provide for heterogeneity and to interview persons situated in diverging life cycles at the time. Also, in each village two interviewees, one person of each gender, lived in the same household. As members of households were not considered as uniform, but as having different interests, experiences, and perceptions, information provided by separate individual interviews with a man and with a woman who lived together in the same household was expected to allow for an interesting comparison. In relation to project activities, at least one person of each gender group participated in CPWF-V2 project activities. Furthermore, also one man and one woman in each village were participants in our focus group discussions.

### 5.3 Data collection

As already stated, qualitative data was considered essential for this specific research focus, as it is concerned with exploring people's everyday behaviour, personal experiences, and perceptions (Silverman, 2005, p. 6). While secondary data review produced relevant background information, primary data was collected by using semi-structured interview methods and other methods of *Participatory Rural Appraisal* (Chambers, 1994, p. 959f.). Because of language barriers, primary data was collected together with a local research partner, who translated questions, answers, and other comments from the local language Móorè to French. Throughout the collection process, special attention was paid to livelihood perceptions and strategies, keeping in mind the relevance and dynamic nature of interconnected categories of capitals (CVTL, 2005, p. 37ff.; Davis et al., 2004, pp. 6f., 12f.).

At the beginning of the data collection process, we paid preliminary visits to seven V2 study sites to gain general information about the villages' ecological, economic, and social situations. We introduced ourselves and the planned research to community representatives and project contact persons, while also getting to know them and their village in the course of an introductory group meeting and village walks. This process allowed for clarification of open questions about us and the research by participating village inhabitants and it also allowed us to request their permission for participation in

the research (Nelson & Chaudhury, 2012, p. 54), including our stay in the village and the research activities.

In the course of these introductory visits, three semi-structured interviews were conducted in each village. Interview partners consisted of one or two women and therefore two or one men, whereas two of the three participated in V2 project activities. In combination with the group meeting, these interviews provided useful preliminary information about local livelihood specifics and concerns that informed and shaped techniques and questions used in future interviews during field stays.

After acquiring these research permissions, I selected four of the seven villages for further research and arranged for research stays in the concerned villages with respective local contact persons. During the research stays at the sites, data was acquired using methods such as focus group discussions, personal interviews, and observations. During the data collection, “emphasis was put on the crucial balancing act between a too strong and a too weak focus, in order to take into consideration actual local understandings, definitions and important issues, but not to lose track of the selected research problem (Silverman, 2005, p. 91).

### **5.3.1 Semi-structured interviews**

Semi-structured interviews, problem-centred and focused, are considered the most important method for this research to gain specific detailed individual information on local livelihood aspects, individual experiences, practices, subjective perceptions, and meaning structures. In particular, they are expected to enhance insights into local intra-household power structures, gender relations and dynamics as well as allocation processes of agricultural activities and of resource accesses. They were conducted among women and men living in households engaged in mixed crop and livestock farming in the selected research villages. Meanings attached to experiences and other narratives presented by the interviewees needed to be and were treated as actively constructed, taking into account the interview context (CORE Initiative, 2006, p. 59; Mayring, 2002, p. 67ff.; Silverman, 2005, p. 48).

In addition to these, initial semi-structured interviews were conducted in the course of the aforementioned introductory visits to the research areas. The interview partners included participants in the project’s Innovation Platforms as well as other village inhabitants. These interviews generated relevant information about individual and collective perceptions, local livelihoods, agricultural activities, market systems and also

about the project's organisation, activities and proceedings, project communication and participation. Most importantly, these initial interviews helped to get to know specific issues and problems that were relevant for the respective local populations, and local perceptions about them. This in turn enabled me to review and restructure interview foci and questions to design them in a locally reasonable way.

All formal interviews were guided by a rough questionnaire with open-ended questions, covering the main thematic research areas, whereas necessary space to follow "upon the unexpected" (Chambers, 1994, p. 959) was provided (CORE Initiative, 2006, p. 59).

### 5.3.2 Focus groups and participatory methods

In addition to interviews, focus group discussions in the villages, among small groups of seven women and men, separately, provided information on village resource situations, social networks, activities, and changes in local agricultural production systems and rainwater management techniques, and captured the various interrelated individual meaning structures, collective attitudes, and ideologies (Mayring, 2002, p. 77f.).

In the course of these, several participatory methods were applied. Drawing **village maps** was used as a "[...] starting point to encourage people to start thinking about their local community" (CORE Initiative, 2006, p. 64). It visualised the local infrastructure, the availability of and access to resources, in particular land and water, their respective use, change, and relevance for local women's and men's lives. The map itself and the discussion evolving around its contents increased understanding of local economic, social, and environmental systems and dynamics (Adank, van Koppen, & Smits, 2012, p. 48; CVTL, 2005, p. 29ff.; Nelson & Chaudhury, 2012, p. 66f.).

To capture concrete activities and their gender-specific distribution in communities and households, **seasonality diagrams** were used. They visualised various general seasonal changes such as weather and economic opportunities, and also, more specifically, gendered tasks and time uses, their relevance, and connectedness in form of a calendar. The accompanying discussion among the focus group participants generated information about related experiences, problems, and recent changes in activities related to crop farming, gardening, and livestock keeping (Chambers, 1994, p. 960; CORE Initiative, 2006, p. 72f.; CVTL, 2005, p. 32ff.).

To identify changes in agricultural practices, gender roles, possible community and household norms and their respective impact, focus group participants discussed **trends** and innovations. This activity was loosely based on the method of trend or change

diagrams. It helped capture changes in various dimensions of community life and work as well as individual peoples' perceptions of these (Chambers, 1994, p. 960; CORE Initiative, 2006, pp. 68f., 72ff.; CVTL, 2005, p. 32ff.).

Additionally, **Venn diagrams**, adapted for this research and including elements of net-maps (Schiffer & Hauck, 2010), were helpful to understand networks and relations inside and outside the village community, and to gain insights into "the importance of different people, institutions or services on the lives of community members" (CORE Initiative, 2006, p. 79). Articulated perceptions and experiences of the participants enhanced knowledge on community network characteristics, intensities and relevancies, on (power) relations and captured local use of and attitudes towards various marketing, information, and training sources, including project stakeholders and activities (Chambers, 1994, p. 960; CORE Initiative, 2006, p. 79f.).

### **5.3.3 Direct observation**

The social anthropological method of observation with different degrees of participation contributed to a better understanding of internally complex local societies, livelihood characteristics, gendered activities, gender roles and relations, fitting for this research's explorative character (Mayring, 2002, p. 80ff.).

These observations included informal interviews and walks with local people through their village, community, household, and field area. The latter relied on some aspects of the method of transect walks, which includes observing, asking, listening, and discussing direct surroundings and which enhances the researcher's understanding of meanings, activities, and other issues related to them (Adank et al., 2012, p. 51; Chambers, 1994, pp. 955, 960).

This method was conducted throughout the research process and documented via field notes and, if useful for a more specific documentation, via photography.

Even though this method was considered as essential for a deeper understanding of the local social and physical environment, the actual amount of participant observation was limited by access possibilities, language barriers, and time considerations. Furthermore, it was acknowledged that the presence of the researcher in the field influences all possible observations, including the behaviour of the people observed. Even though the extent of influencing cannot be determined exactly, reflections on interactions between the researchers and the other people in the field and how these shaped the acquired data

were necessary throughout the research process, and were taken into account while interpreting and analysing field notes (Silverman, 2005, p. 41).

#### **5.4 Data management**

The whole research process was recorded on a regular basis, using a research diary, in which formal and informal occurrences, tasks and problems, insights, findings, and their personal interpretation were documented. Observations and ethnographic interviews or informal talks were further documented via field notes whereas qualitative interviews were recorded digitally after prior and informed consent of the respective interview partners. These digital audio recordings were then transcribed, using the transcription software F4.

In the course of the results presentation in chapter 7, direct quotations of these transcripts were transformed from their indirect, resulting from translation, to a direct form of speech. This was considered as presenting interview and focus group participants' views in a more adequate and personal way. Besides this slight modification, contents, meanings and also various grammatical mistakes due to spoken word were maintained in their original form.

#### **5.5 Data analysis**

The qualitative data produced with this research design was coded and analysed according to Mayring's qualitative content analysis, by using the data analysis software *Atlas.ti*.

Transcripts of interviews and focus group discussions as well as village maps were coded by first using a deductive application of categories, which resulted from theoretical considerations about the research's matter and objective. This structuring of data was further complemented by inductive categories, developed and formulated according to the content of the specific material. After coding the whole material, coded paragraphs could be interpreted and analysed in reference to research questions and theoretical background (Mayring, 2002, p. 114ff.).

As primary data acquired through this empirical research aimed to produce gender-disaggregated information to understand men's and women's livelihood contexts, experiences, and activities from their own point of view, gender analysis played an important role in this data analysis (Deji, 2011, p. 25f.). It can be described as examining "male and female specific activities, conditions, needs, access to and control over resources and access to development benefits and decision making. It studies the linkages of these and other factors in the larger social, economic, political and environmental context" (Deji 2011: 24).

More specifically, a gender-differentiated target group analysis was considered as an important element of this data analysis, as it helped overcome problems of analysing gender in too unspecific and homogenised groups (Coates, 1999, p. 11). When comparing different coded quotes and interpreting interviewees' and group discussion participants' perceptions of strategies and changes in local livelihoods, important factors such as gender, age, education, household and community resource situations were taken into account.

## 6. Research sites

In the course of the CPWF-V2 project on *Integrated management of rainwater for crop-livestock agroecosystems*, two specific research regions with rain-fed crop-livestock smallholder systems in the Nakanbé basin in Burkina Faso were selected according to their agro-ecological gradient and market access<sup>3</sup> (Ayantunde, 2010; Douchamps et al., 2012, p. 3). Furthermore, in the course of this research, two villages have been selected in each region particularly considering their respective water infrastructures.

Two research sites, the villages of Bogoya and Koura-Bagre, are located in the commune of Ouahigouya, which is in the northern Yatenga province of Burkina Faso, sharing a border with neighbouring Mali. Because of climatic changes and decreasing rainfalls, climatic zones shift in a southerly direction. Therefore, several northern provinces like Yatenga can be considered as either still located in the Sudano-Sahelian or as already part of the Sahelian climatic zone, which experiences the lowest amounts of annual rainfall in Burkina Faso (Barry et al., 2005, p. 16f.).

---

<sup>3</sup> Hereby market access was understood by the project as the proximity to a bigger market, namely, in the Nakanbé river basin, the marketing opportunities of the capital Ouagadougou.

The other two research sites are the village of Boussouma in the commune of Koubri, and in the village of Toeghin in the commune of Komsilga, both in the province of Kadiogo. They are located south-east and south-west of the Burkinabe capital of Ouagadougou, respectively, in the geographical area of the Central Plateau, which is characterized by a Sahelo-Sudanian climate.

Because of their agroecological zones and their regional annual rainfall patterns, which range from around 300 to 600 mm or 500 to 900 mm, and therefore favour mixed crop-livestock or predominantly crop farming, respectively, lengths of growing seasons, agricultural activities and livelihoods differ in these two regions (Lemoalle & de Condappa, 2010, p. 658f.).

Concerning the research sites' social conditions, all villages have been observed to lie in the area populated mainly by members of the Mossi ethnic group, whereas small and geographically separated communities of immigrated Bobo and Fulani people have been noted. Inhabitants of the northern research villages are predominantly Muslim, while a slight majority of inhabitants of central Burkinabe villages are Christian. Nevertheless, all research villages own both Muslim and Christian places of worship (Field notes 2013).

Regarding local infrastructures, only Koura-Bagre and Boussouma have improved paved roads that connect them to the next bigger towns, respectively to Ouahigouya and Koubri (Field notes 2013; FG men Bous.). While primary schools are present in all villages, alphabetisation centres are in Bogoya, Koura-Bagre and Boussouma. A Koran school as well as facilities for formal secondary education only exist in Bogoya, the comparatively largest village (Field notes 2013; FGs). A rural health centre also only exists in Bogoya (FG men Bog.; FG women Bog.), whereas access to health services was noted to be especially problematic in Boussouma, as the village is isolated due to flooded roads during certain month of the rainy season (FG men Bous.).

Similarly, market access is also subject to considerable local differences. While both central Burkinabe villages are indeed much closer to the Ouagadougou's profitable markets than the two northern ones, as assumed by the V2 project, local market availability is also important. In this respect, Boussouma and Toeghin have small permanent markets (open on every third day) in the village, whereas Koura-Bagre has a seasonal market but also selling opportunities on the side of a well-frequented road (connecting Ouagadougou with Ouahigouya). Bogoya doesn't have a permanent intra-

village market place at all, although it is the largest researched village (Field notes 2013; FGs).

Further detailed information on livelihood characteristics in the four villages is provided in the following presentation of research results.

## **7. Results**

The research results, presented in this chapter, are structured according to the research questions formulated in chapter 3.2. Therefore, the first sub-chapter addresses gender-differentiated uses and perceptions of rainwater management practices and innovations, as well as gendered roles in constructing the respective techniques. The subsequent sub-chapter on gender dynamics in local crop and livestock farming presents research findings in relation to land and water access, practices and innovations in water use, cultivation, livestock keeping, processing and marketing, as well as access to input resources and services. Additionally, some space was provided to present important issues that arose during the data collection process but are not directly associated with a particular research question.

### **7.1 Dynamics of rainwater management – practices & innovations**

Rainwater is considered as most essential for small-scale crop-livestock systems in the Burkinabe Nakanbé basin, as production of cereals that are used for daily nutrition is undertaken in the rainy season and therefore only irrigated by rainfall. Thus rainfall patterns are commonly perceived as crucial for harvests and livelihood sustainment, but their variability has been mentioned by all interview partners and focus group participants as problematic. In this chapter, local perceptions of rainwater variability and scarcity and the subsequent importance of rainwater management (RWM) techniques are presented. Furthermore research outcomes in relation to gender-differentiated and locally specific perceptions of RWM practices and innovations, their use and application characteristics are discussed.



Rainy seasons in the northern research villages of Bogoya and Koura-Bagre generally only last for about three months, peaking around August and September (Interviews: woman A, K.B.; woman Z, Bog.). The central Burkinabe research villages of Boussouma and Toeghin generally receive little more rain than the northern ones, but in all research sites rain is perceived as highly variable and insufficient. Declining rainfall was observed primarily during the last ten years (FG men K.B.; Interviews: man L, K.B.; man I, Bous.; woman C, T.). Particularly the time of a year's first rains are noticed to delay significantly (FG men Bous.; Interview: woman L, Bog.; amongst others) and also the lengths of local rainy seasons are considered as shorter as they were before. Even though these problematic issues are important parts of a general perception about rainfall, the fact that rainfalls are increasingly variable, with phases of too much and too little rain in between one season and also across several years, has been noted by women and men of different age groups alike. The following quote exemplifies these observations:

“La pluviométrie a vraiment baissé ces derniers années. Parce-que avant, jusqu'à Décembre il pleuvait. Et les récoltes aussi, il y avait à ce quoi manger, parce-que il pleuvait. Mais maintenant, il n'y a plus assez de pluie. [...] Ca dépend, c'est la répartissant en fait de pluie. Et de moment, il commence à pleuvoir tard. Deuxièmement, quand il pleut, il y a des périodes où il pleut abondamment lorsque la plante n'a pas besoin d'assez d'eau à ce moment. Et après en moment où la plante a besoin d'assez d'eau, il ne pleut pas assez. Et puis aussi, la durée aussi, il ne pleut pas duramment. Ce varie” (FG women Bous.).

Another problematic aspect of variable rainfall patterns are dry-spells that mostly occur at the beginning of the rainy season, during the first 30 to 40 days (Interview: woman A, K.B.), which is a crucial time in plants' live cycle as the seeds were just sown and are in need of enough water to develop. When such a period of several dry days occurs, one interviewee mentioned periods of ten to twenty days (Interview: woman C, T.), there is a high probability that most or even all of the plants “die”. As a result one needs to restart the cultivation process, to buy additional seeds and to re-sow them. While this demands a relatively high amount of money that puts strain on personal financial means, which are very limited anyway, it also means that the time left of the rainy season is short, which further increases the probability of another failed growing process. An elderly man in Toeghin describes this problematic issue by comparing the current situation to the one he experienced as a young man, about 60 years ago:

“Aussi, avant, quand tu sème, à l'intervalle de 3 jours on sème. Ca veut dire que, avant, à notre temps, quand l'hivernage commence, en 14 jours on a fini de semer. Tout ce qui reste c'est le

désherbage. Mais aujourd'hui, quand tu sèmes, on attend peut-être plus de 20 jours parce qu'il pleut encore, et on sème. Et souvent, à l'intervalle de 20 jours les semences sont mortes, il faut recommencer encore. Mais c'est ne pas la même chose comme avant. Et aussi, dans notre temps, quand nous étions plus jeunes, quand tu cultivais le maïs par exemple, à l'intervalle de 0 à 150 jours, le maïs est déjà dans les grainières. Mais [...] aujourd'hui la pluviométrie n'est pas ça, il ne pleut pas assez. Donc, souvent même si on a un cycle court [variété de semence], ça ne donne pas" (Interview: man S, T.).

Besides this problematic variability of rainfall during one crop production season, changing rainfall patterns across several seasons are also crucial. Even a good year in terms of rainfall doesn't necessarily translate to good harvests and local food security. A man in Bogoya explained this fact with people's fear of losing their seeds and financial means, which they need to invest in their agricultural production despite facing uncertain rainfall patterns for the coming season. Especially after experiencing rain scarcity in the preceding year, farmers tend to be more careful and reluctant to invest extensively in crop production:

"Peut-être l'an passé, la saison de 2011, [...] il n'a pas assez plu, les gens ont produit, ils n'ont rien presque. Mais à cause de ça, les gens ont eu peur l'an passé, ils ont peut-être fait les petits espaces. Ils n'ont pas voulu produire beaucoup, parce qu'ils sèment beaucoup et qu'il ne pleut pas aussi, ça va peut-être mal-donner. Donc maïs pourtant l'an passé la pluie nous a surpris. [...] autour de 1 au 8 Juin comme ça j'ai déjà fini de semer. Donc la pluie avait bien. Mais cette année, jusqu'au présent, il ne pleut pas. Donc, nous sommes là, nous attendons la pluie" (Interview: man M, Bog.).

Another reason for bad harvest outcomes even though there would have been a lot of rain, is that not all kinds of soil and not all types of crops require the same amount of water. As millet, the crop mainly used for nutrition in the research villages, doesn't need a lot of water, "donc, comme l'an passé [2012] il a assez plu, l'eau a gâté la production de certains, et pour certains c'était une bonne saison" (Interview: woman L, Bog.).

As has been described, not-anticipated variability and lack of rainfall severely affect crop production, but they also determine all other local production processes. One major issue is sinking yields in crop production. Especially too much or too little rain, and dry spells, as already mentioned, cause problems in crop farming (Interview: man E, Bous.) and thus harmfully impact household food security. But at the same time availability of fodder for animals is also negatively affected, as haulms are collected from the crop fields at harvest times and are stored and dried at home to feed small ruminants and cattle during certain dry months when no leaves or grass can be found anymore in the surrounding environment. Another aspect to this agriculture-livestock

interdependence is that if crop harvests are not sufficient for a family's nutrition or for other livelihood needs, animals are sold to receive cash and be able to buy food and possibly other necessary items. But even though there are animals in a household to sell, they usually cannot replace the food otherwise grown in own crop fields:

“Par rapport à l'Elevage, [...] toute est lié à l'Agriculture. Si il pleut pas assez, nous pouvons arriver même que on a assez des têtes [des animaux] et on vende tout. Mais ça ne va pas suffir pour alimenter la famille” (FG men Bog.).

Furthermore, because of rain deficits, water levels in dammed water reservoirs (FG men Bog.; Interview: man E, Bous.) and in wells are not as high as in earlier years and sink especially crucial at the end of the dry season with serious effects on local water availability for household use and vegetable production.

“Mais maintenant au niveau du barrage, la productivité n'est plus comme avant. Au début ça produisait beaucoup, mais maintenant il n'y a plus assez d'eau, ça ne produit pas assez actuellement. La production a vraiment baissé. Avant nous pouvions travailler et au moins acheter un vélo” (FG women Bous.).

As yields of crop fields and gardens are crucially important for local livelihoods, the effective management of existing rainwater by applying specific techniques is perceived as having various positive effects, and as necessary to gain food from one's fields at all in the current context of scarce rain. They represent opportunities to counteract general environmental degradation and to deal with uncertain rainfalls, as “par rapport à la moisson aussi, il y a la pluie mais il y a [aussi] la connaissance de nos jours” (Interview: man O, Bog.; comment by a.).

RWM techniques are perceived by farmers as helping them to gain more from a smaller field (Interview: man M, Bog.), to moisten the field's soil and also to stop rainwater flows from pouring over the field, which would harm plants and wash away nutrients and fertilizer. Additionally, especially the technique of *zaï* (see chapter 2.2), is claimed to protect the seeds from dry-spells for up to two weeks (Interview: man O, Bog.).

“Ces, qui ont mis des *zaï* par exemple, bien avant, si la pluie est tard, peut-être la semence qu'ils ont mis dans le trou est mort. Donc, il faut encore aller prendre. Pourtant normalement quand on fait les *zaï*, jusqu'à une semaine, si il pleut, ça pousse et puis ça continue en même temps” (Interview: man M, Bog.).

The most commonly used technique in both northern and central Burkinabe research sites are stone bunds, cordons pierreux. They can be constructed on all kinds of fields, sandy or not (Interview: woman Z, Bog.), but are mostly used on old fields (Interview: woman A, K.B.) and/or on dry areas that demand this technique to improve the soil's

ability to infiltrate rainwater (Interview: woman C, T.). Generally they are perceived to help against erosion and for maintaining water necessary for plants' development inside the field (Interview: woman E, Bous.). Whereas they can be constructed as surrounding a field, others build several in rows inside a field, also using them as water barriers (Interviews: woman A, T.; C, T.).

Despite their wide-spread application, stone bunds must still be considered as a rather new innovation in agriculture, whereas considerable differences in the duration of their application have been observed between regions and villages. One explanation for this can be that the need to implement RWM strategies arose at different times in the respective study villages. For example, a man in Toeghin noted that at the times of his parents, there was no problem of water scarcity in his village, but since about twenty years he needs to construct stone bunds in his fields to try to maintain existing rainwater for his crop production:

“[...] avant même aux temps de nos parentes, quand il ne pleut pas pendant deux ou trois jours, les gens avaient des cultes, des rituelles à faire pour demander la pluie. Peut-être tuer un chèvre ou bien un bœuf et les femmes préparent le dolo [= local sorghum beer]. Ils font la cérémonie pour demander la pluie, et le même jour, il pleuvait. Donc, le problème d'eau ne se posait pas, ils avaient des solutions. Mais aujourd'hui il ne pleut pas assez, donc dans les champs, ce que nous pouvons faire pour maintenir l'eau de pluie, c'est essayer de faire les cordons pierreux. [...] Depuis ils ont commencé à faire ça, jusqu'à maintenant, ça vaut 20 ans” (Interview: man S, T.).

According to interview partners, farmers in Toeghin appeared to know about stone bunds for the longest time, compared to the other three research villages. One woman, a 55-year old, already uses them since about 1987, when they were first introduced in Toeghin by the organisation AVLPP (Association Vivre les Paysans) (Interview: woman S, T.).

In the other central Burkinabe village Boussouma this technique was promoted in the course of a training workshop by P.D.R.D.P. (Projet de Développement Rural Décentralisé et Participatif, run by the African Development Bank and funded by the African Development Fund) for some few selected local farmers. While this was claimed to have happened only at least seven years ago (FG men Bous.), women participating in the focus group mentioned to use and know about stone bunds for a long time already (FG women Bous.).

In the northern villages, a woman in Bogoya reported that before six years ago, not everybody knew about stone bunds (Interview: woman S, Bog.) and some women in Koura-Bagre started to apply this technique about ten years ago, as it was promoted in

their village by *Agents techniques de l'Agriculture* (FG women K.B.). A man in the same village noted, that he received informations about stone bunds in the course of a training workshop by FNGN (Fédération National des Groupements Naam), where

“[...] ils ont essayé d'associer beaucoup des producteurs sur un espace comme un demi-hectare. [...] c'est pour essayer de nous apprendre comment il faut produire à partir des espaces secs, et à travers des cordons pierreux. Donc on même temps comment on faire les cordons pierreux, comment on maintenir l'eau dans ces espaces secs, où on peut toujours exploiter. [...] Donc, c'est sur cet espace, que beaucoup des gens ont appris de technique pour aller maintenant et reproduire sur leur propre champ” (Interview: man L, K.B.).

Additionally, the technique has also been further distributed and reinforced in all the study villages by INERA (Institut National de l'Environnement et des Recherches Agricoles) in the course of the CPWF-V2 project in the year 2013. For the respective workshops they selected some few persons in each village to implement them. A woman in Koura-Bagre mentioned, that before these workshops, in which her husband participated, took place, she didn't use stone bunds at all (Interview: woman F, K.B.). In contrast, another woman in Koura-Bagre claimed to have worked with stone bunds in her village of origin well before moving here at the time of her marriage, about 25 years ago (Interview: woman A, K.B.).

But even though there are considerable advantages when applying stone bunds in or around a field, there are still also negative aspects to this technique, as their construction needs to be renewed after about four years. This is because rainwater that needs to be kept inside the bunds, in the field, doesn't enter the field anymore but rather surrounds the crop field.

“Souvent quand on fait les cordons pierreux dans un certain espace, la première année, les premiers deux, trois ans, ça peut aller. Mais à un certain moment, on a l'impression que l'eau qu'on veut barrer, le champ est en hauteur et l'eau ne rente plus, ça ça contour le champ pour partir. Ça c'est un des inconvénients aussi des cordons pierreux” (Interview: man A, Bog.).

In addition to or instead of stone bunds, certain herbs like *Kopoko* or trees like *Obalanga* (Interview: man J, T.) are also frequently used around fields to fight against soil erosion. One man in Boussouma uses them for about twenty years (Interview: man I, Bous.) and some women in Boussouma note that they know this technique for a very long time already even though not everybody applies it (FG women Bous.). Sometimes these herbs are sown around the stone bunds and certain trees are left in and around the fields because they are perceived as protecting the field and its crops from fast and thus

destructive rainwater flows and as helping to store enough rainwater inside the fields (Interviews: man A, Bog.; woman Z, Bog.; man J, T.).

Depending on the respective field's size and soil characteristics, inside these stone bunds farmers said to either plough the field, as it reverses the soil and thus allows for improved rainwater infiltration (Interview: man L, K.B.), or to construct *zai*.

“Que par exemple l'espace comme le bas-fond, on ne peut pas faire les *zai* là-bas, parce-que c'est déjà suffisamment [moite]. Il faut rentrer avec la charrue et puis travailler. Maintenant les espaces un peu sèche, c'est où on fait les *zai* ” (Interview: woman A, K.B.).

Generally, *zai* are used for old, degraded and dry fields that haven't been used in the past years because they are not that favourable for agricultural production. But when someone is in need of a new crop field, he or she constructs stone bunds and *zai* to re-fertilize and re-moisture the soil to be able to cultivate it in the following year (Interviews: man A, Bog.; woman A, K.B.).

Next to fields in *bas-fonds*, mentioned in the last quote, sandy fields in general are also not suitable for the construction of *zai*:

“Même si tu fais les trous des *zai* et que il y a le vent, ça peut fermer tous les trous après. Donc elle dit que, les *zai* marchent avec les terrains durs, [...] les terrains un peu en hauteur. Ce n'est pas les terrains en bas attitude, avec beaucoup de sable, ça ne marche pas” (Interview: woman Z, Bog.).

Whereas the construction of *zai* first of all depends on the type of soil, it also doesn't work with all kinds of crops. For groundnuts or red sorghum *zai* are not used because especially the latter crop doesn't support a very humid and fertile soil (Interview: woman F, K.B.). But in fields of millet or of millet intercropped with beans and of white sorghum *zai* are constructed with considerable positive outcomes (Interviews: man O, Bog.; man S, K.B.). But even in these fields they are not necessarily implemented in every season, because their construction requires physical as well as financial means, as one needs to have enough dung or compost to fill the *zai*-holes with (Interview: man A, Bog.).

In the northern Yatenga province *zai* are commonly known and used for a long time already. For example in Bogoya one man mentioned that he uses them on his fields inside stone bunds for about 30 years. He got to know the technique with an elder brother, who was the first in the village to construct them:

“Par rapport aux *zai* [...] c'est près d'un grand frère qui était au village ici. C'est ce grand frère qui était le premier à travailler les *zai* ici. Donc, c'est de ce grand frère, que les gens ont vu comment on fait les *zai* ” (Interview: man O, Bog.).

In Koura-Bagre a 56-year old woman mentioned to know and use the *zai* since she started to work in Agriculture (Interview: woman F, K.B.) and, similarly, male focus group participants even claimed to know them from their parents' generation already: "Les *zai* anciens, nous sommes nés trouver ça, avec nos parentes. Maintenant les *zai* améliorés, c'est ce qui a amené beaucoup plus de changements dans la production. Et aujourd'hui nous connaissions ça, il y a six ans" (FG men K.B.). These men in Koura-Bagre were the only ones in the four research sites to mention the improved *zai* technique at all. They received informations about their construction and use in the course of training workshops by local *Agents techniques de l'Agriculture* about six years ago (FG men K.B.).

In both central Burkinabe villages, *zai* have neither been mentioned as an adopted RWM technique nor has their implementation or use been observed in the fields in and around the villages. The same applies to the technique of *Demie-Lunes* or half-moons that are also constructed in fields for millet production (Interview: woman F, K.B.). They are generally not as commonly known as the other two techniques, as in Bogoya for example one woman reported not to know half-moons at all (Interview: woman L, Bog.), while both men and women in Koura-Bagre mentioned that they know half-moons for about ten years now (FG women K.B.). In contrast to women, man received informations about the technique from training workshops by *Agents techniques de l'Agriculture* (FG men K.B.). A younger man in Koura-Bagre, just in his 20s, has been implicated in another training workshop, in the course of which he also got to know half-moons, but this took place only five years ago by an organisation called P.R.D. (Projet pôles régionaux de développement) (Interview: man R, K.B.). At about the same time, but without any training incorporation, an elderly woman in Koura-Bagre also noted to have gotten to know half-moons (Interview: woman F, K.B.).

Generally, men tend to have more and earlier information about RWM techniques and were much more frequently included in trainings and workshop activities than women. Whereas all women and men mentioned the crucial importance of RWM for their harvest outcomes regarding the challenging current environmental situation, determined by variable rainfall patterns and dry to degraded soils, different techniques are preferred and applied in the different villages as well as by different households and furthermore in different households' fields<sup>4</sup>. In the following, the question on gender-differentiated

---

<sup>4</sup> The differentiations between larger collective fields and small private fields, particularly for women, that are both part of a household's land possessions, are discussed in more detail in the following chapter on land access.

roles in constructing and implementing the described RWM structures will be addressed.

According to a normative view on societal roles in relation to RWM construction, that has been mentioned in some individual interviews in all research sites, but increasingly so in the northern villages, men are considered to be responsible for the construction of RWM techniques, partly because they have received more detailed informations on RWM implementation. But generally, all household members capable of working in fields take part in the construction in one way or another. For example, interviews and observations showed that women are frequently responsible for collecting and transporting stones from the “brousse” to the household’s fields for the construction of stone bunds:

“[P]our les cordons pierreux, c’est les hommes qui vont faire ça. Et ils font ça ensemble. Maintenant, si l’homme ne veut pas faire ça, il doit venir nous montrer comment ils font. Mais généralement, c’est un travail que tout le monde fait ensemble. [...] Donc maintenant, si il y un travail qu’il ne peut pas faire, parce qu’il est malade ou quelque chose, en tout cas, on peut l’aider, ou bien il montre comment on fait, puis on va le faire. C’est pas comme si c’est interdit [pour les femmes de faire]. Mais généralement, c’est un travail qui est fait par les hommes. Les zaï, les cordons pierreux [...]. Nous ramassons les pierres, nous donne aux hommes aller. C’est les hommes qui construisent mais nous, nous sommes là-bas pour l’aider avec les pierres, ramasser les pierres lui donner. Donc nous l’aidons dans ce sens pour qu’ils fassent les cordons pierreux. Nous, nous ne savons pas comment on construit” (Interview: woman L, Bog.).

For constructing stone bunds in women’s private fields, a woman in Toeghin reported that she constructed them herself together with her children (Interview: woman A, T.), while another one in Bogoya said that she knows how to construct them herself but did so together with her husband (Interview: woman Z, Bog.). Additionally, the construction of stone bunds also depends on project involvements that help organising stone transports (Interview: man H, T.), as a woman in Boussouma mentioned that her husband and his parents constructed stone bunds in the course of a project in her field (Interview: woman L, Bous.).

Whereas stone bunds are generally perceived as necessary and suitable for all kinds of fields and are thus frequently constructed in men’s as well as women’s fields, *zaï* are not.

“[P]ar rapport aux zaï, mon mari, ce sont les hommes qui creusent, qui font les trous. Et maintenant, après ça, les femmes sèment, les femmes les aident dans tout. [...] Donc comme nous, les femmes, nous travaillons d’abord avec les hommes dans les champs collectifs, s’il faut encore



faire les *zai* sur son [propre] espace, c'est trop de travail. Et encore, il faut s'occuper de la nourriture à la maison" (Interview: woman L, Bog.).

While this woman in Bogoya mentioned, that she doesn't construct *zai* in her own field because it would be too much work load for her and because it is usually a man's job, she also stressed that it's not forbidden for women to dig and implement them. But generally *zai* are constructed in larger fields that usually belong to men who inherited them by their parents, and not in smaller fields like the women's ones (Interview: woman L, Bog.). Similarly, a man in Koura-Bagre mentioned that *zai* are implemented primarily in the large collective field, whereas women's smaller private fields are only ploughed (Interview: man L, K.B.). Even though this application characteristic can be seen as a kind of norm followed in the past years, as land scarcity is increasingly experienced, *zai* and also half-moons are now also used in smaller fields to increase harvest outcomes (Interview: woman A, K.B.).

While RWM construction specifics aren't only determined by soils', crops' or gender differentials, a person's age also plays a significant role in his or hers involvement in RWM implementation processes. Elder women and men, from about 50 years onwards, most often do not have the strength anymore to dig *zai* or half-moons, and are thus supported by their children and other younger persons who live with them and who can do this physically tedious work for them (Interviews: woman S, Bog.; man L, K.B.; man S, K.B.; woman F, K.B.). In relation to this support by one's children, there is also a gender dimension worth noting. A man mentioned that *zai* are dug more by young men than by women, even though in his household there are two young women who are not yet married and who also contribute significantly to the construction of *zai* in his fields (Field notes 2013, K.B.; Interview: man L, K.B.), "[m]ais généralement c'est les garçons" (Interview: man L, K.B.).

Thus there appeared to be a strong gendered perception of activities contributing to RWM construction, most probably being significantly determined by the primarily male involvement in workshop activities aiming at distributing information and offering training for increased adoption of RWM techniques in rural crop fields. But still, most interview partners emphasized that all members of a household can and need to take part in the construction of RWM techniques. Especially regarding the implementation of stone bunds, all family members work together (Interviews: man J, T.; man S, T.; woman C, T.):

"Pour le faire, nous nous réunissons, d'autres ramassent les pierres, d'autres transportent les pierres sur la tête, d'autres le font par la charrette. Et nous nous réunissons. Ça veut dire que, on

peut aller faire ça dans le champ d'untun et aujourd'hui on part faire dans le champ d'un autre ”  
(Interview: man S, T.).

**In conclusion**, both men and women regarded RWM techniques as positive measures that help them to increase harvest outcomes of their fields, which become increasingly smaller with every new generation. The fact that fields are frequently characterized by a nutrient-poor, often dry soil that results from their long exploitation across several generations, adds to RWM techniques' importance. While there are considerable differences across various households, stone bunds are commonly constructed in all four research villages. They are considered as agricultural innovations and were mostly promoted by various projects and organizations between the respective periods of the past five to ten years, in both northern villages and in Boussouma, and between the last 20 to 30 years in Toeghin. Projects or organizations from outside the village as well as community-intern groups, such as a women's group in Koura-Bagre, organize to help with the construction of stone bunds, mostly by finding, collecting and transporting the stones or small rocks. Still, seemingly all members of a household, who are available and can work, are implicated in the construction of stone bunds. This was especially noted in both central Burkinabe villages.

In contrast, *zai* and half-moons are only implemented in the villages of the northern Yatenga province, which is considered as the “birth place” of this endogenous Burkinabe technique. As their construction demands physical strength, it is generally younger people who dig them in larger collective household fields. Reasons for the fact that they are primarily implemented in the big common crop field, but often not in women's individual fields, include considerations of respective soil characteristics as well as the perception, that these individual fields are too small to apply such RWM structures.

According to expressed societal norms, digging the holes for *zai* and for half-moons is considered as a male-dominated activity, even though personal interviews with women and personal observations of field tasks show that also a lot of women work with the hoe or the local agricultural tool *daba* to construct these RWM techniques.



Figure 4: A woman digs *zai* in a field “en brousse” close to Koura-Bagre (Source: photo by author).

Similarly to the construction of stone bunds, all other tasks associated with the implementation of *zai* and half-moons, like the transport and distribution of dung or compost and the sowing of millet or sorghum seeds, are conducted jointly by all members of a household. Especially children were reported to be a great source of support, particularly for older and for over-burdened farmers.



Figure 5: Distribution of compost to be filled in already constructed *zai* and half-moons in a household’s collective field in Koura-Bagre at the beginning of the rainy season (Source: photo by author).

Generally, women tended to know about RWM practices for less long than men did, while women received knowledge from their own family and also from their new post-marriage family and village. Specific obstacles faced by individuals for the construction of RWM techniques are strength and time constraints on the one hand, and financial and physical means especially needed for *zai* and half-moons on the other. The latter includes the possession of enough dung or compost, resulting from possessing either enough animals or enough money to buy it. While these obstacles are experienced by both, women and men, women with young children and few or no animals were observed to constitute the most severely affected group.

As noted in chapter 2.2, this study understands RWM in a broader sense, incorporating the herein discussed stone bunds, *zai*, half-moons and other soil protection measures, but also the management and use of important water sources, as their respective water levels and utilisation opportunities crucially depend on rainfall patterns. Gender-differentiated access to and use of various locally available water resources will be discussed separately in the following chapter 7.2.2.

Next to RWM techniques, there are also other related measures that help to sustain and improve harvest outcomes. Most prominently, these include fertilizing the soil by applying dung, compost or chemical fertilizer, and also using specific new seed varieties adapted for a short-lasting rainy season. These contributions to local abilities of coping more effectively with environmental difficulties were already briefly mentioned in this chapter and will be addressed more specifically in the following ones, particularly in chapter 7.2.5.

## **7.2 Dynamics of crop & livestock farming – practices & innovations**

As has been shown in the previous chapter, rainwater management in crop-livestock systems cannot be considered independently from other essential social, economic and environmental factors that influence and determine local livelihoods. Perceptions on and implementation of innovations as well as specific local construction practices of RWM techniques are inherently linked to accessible land and its respective soil quality, to water access and to agricultural tasks, which are in turn determined by access

characteristics to input and output resources and services as well as, and most importantly, by gender-specific social norms.

Details on general and gender-specific practices and related innovations in crop and livestock farming are presented in the following sub-chapters.

### 7.2.1 Land access

Availability of and access opportunities to land are constructed very differently among the four research sites, as they are dependent on the respective environmental situation of the village. To answer the question on gender-differentiated land access, one needs to differentiate between land resources for different uses. Land is primarily used for crop production in the actual agricultural season, the rainy season, which spans from about June to September. Besides that, land is also used for animal pasture, and additionally, land next to a suitable water resource can be used for gardening, for producing vegetables for sale. This is a rather new activity that is increasingly promoted across the country.

Generally, land distribution in all four villages is subject to customary inheritance rights, whereupon a family's land is distributed among the family's sons. All interview respondents confirmed the prevalence of male land ownership, whereas formal land titles were reported to be rare if not non-existent. The bureaucratic process of acquiring formal land titles with the local administrative unit, the *Mairie*, was known by some male village inhabitants, but it was perceived as a complicated, long and expensive procedure and mostly as not necessary, as land ownership by families is commonly known and respected among the various village populations.

Acquiring land is therefore subject to patrilineal inheritance practices, with women receiving land from their husbands, but also possibly from their fathers. The latter is possible for women who are not yet married or who are married to a man within their village of origin. In this case they are still *enfants du village*, currently living in their home-village, and therefore user rights to land for food production are negotiable with members of their patrilineal lineage. Common land access and the resulting dependence of women on men in this respect were explicated by a female interview partner in Bogoya: "Ces champs appartiennent aux hommes et pas aux femmes. Donc nous, les femmes, nous associons toujours aux hommes pour travailler" (Interview: woman L, Bog.).

A problematic aspect that affects land access is the increasingly perceived lack of land for agricultural use:

“Par rapport à la situation agricole, ce-que je vois aujourd'hui, c'est très différent de ce qui était d'actualité au moment où j'étais plus jeune. D'abord il y avait de l'espace, il y avait assez d'arbres. Donc, quand on veut vraiment cultiver ou veut peut-être abattre les arbres pour faire un nouveau champ, et la terre était fertile là-bas. Quand on partait cultiver là-bas, le rendement était bon” (Interview: man S, T.).

This issue was stressed by all interview partners in the northern villages of Bogoya and Koura-Bagre as well as in one central Burkinabe village, Toeghin. An exception is Boussouma, where only half of all interview partners, women as well as men of different age groups and household backgrounds, perceived land shortage. Even though the use and exploitation of existing fields by multiple generations and the expansive occupation of space by a growing population and their fields can be understood as a widespread problem that already diminishes livelihood security of the current generation and that will most likely be exacerbated for the next one, this issue is subject to regional and local differences. Land pressure is experienced by different villages and families at varying levels. One woman in Koura-Bagre mentioned that village fields are limited and that space for cultivation is sought farer from the village and closer to other surrounding villages that don't yet experience such a lack of land. Furthermore she said that she was still used to cultivate large fields in her home-village, unlike in her husband's village where families need to live off smaller fields (Interview: women A, K.B.). Even though some years ago smaller fields have not been cultivated by using RWM techniques such as *zai* and half-moons, this is now increasingly necessary to improve harvest outcomes. Also, fertilization has been mentioned by women and men of all villages to be of pressing relevance to re-fertilize the old and depleted soil and to boost production.

Land deficit affects crop production as well as livestock keeping. Limited pasture land is observed and problematized in all four villages but especially in the north, where keeping of less animals is mentioned as a resulting change (Interview: woman A, K.B.). Nowadays cattle, which is used for agricultural labour with a plough during the rainy season, is more often temporarily left with herders of Fulani communities living close by, who are specialized in cattle keeping. They take care of the cattle during the dry season, as they own land specifically dedicated to pasture. This practice is particularly common in the northern villages, in Koura-Bagre for example it is considered necessary

as there isn't enough land for pasture available since about ten years (Interview: man L, K.B.).

Another effect of limited land is the diversification of activities that are used and needed to build and sustain people's livelihoods. As agriculture lost its role as a sole provider of food and other livelihood needs, it is increasingly complemented with livestock keeping and gardening that serve as important income sources (Interview: man M, Bog.). Furthermore food production for sale at local and regional markets is increasing significantly, as opposed to subsistence agriculture, which was more common among the former generation.

Next to population growth, formal purchase of land by people outside of a village represents a new factor exacerbating land pressure. This occurs in central Burkina villages that are relatively close to the growing capital city Ouagadougou. An elderly male interviewee in Boussouma observed dynamics related to the emergence of rich agro-business men, who buy land at the local district capital Koubri, about 15 kilometres far from his village:

“Avant c'était plus facile d'avoir accès à la terre ici pour cultiver. Mais ces dernières années c'est devenue difficile parce-que, par exemple ces de Koubri quittent là-bas, à cause des riches, des Agro-business men. Les gens de Koubri ont vendu leur terre et ils sont obligés maintenant de quitter Koubri pour venir travailler ici. Donc, ça fait que il n'y a plus assez d'espace aujourd'hui pour quelqu'un qui veut venir s'installer pour cultiver. C'est difficile d'avoir accès maintenant à la terre. [...] En fait c'est les riches qui occupent les grandes espaces, ils viennent payer les grandes espaces. Donc, les gens ont vendu leurs espaces. [...] Ces les riches d'Ouagadougou qui viennent occuper, payer les espaces” (Interview: man I, T.).

The formal purchase of locally owned crop or garden land by non-village members for commercial use is emerging in the area around Ouagadougou and has considerably negative effects on local land availability and access. While cash income is crucial and frequently needed, land is still necessary for agricultural production and seeking new fields elsewhere increases local land pressure.

These dynamics and trends that result in local land deficits, do not only negatively affect land availability in general, but also land access, particularly for women. For example, one woman in Toeghin explicates, that access to land is especially difficult for her and for other women,

“[...] parce-que les hommes même trouve que l'espace ne les suffit pas. Donc, et nous sont les femmes qui sont venu d'ailleurs, nous ne sommes pas d'ici. Donc à cause de ça, c'est difficile d'avoir des grands espaces et faire des grandes choses. Nous produisons sur des petites espaces.

Donc à cause de ça, je transforme un peu un peu à côté pour aussi me débrouiller. Si non, l'accès de terre est difficile" (Interview: woman C, T.).

As she said, families' bigger fields usually, according to all local verbal informations and observations, belong to male household heads, as they inherited them from their parents. Women, on the contrary, most of the time grow up in different villages and move to their husbands' village in the course of their marriage. Therefore they cannot claim any permanent land ownership rights in their new village and need to rely on and cope with limited land resources given to them by their husbands. To make a living with these limited resources, processing and selling of agricultural products to generate higher surplus by adding value to goods is considered as very important, especially for women.

Besides land, male household heads also own their fields' harvest outcomes. The harvest, produced by all household members who are physically able to cultivate, is commonly used for alimentation of all household members. But control and decision making over the harvest's use, be it for food preparation within the household or for selling to earn money at the market, is part of the household head's responsibility. Even when harvest is used for the family's nutritious sustainment, it is most often not sufficient for consumption during the dry and rainy seasons until the next harvest time. The fact that subsistence production is not possible anymore for most households is related to population growth. This contributed to the splitting of households' fields, which are divided into a larger common field and several smaller individual fields assigned to particular household members, notably wives and elder sons. This change is described by a woman in Koura-Bagre in the following quote:

"Maintenant comme de nos jours les gens sont devenus nombreux c'est pourquoi on fait en sorte que chaque femme ait un champ à partir de lequel elle peut aussi récolter pour faire ses besoins et ses enfants. Donc maintenant c'est chaque enfant qui travaille avec sa mère dans son champ" (Interview: woman F, K.B.).

Therefore, nowadays wives have their own small individual fields which they cultivate with their own children's help. If there are more co-wives in the same household, as is often the case among Muslim families, each wife is given her own field or fields by her husband. She cultivates these fields together with her respective children and other people, mostly young relatives, who are living with her and of whom she takes care of. These fields' harvests can be sold, and also processed before selling, to cater for personal needs as well as those of the people the respective woman takes care of. But



still, usually this personal harvest is also required to contribute to the families' food provision.

Another trend that takes place at about the same time, in the last five to 20 years with considerable regional variation (earlier in central than in northern Burkinabe villages), is a change in social organisation. Formally land was owned exclusively by the oldest male household head. His family members lived and worked together in larger groups including parents, sons and their respective families. But nowadays land ownership is increasingly possible for married sons and their young families that constitute new separate economic and social entities. In contrast to those larger *concessions* or *cours* in the past, grown-up sons now have access to their own land, which they can cultivate independently well before their fathers' or grandfathers' deaths (FG women Bog.; Interviews: woman Z, Bog.; man L, K.B.; amongst others). In some households, especially in the southern research villages, even household members who are not yet grown-ups, mostly sons from the age of 15 onwards (Interview: man J, T.), can receive small individual fields within the household's land resources that they cultivate independently to care for themselves, to "essayer de produire pour s'occuper de ses propres besoins" (Interview: man S, T.).

While land is usually received from the household head and land owner, as has already been discussed, in case of land shortage it is also possible and not uncommon to borrow land from a non-family member who either lives in the same or in a neighbouring village. Interviews and focus group discussions showed that this practice of borrowing land temporarily for food production is particularly common among married women. While it has been stressed by various men and women during the research process that there is no money involved in temporary land provision, voluntary gifts for the land owner are still appreciated, though not required. A woman in Koura-Bagre noted that, if the harvest was good and even selling of surplus is possible, one can donate a plate filled with harvest products such as millet or sorghum or groundnuts, and some sugar for a morning coffee. This would facilitate access to his land in the next season (Interview: woman F, K.B.).

As lack of rain and fertile land result in the problematic fact that crop farming in the rainy season alone is usually not sufficient to provide for food and other livelihood needs for the rapidly growing population, access to other income sources is increasingly important.

“Donc, ça fait que ce qu’on gagne dans l’agriculture même ne suffit plus pour manger. [...] Même s’il pleut souvent ce qu’on gagne, en tout cas, ce n’est pas comme avant, que ça suffisait. Parce que les espaces se sont devenues petites avec le nombre de la population” (Interview: woman L, Bog.).

Therefore, access to land for gardening purposes is crucial, as was expressed by male focus group participants in Bogoya:

“Aujourd’hui le jardinage procure d’autres sources des revenus pour des gens. [...] Ça c’est parce que aujourd’hui souvent dans l’Agriculture hivernal, on ne trouve pas souvent des bonnes récoltes. Si bien qu’on a obligé d’associer à ça, en tout cas, le Jardinage peut s’emporter. [...] Maintenant le Jardinage c’est une dérogation qui produit de l’argent pour des gens” (FG men Bog.).

The existence of water reservoirs, dams (*barrage*) or other water resources such as a low-lying area that stores rainwater (*bas-fond*) or an open well with enough water of considerable quality enable the use of the surrounding land as gardens during the dry season. These garden parcels, especially located around artificially constructed water reservoirs, can be either subject to family lineage ownership or they are constructed and distributed among village inhabitants in the course of a development cooperation project.

Two research sites, the villages of Bogoya and Boussouma, have water reservoirs that were constructed by building a dam. In Bogoya, land around its *barrage* belongs to the inhabitants of one certain village neighbourhood, the *Cartier* Kanbengo, as this area is a part of their fields. Therefore, it’s the men and women of Kanbengo’s families, who primarily cultivate the fields around the *barrage*. But if someone else wants to produce vegetables there, he or she needs to rent the fields from them for 5,000 FCFA (franc de la Communauté Financière d’Afrique) per year. In addition to the necessary financial input, garden plots around the *barrage* are limited and thus access is difficult. This is the case especially for women who, most of the time, have less financial means than men (Interview: woman L, Bog.), which is reflected in the fact that there are more men than women working in these gardens (FG women Bog.). Next to vegetable production in the dry season, there is also rice cultivation during the rainy season located at the edge of the *barrage*. The rice fields have been constructed and initially ploughed through by an unknown project in the year 2012. They were distributed among men as well as women, while acknowledging former field owners (Interview: woman L, Bog.). In relation to the effects of local access to gardens, male focus group participants mentioned the back-migration and subsequent village population growth after the

construction of the barrage more than 40 years ago, as access to gardens was perceived positively as access to needed additional income sources:

“Le barrage existe plus de 40 ans. Avant ça il n'y avait pas le Jardinage, c'est après ça. Il y a d'autres même qui sont-, quand ils quittent en Côte d'Ivoire, ils sont venus trouver de barrage, qu'ils peuvent travailler, ils ne sont plus repartis” (FG men Bog.).

In the second village that owns large surface water resources, Boussouma, there are three *barrages*, whereas one of them is not useable anymore due to misconstruction. Even though they have been built much earlier, gardening practices are known and practiced among the village population since about 15 years, owing to information and training by FNGN (FG men Bous.). Therefore, garden access is mainly constructed via membership in women's or men's associations, who cooperated with FNGN (Interviews: woman E, Bous.; man I, Bous.; woman L, Bous.). Members of the village's women's association helped with collecting sand for the dam's construction and were therefore included in the distribution of gardening plots, which were reserved partly for men, partly for women. This opportunity for additional food and income generation attracted even more women to join the association (FG women Bous.). Gardening is subsequently practiced in cooperation and with support by the respective association, but also possibly together by husband and wife, as known from a young catholic household in Boussouma (Interview: woman E, Bous.). Nevertheless, some women, regardless of their personal garden access, mentioned that there is not enough space for gardening and that population growth is one of the reasons for the difficult access to new gardens (Interviews: woman A, Bous.; woman L, Bous.).

In Toeghin, gardens are limited because of local water constraints. There is no permanent water surface, but there is a *bas-fond* close to the village with some few gardens, and recently also rice fields that can both be cultivated exclusively during the rainy season. Additionally, some inhabitants of Bogoya also cultivate gardens during the dry season at a *barrage* in the nearby village Kalzi, partly drawing on family relations and on memberships in gardening associations for land access (Interview: man H, T.; man J, T.). Somehow this practice has only been observed among men. While access to the gardens at the *bas-fond* also appeared to be easier and more common for men (Interviews: man H, T.; man J, T.; woman A, T.), rice cultivation plots were set up and distributed among village households by the project “riz pluvial”, an outcome of the development cooperation between Burkina Faso and Taiwan. The allocation of rice fields followed the pattern of one parcel for a household with a husband and one wife

and two parcels for a polygynous household in which one is dedicated to the man and the other one to his wives (Interview: woman S, T.).

While gardening in the dry off-season is generally more common around water reservoirs, it is also possible in an area surrounding open wells that are deep enough not to dry up during the critical month of March to May. This is done in Koura-Bagre. Here land also belongs to certain private village inhabitants, who use the land as plots for their cereal production in the rainy season, and who give away their land, divided into parcels of equal size, to women living in the village who want to produce vegetables in the dry season. Access to garden land in Koura-Bagre is therefore subject to distribution according to direct demand, whereas there are no requirements of payment for this temporary land leasing. The involvement of financial payment was strictly denied but the villagers admitted, that one can offer a part of the harvest to the landowner's family as a sign of thankfulness. This practice results in a win-win-situation for both, for the land leasing female gardeners, because they have the opportunity to produce vegetables, to sell them and to receive extra income, and for the land owning crop farmers, because their land does not lie fallow during the hot and dry season, but is cultivated, irrigated and fertilized, leaving it in a favourable condition for the ensuing crop production season (Field notes 2013, K.B.).

Similarly to these gardens in Koura-Bagre, a man in Bogoya mentioned, that he used to cultivate vegetables in his field, by digging a well himself and irrigating by hand: "[I]l n'y a même pas les moto pompes. Donc je creusais un puits dans mon champ et c'est à partir du puits au jardin. Et c'est dans ce puits que je puisse remplir les arrosoirs et j'arrosais avec la main" (Interview: man O, Bog.).

As gardening generally produces higher revenues than crop production, there are also persons who use their field, if it is sloping, located on a hill for example, to produce vegetables during the rainy season (FG men Bog; FG women Bog.).

**In conclusion**, access to crop land and partly also to land suitable for gardening, is subject to patrilineal inheritance rights, whereas men's inherited land is increasingly diminishing because of population growth and degraded by agricultural exploitation over several generations. Women usually receive crop land through their husbands, and gardens either through their husbands or by membership in a women's group or association. Additionally it is common practice, especially for women, to borrow both types of land for one or more growing seasons from a non-family member who is able

to give away one of his crop fields during the rainy season or a garden parcel during the dry season. Land access is not financially restricted as far as informal lending of land within a village community and also in interaction with neighbouring villages is concerned. But access to limited land around water resources, specifically dedicated to gardening or rice production, is restricted by lineage ownership or project-related land distribution patterns, and thus has to be paid for by persons not included in these access structures.

Women are also, if not more intensely affected by population pressure, as their land access possibilities also diminish along with a growing land deficit, while they are particularly responsible for family care, food provision and food preparation. The change in social organisation with more populous *cours* separating into smaller households that live, cultivate and consume largely independently from one another, effected women's access to land and their related production responsibilities. Still, in contrast to the importance of women's land cultivation, a young woman who moved to her husband's village some years ago said that she cannot say anything about the situation of land access in her new village, because as a woman she is not integrated into the local discussion and decision making regarding land at all (Interview: woman A, Bous.).

### 7.2.2 Water access and use

Access to water resources depends on several factors, while actual availability determined by seasonal variation, access rights and ownership regulations, as well as competition over these scarce but essential resources have been found to be of significant importance in all four research villages.

The research sites show considerably different ecological conditions in relation to their respective water infrastructure. Water resources considered in this study include various water surface areas such a *barrage* or a *bas-fond*, and wells, whereas their availability is locally diverse and always determined by seasonality of and change in rainfall patterns. This chapter gives an overview of available water resources in the respective villages and related problems caused by rainfall characteristics as well as other external and internal influencing factors. Local perceptions of these issues and their dynamics are furthermore complemented by insights into local gender-differentiated water access and use characteristics.

Large and usually permanent water surface areas, where water is stored by the construction of a dam, a *barrage*, exist in Bogoya and in Boussouma. In Bogoya one *barrage* has already been constructed over 40 years ago and in Boussouma three *barrages* have been built intermittently during the last 30 years. While water levels in Bogoya's *barrage* are perceived as sufficient, inhabitants of Boussouma noted that one *barrage* sometimes runs dry (Interview: man I, Bous.), an issue that has devastating effects on the use of this *barrage* for irrigating gardens and for watering animals.

In Toeghin there is a *bas-fond* called *Morigo*, which holds changing levels of water mainly during the rainy and early dry season, but dries up during several month in the dry season. Therefore, the surrounding fields can only be used for water-intensive activities such as gardens and rice fields during the rainy season (Field notes 2013, T.).

A third kind of water resource, open wells, exists in all villages and is primarily used for washing clothes and also for irrigating gardens. Irrigating with water from a well by using watering cans is practiced particularly widespread in Koura-Bagre, as already described in the above chapter on land access. Besides that only two such incidents have been found. One in the other northern village, Bogoya, where a man irrigated his garden by using a self-built well (Interview: man O, Bog.), also mentioned in the previous chapter, and another one in Toeghin, where water from a privately owned well is pumped up with a motor pump to irrigate the surrounding private garden (Field notes 2013, T.). But still, water access for irrigation was commonly perceived as difficult. For example one woman in Bogoya noted that on the one hand there is not enough land available for garden purposes around suitable water sources and on the other hand there are not enough water resources in appropriate distance that would allow her to irrigate gardens around her compound (Interview: woman Z, Bog.).

Irrigation of gardens during the dry season is mostly undertaken with the help of private or collectively owned motor pumps at the *barrages*, but at open wells it is watering cans that are primarily used to produce vegetables for sale. During the field research, the only noted exception to this is the aforementioned open well with a motor pump on the garden area of a man in Toeghin, who is comparatively better-off in terms of land and animal possessions as well as family size.



Figure 6: Open well with a motor pump in a private garden in Toeghin (Source: photo by author).

Generally, gender-differentiated water use for gardening purposes is constructed very differently among the four research sites. In Bogoya and Boussouma, where there are specific, mostly permanent water surface areas, men and women can have access to land and water to produce vegetables. Especially around Boussouma's *barrages* women are active in gardening as they, as long as being member in the local women's group, have their own garden parcels specifically reserved for them. But in Bogoya's dry season's as well as in Toeghin's rainy season's gardening activities there are mostly men implicated and subsequently profiting from vegetable sales. This differentiation can be understood as related to scarce local land and water resources as well as to household intern distribution of farming and other livelihood activities. But another important influencing factor concerning the use of Bogoya's *barrage* is that one has to pay for a gardening parcel if the land does not belong to one-self, and generally, according to information by most interviews, men have more financial and physical means, as they are the households' heads and control the large collective field including its outcomes.

In contrast to these gender-differentiated constructions of water access, rice production along Toeghin's *bas-fond* is practiced by men as well as women, as the respective parcels have been constructed and distributed by a development cooperation project, already described in the last chapter. Even though a husband and his wife received a parcel together and in polygynous households a husband and his wives received either

one plot, actual irrigation and cultivation activities are still subject to intra-household decision making.

Yet differently, water access to irrigate gardens around Koura-Bagre's open wells is exclusively acquired by women while men take care of animals during the dry season. While these wells are constructed for common use, the surrounding land belongs to men and is temporarily borrow from them by women to produce onions (Field notes 2013, K.B.). These women's gardening networks in Koura-Bagre are supported by organisations, one of them being *Burkina Vert*, a non-profit Non-Governmental Organisation (NGO) (Burkina Vert, 2011). These organizations help to increase water access by improving the construction of existing wells that are described as being not deep enough and therefore as sometimes drying up during certain very dry months (FG men K.B.). But future support remains unclear, even though the women presented their current problem to *Burkina Vert* of not having a well big and deep enough for unproblematic gardening:

“C'est Burkina Vert qui nous a donné le grillage. Et c'est Burkina Vert qui nous soutient pour le maraichage. Et l'an passé ils sont venu nous donné. La saison passée nous avons travaillé, ils ont dit que c'est bon. Donc ils vont revenir ajouter le grillage. Et aussi nous avons posé le problème, que nous n'avons pas assez d'eau et si nous puissions avoir un bon puits. Et ils ont même dit, que si nous, les femmes là, puissions aussi contribuer, peut-être payer les semences et ils vont nous aider à creuser un grand puits à grand géométrie pour cémenter et là il va avoir assez d'eau pour le travail. Mais ils ne sont pas encore venus” (Interview: woman A, K.B.).

In addition to these water uses for food production, *barrages* are also used for livestock care, more specifically for watering and washing animals. In Bogoya watering animals poses no problem as water in the *barrage* is continuously available, but one has to be careful during the rainy season because there has already been an incident that fast rising water levels surprised and carried away some animals. Another difficulty in relation to water access for watering animals in Bogoya is, that in times of intense vegetable production around the *barrage* there is only one path available for animals and their herders to reach to the *barrage* (Interview: man A, Bog.). In Boussouma access to water for animals is perceived as more problematic due to seasonal lack of water in one of their *barrages*, whereas the lowest water levels usually occur at the end of the dry season where access to water is specifically crucial anyway (Interviews: man I, Bous.; woman A, Bous.).

Another way to water animals has been described by male focus group participants in Toeghin, where excess water of pumped wells is now useable for this purpose because



of an innovative well construction that includes a retention basin, built by livestock keepers from the village themselves (FG men T.).

“Avant même les pompes qui sont là, on ne considérait pas. [...] Là où les animaux pouvaient passer. Mais maintenant, comme toutes l'eau pompé n'est pas forcément utilisé les eaux de rejet sont un peu canalisé vers un peu baquet là. C'est accessible aux animaux pour aller boire là-bas. Les pompes, bonnes fontaines comme ça. Ca aussi c'est une innovation [...]. C'est construit par les Eleveurs [du village même], qui veulent utiliser la pompe avec les usages” (FG men T.).

As water is essential for general life sustainment and health, it is needed on a regular basis for drinking, cooking, washing, body hygiene and cleaning. Whereas water of open wells is used by women for washing clothes and also by some local *dolotières* for the preparation of sorghum beer, the *dolo* (FG women T.), water for household consumption, for drinking, cooking and hygiene, is generally drawn from closed wells that are operated with hand pumps, wheels or pedals. Usually access to these closed wells is free as most of them are collectively owned. But some wells are dedicated primarily to the inhabitants of a certain village *quartier* and others are restricted for certain institutions like schools. School wells are sometimes even closed at night or during holidays, prohibiting their private use by neighbouring compounds (Field notes 2013).

Searching, collecting and transporting water for domestic use is a responsibility of women in the research villages. Women receive support from their children, who help to bring fresh water to the compound even before leaving for school in the morning (Interviews: woman Z, Bog.; woman F, K.B.). Every day either one or both of them walk or drive with their bikes or, rarely, with motorbikes, to the closest functioning well, pump water into canisters and carry them home. Those who go by foot carry their canisters either on their heads or, if their household owns a cart, use this as it facilitates the task by reducing workload and energy input (Field notes 2013, K.B., T.).



Figure 7: Cart specifically but not exclusively used to transport water canisters (Source: photo by author).

Generally, in individual interviews it has been predominantly women who talked about the issues and problems of searching for water. In Bogoya, one major issue that has been mentioned by participants in the women's focus group as well as by individual female interviewees is that their village's water tower doesn't work anymore and so do also several pumped wells throughout the village. Even though the different *quartiers* of Bogoya collected around 100,000 FCFA for the specific purpose of quickly repairing broken wells, this has not been undertaken yet because representative decision makers in the *quartiers* that are not directly affected have refused to contribute to the reparation until now. This results in a very difficult water access situation for the whole village as availability of drinking water is crucially scarce, only remaining in three single sites, one of those being the school's well (FG women Bog.). Therefore women need to walk or drive farer and earlier to be able to fetch water from those overcrowded and overused sites for their own and their families' water needs. This difficult situation is described by a woman who lives in the *quartier* with a functioning well, in the following quote.

“[...] parce-que les pompes sont gâtées un peu, le problème de l'eau était dangereux et cruciale à Bogoya ici. Si bien que vers où là où vous [research partner and me] habitez [AJBFB meeting compound], que généralement les gens quittent là-bas pour venir vers ici pour chercher l'eau. Ça fait que c'est très difficile. Et c'est pourquoi moi souvent, je m'élève très tôt pour aller chercher l'eau. Parce-que si je laisse, au même moment que les autres viennent, souvent ils peuvent se frapper là-bas, pour l'eau. Parce-que chacun veut l'eau. C'est comme un point d'eau pour beaucoup

des personnes. Normalement c'est la source d'eau pour ce quartier. Mais il y a d'autres qui viennent parce-que là-bas ils n'ont pas d'eau" (Interview: woman Z, Bog.).

Water access in Koura-Bagre depends on the respective location of the household's compound, as one interviewee said that "par rapport à l'accès à l'eau, je n'ai pas des problèmes, je suis juste à côté du puits. L'eau est permanent là" (Interview: woman A, K.B.), while another mentioned, that "pour avoir de l'eau, il faut aller jusqu'au vers la mosquée pour aller chercher l'eau pour boire. Il n'en a pas à côté de nos maisons. C'est ça vraiment qui nous nerves" (Interview: woman F, K.B.). In the whole village, there are only two pumped wells for common use and one additional for the local school's water needs (FG women K.B.).



Figure 8: A closed, foot pedal pumped well for drinking water on the outskirts of Koura-Bagre (Source: photo by author).

In Boussouma, in turn, participants of men's focus group noted that there is "un nombre assez grand des forages dans le village" (FG men Bous.). This fact is also reflected in both women's and men's village maps that showed the existence of eight pumped wells in Boussouma.

In Toeghin, men mentioned five pumped wells in their focus group's village map, whereas women only noted the existence of four such closed wells but also of two additional ones that currently do not work. Furthermore both men and women remarked that one pumped well is not generally accessible because it belongs to the local school, and another one is not accessible during certain month in and shortly after the rainy

season as water creates a barrier that prohibits reaching the well (FG men T.; FG women T.). Another problematic aspect of water access in Toeghin is the available water's quality, which results in the fact that one pumped and one open well are not useable (FG women T.).

Notably, the availability of water in all sources is always determined by rainfall patterns. Therefore, rainfall, being observed as variable and increasingly scarce by farmers in all research villages, as already described in chapter 7.1, poses significant, mostly seasonal problems for access to water for productive as well as household uses.

**In conclusion**, the collection and transportation of water for domestic use is considered to be a woman's responsibility in all research sites, whereas children are fundamentally implicated in related tasks. Changes in access to drinking water are induced by seasonality of rainfall as well as by seasonal or permanent non-functioning of wells. Repairing of broken pumps usually lies in the responsibility sphere of communities, namely whole villages and frequently also village *quartiers*. The respective decision makers are observed to be usually men, even though, due to women's societal gender roles as water providers, it is mostly women and children who are affected by broken and non-functioning wells in terms of increased energy and time inputs.

In relation to water access for productive use, ownership regulations play important roles, as land around water sources such as *barrages*, *bas-fonds*, but also wells, is subject to private ownership through male inheritance rights. If the respective land is owned by a family, user rights are negotiated among the family members, whereas men, being perceived as household heads, tend to take ultimate decisions. If the respective land is not owned by one's own family, payment requirements are common for scarce garden land surrounding *barrages* or *bas-fonds*. But however, no payment habits have been observed for borrowing privately owned land around wells. A yet different way of constructing access to water resources for productive use is practiced by organizations and projects that set up rice or vegetable production parcels. They tend to distribute these parcels more or less equally among village inhabitants, privileging both male and female contributors to the respective construction, whereas they have been noted to consider former field ownership structures.

### 7.2.3 Working in fields and gardens

Agricultural activities in fields and gardens are conducted by men, women and children to contribute to their household's alimentation and earn money to pay for other specific needs, which include health care, education, clothing and additional food. As has already been described, there are common fields that are cultivated collectively, and private fields cultivated by individual household members. Similarly, gardens can also be cultivated together with other household members, but appeared to be used most often individually. These differentiations result in the fact that responsibilities and tasks in cultivation, with which this chapter is concerned, are subject to field-specific variation, while gender dimensions play an important role in the distribution of daily and seasonal agricultural tasks. Additionally, agricultural responsibilities and activities are household-specific as they are negotiated household-internally and are determined by various household characteristics such as the number and age of its members, the household's wealth situation as well as the respective land possessions and land access opportunities.

In relation to daily routines in agricultural labour during the rainy season, interview partners in all research villages reported similar courses of actions. Generally, all household members who are available and physically capable of farming work together in the common field from morning to noon. After some rest and lunch from about noon to 2 p.m. women and other young household members who have their own individual fields continue to work there until returning home in the evening. While men tend to leave earlier in the morning for the common field, women take care of the household's water provision, food production and other household tasks before joining the male and other, mostly younger household members in the collective field. However, there are considerable household-specific differences in relation to agricultural labour before noon, as not all women in a household prepare food on a daily basis. It has been noted that in polygynous and in multi-generational households, food preparation for all household members is often organized in a wheel, with women taking turns and therefore staying at home for longer because of cooking responsibilities only every few days. While elderly women were said to be included in this work as well, they are sometimes excluded from agricultural tasks in the household's common field because of age-related strength deficits (Interviews: man J, T.; man S, T.). In this case, they can head directly to their individual fields to cultivate over there.

In general, important food crops such as millet, sorghum and, increasingly, corn, are cultivated extensively in the common field. While these are frequently also grown in individual fields to provide for the family's consumption needs, cash crops such as groundnuts, sesame or beans, and others such as peas, Bambara groundnuts, hibiscus and sorrel are particularly often farmed in personal fields. Crops specifically grown by women include "les petites petites cultures" (Interview: woman A, K.B.), namely groundnuts, hibiscus, sorrel and beans, and also sesame (Interviews: man M, Bog.; woman L, Bog.). While women frequently dedicate specific fields to these crops, they are also cultivated by men but generally in a smaller quantity and just inside their millet field. "Mais, le cultivate des hommes ne touche pas lequel des femmes, c'est carrément féminine" (Interview: woman A, K.B.). This applies particularly to groundnuts that are easily and profitably sold at local markets. The so generated revenues allow women to pay their children's school fees (Interviews: woman L, Bog.; woman S, Bog.; woman A, T.).

"C'est les femmes mêmes qui font l'arachide. Comme il y a l'argent dans l'arachide, souvent même tu peux venir trouver que il n'y a pas d'arachide parce-que elles ont tous vendu. Donc, c'est les femmes qui vendent et qui produisent l'arachide" (Interview: man M, Bog.).

In gardening, there are also gendered crops. Especially okra is considered as a female crop (Interview: woman A, K.B.), but also cabbage, sorrel and green beans are more often produced by women than by men (Interview: man O, Bog.). Besides that both men and women cultivate tomatoes, onions, aubergines and pepper (Field notes 2013, Bog., K.B., T.; Interviews: man M, Bog.; man O, Bog.).

In the following, general as well as gender-differentiated agricultural activities are discussed, following the chronological order presented by focus group participants in their seasonal calendars, while regional and village specific differences are accounted for.

At the beginning of the farming season, before and during the first rains, only men reported to be engaged in repairing agricultural tools (Field notes 2013, Bous.; FG men K.B.; Interview: man R, K.B.). At the same time, in May, men in Koura-Bagre noted to plant small trees in a specific tree nursery, which they replant in and around their fields for fertilization purposes and against soil erosion in August (FG men K.B.).

The preparation of a crop field includes tasks such as cutting down small trees and bushes and initially ploughing the field or constructing RWM strategies. This takes

place from about February to May, depending on the respective local start of the rainy season, which was already described to be very variable from year to year.

Clearing the field from small trees and bushes with a machete takes place between March and May. In the northern research sites, the exclusively male character of this tedious work was stressed by several male and female interview partners (Interviews: woman L, Bog.; woman Z, Bog.; man S, K.B.; amongst others) and explanations included, that when

“[...] il peut y avoir des serpents, et puis ça demande de la force physique. Donc ça aussi ça dépend, si tout un champ qui doit être coupé par- et où la femme doit vraiment couper les herbes c’est un peu difficile pour la femme, c’est un travail pénible. [...] Et pour même couper les herbes, pour protéger la femme contre des petits reptiles, les serpents ou bien les scorpions qui peuvent la piquer. Et nous pouvons faire plus attention que la femme” (Interview: man L, K.B.).

However, in the central Burkinabe research sites, focus group participants mentioned that women and children also frequently help with this task (FG women Bous.; FG women T.). And additionally, women in Toeghin mentioned that they engage in burning their fields in March, an activity that also aims at clearing the fields from various plants (FG women T.).

For the initial ploughing of the field with ploughs drawn by cattle or, more recently also by donkeys (Interviews: man O, Bog.; man L, K.B.; man S, T.), it is exclusively men in northern, and both in the central villages. The work with a plough therefore showed one of the most notable differences between research sites in the two geographically different areas. While in Boussouma and Toeghin women and men of various age groups alike were said and observed to be involved in ploughing, in Bogoya and Koura-Bagre both emphasised that it is only men who conduct this task, who hold and guide the plough, while young men or boys walk before and beside the plough to guide and drive the ox or the donkey pulling the plough. The main explanation cited by men for this strict gender-differentiation was related to strength, as “la charrue est lourde, ça a du poids, donc des fois il faut soulever la charrue pour éviter quelques choses. Si la femme n’a pas la force, c’est difficile” (Interview: man L, K.B.).

Even if the household head or other male grown-up household members are not available at the time of the first rains, the most suitable period for ploughing the field, a woman in Koura-Bagre reported that her husband, who didn’t own a plough at that time, sold a cattle and distributed the money among his wives so that they can pay someone to come and plough their fields for them (Interview: woman F, K.B.).



In central Burkinabe research sites, where working with the plough isn't uncommon for a woman at all, gender-differentiated working patterns in relation to ploughing are still present. A woman in Boussouma noted that on the one hand everybody can work with a plough, but on the other children and women usually walk behind the plough to sow (Interview: woman L, Bous.) and another in Toeghin reported that she knows how to use it and that she actually works with the plough when her husband isn't around. But if he is, he prefers to do so (Interview: woman C, T.).



Figure 9: A man and his sons plough the field at the beginning of the rainy season in Koura-Bagre, while some women work with a hoe in another field behind (Source: photo by author).

If a household has enough money to borrow a tractor, which is usually available in the next bigger town like the district capital, men pay someone to come and plough the field for them: “[...] si c’était comme il a plu et que j’ai de moyen, il y a des fois à cette période-là, mon grand frère et moi-même nous nous associons louer un tracteur qui vient labourer tous les champs et puis nous semons” (Interview: man A, Bog.).

As already noted, some fields, according to respective soil and plant characteristics, are ploughed, while others require increased fertilization by certain RWM structures. These are also constructed in the course of other field preparation activities from about March to May, depending on the time and quantity of the year's first rains (FG men Bog.; FG men K.B.; FG women K.B.). Stone bunds were noted to be constructed primarily in March and April, earlier than *zai* or half-moons (FG women K.B.; FG men Bous.).



Additionally, stone bunds require a longer preparation time, which was reported by men in Boussouma to span from December to February (FG men Bous.). Another technique of RWM, the utilisation of herbs against erosion and for increased soil humidity, was mentioned in men's seasonal calendar in Koura-Bagre, as already cited above, and also by men and women in Boussouma, who plant these herbs in July and August, parallel to weeding tasks (FG men Bous.; FG women Bous.).

While activities in relation to the implementation of RWM strategies show certain gender- and also age-differentiated work patterns, as has already been discussed in chapter 7.1, most of the other following tasks in the fields are more frequently considered as common responsibilities with all household members participating. Everybody is required to participate in agricultural labour as all household members rely on and profit from the crop fields' harvest and because human work force is crucially needed for the household's sustenance. "Quand il s'agit de désherbages, de mettre l'engrais, de mettre le fumier et quand il s'agit des récoltes, c'est toute la famille qui participe" (Interview: woman L, Bog.).

But somehow contrary to this, a man in the northern social context has explicated the view that, if it would be possible, he would prefer his wife to concentrate on household tasks but not to also cultivate herself:

"Si j'ai le moyen même, je ne veuille pas que la femme travail sur le champ. Elle puisse vraiment donner nous à manger seulement, mais pas travailler sa propre production. Mais comme ça ne va pas donner, il faut se soutenir sur le champ pour avoir de quoi manger" (Interview: man O, Bog.).

Directly after and frequently also at the same time as the initial field preparation, the soil is fertilized and the crops are sown. In this respect some farmers noted an important change in their agricultural activities which is related to the increased use of the plough. Nowadays ploughing and sowing can be done at the same time, as one person, usually a man, handles the plough and another, commonly a woman, follows behind while directly sowing. As these two tasks were conducted temporarily separate in former times, this change is considered positively as time saving.

"[...] de nos jours, il y a un changement, parce-que avant, les gens labourent, on finit de labourer avant de commencer à semer. Aujourd'hui, en même temps quand on labour, les femmes peuvent être derrière en train de semer. Donc, ça fait gagner en temps. [...] Donc maintenant, les femmes sèment en même temps que les hommes labourent. C'est ça qui peut être la différence que les femmes sèment et les hommes labourent. Si non, ils peuvent faire le même travail mais pas pour labourer avec des ânes [ou bien avec des bœufs]" (Interview: man O, Bog.; comment by a.).

Sowing is generally done after ploughing around June (FG men Bog.; FG women Bog.; FG men K.B.; women K.B.; FG women Bous.), or at some time during May and July as it depends on the actual start of the rainy season (FG men Bous.; FG men T.; FG women T.). While this applies at least to the most commonly used crops such as millet or sorghum, other plants are sown later. For example groundnuts (FG men K.B.), sesame, beans and corn have been mentioned to be sown in July (FG women T.).

As also broached in the above quote, especially in sowing, but also in fertilizing the field, women are not exclusively, but most prominently implied (Field notes 2013, K.B.; Interviews: woman L, Bog.; woman Z, Bog.; man L, K.B.; amongst others).



Figure 10: Women sowing millet inside zai holes in their household's common field in Koura-Bagre (Source: photo by author).

Fertilization of the field appeared to be conducted at two different times. The first application of compost or dung usually takes place in April, May or June, before it rains and before the crops are sown (FG men Bog.; FG women Bog.; FG men Bous.; FG men T.), and the first application of chemical fertilizer was described to happen after the first rains and the sowing, in June (FGs men & women K.B.). The choice to apply one's animals' dung, compost or chemical fertilizer, or a combination of those, depends on the respective financial means and on the number of animal possessed by a household. Generally, the pressing need to fertilize the soil, and even the importance of chemical fertilizer was oftentimes stressed. But in many cases interview partners and focus group

participants reported that chemical fertilizer strains their financial capacities and organic fertilizer is mostly not sufficient for all of the household's fields. In this respect, women in Koura-Bagre noted that dung is primarily applied on the common field, as there is not enough quantity available to also use it on individual fields. Furthermore, they stated that fertilizer is not easily accessible to women (FG women K.B.).

A second fertilization of the crops is said to support the plants development in the last growing stage, as it would be conducted in August when the plants are already grown to a considerable height. This only concerns chemical fertilizer and is only done if there are enough financial means available (FG men T.). In relation to chemical fertilizer, male focus group participants generally seemed to be better informed about and more concerned with the specific varieties than women were (FG men K.B.). Nevertheless, while it was frequently stressed that all household members can apply organic as well as chemical fertilizer (Interviews: woman L, Bog.; man L, K.B.; man S, T.; amongst others), women and particularly children are probably even more implied in this work than men are, especially when fertilizing a field with organic matter in the course of RWM implementations, but also when applying chemical fertilizer (Interviews: man L, K.B.; woman A, K.B.; amongst others). "Donc, ça veut dire que, l'amendement là, c'est ne pas forcément les hommes qui faisaient ça pour nous. Moi aussi, je sais comment de faire ça" (Interview: woman Z, Bog.).

Regarding the provision of organic fertilizer, there are specific gender-differentiated tasks, as manure from animals is mostly collected by household heads, who are usually male, but the preparation of compost during the dry season, including its composition and regular watering, is mostly conducted by women, who are supported by their children (FG women Bog.; Interviews: woman F, K.B.; man S, T.). Concerning the respective fosses for the compost, their construction was observed to be undertaken exclusively by men and often in connection with a supporting project or workshop (Field notes 2013, K.B.; FG men Bous.; Interview: woman A, T.; amongst others).

In relation to compost, but also generally, men were noted to be much more frequently implied in training and information incentives. This was also mentioned by women in Boussouma, who noted that, while men in their village already knew about the construction and use of compost, women hadn't received any information or been included in workshops until some ten years ago, when the *Service de l'Agriculture* specifically turned towards selected members of a women's group and taught them how to produce and work with compost (FG women Bous.).

After sowing crop seeds in a fertilized field and the plants sprout, regular weeding is required throughout the plants' growing process until the harvest. The first weeding sequence was noted to start approximately two weeks after sowing, which is either in June or July (FG men K.B.; FG women K.B.), and a second one, which is considered as a particularly intense activity by both men and women, takes place in July and/or August (FG men Bog.; FG women Bog.; FG men K.B.; FG women K.B.). Differences between northern and central Burkinabe research sites include the duration of weeding and the respective tools commonly used. Focus group participants in Boussouma and Toeghin mostly noted to weed until September, which can be explained by different and frequently longer lasting rainfall in these more southern villages. While weeding in the northern villages was reported to be most commonly done by using the *daba*, but sometimes also with a smaller plough pulled by a donkey (Interview: man L, K.B.), in both southern villages, farmers specifically differentiated between the first weeding sequence, conducted with a *daba* and considered as very intense (FGs men & women Bous.), and the second one, done with a plough pulled by an animal (FG men Bous.; FG women Bous.; FG men T.). Reasons for this commonness of weeding with the plough particularly in the central Burkinabe research villages include that ploughs are in general more frequently used there and that half-moons, for which ploughs cannot be easily used, are not implemented, as in contrast to the northern villages.

While everybody is implied in these crucial weeding tasks in the common field, in many cases it is particularly women, who are usually considerably younger than their husbands, and their older children, who conduct this work (Interviews: woman Z, Bog.; man L, K.B.; man S, K.B.; man S, T; amongst others).

“Par rapport à labour, les hommes désherbent, les femmes désherbent. Maintenant, beaucoup des hommes n'aiment pas désherber, ils préfèrent que les femmes désherbent. Ils partent, les aider à semer et puis ils coupent [les tiges au moment de la récolte], pour laisser les herbes avec les femmes” (Interview: woman Z, Bog.; comment by a.).

Contrary to these common agricultural tasks in which women are extensively implicated, the application of pesticides has been emphasised to be exclusively conducted by men in all research sites. Commonly, pesticides are applied in August on pure beans fields, but recently also on corn fields (FG men Bog.; FG men K.B.; FG men T.; Interview: woman A, K.B.; amongst others). Only in rare exceptions, such as an illness without proper (male) replacement but with time pressure, women would apply pesticides:

“Pour traiter le benga [Móorè pour haricot, comment by a.] par exemple, pomper le benga, ça ces sont les hommes. [...] comme c’est l’homme qui est le chef du ménage, c’est l’homme qui fait ça. [...] si c’est pas parce que l’homme est malade ou bien il a quelque chose, il peut pas faire les travaux, que les femmes peuvent peut-être faire ça pour que la production ne se gâte pas. Sinon, tout ce qui est lié vraiment à pomper la production, c’est les hommes qui font ça” (Interview: woman L, Bog.).

While the exclusive responsibility of men for applying pesticides was also noted by many other interview partners across all research sites, one man drew the connection to protection aims but also to information and training access, as it seems that only men have been included in respective workshops and learned about appropriate dosages and protection measures in pesticides application:

“C’est pas la force forcément, il dit que c’est aussi pour se protéger, si la femme est enceinte par exemple, c’est pas bon de toucher aux pesticides [...] elle ne maîtrise pas les dosages, elle ne sait pas comment bien se protéger comme les hommes. C’est les hommes qu’on forme d’habitude, parce qu’il faut marcher pendant longtemps dans les champs. Et y a des choses que l’homme peut faire attention, auquel l’homme peut faire plus attention que la femme. Donc c’est pour ça que pour les traitements, les hommes choisissent de faire ça. C’est pas que la femme ne peut pas être initiée mais il faut en tout cas se protéger pour vraiment bien faire le travail et savoir le dosage qu’il faut mettre à chaque fois. Donc à cause de ça le traitement c’est nous qui choisissons et nous faisons ça” (Interview: man L, K.B.).

Finally, when the rains decrease and the plants reached maturity, the grains are harvested and transported to the compound where they are stored in specific cereal storages that are exclusively constructed and woven by men (Field notes 2013; Interview: man S, T.).

Similarly to sowing, in harvesting there are also temporary differences between various crops. All focus groups’ seasonal calendars showed that beans are harvested first, already in August or September. Furthermore corn, groundnuts and Bambara groundnuts were reported to be harvested well before others including millet, sorghum, sorrel and sesame. Generally, harvest in all four research villages takes place from around August to November.

“Lorsque le millet est prêt et quand on veut venir couper, récolter le millet. Ça aussi, on récolte avec les machettes. C’est les hommes qui font ça. Parce-que c’est pénible. [...] Même si on finit de couper le millet, on laisse au champ. C’est encore les hommes, qui ramassent le millet pour charger dans les charrettes et amener à la maison, mettent dans les grainiers. [...] Quand les millets arrivent à la maison, c’est aussi [les hommes] qui mettent ça dans les grainiers” (Interview: woman Z, Bog.).

While men start by cutting the haulms with a machete and leave them in the field, women's tasks include collecting millet or sorghum themselves. After that men join women to collect and tie up the remaining haulms (Interviews: woman Z, Bog.; man L, K.B.; man S, T.).

But regarding beans, and also Bambara groundnuts, it is women who harvest them in their individual fields and at the same time collect their leaves, which are used for animal nutrition (Interviews: woman A, K.B.; woman C, T.).

“Mais quand c'est le temps de la récolte, avant quand il n'avait pas la charrette, c'est les femmes qui prenaient les récoltes à la tête. Elles chargent ça sur la tête avec les plats pour venir mettre dans les grainiers. Mais maintenant comme il y a la charrette, ça c'est facile. Mais [...] pour les récoltes, là où l'homme seul travaille et que la femme ne fait pas, c'est quand ils coupent les tiges, pour récolter. Quand ils coupent les tiges, ça c'est un travail des hommes pour défricher. [...] pour aussi confectionner les grainiers, là où il faut conserver la récolte, ça aussi c'est l'homme qui tisse ça. Maintenant, tout le reste ils peuvent faire ensemble” (Interview: man S, T.).

While transporting the harvest from the fields to the compound was considered to be mainly done by women in the past, nowadays, as this task is facilitated by carts, it is rather children who generally conduct it (Interview: man S, T.). At the compound it is also young and small children who put cereals into the *grainier*, the household's cereal store. It was emphasised that women do not enter these *grainiers* themselves but send children to bring them the amount of cereals sufficient for food preparation (FG men T.; Interviews: man L, K.B.; man S, T.).

After cutting the crops' haulms and collecting the harvest, the last task of the agricultural season in the fields consists of collecting and tying up the remaining haulms and leaves that are used for animals' alimentation during the dry season. Focus group participants in all research villages noted that this generally happens parallel to and after the harvest, from around September up to January.

“Pour amener encore les tiges pour les préparer en foin, donner aux animaux. C'est les hommes qui amènent les tiges et ils construisent des hangars, et ils prennent le foin qu'ils ont attaché comme ça, mettent ça, parce au moment où il n'y ont pas d'herbes pour les animaux, on donne ça aux animaux comme nourriture” (Interview: woman Z, Bog.).

While generally all members of a household who are available (most children are in school at that time) were reported to take part in this activity of collecting, tying up and transporting haulms and leaves for animals' fodder, it is specifically men who construct the sheds in and around the compound on which the fodder is stored until use. Still, some male focus group participants in Toeghin discussed controversially if women

would join them in the field to collect fodder or not. While one man stated that women who personally own animals should collect their fodder by themselves, another said that if animals are taken care of together in a household both engage in fodder collection. Yet another man raised the issue that “quand une femme ramasse de foin comme ça dans le champ, c'est juste pour vendre et puis avoir l'argent, [vendre] à ces qui ont des animaux mais n'ont pas assez de foin” (FG change men T.; comment by a.) because women generally do not have access to land, which is needed to collect enough haulms for their animals' nutrition.

It has been shown in this chapter that all household members in rural crop-livestock systems in the research villages need to work together to accomplish all those tasks in the common crop field, which provides the whole household with a considerable amount of necessary food and additional income for a year. In this respect a woman in Bogoya stresses the importance of trust among married partners, as “tout c'est d'abord basé sur la confiance. Donc, s'il y a pas de confiance entre toi et ton mari, vous n'allez pas vous associer, faire un travail ensemble” (Interview: woman L, Bog.). A household's members are expected to support each other in terms of work and in times of hardships. For example if a man is sick, his wife or wives take over at least his most essential work responsibilities (Interview: man A, Bog.). However, in the case of child birth, sickness or overburdening workload of a woman, it has been observed that they also but not exclusively draw on family supporting networks. Women rather increasingly mobilise other local social networks like their village's or village *quartier's* women's group (FG women K.B.; FG women Bous.; FG women T.; Interviews: woman Z, Bog.; woman A, T.; amongst others).

**In conclusion**, women are generally expected to help men in all activities, especially concerning the common field (Interviews: man L, K.B.; woman A, K.B.). Even though men, women, girls and boys oftentimes work together in their common field, many of these activities appeared to be gender-differentiated. While this differentiation relates to unequal land, training and cash access opportunities, as well as perceived strength differences between women and men, it was also explained by a man in Koura-Bagre as “il y a des travaux, eux décident que ce sont vraiment des travaux des hommes, pour ne pas qu'elles fassent tout. Parce-que généralement les femmes les aident et elles préparent aussi à la maison” (Interview: man L, K.B.). Therefore, men's activities in

relation to crop cultivation in all research sites include repairing agricultural tools, applying pesticides, collecting manure and constructing compost fosses. Additionally, men are considered to be more implicated in planting trees against soil erosion (FG men K.B.; FG men Bous.; FG women Bous.; Interview man A, Bog.). Only in the northern research villages (mostly younger) men are exclusively implied in initially clearing the field from bushes and weeds and in utilising a plough, whereas in the central Burkinabe research sites women also take part in these two latter tasks. Common field activities in all research sites include field preparations such as ploughing the soil with a hoe and constructing RWM techniques, and also sowing, fertilizing, weeding and harvesting. Moreover, the construction of some RWM structures and harvesting include several gender-differentiated responsibilities. In turn, women's exclusive responsibilities contain water and food provision in the compounds but also in the fields and compost preparation, whereas children also seemed to be popularly implicated in these tasks. Furthermore, women appeared to be more strongly implied than man in sowing, fertilizing and weeding. While this was stressed by several female and male interview partners, participants in Toeghin's women's focus group even noted to be exploited by their husbands as they are sometimes left alone in the common field with the collective work (FG women T.).

Harvests of these common fields, which are owned by male household heads, are usually used for the whole household's nutrition during the dry and the following rainy season, or more realistically, as long as the harvest outputs last. Nevertheless, as there are considerable differences between households also in this respect, during the research process there has been only one exception noted, where women were required to work in the common field but to feed themselves, their children and their husband exclusively from the output of their individual fields (Interview: woman A, T.).

Individual fields are generally cultivated by the respective individual, mostly a wife and mother who receives her field from her husband, or a son who receives his field from his father. In the case of mothers, they are usually supported by their children if they are old enough. Responsibilities in relation to these individual fields' harvests are again subject to household-specific differences. Whereas some women control their own harvest outcomes themselves and can sell them to provide for their own, their children's and their family's needs (Interviews: woman Z, Bog.; woman O, K.B.), due to frequent food shortages and nutrition insecurities most women are expected to contribute to their households' alimentation (Interviews: woman S, Bog.; woman F, K.B.; woman C, T.;



woman S, T.; amongst others), and in some cases to even provide alone for their hearth-holds' whole alimentation and additional needs (Interview: woman A, T.).

Cultivation in crop fields is nowadays frequently supplemented by gardening, if there is access to a suitable water resource, as harvests of gardens provide important additional income for an individual or a household. But gardening, in contrast to cultivating in the field, is neither practiced nor practicable by all members (of a considerable age) of rural households in researched crop-livestock systems. Moreover, responsibilities in gardening are considerably different to the aforementioned gender-differentiated responsibilities in common crop fields, and the respective activities usually take place during the dry season, the off-season of crop production. Therefore, responsibilities and tasks in gardening have not been included in this chapter so far, but will be described in brief in this following last part.



Figure 11: Seeding nursery next to the mosque in Koura-Bagre (Source: photo by author).

Gardening activities usually start with the construction of seeding nurseries shortly after harvesting the crop fields, in November (FG women Bous.) or December (FG women Bog.). After re-planting the vegetable plants in the garden parcel in the ensuing month, all following activities include watering, weeding, applying pesticides and harvesting. These tasks are conducted frequently and rotationally for about four month, usually until April. While this pattern is similar in all research sites, women in Koura-Bagre

mentioned to start earlier than gardeners in other villages. They produce seeding nurseries already in October and replant after 20 days, in November (FG women K.B.). Each person is usually responsible for all of these tasks in his or her own garden, while tasks in common vegetable gardens or rice parcels, for example shared by a married couple, are subject to intra-household decision-making.

Due to the villages' different water infrastructures, diverse gender-differentiated gardening practices can be observed. In Koura-Bagre, where cultivation of onions is exclusively conducted by women, men only engage in digging holes in which women plant their onions and continue with all other tasks alone (FG men K.B.; FG women K.B.). On the contrary, in Toeghin no female focus group participant noted to engage in gardening, for which one needs to rent a garden around a barrage in nearby villages or towns as there is no gardening possibility in Toeghin itself (FG women T.). While vegetable production is predominantly but not exclusively undertaken by men in Toeghin, rice production parcels next to the local *bas-fond* were constructed and distributed by a Taiwanese project among both women and men, and are also cultivated by both of them (Field notes 2013, T.).

In Bogoya, where gardening is conducted by man and women alike, but where men have easier access to garden parcels because of inheritance rights and greater financial means, only women mentioned that they produce pepper in May and June, in addition their regular vegetable production from January to April (Field notes 2013, Bog.; FG women Bog.). Somehow similarly, women in Boussouma reported to cultivate in their gardens for a longer period of time than men do, who reported to finish by the end of April (FG men Bous.). As weeding in their rice gardens is conducted at the same time while sowing in the crop fields, the month of June is perceived by women to be very intense (FG women Bous.).

#### 7.2.4 Keeping livestock

Keeping of animals is a very important element of livelihoods in researched crop-livestock systems. Livestock is perceived as an additional security for farmers, especially in times of hardships.

“[S]i tu vie au village comme ça et tu n'as pas d'animaux, c'est comme tu n'es pas en sécurité. Par exemple si tu as un problème financier, tu ne pourras pas facilement le résoudre. Si par exemple tu n'as pas fait une bonne saison. Parce-que généralement, après la production, ils finissent, ils ont

seulement de quoi manger, mais pour avoir l'argent, il faut vendre quelque chose" (Interview: man A, Bog.).

As financial means are predominantly invested and bounded in livestock, animals can be sold to pay for various necessary things, frequently referred to as “problems”, like additionally needed food, health care or school fees, but also agricultural input resources such as fertilizer and working tools. While access to organic fertilizer is intrinsically linked to livestock ownership, chemical fertilizer is usually bought with the surplus generated through livestock selling, because most often animals constitute the sole saleable possession of a household. Therefore men as well as women in all research villages emphasised the importance of livestock keeping, of investing in animals to bind financial means and to be able to cope with low agricultural outputs and possible failed growing seasons. Especially for women personal possession of animals, which is not possible for all of them due to financial constraints on the one hand and social gender norms on the other, is of pressing relevance. Livestock ownership improves women’s decision making capacities, particularly in terms of contributing to their household’s welfare, and reduces their oftentimes problematic dependence on their husbands.

“Nous avons trouvé la nécessité d'élever, parce-que nous trouvons qu'il faut quand-même épuiser certaines ressources là-bas pour vraiment aider-, pour venir à résoudre nos problèmes. Par exemple si notre mari n'est pas là et puis tu as un enfant, qui est malade, tu ne peux pas forcément essayer de l'attendre. Si tu as un animal, tu peux peut-être vendre pour résoudre le problème, et payer les médicaments. Si par exemple tu dois t'asseoir attendre que le mari va venir, il va revenir trouver que l'enfant est décidé. Donc, c'est pourquoi nous élevons en plus de l'Agriculture pour quand-même essayer de pouvoir avoir des ressources à côté pour résoudre des problèmes. [...] c'est pour ça, que l'Elevage est devenu activité secondaire” (FG women Bog.).

The importance of owning animals is particularly obvious in times of insufficient food availability, mostly at the end of the dry and during the rainy season, and when facing acute payment pressures, especially regarding health problems and children’s school fees, which need to be paid in the late rainy season usually before the crop harvest is ready to be sold. Payment responsibilities regarding school fees and health care are subject to considerable variation within households. Even though fathers and male household heads are commonly perceived as responsible for their household’s members’ wellbeing, mothers or other female care-takers have been observed to assume a great share of this responsibility (FG women Bog.; FG women T.; Interviews: woman L, Bog.; woman F, K.B.; woman A, T.; amongst others).

Additionally, a man in Bogoya explicated another aspect, a more symbolic meaning that contributes to the importance of livestock keeping. Besides being able to sell animals to pay for households' members' health care, he noted that animals can take on a livestock keeper's misfortune in terms of health problems but also otherwise and die in his or her place:

“[S]i quelqu'un n'a pas d'animaux dans sa vie, c'est comme sa vie n'a pas de sens. C'est très important parce-que l'animal même, c'est comme un autre humain. Donc, pour nous, l'animal peut aider l'autre humain à peut-être résoudre ses problèmes. Que, parce-que il y a des fois par exemple en dehors de fait que tu peux vendre l'animal pour résoudre tes problèmes, quand tu élèves un animal, un malheur peut arriver, un animal meure à la place. Par exemple quelqu'un devait mourir et puis l'animal meurt à la place de la personne. Qu[‘il y] a tout ça. Donc nous, nous ne pouvons pas nous assoir sans élever” (Interview: man A, Bog.; comment by a.).

While life in a rural household without animals is considered as very difficult and, as he put it, senseless, women and men face certain access difficulties to livestock ownership, which are partly common but usually show considerable determinations by gender-differentiated social norms. Therefore, general and locally specific aspects of women's and men's involvement in livestock ownership, raising and care, as well as internal (like underlying social perceptions) and external (like ecological and economic conditions) influencing factors and relevant respective changes will be discussed in this chapter.

While many women as well as men across all research sites stated to own and take care of all animals in the household together, livestock keeping and even more livestock ownership is generally perceived as being “for men”. This relates to the belief held by many men that women are not capable of properly raising their own animals, even though they are essentially implicated in daily caring activities of male owned animals in their households (FG women Bog.; Interviews: man O, Bog.; woman Z, Bog.; woman A, Bous.; woman A, T.; amongst others). This perception of men being more responsible and involved in livestock keeping is also reflected in and reproduced by the fact that women are mostly excluded from trainings and workshops concerning livestock keeping (FG women T.; Interview: woman L, Bous.).

“Que c'est à travers des formations que nous avons eu. Donc quand nous allons dans les formations, souvent avec des hommes, nous apprenons tous ensemble qu'on dit qu'il faut laisser la chance aux femmes de chercher. Donc c'est dans ça que d'autres ont compris, ils laissent les femmes élever. [...] Mais [beaucoup des] hommes nous interdit d'élever. Mais les hommes veulent toujours que nous les aident à regarder les animaux. Quand ils viennent, ils veulent que nous sont à

la maison et [si] les animaux n'ont pas bu, c'est un problème. Donc il faut chaque fois les aider et puis laisser tomber ce que toi-même tu veux chercher après” (FG women T.; comment by a.).

Even if livestock keeping is permitted for a woman, many women noted that it is very difficult for them to get started with it, as one usually needs to buy animals at the market. This is especially problematic for women as they generally have less financial means than men, which is mostly due to land access difficulties and specific financial constraints like aforementioned payments for their children's health care and education that require reselling their animals and hence starting anew. Alternatively to buying livestock oneself, women mentioned two other ways of accessing animals:

“Souvent, quand tu te mariée, quand tu quittes ta famille, quand tu pars trouver que dans ta famille, ça ne va pas, tes parentes peuvent te donner un animal d'élever. Et c'est à partir de ça, que tu élèves et à outre de ça deviens beaucoup, c'est pour toi” (FG women Bog.).

Next to this support by a woman's parents, there are also several organizations that implement projects in certain selected villages that specifically aim at helping women to get started in livestock keeping. This is understood as improving their lives by facilitating cash access. Similarly to trainings by an unknown organization in Toeghin (see above quote of FG women T.), in Koura-Bagre the NGO ADEFAD (Association d'aide aux enfants et familles démunis) also, but with seemingly more impact, engaged in counselling local men to change their minds about women owning animals in their (the household heads') compounds.

“L'ADEFAD est venu est ils s'intéressaient à toute les femmes, étape par étape. Et donc, qu'ils sont venus flatter les hommes pour qu'ils acceptent que les femmes élèvent. Parce-que ils ont pris des scénarios pour demander aux hommes si par exemple les hommes meurent pour laisser leur femmes et qu'elles ne peuvent pas cultiver correctement, il y a pas de l'aide, comment ils peuvent faire pour gêner les enfants à la famine. Et elles n'ont pas aussi de moyen. Donc, ça peut convainquait les hommes de laisser élever” (Interview: woman A, K.B.).

After these counsellings ADEFAD selected 40 women in a first and 50 women in a second round to give each of them three sheep, one female and two males, to initiate them in livestock keeping. Whereas only the male sheep needed to be returned after three years, women could keep the female and various new sheep. As these sheep were of a new foreign variety, called *Bal-Bal* or *Béla*, which is taller, more heat resistant and more expensive than the former Mossi kind, *Hourza*, local men also followed their women and switched to this new variety, profiting from higher market prices (Field notes 2013, K.B.; FG women K.B.; Interview: man L, K.B.; women A, K.B.).

While livestock keeping by women was subsequently accepted and is practiced in Koura-Bagre since about nine years, many women in Toeghin are still not allowed to own animals by themselves (FG men T.; FG women T.). Contrary, women and men in Bogoya and in Boussouma didn't mention any general restrictions in this respect. Some women in Bogoya just mentioned occurring jealousy by men in some households of animal ownership by their wives (FG women Bog.).

As all women and men noted that buying and selling livestock is exclusively practiced by men, some women in Bogoya and Koura-Bagre mentioned that they, to prevent any problems caused by jealousy, subtract a small amount of the money received by their husbands from their animal sale and give it back to him. "Donc, quand tu fais comme ça, généralement c'est pas des problèmes avec des hommes" (FG women Bog.). As men are in charge of all negotiations and sales processes concerning their own and their wives' livestock and women do not take part in these, they cannot actually control this transaction and the money they eventually receive for their animals through their husbands. Not to be deceived financially, women in Koura-Bagre reported to inform themselves about current market prices since about ten years.

"Donc chaque fois nous passons par les hommes pour vendre notre animal. Et avant les hommes étaient un peu mal au tête. Quand nous vendons, ils vendent nos animaux, ils coupent une partie et vient dire, qu'on a payé comme ça. Nous n'avons pas le choix, nous devons prendre. Et dans ça nous enlevons quelques choses données. Maintenant comme nous avons accès aux informations au marché, quand nous voulons vendre, nous savons à peu près combien ça peut coûter. Donc on ne peut plus nous tromper. Donc quand le mari vend, il vend au prix normal avec beaucoup de transparence. [...] Il y a 15 ans les hommes vendaient sans rien nous dire. Sans transparence. Donc ce qu'il gagne il vient donner. Ça vaut 10 ans depuis que nous commençons à avoir des informations sur le marché" (FG women K.B.).

In relation to the kinds of animals owned by men and women in the four research sites, there are mainly chicken, goats, sheep, donkeys and cattle. Additionally, pigs are only common among Christians in the central Burkinabe research sites and, without any underlying religious reasons, ducks have also only been observed in these southern villages. While generally all of them can be owned by women and men alike, cattle, being the most valuable animal, was observed to be exclusively owned by men.

"[P]ar rapport aux bœufs, c'est lié plus aux moyens. Parce-que les femmes franchement n'ont pas l'argent pour s'acheter les bœufs. Les petits ruminants ça va, on peut acheter, même si tu n'as pas l'argent, tu peux demander l'argent à quelqu'un [...], un crédit comme ça. [...] Mais si c'est un bœuf, si tu pars prendre l'argent beaucoup, peut-être 150 000 FCFA ou 100 000 FCFA pour acheter un bœuf, [...] comment tu vas rembourser ? C'est difficile, c'est trop pour toi ! Donc,

chacun achète les animaux qu'il peut, dans ses moyens, peut vraiment entretenir" (Interview: woman L, Bog.).

In relation to animal species, one positively perceived change in Koura-Bagre is the introduction of the new sheep variety *Bal-Bal*, whereas a negative one in relation to livestock keeping is, that it's not possible anymore to own and raise a large number of animals like before because there is not enough space for pasture available (Interview: man L, K.B.; woman A, K.B.). While this lack of pasture land was mentioned exclusively in northern research villages, diminishing numbers of animals per household were observed by farmers in the central Burkinabe villages as well. In Boussouma increased animal sicknesses were reported by some interview partners as a major reason for this (Interviews: man I, Bous.; woman A, Bous.; woman L, Bous.) and in Toeghin the problem of rising animal thefts was stressed as contributing to frequent animal losses (FG men T.; Interview: man S, T.). Besides that men and women in all four villages mentioned rising livestock prices and increased financial means that are required to take care of animals nowadays, to pay for their additional alimentation and health care. These higher investments in animals' wellbeing are reflected in a major change in farmers' perception on livestock keeping in general, driven by improved knowledge on animals' alimentation and health needs, and most importantly, by a growing and profitable livestock market:

"[V]raiment l'Elevage est devenu une autre activité sérieuse pour tous ménages. Parce-que dans l'Elevage on peut en tout cas, faire des profits, plus que avant. C'est pourquoi les gens qui élèvent aujourd'hui sérieusement, ils s'occupent bien des animaux. Quand par exemple tu vas élever, si tu achètes des animaux, tu fais un hangar sur lequel on va mettre les herbes sèches. Et après tu t'assures que chaque fois les animaux on à boire, ont à manger. Et tu les ne laisses pas aller dans les saletés. Avant, les gens achètent les animaux, ils les attachent à la maison, c'est fini. Il ne considère pas, c'est juste [...] pour le fait de privilège d'avoir des animaux. [...] Donc, c'est comme si c'est aujourd'hui un Elevage du marché, ça veut dire on élève pour vendre" (Interview: man O, Bog.).

Activities and responsibilities in livestock care (general ones as well as new ones resulting from this perception change during the last twenty years) and gender-differentiated involvement in these tasks are subject to seasonal variation, which was shown by women and men in focus groups' seasonal calendars.

During the first month of the dry season animals can still feed themselves from fresh greens and are mostly guarded by children while pasturing (Interview: man A, Bog.; man M, Bog.; women A, K.B.; amongst others). Particularly in the northern villages,

some men mentioned to hand over their cattle to Fulani herders for pasture. They return the cattle again when there is no more grass and leaves in the surrounding land for them to eat (Interviews: man M, Bog.; man L, K.B.). As water and hence also greens become increasingly rare in the course of the dry season, animals are usually kept at and around the compound and are fed with haulms and leaves, which have been collected from the crop fields after harvest from around September to December. Daily alimentation at the compound is needed from around January to May and is especially difficult between March and May, demanding a lot of time and energy because of resource scarcity (FG women Bog.; FG women Bous.; FG men K.B.; FG men T.). Women, and also children have been noted to be particularly engaged in feeding, watering and caring for animals in this season (FG women Bog.; FG women Bous.). While many man and women mentioned to take care of their animals together, both reported that women and children are more implied in daily caretaking responsibilities, especially watering, because they are more frequently around the compound (Interviews: man M, Bog.; man O, Bog.; woman Z, Bog.; woman A, Bous.; man R, K.B.; women A, T.; amongst others).

“Mais maintenant, à la saison de pluie, c'est là où je pense qu'il y a beaucoup des difficultés, parce-que souvent, nous les femmes, c'est à nous de faire sortir les animaux. Parce-que l'homme n'a pas de temps. Donc, c'est nous qui s'occupons des animaux, nous faisons sorties des animaux et nous les donnons à manger” (Interview: woman Z, Bog.).

Livestock care during the rainy season is even more difficult, because farmers are increasingly occupied in their crop fields. But at the same time it is also more important because animals need to be prohibited to graze in growing crop fields and destroy precious harvests. While some ox are selected for cultivation purposes, it is again children who are particularly implied in livestock care from May to August (FG men K.B.; Interviews: man M, Bog.; woman L, Bog.; woman Z, Bog.), and are supported by adults especially during the crucial harvest time (FG men Bous.). While in many households animals are confided to children for pasturing, in others they are kept at the compound, where they are fed and watered predominantly by women and children (FG women Bous.; FG men T.; FG women T.).

Regarding animals' alimentation, in addition to fresh greens and dried haulms, nowadays animals also receive salt and a certain supplement produced out of cotton seeds, the *Tourteau*. These additional dietary supplements are given to animals during the late dry and early rainy season and were reported to improve animals' strength and weight, as they allow them to eat and drink sufficiently. While these products are perceived as important to properly take part in and profit from market-oriented livestock



keeping, they need to be bought at the market and thus strain farmers' limited financial capacities. Therefore, their use depends on a household's financial situation (FG men T.; Interviews: man O, Bog.; man L, K.B.; woman A, K.B.; man J, T.; man S, T.). Payment responsibilities for animals' alimentation are, like care taking, generally shared among households' members, whereas men were noted to be particularly involved in paying fodder, especially for his or for commonly owned animals (FG men Bog.; Interviews: woman F, K.B.; man S, T.). Women who need to buy such dietary supplements for their own animals by themselves reported to face major difficulties and oftentimes only use fodder they can prepare by themselves, such as haulms and leaves from their crop fields (FG women Bog.).

Next to alimentation habits, animals' health care is also substantially influenced by the reported change in farmers' perception on livestock keeping. Animals' health situation is more precisely monitored by its owners and other caretakers in the respective household, and veterinarian services as well as pharmaceutical products are increasingly used in all research sites, especially during the last ten years. An important incentive that facilitated access to vaccinations and increased their prevalence, are annual vaccination campaigns in certain villages where small ruminants and cattle are vaccinated in bulk for lower costs. Next to these common vaccinations, there are a few veterinarians per district, provided by the government, who can be called to seek information or to assist in a health emergency. It has been stressed by men and women in all research villages alike that only men call the veterinarian and arrange for visits and vaccinations. It is also most of the times men who pay for veterinarian services, but it is subject to household-specific differences if men pay only for their own or for all animals in a household (Interviews: woman L, Bog.; man L, K.B.; man S, K.B.), or if women also pay for either their own (Interview: woman A, K.B.) or their husband's animals (Interview: woman A, T.). A woman in Bogoya mentioned that her husband pays for vaccinations for all animals in their household, his own, their common ones and hers, but this also means that she cannot prohibit him from using her animals if he is in need of an animal to sell (Interview: woman L, Bog.).

Besides vaccination campaigns, information distributing workshops or projects and enhanced access to veterinarian services via increased cell phone use, farmers themselves importantly contribute to the widespread positive perception and perceived

necessity of improved livestock health care, as they share informations about livestock keeping and counsel each other, reinforcing good practices and working habits:

“Entre eux, chaque fois ils se partagent les expériences. [...] Donc, à cause de ça [...] nous s'assurons que les animaux sont bien nourris, ils boivent bien. Si un animal est malade, nous cherchons pour trouver la solution, on peut appeler quelqu'un pour venir regarder, ou bien s'il faut lui donner médicaments ou lui vacciner, je le vaccine. Donc, à cause de tout ça, tous ces conseils qu'il gagne et aussi à cause de faite que aujourd'hui aujourd'hui l'Elevage est devenu une activité des profite pour eux. Donc, ça fait que si tu as des animaux, si tu les laisses mourir, si tu as un problème que tu devais résoudre avec un animal qu'il faut vendre, tu ne peux pas laisser va chez quelqu'un 'ah, donne-moi ton animal, je veux aller vendre pour résoudre mon problème'. Il va te dire 'mais tu as laissé tes animaux mourir, je ne veux pas t'aider'. [...] C'est à cause de ça, les conseils que je gagne des autres sont précieux. Et je travaille avec ces conseils à s'assure que vraiment les animaux sont bien entretiens” (Interview: man O, Bog.).

**In conclusion**, access to veterinarian services, vaccinations and improved alimentation result in enhanced livestock care, which is perceived positively as reducing animal sicknesses (FG women Bous.; Interviews: man O, Bog.; woman Z, Bog.; woman A, K.B.; amongst others). These practices counteract animal and thus financial losses, as animals are kept as a security, as valuable assets that complement agricultural crop production. Driven by a growing and profitable livestock market, livestock keeping and selling are increasingly important in local crop-livestock systems, being used to compensate bad harvests and allowing farmers to meet their needs and responsibilities, most importantly in relation to their households' alimentation, health and education. Still, access to and ownership possibilities of livestock are constructed very differently for men and women, as livestock keeping is commonly perceived as a male activity. While women frequently own animals by themselves or jointly with their husbands in all research sites, female animal ownership is forbidden in some households, or as some interview partners put it, in their “compounds”, which are perceived to be owned and controlled by the (male) household head. Generally, female animal ownership has been observed to be a very recent change, as women mentioned to be allowed by their husbands to own animals since about nine years in Koura-Bagre and only since about four years in Toeghin. But even if women are allowed to keep their own animals, they face specific financial constraints to buying and keeping them. Furthermore marketing of livestock is only practiced by men, which means that women need to pass through a male family member, usually their husband, to be able to buy animals or to sell them in order to receive needed cash. Also, livestock health care has been observed to be a male

domain, as it is usually men who communicate with the veterinarian and who take animals to vaccination sites.

Somehow contrary to male-associated and dominated livestock ownership, women, and also children are particularly implied in daily caring activities of their household's animals. While children are expected to pasture with animals during the rainy and early dry season, it is mostly women and children who water and feed animals at the compound during the late dry season and throughout the rainy season. Especially tasks related to watering, feeding and looking after animals on a daily basis were noted to have increased significantly in the course of enhanced livestock care and livestock health awareness.

“[A]vant les animaux mouraient. Mais maintenant, je pense que ça va. Parce-que quand les animaux mouraient, c'était parce-que il n'y avait pas de la connaissance. Les gens n'étaient pas aussi suffisamment informés sur l'Elevage. Maintenant, nous considérons les animaux comme les humains. Par exemple quand il y a un animal qui ne mange même pas du tout, tu constates que un animal ne broute pas, ou bien il est bizarre, tu peux aller appeler un vétérinaire, il va venir voir ce qu'il y a. [...] Actuellement, à coté Elevage, nous connaissons tous, nous connaissons tout ce qu'il faut porque les animaux sont en bonne santé. Mais c'est le moyen pour vraiment faire, qui est difficile souvent” (Interview: man A, Bog.).

Such informations on livestock keeping are received by veterinarians, by governmental institutions like INERA, the *Service de l'Elevage* or *Agents Techniques de l'Agriculture*, and by several NGOs, such as ADEFAD in Koura-Bagre, and their respective projects. Generally, men are much more implicated in such projects and information distributing meetings or workshops, while women are only partly and recently considered and incorporated, if they are at all. While such incentives can be influential, like ADEFAD's impact on livestock ownership possibilities by women in Koura-Bagre, it has to be acknowledged that there are multiple factors that interact to induce changes in societal perceptions. In the case of Koura-Bagre, such factors may include ecological insecurity, demographic pressure, intensified dependence on cash incomes, increasing market-orientation of farming, and economic considerations like facilitated access to a new and more profitable animal variety in the context of increasingly important livestock markets.

### 7.2.5 Access to input resources and services

Access to input resources such as information, credit and cash, improved seed varieties, fertilizer, pesticides and working tools, as well as to relative extension services is crucial for agricultural production in resource-constrained local crop-livestock systems. Especially in the context of changing environmental and economic situations, access to material and immaterial agricultural inputs is important for rural livelihoods of women, men and their households. “Nous savons que la pluie-, il ne pleut pas assez. Mais les nouvelles variétés nous permettent d’avoir un peu, avec les connaissances et les engrais nous gagnons toujours un peu” (Interview: woman L, Bog.).

Access to knowledge is considered as particularly important for agricultural work in today’s challenging environmental conditions. Informations on cultivation techniques are primarily passed on within a family from one generation to the next, as family members cultivate their fields together (Interviews: man O, Bog.; man L, K.B.; woman F, K.B.; man S, T.; amongst others), and also within a village community, by observing and sharing new informations and insights.

“[P]ar rapport à la moisson aussi, il y a la pluie mais il y a la connaissance de nos jours. Parce-que même si tu es commerçant aujourd’hui aujourd’hui, si tu n’as pas la connaissance, tu ne peux rien avoir. [...] De nos jours, on ne peut pas avoir de la connaissance sans avoir la connaissance de quelqu’un. Ça veut dire que, la connaissance ne vient pas comme ça. On gagne toujours. Même si tu vas peut-être regarder en façon de comment quelqu’un autre travaille, tu peux faire la différence entre sa manière de travail et toi ta manière. Que, en fonction de ça, tu peux comprendre ce qu’il faut, [...] tu dois savoir maintenant ce qu’il faut faire pour être comme cette personne si sa production est bonne. Donc c’est pour dire que, avec les autres comme on apprend” (Interview: man O, Bog.).

Next to learning from each other’s cultivation techniques village-internally, newly gained informations from workshops, meetings or other project initiatives, are shared by the respective participants with the wider village community (FG men K.B.; Interviews: man S, K.B.; woman O, K.B.). Such initiatives to distribute and reinforce knowledge by various institutions and organizations from outside a village were considered as valuable and desired by most interview partners and focus group participants. But in general, opinions ranged from trust in local cultivation practices without any desire to seek informations from outside, to the necessity of gaining improved knowledge, and the need for more workshops and trainings.

Also, opportunities and constraints in accessing information and technical services were perceived differently among village members. This is due to the selective nature of

participation in the respective information and training initiatives, whereas selection criteria include gender, age, social status, education and former project involvements. For example, in Koura-Bagre access to information and extension services was perceived as easy by most interviewees and focus group participants as they mentioned that many people in the village are interested in agriculture and many different *Agents techniques* come to work with them. Thus, information is generally available and accessible either directly or indirectly as usually only a small number of people per village is selected to participate in workshops or meetings who pass informations gained on to other community members (FG men K.B.).

”Donc, par rapport à l'accès aux informations, comme, ces qui s'intéressent à l'agriculture sont beaucoup. Donc, les gens viennent. Différents secteurs viennent. Que bétail vienne souvent, c'est pas pour toucher tout le monde. On peut enlever un certain groupe, on travaille avec eux pour les membres de groupement parlent de travail. De diffuser ça pour le reste de la population qu'on n'a pas pu toucher” (Interview: woman A, K.B.).

Still, considerable gender-differentiated participation in these information and training initiatives has been observed. Another woman in Koura-Bagre noted, that even though supportive institutions and organizations like the government-related *Agents techniques de l'Agriculture* operate in the village, they do not cooperate with women: “Que même si les Agents techniques de l'Agriculture arrivent ici, il vient s'entretenir avec mon mari mais pas avec les femmes” (Interview: woman F, K.B.). This increases women's access difficulties to informations, leaving the distribution subject to village- and household-intern power structures.

Additionally, Venn diagrams drawn by focus group participants showed that men are considerably better connected to institutions and organizations outside their village. While women frequently also mentioned ATA, INERA and local credit institutions like the *Caisse Populaire* as important partners for their agricultural work and rural life, other institutions like FNGN or the local *Mairie*, and more particularly NGOs have most often been mentioned by men, and veterinarians were exclusively referred to by men. The fact that men are connected to and cooperate with more extra-village institutions and organizations than women was also reflected in personal interviews. These also showed that even when men are not directly involved in cooperations and extension services themselves, they appeared to be considerably better informed about such partners from outside their village than women were.

Among the most important cooperation partners for access to information, the state-related ATA were mentioned particularly often by farmers in all villages, who stressed

the importance and value of their counsels (FG men K.B.; Interviews: man M, Bog.; woman L, Bog.; amongst others). ATA distributed important informations concerning issues such as the cultivation of smaller fields with higher productivity, RWM techniques (FG men K.B.; FG women K.B.; Interviews: man I, Bous.; woman C, T.), crop rotation to increase soil fertility particularly for old fields (Interviews: man M, Bog.; man R, K.B.), fertilizer use by mixing chemical and organic fertilizer (thus increasing efficiency and reducing the amount of chemical fertilizer that needs to be bought by farmers) (FG men K.B.), and use of pesticides on beans (FG men K.B.; Interview: man M, Bog.). While they were commonly said to be accessible to farmers in case of any questions about current cultivation problems, only interview partners in Boussouma reported that ATA do not frequent them anymore like they did some 40 years ago (Interviews: man I, Bous.; woman L, Bous.).

In addition to ATA, FNGN conducts similar trainings and information workshops. Issues addressed by them include RWM techniques (particularly the promotion and construction of stone bunds) (FG men Bous.; Interviews: man L, K.B.; woman A, K.B.), and gardening, as they introduced gardening techniques in Boussouma about 15 years ago and also took part in constructing a dam and related gardens together with local women's and men's groups (FG men Bous.; FG women Bous.).

Besides these counsels, both cooperation partners also frequently gave away new seed varieties, fertilizer and pesticides for testing (Interviews: man L, K.B.; man S, K.B.; woman A, Bous.). For example, ATA introduced a new variety of beans via field trials that grows faster than the former variety and can be harvested before millet (Interview: man A, Bog.; man M, Bog.), distributed corn seeds (Interview: man R, K.B.), and gave away a pump for pesticides application on beans (Interviews: man M, Bog.; man S, K.B.). Especially the new short-cycled bean variety was reported to have considerable impacts on local cultivation, nutrition and marketing practices, as it is well-liked (in contrast to the former bean variety) and has been increasingly integrated into local consumption habits. Therefore it can be sold profitably and is cultivated particularly to gain money to arrange various "problems", arising from financial dependencies (Interviews: man A, Bog.; man S, K.B.; woman O, K.B.; amongst others).

As all four research sites are villages that take part in CPWF-V2 project activities, they were all concerned by field trials conducted by the Burkinabe scientific and technological research institute INERA. In the course of these field trials, selected project participants, exclusively male village inhabitants, were given short-cycled seed

varieties of millet, sorghum and beans as well as fertilizer to test in their private fields, which are households' common fields (Interviews: man M, Bog.; man L, K.B.; man R, K.B., woman A, K.B.; man H, T.). While these field trials were conducted in the year 2012, several village members, both women and men, mentioned that they already received various seeds for testing by INERA during the last years (Interviews: man L, K.B.; man E, Bous.; woman L, Bous.).

Next to these three organizations, government-related institutions as well as various NGOs, operating at regional, national or international levels, were reported to play important roles in accessing information, trainings and material resources. In Bogoya, farmers received support in gardening by the NGO OCADES (Organisation catholique pour le développement et la solidarité), who distributed tomato and onion seeds as well as fertilizer on credit in the last six years. Additionally, they conducted information workshops and trainings on tree planting to counteract soil erosion for about eight years (Interview: man A, Bog.). In Koura-Bagre, the NGO *Burkina Vert* and the governmental institution *Service de l'Elevage* were noted as important cooperation partners. While the first one supported women in gardening by improving an existing well construction and donating onion seeds and fertilizer (Field notes 2013, K.B.; Interview: woman A, K.B.), the latter conducted agricultural trainings and gave away seeds of beans and millet, fertilizer, pesticides and pumps for their application (FG men K.B.). The *Service de l'Elevage* was also reported to have introduced the practice of producing livestock fodder from crop fields' haulms and leaves, which is now done for three years in the village (FG men K.B.). In Boussouma the African Development Bank's project P.D.R.D.P. was considered as most important besides ATA and FNGN. It promoted the RWM technique of stone bunds and also constructed 10 ha of gardens as well as an Alphabetisation centre in the village (FG men Bous.). In Toeghin it was ALVP that first introduced stone bunds in 1987 (Interviews: man J, T.; woman S, T.), while it also conducted trainings on compost fosses (Interview: man J, T.). Additionally, the district's *Mairie* in Komsilga was reported to have distributed information and trainings on compost fosses by contacting the village's household heads (Interviews: man H, T.; woman A, T.).

Looking at this presentation of cooperations that are perceived as having the biggest impact on local cultivation practices, it is obvious that men are involved more frequently and in greater scope in trainings and workshops. Therefore, it is men who profit directly and primarily from informations about techniques in cultivation, RWM,

fertilization and pest control, but also from distributions of material agricultural inputs. These new techniques and input resources are implemented and tested in households' common fields, which are usually cultivated by all household members and which are commonly, but not always, dedicated to the whole household's food provision. Even though all household members, men as well as women, can theoretically profit from an allocation of input resources and services in such a way, it has to be acknowledged that these large common fields are prioritized in regard to various input resources anyway. Furthermore they are exclusively owned by men, which means that men control eventual earnings from harvest sales, but women do not control decisions concerning the common fields' production or harvest use.

Other means of access to seeds include, first of all and most popularly used, re-sowing one's own seeds that have been collected and saved from last season's harvest (Interviews: man M, Bog.; man R, K.B.; man H, T.). Access to fertilizer, primarily organic, naturally depends on the amount of animals personally owned, and also on the knowledge and ability to produce compost. While common fields appeared to be prioritised in the distribution of a household's manure and compost, women's individual fields are fertilized with the remaining amount. One possibility to increase access to organic fertilizer for women's fields was mentioned by a member of a women's group in Koura-Bagre, who produces compost together with her co-members, which is distributed specifically on their individual fields (Interview: woman A, K.B.).

Furthermore, seeds, fertilizer and pesticides for crop as well as vegetable production can of course be purchased at markets, providing that the desired variety is available at the local market. Some interview partners mentioned that they prefer to purchase new and improved seed varieties and test them to see if they work on their respective fields.

“Souvent, quand nous allons sur la place de marché, nous achetons de semence pour venir et travailler avec. Si ça ne marche pas, si nous entendons parler d'une autre variété, qu'il soit être meilleur, qui est disponible sur le marché, nous partons acheter pour venir essayer” (Interview: woman F, K.B.).

It has also been mentioned, that new improved seed varieties, derived from field trials, can be purchased from other villagers who haven't been implicated in the trials (Interview: man A, Bog.). However, the ability to purchase agricultural input resources at the market always depends on personal financial capacities and strains farmers' limited budgets (Interviews: man L, K.B.; man E, Bous.; man J, T.; man S, T.; women A, T.; amongst others). This is especially problematic in times of insufficient rainfall,



when cereal prices are high and thus even more money needs to be spent on food provision.

Access to agricultural working tools is characterized by a similar situation. They have been reported to be “introduced” and sometimes also distributed selectively by various cooperation partners, frequently on credit (Interviews: man L, K.B.; man I, Bous.). But most of the time they need to be bought at local smiths or vendors (Interview: man O, Bog.). Whereas a hoe or *daba* was observed to be the most common and most essential working tool, owned by every household, ploughs are not as widespread despite their increasing importance for local cultivation in terms of productivity, time and energy input (Interviews: man M, Bog.; woman O, K.B.; man E, Bous.; amongst others). Even though their prevalence is continuously rising, ploughs still aren’t owned or used by all households, due to financial access constraints. But even if a household doesn’t own either a plough or an animal to draw it, which is an ox or a donkey respectively, some men mentioned to negotiate with friends to lend it to them (Interviews: man O, Bog.; man L, K.B.; man L, Bous.).

Generally, ploughs have been known in all research sites for several decades. In Boussouma they were said to have been introduced by missionaries more than 50 years ago (FG men Bous.). While it was stressed that, until about 10 years ago, ploughs were not as popular as they are today (FG men T.; FG women K.B.), the actual use of ploughs in personal fields of interview partners ranged between 40 (Interview: man S, T.) or 30 (Interviews: man E, Bous.; woman A, Bous.) to 15 years (Interviews: man I, Bous.; woman A, K.B.). While this refers to ploughs pulled by an ox, there are also other, smaller and lighter ploughs that are specifically pulled by donkeys. These were reported to be newer, known for about five (Interviews: man M, Bog.; man L, K.B.) or 15 years (Interview: man I, Bous.).

Regarding gender-differentiated access opportunities to ploughs, power structures inside households play significant roles. As ploughs have been observed to be commonly owned by men and usually even only by the household’s head, actual access is determined by individual negotiation power and by competition of multiple household members, as a household mostly only owns one or two ploughs for all cultivators and fields. Competition is therefore intensified by scarcity, by the number of potential users and fields, and also by time constraints as ploughing is only optimal during the first rainy days. In polygynous and in multi-generational households, access to a plough for

working in individual fields is especially difficult (Interviews: woman Z, Bog.; woman F, K.B.; woman A, T.) and women in Boussouma describe: “Nous négocions avec notre mari, pour nous donner le bœuf avec les enfants pour nous aider. Il y a des moments il accepte, il y a des moments il n'accepte pas” (FG women Bous.).

As these material input resources need to be bought at local markets if they cannot be produced sufficiently by oneself or are not received by a project, access to money is crucial. Generally, cash is acquired either via selling of livestock or of agricultural produce from gardens or crop fields, most notably beans, groundnuts and sesame, or via credit. Whereas credits can be used instead of selling agricultural products or livestock, it can also be used to support such sales activities. This happens insofar as improved livestock alimentation such as dietary supplements can be bought to increase livestock's market value, and crops can be sold at times of more favourable market prices instead of directly after the harvest, when prices are particularly low but money is crucially needed to pay for children's school fees and other acute financial dependencies. Furthermore credits could be used for buying instead of selling crops after the harvest, to stock and resell them at times of higher market prices to make profits.

“Parce-que au moment où ils font les récoltes, à la maison c'est difficile, il n'y a pas d'argent. Donc nous sommes peut-être intéressés de pouvoir acheter, déposer et vendre pour faire des profits. Si je pouvais m'entendre avec les banques, pour avoir du crédit, je peux faire ce travail aussi. Acheter à bas prix, stocker et après revendre pour faire du profit et rembourser notre argent contracté avec la banque. Mais [...] de ce côté c'est un peu difficile. Quand les trucs [champs] sont vieux, généralement je vends, je sais que je vends ça à bas prix, c'est pas le bon moment de vendre mais c'est ça aussi la difficulté. Nous sommes obligés de vendre souvent pour arranger certains problèmes” (Interview: man L, K.B.; comment by a.).

The most notable official credit institution in rural Burkinabe areas is the *Caisse Populaire*. Whereas it has multiple branches in cities, smaller towns and also villages throughout the country, it is only directly present in one research village, in Bogoya (FG men Bog.; FG women Bog.). Some farmers in Koura-Bagre mentioned to use a branch in the nearby village of Ziga (Interview: woman A, K.B.) and some farmers of Toeghin are attached to their closest *Caisse Populaire* in Saponé (FG women T.). Especially in the early days of this institution's outreach, many farmers opened accounts and profited from savings and credit opportunities. But in the last years, working with the *Caisse Populaire* proved to be difficult as conditions were tightened. Especially short and inflexible credit durations and high guaranties requirements were reported to prohibit

local farmers from obtaining credits (Interviews: man A, Bog.; man M, Bog.; man O, Bog.; man J, T.). Besides these difficulties, a woman also mentioned, that she is afraid of working with credits, as she considers her individual fields as too small to be able to repay a credit plus interests (Interview: woman L, Bog.). Still, there are several people who reported to use the *Caisse Populaire's* services, even if it is just to withdraw money from and add to one's private bank account, as it is the only official institution where local farmers can gain credits from (Interviews: man M, Bog.; woman S, Bog.; woman Z, Bog.; woman C, T.).

Alternatives to this institution are partly available, but not always accessible by everybody, as some require memberships in certain official groups. For example, a credit agreement by an official *groupement* at the *Banque agricole* was mentioned (Interview: man S, K.B.). Other credit opportunities are specifically dedicated to gardeners, like one by the NGO OCADES (Interview: man A, Bog.) and another one by FNGN (Interview: man I, Bous.). Women gardeners in Koura-Bagre also reported to have access to credit for gardening purposes by FNGN, whereas this is due to a specific connection established by a middle man who comes from their village (Interview: woman F, K.B.).

Facing these regulated and restricted credit opportunities, many interview partners expressed their view that accessing credits is difficult for them, even though they would want to use them (Interviews: man M, Bog.; man L, K.B.; man L, Bous., woman S, T.). If credits were obtained or bank services like personal accounts were used, both men and women were noted to do so, whereas women were noted to be confronted with more access and repaying difficulties due to their generally lower financial capacities, fewer animals and smaller fields. Another, contrary, gender-specific difference in credit access was expressed by some women (Interviews: woman L, Bog.; woman A, K.B.), who reported that women are generally perceived as more reliable than men in paying back credits, and that “les gens n'aiment pas donner les crédits aux hommes, parce-que souvent ils n'aiment pas respecter les termes” (Interview: woman A, K.B.).

As access to official credit structures is linked to several difficulties and constraints, families and intra-village social networks are essential for borrowing urgently needed cash. Commonly, grown-up children and those who receive some financial income donate money, food or animals to support their parents, particularly their mothers, most importantly but not exclusively in times of hardships (Interviews: man M, Bog.; woman L, Bog.; woman F, K.B.). Among a village community, money can be temporarily

borrowed from other villagers (Interview: woman L, Bog.) and also, more specifically, from co-members of a group. In all research villages many groups, male-only, mixed and often women-only, which are partly initiated for specific production purposes, have been noted to exist. One example is a group of Muslim women in a Toeghin neighbourhood, who's members help each other with temporarily high workloads and try to save money collectively (Interview: woman A, T.). Another notable example for a seemingly well-functioning, savings-generating and credit-providing network is the women's group *Wiz Menga*, "forcing oneself to get up and struggle", in Koura-Bagre. The group actually consists of three similar sub-groups, whereas each of them conducts weekly meetings where all of its members donate a certain, commonly agreed-on amount of money to their own common fund. Additionally, the women conduct various available jobs together (like helping each other out in their fields or gardens, constructing a compound's floor, or helping with the collection of stones for stone bunds construction) and add the respective earnings to their fund. If members are in need of money, they can obtain credits while respective interests also feed the collective fund, which is distributed equally among the group's members twice a year (Field notes 2013, K.B.; FG women K.B.; Interview: woman A, K.B.).

"Et *Wiz Menga*, ce que nous faisons tous les Mardis, les cotisations là. Là-bas on peut faire des prières. Même si tu en prends l'argent et tu veux venir pour rembourser, même si le taux qu'on dit de rembourser-, si tu rembourse le taux là, c'est encore pour toi. Mais là-bas [Caisse Populaire] tu dois payer un taux d'intérêt qui est pour la banque" (Interview: woman A, K.B.; comment by a.).

**In conclusion**, access to immaterial input resources such as information and training in agricultural production techniques is first of all acquired through one's parents, elder family-members and in exchange with other village members. Additionally, government-related institutions, technical agents and NGOs distribute information on new or revised cultivation techniques, on RWM, on production and use of fertilizer or livestock alimentation. Access to material input resources such as fertilizer, pesticides and seeds, mostly new improved ones with a shorter growing cycle adapted to shorter rainy seasons, can also be acquired through these village-external cooperation partners. But participation in such workshops or field trials is usually only possible for a smaller number of, mostly male, selected participants in a village. Next to gender, other selection criteria such as social status, age, education and former project involvements have been observed to significantly influence project participation.

Whereas crop seeds are generally derived from last season's harvest, organic fertilizer is acquired by one's animals, as their manure is either directly used or included in compost production. Because of a general prioritization of common fields in respect to the distribution of available input resources of a household, as well as constraints in livestock ownership, women face increased difficulties in accessing organic fertilizer for their individual fields.

Access to working tools like ploughs is insofar gender-differentiated as they are commonly owned by men and access for individual fields needs to be negotiated in competition with multiple household members.

Furthermore, needed cash to acquire input resources at the market is accessed via sales of livestock, gardening and crop production, and via credits. Determining factors include gender-specific access opportunities to animals and land as well as general access difficulties to credit services by institutions such as the *Caisse Populaire*. Other credit opportunities are restricted to gardeners or to members of certain groups, whereas village-intern women's groups have been observed to be of particular importance. They are frequently engaged in group-internal money-saving and credit-distribution activities, as well as in supporting its members in income generation, in sharing of workloads and also in accessing fertilizer.

#### **7.2.6 Processing and marketing**

While marketing agricultural produce, including livestock, is crucially important for women and men in local rural communities, certain gender-differentiated responsibilities and perceived capabilities contribute to different involvements in marketing activities. As local markets are growing and prices for agricultural products are rising, market structures are increasingly integrated in agricultural production habits. This integration affects the market the other way round too, of course.

“Avant, vraiment le prix n'était pas chère mais aujourd'hui les prix ont évolués sur le marché. Parce-que c'est lié à la famine. Et aussi parce-que il ne pleut pas assez. Quand il ne pleut pas assez, les gens aussi-, tous ces qui ont un peu de la production, ils veulent vendre pour acheter d'autre nourriture disponible. Ils veulent faire beaucoup des profits pour pouvoir avoir d'argent et être capable d'acheter d'autre nourriture” (Interview: woman A, K.B.).

Participation in buying and sales activities is increasingly perceived as necessary to sustain livelihoods in local smallholder crop-livestock systems. They are needed to

compensate insufficient crop harvests and to provide cash for multiplying financial dependencies and generally rising livelihood costs (Interview: woman L, Bous.).

While processing usually adds surplus to agricultural produce and is therefore considered as an important possibility to increase sales profits, participation in related tasks is significantly determined by social gender norms. Processing agricultural produce is generally associated with food production, and thus perceived as a woman's sphere of action. In this context, no male but most female interviewees mentioned to process one or another product into foodstuff for sale. Notably, women frequently do not use their own field's harvest, but rather prefer to purchase necessary ingredients. Some women explained that, in doing so, they can differentiate more easily between their earnings and expenditures, as they sell their own harvest separately (Interviews: woman L, Bog.; woman O, K.B.). Processed and sold foodstuff in research sites popularly include cooked beans, roasted groundnuts, *nyion* (snack containing millet and bean leaves), *samsa* (beignet containing beans flour), cakes (using imported wheat flour), galettes (usually containing millet flour), and drinks such as the hibiscus-juice *bissap*, the millet-drink *ZoomKum* (traditionally only prepared for special occasions, and only commercially sold in towns, with the exception of Bogoya (Field notes 2013)), and the sorghum beer *dolo*. Regarding the preparation of *dolo*, there are several persons involved in different processing steps. Women who cook *dolo*, the *dolotières*, commonly do not cultivate the whole amount of needed red sorghum by themselves, but rather buy pre-prepared red sorghum from local female farmers (Interviews: woman C, T.; woman S, T.). Usually, women sell their pre-prepared products and processed food themselves or with the help of their children either in their village, at the local village market or at a market in a close town (Field notes 2013; FG women Bog.; Interviews: woman Z, Bog.; woman C, T.; amongst others).

In contrast to these foodstuffs, meat has been observed to be only prepared and sold by men (Field notes 2013; Interview: man J, T.). The same applies to other animal products like hide, which is used for example in the construction of chairs, and to all live animals themselves as well. Additionally, local cafés or small shops have been observed to be exclusively run by men, whereas women are particularly involved in selling *dolo* at *cabarets*, specific venues for sale and consumption of this alcoholic beverage in villages (Field notes 2013). Thus, processing but also selling of food, animals and other items show specific gendered structures, implying different income opportunities for women and men.

In regard to selling harvests, garden products are particularly lucrative. It has been observed that both women and men usually sell vegetables, which are produced in their own gardens, themselves. In the case of a commonly owned and cultivated garden, selling responsibilities are negotiated among the cultivators, but generally, it is possible for both, men as well as women, to sell a common harvest (Interview: woman E, Bous.). These vegetables are then sold either directly at a local market or to middlemen, who are either traders from outside the village, region or even country, or other village inhabitants who do not have access to gardens themselves (FG women Bog.; Interviews: man M, Bog.; woman E, Bous.).

Concerning women's and men's involvement in selling crop fields' harvests, the differentiation between a household's fields and relative responsibilities play particularly important roles. As men are understood as household heads and land owners, they control the common fields' harvests that are usually primarily used for households' members' alimentation, but can also be sold to provide for various individual or common needs, including health care, education and investments in livestock farming. Harvests of individual fields are generally controlled by the respective owner, who is mostly a married woman but sometimes also a young man. These individual harvests, especially those of mothers, are most often also expected to contribute to the household's food provision, and most women noted that, even when they sell part of their personal harvest, they usually use their earnings for their families', in particular their children's needs, which include clothing, soap, health care and school fees. Crops that are specifically cultivated for sale are beans, groundnuts and sesame, while the latter was reported to be a newly introduced crop that is exclusively cultivated for sale and not consumed in the household at all (Interviews: man O, Bog.; woman Z, Bog.; man S, K.B.; woman A, K.B.; woman S, T.).

While garden products are usually sold right after harvesting, crops and livestock have been reported to be only sold in cases of acute financial demands. In turn, this also means that crops that are sold during the year are more expensive, as vendors try to get the best possible prices. "Une fois, quand les gens achètent et ils mettent dans les maisons, c'est pour chercher des profits. En ce moment ça devient plus chère que si c'est au moment où juste on vient de récolter" (FG men K.B.).

As has already been described, selling of livestock is perceived as particularly important and supportive by both women and men, but is exclusively undertaken by men. Rising livestock prices add to the importance of livestock ownership, as sales revenues are

much higher than in former years. Some men in Toeghin exemplified this fact with their observation that about ten years ago, they couldn't sell an animal to buy a motorbike, which is now possible (FG men T.). These rising livestock prices have been explained by some elder men to derive from social and economic changes in the country, as people generally buy and eat more meat, have more financial means than before and also because of a rapid population growth (Interviews: man L, K.B.; man S, T.).

**In conclusion**, processing of and therefore adding value to agricultural produce by generating foodstuff, including snacks, sweets and drinks, is exclusively conducted by women, whereas only men dispose animal products. It is also solely men who are involved in selling livestock, be it owned by themselves, by their wives or collectively by the household. In turn, selling of vegetables is conducted by the respective garden's owner and selling of a crop field's harvest is also undertaken by the person who was responsible for its cultivation. Common household fields and hence also their harvests fall into the male household head's sphere of responsibility. While they are usually primarily used for the household's alimentation, at least a significant part of women's individual harvests is also added to the household's food provision. Additionally, women's earnings from their crop sales are also frequently invested in their families, particularly in their children's daily needs but also in health and education issues.

## **8. Discussion**

The following chapter discusses the research results in relation to concepts and theories presented in chapter 4. It is structured according to the various elements of the Sustainable Livelihoods Framework, including local vulnerability contexts, access to and control over assets, and influences of structures and processes. It will conclude by discussing effects of changes and innovations on women's and men's livelihood strategies and outcomes, answering the third and last research question.

### **8.1 Gendered vulnerabilities**

Livelihoods of smallholders in local crop-livestock systems are importantly framed by their external environment. Natural, social and economic shocks, but also several trends



like rapid population growth, resource degradation and rising market prices, as well as various seasonal changes affect local farmers' livelihoods and the availability of essential assets, thus determining their vulnerability context.

In the Burkinabe Nakanbé basin such natural shocks mainly consist of draughts and their respective social and economic effects like food insecurity and high food prices. But due to their relatively low frequency, it is rather trends and seasonal changes that most significantly impact rural women's and men's daily lives, production and alimentation.

One important and frequently mentioned trend is the high and rapid population growth that increases land shortages, leading to smaller common and even more limited private crop fields. Another trend is the increasing scarcity of essential natural resources. Next to diminishing land resources, lack of rainwater due to variable rainfall patterns and generally shorter rainy seasons are exacerbating sinking harvest yields in crop fields and gardens, thus increasing food insecurity. In line with crop harvests, water scarcity also reduces the availability of livestock fodder produced on these crop fields, thus further straining limited financial resources of local smallholders. Furthermore, as animals are commonly sold to purchase food and other necessary items, low crop yields necessitate increased sale of livestock. This intensifies farmers' insecurity and vulnerability there are no other resources in the household to sell in case of additional financial demands.

Another notable trend that increases local vulnerability is the degradation of the scarce available land resources. This includes sinking soil fertility deriving of overexploitation by multiple generations.

Crucial economic trends consist of rising general livelihood costs and rising market prices. The former results from necessary financial investments in education, formal health care, additional livestock alimentation and health care, as well as additional purchased food for household alimentation needs as crop yields sink with degrading soils and shrinking lands while local population expands. Rising market prices for agricultural products and livestock affect local farmers insofar, as they enable higher revenues for agricultural produce, but also increase constraints in livestock farming as purchasing and caring for animals becomes more and more expensive.

In addition to these trends, certain seasonal changes also considerably affect local rural women's and men's vulnerability. For example, availability of natural resources like water depends on seasonal rainfall patterns producing access problems to water for productive (crop cultivation, gardening and livestock care) and for domestic use

especially at the end of the dry season. Particularly seasonal availability deficits of water for household consumption has disproportional effects on women in terms of increased time and energy input, as they are considered as responsible for water provision. Being determined by water availability, agricultural production is also subject to seasonality. As crop cultivation is only practiced in the rainy season and gardening during the dry season depends on access to a sufficient water source, farmers are limited to seasonal food production and hence seasonal food availability. This renders them vulnerable to seasonal changes in food prices that typically rise during the dry season to peak in the rainy season when availability is low and rural smallholders are in need of purchasing additional food.

While these trends and seasonal changes act as external determinants of a local vulnerability context, actual vulnerability also depends on a community's environmental, physical and economic exposition. Regarding the four research communities, their exposition is negatively influenced by their strong dependency on natural resources, particularly land and water, and by their intensified dependency on market dynamics, including seasonal price fluctuations as markets are increasingly incorporated into local crop-livestock farming practices to compensate lower harvests and higher livelihood costs.

In reaction to these dynamics, observed coping and adaption strategies of women and men in local rural communities include the integration of RWM structures, increased soil fertilization, the use of credits, the modification of food consumption habits, and the diversification of local livelihoods by relying more intensively on livestock farming and vegetable sales instead of primarily on crop farming. While women and men in all research sites acknowledged the increasing necessity of implementing RWM techniques and applying of organic as well as chemical fertilizer to increase soil fertility and harvest outcomes, they face specific obstacles such as access to enough organic fertilizer (acquired through livestock ownership), access to financial means to buy fertilizer at the market and access to related knowledge and training through village-external cooperation partners. Especially women are confronted with several difficulties in fertilizing and in implementing RWM structures in their personal fields, as these fields are sometimes considered as too small and the limited fertilizer available to the household is primarily concentrated on the common field. Furthermore, livestock ownership which is essential for accessing manure, is sometimes generally prohibited

for women. Even if it is not, women's possibilities to acquire and keep animals are particularly limited due to their low financial means, special responsibilities for their hearth-hold's livelihood sustainment, and small crop fields to acquire enough fodder.

The use of credits can be understood as another coping strategy, especially in the context of seasonality of production and market prices. Acutely needed cash to pay for health services, school fees, agricultural inputs or food can be acquired via credits instead of relying on sales of crops, vegetables or livestock. As these agricultural products may be unavailable or market prices may be unfavourable when money is needed, credits can be helpful to react to season-specific production possibilities, resource availability and price fluctuations. Yet, access to credit is frequently restricted due to problematic terms and conditions of official credit institutions, but also because of group membership or project participation requirements. Men and women are differently affected by these access difficulties, as men tend to own and control more physical property, which makes it at least slightly easier for them to provide required credit guaranties and to repay credits plus interests. On the other hand, women as well as men face difficulties in group membership and project participation, as both of them have been observed to focus either exclusively on women or men.

An important change that also seems to reduce several effects of aforementioned vulnerability aspects and to improve local coping capacities is the increased integration of beans in production and consumption habits. This new beans variety, which has been promoted and distributed by village-external cooperation partners, has a shorter growing cycle and thus a reduced probability of a failed growing season in times of generally shorter rainy seasons. Because of its shorter growing cycle it can be harvested earlier than other crops and thus enables earlier food as well as earlier cash availability, counteracting problematic seasonality. Also, because of these beans' widespread and frequent consumption they provide farmers with increased market revenues.

## **8.2 Gendered capabilities – gender dimensions of livelihood assets**

A person's capabilities, consisting of his or her livelihood assets or capitals, are utilised in coping with local vulnerability contexts. Adding to the aforementioned coping and adaption strategies, this chapter discusses essential aspects of intersected natural,

physical, human, financial and social capitals and the ways in which local women and men access and control them. A particular focus lies on implicated gender dimensions and potential effects on empowerment.

### **8.2.1 Access to & control over natural capital**

Due to rural smallholders' dependence on natural resources for their productive activities and general livelihoods, access to natural capital, particularly to water and land, is of crucial importance.

As provision of water for basic household consumption like drinking, cooking, body hygiene and washing, is considered as a woman's sphere of responsibility, access is primarily required by and most important for women. External aspects that shape local water availability and thus access possibilities are, first of all, rainwater patterns that determine seasonal changes in wells' water levels, and also village-specific water infrastructures, namely the number and location of functioning and of non-functioning wells. This infrastructure, the quality and quantity of existing wells, is in turn influenced by village members' and more particularly women's access to village-external agents like organizations and institutions that engage in building and improving local wells. Despite women's role in collecting and transporting water for domestic use, men have been observed to assert more control over respective water resources than women. They are more influentially involved in decision making at village-level, for example regarding the repairing of broken pumps as has been described for the village of Bogoya.

Access to water for productive use is crucially relevant for both, women and men. Whereas rainwater, which cannot be controlled by local smallholders, is used as the sole water input for crop production, rain-fed water surface areas like *barrages* or *bas-fonds*, but also open wells, are required to irrigate gardens. For gardening, access to physical capital like watering cans or motor pumps is necessary and can be acquired by men as well as women either through personal or collective purchase, or through donations by supportive organizations engaged in development cooperation. The availability itself of such water resources that are suitable for gardening in the dry season generally depends on environmental characteristics on the one hand, and on the other on the involvement and investment of village-external agents such as institutions or organizations who construct new or repair existing dams and wells, as rural smallholders usually do not have access to sufficient financial means to do so on their own. These water resources

themselves are considered as a common resource in the research villages, even though this is not always the case in other surrounding villages and towns. However, to be able to use available water for gardening, access to surrounding land is crucial. Access to these scarce and limited land resources is primarily related to male patrilineal inheritance rights, privileging men and rendering women's access to household-internal power and negotiation structures. These structures are in turn affected by a rather recent change in social organization, whereas married sons are given their own fields to cultivate independently with their new family. This has been noted to be of specific importance to women, who negotiate access to natural and also to productive assets only with their husband instead of with their wider family in-law.

If a garden is not owned by one's own family, financial capital is required to rent it. While this is generally possible for men as well as for women, it poses a particular access constraint to women, as they usually have less financial capacities than men. This is because they control harvests of smaller crop fields and own fewer livestock that can be sold to receive cash.

Another way of accessing scarce and precious, because highly profitable, garden land is subject to distribution by various organizations who construct these garden parcels. While they also, at least partly, consider traditional land ownership rights, men's and also women's membership in a local village-internal or regional group considerably facilitates access. Therefore, social capital compensates for a lack of natural capital, a dynamic that is especially important for women who otherwise face increased difficulties in accessing garden land that generates needed financial capital for them via profitable vegetable sales.

Whereas gardening is a rather new activity for farmers in local crop-livestock systems, conducted since about 15 years in research sites that have access to a suitable water source, crop farming still has to be considered as the most important activity as it produces food for farmers' household members. Gender-differentiated access possibilities to crop fields are due to customary male inheritance rights, which limit households to increasingly diminishing land resources and require women to pass through their husbands to receive land for food crops cultivation. Generally women do not control land access and related local decision making because of gender-differentiated responsibilities and power structures, but also because they are usually not *enfants du village* as they move to their husband's village at marriage, which is most

of the time different to their village of origin. This lack of power to and over essential productive natural resources is expected to hinder women's empowerment.

Especially permanent official land ownership rights for women are frequently considered to act empowering (The World Bank, 2009, p. 143) as "[w]omen with land rights are more likely to be active members of their communities, and, as a result, community institutions themselves are more likely to be responsive to women's needs" (The World Bank, 2009, p. 126). Still, official land rights are very rare for women and also for men in rural Burkinabe research sites. Formal land titles are only common for wealthy individuals from outside the village or for agro-business men, who officially purchase land at the local administrative unit, the *Mairie*. This depicts a new change in land access and was only noted in the area close to the national capital Ouagadougou, thus only affecting central Burkinabe research sites. In contrast to village community members, these land owners from outside the village seem to see greater necessity in acquiring official documents to secure their access to garden or crop land in a village to who's community they do not belong to and therefore cannot claim any traditional land access rights via inheritance.

As local available land is increasingly scarce from one generation to the next one, a problem that is exacerbated by high population pressure and also by the land purchases from community-outsiders, additional land needed for a household's food production can be borrowed from non-family members. This is particularly often practiced by married women who are in need of further fields to meet their responsibilities of providing alimentation for their hearth-hold or of contributing to their household's food availability, because their land resources received by their husband are limited. It can be argued that "[m]en landholders who have excess land are more willing to lease to women because women cannot claim permanent rights to land" (The World Bank, 2009, p. 143). While it has been stressed by local farmers that this temporary lending of cropland does not include any rents or compulsory financial rewards as the term "leasing" might suggest, women noted donating food as a voluntary sign of thankfulness. This possibility has been noted to be of great importance to local smallholders and is secured by social norms, as land owners generally "do not have the right to refuse an outsider the use of the land if they have valid reason" (Barry et al., 2005, p. 54). Despite positive effects of this practice like enabling farmers to meet their responsibilities and to provide enough food for their household members' sustenance, some notable negative effects have to be mentioned too. These are the insecurity of

access to these lands, as landholders can reclaim their lands when being in need of them, and the fact that these lent fields are not allowed to lie fallow for one or more seasons, a practice that would increase much needed soil fertility for generally overexploited land resources.

### **8.2.2 Access to & control over physical capital**

Contrary to frequent assumptions, it is not the farm size that acts as the key determinant of agricultural productivity, which is crucially needed by rural smallholders to meet their alimentation needs in times of difficult environmental and economic changes. “The key to their success is not the size of their land holding but their access to intensifying farm inputs and particularly to inorganic fertiliser” (Carr, 2013).

Farm input resources that determine agricultural productivity include most importantly organic as well as chemical fertilizer, improved seed varieties with a shorter growing cycle and agricultural tools such as ploughs. Women and men alike stressed that all of them are crucially important for their ability to gain crop harvests and therefore food from their fields that are increasingly smaller and less fertile, while rainfall is additionally decreasing, but the number of people who need to be fed with the same amount of land are rising. Difficulties in accessing these agricultural input resources are posed by gender-specific access constraints to financial capital for their purchase at local markets on the one hand, and to participation in local project initiatives and field trials, frequently conducted by institutions and organizations, on the other. Next to testing of seed varieties, chemical fertilizer and sometimes also pesticides, such projects sometimes also distribute agricultural tools such as ploughs but also carts used for water collection from wells. Regardless of actual gender-differentiated utilization of these donations (partly given away on credit), organizations and institutions tend to incorporate mainly male farmers with higher social status and former project involvements. Thus there is a tendency not only to generate general dependence on input donations, but more particularly to disproportionally favour the local rich and therefore to negatively reinforce local power hierarchies at the expense of the poor. Also due to social power structures, women are mostly not included in agricultural extension services, as those input resources are commonly distributed to male household heads who would apply them on their households’ common fields. Thus intra-household decision making and power structures are important determinants of actual access to these available input resources by individual household members,

especially if they want to access these input resources for application on their personal fields.

In the case of farming equipment, the use of a plough needs to be negotiated among household members, whereas the male household head generally owns and also controls both, the plough and the respective needed animal, which can be either an ox or a donkey. As cattle, and also donkeys, are considered as the most valuable and expensive animals, they appeared to be owned by men, who have easier access to sufficient financial capital for their purchase than women have. While this shows a considerable amount of dependence on the owner of these physical assets, gendered intra-household power relations act as enabling and also as constraining access to these tools. As gender as a social status is understood as evolving over a person's live cycle, being determined not only by age, but also by kinship relations and social statuses and therefore power positions are expected to differ significantly among various household members of the same gender. These can include for example a first wife, a third wife, a husband's brother's wife, a husband's mother and a second wife's younger sister. Here, the change in local social organization, as access to agricultural tools is negotiated mainly between a husband and his wife or wives (and additionally among some of the before mentioned possible household members), but not anymore between multiple members of an extended multi-generational family, allows for a more flexible distribution and access organization. Additionally, access to actual use of a plough is gender-differentiated, as ploughing is considered as a male task especially in the northern research sites. This renders women dependent not only on male capital owners but also on male labour force for ploughing their fields, and therefore acts as constraining agricultural productivity of women's individual fields. Subsequent disempowerment effects include limited control over productive decisions, limited autonomy in production, as well as increased workload and time input.

Generally, any distribution of available agricultural input resources in a household prioritizes the common field, which is usually owned and controlled by a male household head, but cultivated by all household members. Smaller individual fields receive inputs mainly through excess compost or manure from the household's livestock, and through purchase at the market by their respective field owner, who is most often a wife and sometimes an elder son or a younger brother of the household head.



As access to chemical fertilizer is difficult for most rural smallholders due to their financial constraints, livestock constitutes the most important source to access fertilizer. Animals act either directly as a source of accessing fertilizer, by producing manure and contributing to compost, or indirectly via transfer in financial capital. Livestock is considered as an important wealth resource that can be sold to buy agricultural inputs like fertilizer, but also to provide for various other needs, in particular health care and education. Even though women and children are importantly implicated into labour concerning value adding activities such as raising, feeding and watering animals, women face specific constraints to access livestock themselves. Because the physical environment of the compound is considered as a male household's property, he ultimately controls all activities by household members residing in his compound and can allow or prohibit them from owning physical capital, particularly livestock, in his home. Whereas personal livestock ownership by women has been observed to be a generally new phenomenon in the research villages, it is subject to household-specific differences relating to internal power structures.

Besides the basic possibility of owning livestock, financial capital is needed to buy animals and to provide for their alimentation and health care. This is in turn determined by a person's natural and physical capital, by access to a considerable size of land and to input resources to allow for sufficient agricultural productivity, as money derives from crop or vegetable sales and fodder typically derives from haulms collected from crop fields.

Another gender-specific constraint to livestock farming is that women depend on their husbands for buying and selling livestock, as marketing of animals as well as their products is an exclusively male domain.

In general, equal access to physical agricultural input resources is considered as dramatically increasing agricultural productivity of individual fields, thus contributing to higher food stocks and sales revenues for the whole household. More particularly, "increasing women's assets raises investments in education and girls' health" (International Food Policy Research Institute, 2000, p. 1), as financial capital, necessary to provide for all children's needs, is crucially limited in rural smallholder's households, thus contributing to selective investments based on children's gender but also on their age. These investments also depend on household-specific gendered responsibilities, putting payment pressure for education and health either exclusively on the male household head or the female hearth-hold head, or on both, whereas it has been

observed that women in the research sites at least significantly contribute to their dependents' welfare. A relative incentive that aimed at increasing education for girls was conducted by the association ADEFAD in Koura-Bagre. It promoted and initiated female livestock ownership to enable local women to pay for their daughters' school fees despite their various other financial payment pressures concerning their productive activities as well as their hearth-holds' welfare.

### **8.2.3 Access to & control over human capital**

Human capital, including education, information, knowledge, skills, health, physical capability and labour power, is also essential for agricultural productivity and thus to meet respective gender-differentiated responsibilities and needs in the local context of challenging environmental and economic changes. The necessary agricultural labour available to rural households is in turn influenced by the number of household members as well as by their respective human capital, including skill levels, health and the level of their individual empowerment such as their leadership potential (DFID, 1999; International Food Policy Research Institute, 2012).

A person's labour power and physical capability are subject to perceived gender-differentiation insofar as men frequently noted to think of women as being less strong than men and therefore some physically tedious agricultural tasks like drawing a plough or working with a machete are primarily devoted to men. Nevertheless, a person's physical strength needs to be considered as a primarily individual capacity, changing over a lifetime, differing among both gender groups and being importantly determined by a person's health.

Access to health care in case of sickness is constructed very differently for inhabitants of the four research sites, as Bogoya is the only village among them that has a rural health centre inside its village. Contrary, inhabitants of Boussouma particularly stressed their difficulties in reaching a healthcare centre as their village is isolated during some months of the rainy season. This is the time where sicknesses, especially malaria, are particularly prevalent. Actual personal access to health care further depends on the availability of necessary financial means, whereas payment responsibilities are subject to considerable household-differences. Whereas in most cases the male household head, husband and father, was reported to be responsible for his household members' welfare, there are also households in which the female hearth-hold head is actually responsible to pay for health bills of her dependents, primarily children. To be able to do so, livestock

was noted to be the most important resource as, nowadays, it can be sold easily at any time of the year to acquire cash and solve acute health problems. The importance of livestock ownership and control in this respect shows the relative disadvantage of women who do not own livestock, as they are hence either required to sell their food crops or to depend increasingly on their husbands' resources and decisions.

Another important aspect of human capital in this research's context is knowledge about daily agricultural activities in local crop-livestock systems, particularly on cultivation techniques and livestock care. This knowledge is primarily distributed via informal education, training and capacity-building at the respective family and wider community context. Beyond that, workshops and trainings conducted by village-external agents such as government-related institutions and NGOs provide further information, which is mostly related to intensification and diversification of local agricultural production. Access to these knowledge and skill improvement initiatives is structured by selective participation in respective meetings and workshops. Important participation criteria include gender, social status and former project involvements. Therefore, these initiatives can have a strong tendency to reinforce existing power structures and hierarchies by acting as empowering (mainly through leadership building, social networking, and possibly improved resource or credit access) primarily for already particularly empowered village inhabitants. Nevertheless, a notable change mainly in the last ten years consists of women's increased inclusion in these formerly male-only participation structures, as they seem to be more and more recognised by these institutions and organizations as important actors in cultivation and household staining food provision. An example for this shift has been mentioned by women in Boussouma, who received trainings in compost production some years after their fellow male villagers did. This training, like many others, was directed towards a village-internal social group, as these groups are frequently used by organizations as entry-points for information distribution among a village community. While further knowledge distribution is subject to village and household power structures, group membership importantly facilitates access to information. Thus this kind of social capital enables farmers, particularly women, to increase their power to immaterial input resources and services by drawing on their power with their group's co-members, and, in the course of this, supposedly also enjoying a growing power within their respective communities and households.

Access to formal education depends on the respective village infrastructure and on the financial means of the responsible care-taker, namely a parent, another co-residing family member or oneself. The latter particularly applies to adult women's education in alphabetization centres, which exist in Bogoya, Boussoma and Koura-Bagre. These centres allow grown-up women, who frequently have not been alphabetized as a child, to learn how to write, read and count in their local language Moòré. This is considered as particularly important as “[w]omen's education and status within the household contribute more than 50 percent to the reduction of child malnutrition” (International Food Policy Research Institute, 2000, p. 2). Furthermore, women's education is crucial for general poverty reduction (International Food Policy Research Institute, 2000) and has specific empowerment potentials as it increases their leadership capacities and enables them to better participate in marketing their agricultural produce. However, a significant connection between education and fertility has not been observed among the sample of interview partners in the research villages.

Relevant financial means to pay school fees are generally acquired through sales of agricultural products and livestock at the market. Therefore, access to livestock, to new crop seed varieties with a shorter growing cycle, preferably profitable beans, groundnuts or sesame, and to credit play crucial roles as school fees need to be paid before most crops are harvested and can be sold.

In general, “developing the skills base of members of rural communities – through training in literacy and numeracy, or financial and legal literacy – empowers rural women and men to take more informed decisions” (IFAD, 2012, p. 14). Whereas education, skills development and vocational trainings have several empowerment implications (Kabeer, 2012, p. 43f.), a non-linear relationship between human capital development and a wider economic empowerment, including income, productivity and time savings (The World Bank, 2009, p. 363), can be observed, as “[i]ncreased human capital is needed to achieve economic empowerment and, in turn, economic empowerment enables human capital development” (The World Bank, 2009, p. 362).

#### **8.2.4 Access to & control over financial capital**

As has been noted in the previous chapters, access to financial capital, including cash, savings, loans, credits and other inflows, is of especially crucial importance to buy and care for livestock, to pay for agricultural input resources, for additional natural

resources like gardens, for education and for general livelihood needs for oneself and one's respective dependants, which mostly consist of children and elderly family members.

Access to financial capital inflows can, first of all, be acquired through market sales of crops, vegetables and livestock. While this depends on the general local availability and gendered accessibility of markets (as livestock markets are currently not accessible to women), it is also determined by gender-differentiated access possibilities to livestock and to natural resources, in particular to fertile crop fields of a sufficient size and to gardens. A major access constraint to both types of land resources is their increasing scarcity in all research sites. This generally affects women as well as men, while women are in so far more vulnerable to this scarcity as their farm holdings, deriving from inherited land resources controlled by their husbands, are smaller anyway. Therefore, wives in polygynous and multi-generational households with few land possessions represent the most vulnerable social group with the highest access difficulties to crop land. This group can also be considered as most affected by scarce gardening land, as money for renting gardens derives from crop and livestock sales.

Another source of financial capital inflows is support by children. However, in this respect mothers were noted to receive more financial and physical, mostly consisting of food crops, support than fathers.

Furthermore, credits can be obtained at formal financial service institutions, organizations and village-internal groups. The most notable formal financial service institution available to inhabitants in research villages is the *Caisse Populaire*. While its credit and savings services are used by several women and men, access constraints for rural smallholders rose during the last years as conditions were unfavourably tightened and now include high guaranties requirements and short, inflexible credit durations. Specific gender-differentiated access constraints include the lack of physical capital to provide for compulsory guaranties, and also some women's fear of not being able to repay the credit including the respective interests, due to their small fields in which productivity they could invest.

Generally, financial services organizations can increase the productivity of existing savings and various financial inflows (DFID, 1999, p. 15). But investment of savings in other assets such as a field's productivity or livestock, which value can be considerably increased by alimentation and improved care, can be considered as even more profitable in livelihood contexts with high inflation, particularly with rising prices of agricultural

products and livestock. Another important consideration is the potentially disempowering effect of credit services as credit is also debt (The World Bank, 2009, p. 103f.). Withdrawing credits puts additional payment pressure on smallholders and increases their vulnerability to failed growing seasons or (temporarily) ineffective markets as their investment success and thus their repaying ability considerably depend on these external factors. However, if credit investments work and produce profitable outcomes, it can be assumed that the credit withdrawer is able to increase his or her power within the household and within the community, subsequently improving his or her social status and decision making influence.

Similar vulnerability and empowerment effects also apply to purpose-tied credits, mostly offered by NGOs for gardening. In this regard, collateral requirements sometimes represent an additional access constraint, when credits are only offered to members or a specific formal or informal group, for example a local association of gardeners.

Next to these formal financial service structures, an important way to save money and gain credit is the membership and engagement in a social group. Particularly women have been observed to be active members in certain village-internal groups with savings and credit structures. These social groups outside their household's social context allow women to assert increased control over their financial resources, to save money on a regular basis, thus accumulating it, and to obtain credits from their own group's common fund. Especially this self-controlled and self-organized support among women (thus creating a social environment in which at least some levels of gender-based power hierarchies can be deactivated) enables them to empower themselves (power with their social group) by increasing their leadership skills, improving their access to productive resources as well as their control over their income and other financial inflows. More particular, in relation to economic empowerment, women's enhanced access to financial services can support the promotion and diversification of their own economic activities, create and protect assets, as well as improve their access to markets "[b]y strengthening women's economic roles and enhancing respect for women's decision making, access to financial services may also increase women's own share of the benefits from greater household well-being" (The World Bank, 2009, p. 88).

### 8.2.5 Social capital

Especially in resource-constraint livelihood settings, social capital, the diverse “social resources upon which people draw in pursuit of their livelihood objectives” (DFID, 1999, p. 9), is of particular importance and can compensate a lack in other assets or capitals. As has been shown in the previous capital discussions, social capital is frequently transferred into importantly needed natural (community- and household-internal borrowing of crop land), physical (access to productive input resources), human (intra-community knowledge transfer, access to village-external information distribution and training initiatives) and financial capital (access to credits and financial support).

In this research’s context, social capital therefore includes networks, membership in formal or informal groups and organizations, safety nets, social relations and claims, mutual assistance, access to opportunities, as well as decision making ability.

Most generally, mutual trust and support among family and more particularly household and hearth-hold members are considered as essential for local smallholders’ livelihoods. These members, engaging in essential common production and consumption of available resources, act as safety nets for one another, whereas reciprocal claims are exerted not only, but most importantly in times of acute resource constraints.

Next to household-internal social capital, social networks and relations among a village community have proved to be specifically important for smallholders in all research sites. While financial support and access to information, to mutual learning as well as to natural capital can be acquired through general intra-community social relations, there is also a great number of formal or informal groups and associations in each village, which appeared to be mostly either male- or female-only. Especially women’s groups or associations, partly dedicated to specific purposes like gardening activities or financial services, have been observed to be of significant importance to enable women to meet their respective gender responsibilities and to provide for their own and their hearth-holds needs. An example for such a women’s group is *Wiz Menga* in Koura-Bagre, whose members engage in collective savings, credit distributions, collective economic activities for further income generation and facilitate women’s crucial access to organic fertilizer for their private fields, as the group produces compost.

As women usually live for less long in a community, being required to leave their village of origin at the time of marriage if it is different to their husbands’ village, building of social capital via membership in groups or associations is expected to be of

particular importance to them. But the “extent to which women enjoy important advantages obtained by membership in groups, such as economic gains from collective marketing, agroprocessing, or input supply” (The World Bank, 2009, p. 64), depends on respective gender relations, most importantly at the household level.

This participation of women small-scale farmers in collective action offers several economic benefits for them, as it facilitates overcoming barriers to engagements in markets (Baden, 2012). These benefits include improved access to information and informants, trainings and productive resources such as fertilizer and seeds, as village-external organizations and institutions frequently draw on existing local social organization and specifically address group members to distribute immaterial and material input resources. Therefore, group memberships particularly improve women’s access to various material input resources, but also to information about new technologies and improved cultivation techniques. This is especially important as knowledge is otherwise typically distributed by male village representatives or other male project participants among the village community, drawing on gender- and age-differentiated community power structures.

Another aspect of economically valuable information access acquired through social networks concerns informations about current market prices, which enable women and also men to increase their earnings from crop and livestock sales to traders coming to the village.

In addition to these economic benefits, women’s group membership and participation in collective action is considered to have various empowering effects. These may include increased internal and external social capital, solidarity among group members, improved organizational skills, experience in democratic decision making, leadership and speaking in public, as well as enhanced self-esteem and self-worth. These effects can in turn lead to a higher appreciation and recognition of women’s capabilities regarding economic activities but also decision making in extra-household institutions (Baden, 2012, p. 48ff.; The World Bank, 2009, pp. 63f., 126).

Therefore, collective action has the strong potential for improving livelihood opportunities for men and increasingly so for women in local rural communities as it attacks root causes for poverty in resource-constraint agricultural systems by improving farmers’ access and control over resources and relative decision making processes.



### **8.3 Influences of structures & processes on women and men**

Whereas political structures including laws, regulations and various institutions, are acknowledged to exert influence on local smallholders' lives (particularly in terms of land ownership regulations that allow village-external people and companies to purchase valuable land in rural areas), this chapter selectively focuses on institutions and organizations that influence local livelihoods with their respective initiatives, and on market structures and processes that increasingly affect and modify rural livelihood strategies.

Generally, processes that define the ways in which available structures operate, influence people's choices and livelihood strategies insofar as they provide stimulating incentives, grant or deny access to assets, and enable people to transform their available assets into others. In doing so they do not only connect local to regional and wider international structures, but also strongly influence inter-personal relationships at the local level (DFID, 1999, p. 21).

A number of governmental organisations and institutions as well as regional, national and international NGOs have been mentioned to be actively involved in the supportive provision of physical and human capital in the research villages. Their respective information and training initiatives, workshops and field trials deal with various issues mostly related to agricultural intensification and income diversification. While these include RWM, fertilization techniques, pesticides use, compost production and gardening, agricultural input resources like short-cycled seed varieties, agricultural tools or credits are frequently distributed among selected participants in a village. As participation structures generally favour men and only some few projects are exclusively directed towards women, access to distributed material and immaterial assets is strongly gender-differentiated. Furthermore local power structures in households and communities are mostly reinforced by applying participation criteria such as gender, age, social status and former project involvements. Especially persons with a high social status and frequent project involvements can be assumed to be comparatively better off to control a larger amount of livestock and other physical assets and to have access to considerable social capital. However, the same does not apply to human capital, in particular formal education. Therefore, effects of such project initiatives need to be questioned as they potentially provide profit for already

comparatively better empowered individuals to exclude poorer and most vulnerable social groups in a community.

The CPWF-V2 project's field trials can be seen as an example for such an initiative that tends to reinforce and support local social hierarchies, as project participation centred on households, using solely male household-heads as contact persons. Thus it was only male household heads who received seeds, fertilizer and pesticides to test them in their fields. This practice privileges the household head in terms of access to and control over productive resources over other productively active household members, particularly women, who also have multiple productive roles and responsibilities. Furthermore, it supports his position as decision-maker about agricultural production.

An example for a project that rather questions and challenges existing local power structures and unequal gender-differentiated power to assets is a project incentive by the organization ADEFAD in Koura-Bagre. It successfully introduced sheep ownership by women and shaped local practices and believes as women were formally not allowed to personally own livestock in this village. Influential incentives that contributed to this change include human capital building workshops and physical capital donations. Owning and raising livestock provides women with control over a productive resource that can be transferred into financial capital via sales. On the one side this can improve women's empowerment in multiple dimensions, such as facilitated provision of basic needs, access to financial capital and increased participation in decisions, for example on their children's education. On the other side, however, women are dependent on their husbands to be able to sell their livestock as they cannot access livestock markets themselves. And furthermore, livestock ownership implies care and alimentation responsibilities that can also put increasing financial pressure on women who raise livestock.

Generally, organizations and institutions operating in research villages in various ways often proved not to provide sufficient accountability and transparency to villagers, rendering them insecure about the availability and dimension of future cooperation and support. This increases local farmers' dependency on village-external support as it possibly prevents them from seeking other solutions to problems.

Market structures and processes also assert significant and increasing influence on local crop-livestock farmers, as they are more and more used to sustain and support changing rural livelihoods. Markets are particularly important to transform physical into financial

capital to be able to pay for increasing livelihood costs, for education, health care and various input resources for cultivation and livestock keeping.

Positive effects include the enabling of necessary agricultural intensification and of a diversification of livelihood strategies, as cultivation in crop fields is supplemented by gardening, livestock selling and trading. But the rising incorporation of market activities such as selling, buying and re-selling agricultural produce, including livestock, into rural smallholders' livelihood strategies has also negative effects like vulnerability increasing dependencies on local markets' functioning and on price fluctuations. These in turn are affected by seasonal resource availability and by environmental shocks such as rain deficits and draughts.

Access to markets is generally determined by their local availability and by the respective infrastructure to reach to markets, but also by social gender norms due to which women are excluded from livestock markets. This selective exclusion secures men's control over animals possessed in his household and negatively affects women by limiting their control over their animals as their productive resource and over possible earnings from their sales.

As another effect of the "intrusion" of commodity, labour and land markets on women's and men's livelihoods in shifting cultivation systems, Ester Boserup (see chapter 4.3) assumed the erosion of separate economic spheres of operation for women and for men (Bryceson, 1995, p. 5). This has not been observed in the research sites. Even though gender-differentiated spheres of responsibilities and action are shifting, due to market but also project-related incentives, woman and men seem to be at least partly considered as responsible for different tasks. And contrary to the assumption that only men would increasingly take over lucrative activities implying market-induced profits, women are also either still or recently engaged in such activities. While one notable example is the still female dominated cultivation of profitable groundnuts, another one is livestock farming, which was until in recent years an exclusively male domain, but now, with important impetus by village-external organizations, women have engaged at least partly in this increasingly profitable activity.

#### **8.4 Effects of innovations on livelihood strategies & outcomes of women, men & households**

Various changes and innovations affect livelihood strategies and outcomes of women and men in local rural crop-livestock systems. Innovations are herein understood as the diffusion and adoption (Deji, 2011, p. 325) of new technologies in relation to RWM and agricultural activities. These innovations, their included actors, decision makers, beneficiaries as well as various gender-differentiated effects will be summarised and discussed in this chapter.

An important environmental change, particularly observed during the last ten years, is the increasing variability of rainfall patterns that negatively affect water availability and thus harvest outcomes of crop fields and gardens. This problem is compounded by a rapid population growth that contributes to smaller inherited fields for every new generation. Both changes result in the rising necessity to apply organic as well as chemical fertilizer. Still, acquiring both, enough manure and sufficient financial means to purchase chemical fertilizer, pose considerable difficulties for women as well as men. But women have been observed to face specific difficulties due to their constraints in natural capital access and in livestock ownership and control. Furthermore, men receive more fertilizer donations by organizations and institutions as well as earlier and more informations and trainings regarding fertilizer use and compost construction than women. It is also exclusively men who construct compost fosses, while women and children are predominantly implicated in producing compost. This compost, but also other available fertilizer, is first of all applied on the household's common field, controlled by the male household head. While this common field is usually primarily used for the whole household's food provision, only its owner controls harvest sales. Thus, other household members, particularly women, rely on additional fertilizer. This can be manure from their own animals or self-purchased fertilizer. Therefore, they face intensified difficulties in accessing enough fertilizer to sustain and boost their private fields' yields, needed to meet their various social and economic responsibilities in the context of scarce degrading land resources.

Next to fertilizer, RWM structures are also increasingly perceived as necessary to improve harvest outcomes of crop fields that provide for a household's alimentation and for income via crop sales. Informations and trainings are mostly received through village-external technical agents of various government-related institutions and NGOs

that have distributed and reinforced RWM knowledge during the last years and decades. These initiatives again mainly incorporate men as recipients of information, skill-trainings and other support, which probably contributes to the perception of several activities relating to RWM such as the digging of *zai* or half-moons as being male-dominated. Contrary, the construction of stone bunds does imply considerable female labour as collecting and transporting stones has been observed as frequently conducted by women, if it is not done in the course of supportive projects. Generally, the construction of RWM techniques must be considered as time consuming, which limits their application on the driest and most unfertile fields, which are in greatest need of them. Furthermore selective RWM implementation has also been observed to prioritize larger fields and the ones that are considered as most important for the household's alimentation and basic needs. Therefore, RWM is more frequently implemented on a male household head's common field than on individual household member's smaller private fields. Taking into consideration that weeding with a *daba* is predominantly conducted by women, and that the utilization of ploughs for weeding is less easy in fields with *zai* or half-moons, women's time and labour input can be understood as particularly affected by the widespread implementation of RWM structures.

Another innovation aiming at reducing farmers' vulnerability to changing rainfall patterns is the use of seed varieties with a shorter growing cycle. These enable farmers to gain more crop harvest even in years with shorter rainy seasons and to harvest crops earlier, which is specifically important for a household's alimentation and for paying children's school fees. As these improved new seeds can be acquired by purchase at a local market or by participation in field trials organized by institutions or NGOs, access requires considerable financial and/or social capital, and thus several gender-differentiated constraints.

To further increase harvest outcomes and to facilitate cultivation ploughs are more and more utilized. While this tool and its cultivation technique have been observed to be already widely adopted in the Central Burkinabe research sites, it represents a rather recent innovation in the northern research villages. A significant change in access and utilization opportunities of a plough presents the emergence of a new smaller and lighter plough pulled by donkeys. This is primarily positively perceived by members of poorer household that do not have the financial capacity to buy and keep more expensive cattle. A generally declining female participation in agricultural labour due to increased utilization of ploughs instead of hoes, as suggested as a general trend by Ester Boserup

in the 1970s (Bryceson, 1995, p. 4f.), has not been observed. Especially in regard to central Burkinabe research sites this tendency cannot be confirmed at all, as women, wives as well as daughters, also plough common and private fields with donkeys as well as with cattle. Therefore, they decrease their dependence on male labour for their personal fields and gain a certain amount of autonomy in production, an indicator of empowerment in the WEAI. But still, they have not been observed to control the necessary productive resources, ploughs and animals, themselves, as they are still owned and controlled by men and use needs to be negotiated.

This male domination of agricultural labour due to increased plough utilization can, however, be partly observed in northern Burkinabe research villages as only men cultivate with ploughs and women indeed do not take part in the field's ploughing (so far). On the one hand, this may have subsequent effects on women's participation in other cultivation and livestock keeping tasks, increasing their time and energy use and possibly enhancing their decision making power. On the other hand, this can empower women insofar as it can increase their scarce leisure time and/or enable them to devote more energy and time in profitable processing activities (thus directly increasing their personal income), in their own education (increasing their human capital), in enhanced child care, or in social networking (with various positive effects on leadership qualities, mutual support networks, self-esteem and income generation).

In addition to ploughs, the use of tractors can also facilitate and speed up cultivation tasks. But in contrast to ploughs, tractors are only accessible to and used by few farmers because of insufficient financial means to rent them. In order to be able to rent a tractor, which was only mentioned by one man, social capital appeared to be particularly important.

As the increased utilization of ploughs for field preparation and weeding generally enables farmers to devote more time and energy to other livelihood activities, this change determines other changes in livelihood strategies, most notably their diversification by engaging in gardening, intensified livestock keeping and marketing.

Gardening on fields surrounding *barrages* and other water sources in the dry season, but also on hill-side crop fields in the rainy season presents a rather new activity in all research sites. Its popularity has particularly increased during the last 15 years, since gardening techniques are more and more distributed by various institutions and organizations. Access to such informations and trainings, as well as to limited gardens around scarce local water resources, can be obtained by men as well as women, whereas

social capital in the form of membership in local groups or associations significantly facilitates access. Garden land itself can be acquired either through male inheritance rights (implying gender-differentiated difficulties in accessing and controlling natural resources), through project-controlled distribution patterns (implying the relevance of social capital), or by renting (implying gender-differentiated difficulties in accessing and controlling financial capital). Generally, access constraints to gardens are worsened by a high population growth and subsequently increased competition. This competition is further increased by the reduced out-migration of young men, who prefer these new and improved local marketing and income possibilities provided by gardening to wage labour outside their village or even country.

Despite these access difficulties, gardening appeared to be perceived positively as it enables farmers to gain much-needed additional cash in the agricultural off-season that is otherwise mainly dedicated to livestock care and cultural activities. Still, it has to be acknowledged, that negative effects of increased gardening and irrigation use can include increasing workloads for local crop-livestock farmers. This can be especially the case for women, as gardening activities might not be conducted instead but be added to their social and economic responsibilities in crop cultivation in the common as well as their private fields and in livestock care.

Another important change lies in farmers' perception on livestock keeping. Particularly in recent years local farmers perceive intensified livestock care as important and necessary. This is due to influential incentives such as high profitability of livestock selling because of rising animal prices and facilitated selling because of generally increased meat consumption by a higher population. Various effects on activities and habits in livestock farming include enhanced alimentation with fodder from crop fields' haulms and leaves as well as with additional purchased dietary supplements. Another effect is the provision of livestock health care, whereas veterinarian services are increasingly used and regular vaccinations seem to be conducted especially during the last four to ten years. While these changes increase livestock owners' income from sales, they also imply considerable access constraints to livestock keeping as more financial investments are required for animals' purchase and care.

Another gender-differentiated effect of this perception change on local farmers' livelihoods is the additional workload for women, who are predominantly implied in livestock's daily alimentation, watering and caring activities. This has been explained with the argument that women are more often "at the compound" than men are, due to

their gender-specific responsibilities for food provision and other household tasks. Furthermore, women face specific constraints in providing required health care for their animals as access to livestock health services, which seem to be considered as men's responsibility, is denied to women. Therefore, they are dependent on their husbands and vulnerable to intra-household power dynamics about access to veterinarian services and vaccinations for their livestock.

Another change in relation to livestock keeping is the decreasing availability of land for pasture, which has been observed by farmers in the northern research villages in the last ten years. This also adds to women's daily tasks as livestock increasingly needs to be kept around the compound, being taken care of by women as well as by children.

Another major change in local women's and men's livelihoods has been described by the increased incorporation of markets and related selling, buying and reselling activities. While rising prices for various agricultural products and livestock, particularly in the last 10 to 20 years, and the general necessity to engage in marketing activities because of rising livelihood prices and additional payment pressures (particularly for education, health care, additional food purchase and livestock care) act as important incentives, women and men are differentially affected in positive as well as negative ways. These include enhanced possibilities of acquiring financial capital for owners of physical assets as well as increased dependence on seasonal market dynamics.

Whereas gender-specific positive as well as negative effects of these changes have been stressed, generally, "the combined effects of increased assets, market access, reduced vulnerability, and improved information and organization can initiate an upward spiral of economic gain and empowerment for poor women as well as their families" (The World Bank, 2009, p. 103).

Environmental and economic changes as well as their induced changes in livelihood strategies and requirements may have contributed to an observed change in local social organization, as larger multigenerational *cours* tend to separate into largely independent compounds with smaller households. This enables more individual decision making on life and work organization and has been perceived as positive particularly by women who mentioned to enjoy improved access to agricultural tools and profit from a more flexible intra-household negotiation and allocation of tasks.



## **9. Methodological reflections**

The methods used to acquire the data presented and discussed in this thesis, must be considered as having various limitations that affect the research findings.

Most importantly, such limitations include language barriers between a French speaking researcher and mostly exclusively Mòorè speaking village inhabitants. Another difficulty particularly in conducting participatory methods like village mapping, seasonal calendar construction and Venn diagram drawing was posed by these methods' literacy requirements. This stood in contrast to many male and female focus group participants' illiteracy, uncommon usage of maps or the general unfamiliarity of using a pen. These situations required the spontaneous modification of the planned methods whereas solutions included the drawing of village maps without labelling local resources or the construction of seasonal calendars by partly using signs on which the focus group members agreed on. Another solution to this problem was that either my research partner or I wrote down informations given to us by focus group participants during the discussions. This implies another level of problematic restructuring and thus modifying of acquired informations.

Furthermore, even though these methods applied in focus groups were considered as being part of participatory appraisal techniques, the literacy requirements as well as the structuring of informations in the shape of calendars and diagrams appeared to be derived rather from Western concepts that are different from local ways of displaying informations.

Another limitation includes the short length of my research stay in the respective villages that limited insight into local communities' habits, activities, interactions and power structures. Additionally, the number of interviews that were conducted in the frame of this diploma research was naturally limited. Due to this a variety of persons in more diverging social and economic situations could not be touched.

While I am grateful for the support of village-internal contact persons, who were involved in CPWF's project initiatives, this also created a certain amount of dependence and asserted influence on acquired data, particularly in relation to the selection of focus group participants.

## **10. Conclusion**

Gender dynamics in rural crop-livestock systems in the Burkinabe Nakanbé basin are shaped by various gender-differentiated roles and responsibilities as well as by multiple interdependent changes in resource access, livelihood opportunities, and strategies.

As natural resources, in particular land and water, provide an essential basis for agricultural activities on which rural women and men rely for their own and their households' livelihoods sustainment, local farmers are particularly vulnerable to changes in rainfall patterns and to increasing land scarcity. Rainwater management structures are thus of crucial and growing importance to gain sufficient harvest outcomes in male-inherited crop fields that feed household members and provide necessary financial income for education, health care, livestock, agricultural inputs, and additional food purchases. Various rainwater management techniques are applied to households' common fields and, to a lesser degree, to individual household members', mostly wives', personal fields. Responsibilities related to these primarily gender-differentiated fields include, first of all, the provision of food for all household members, whereas common fields, cultivated by all household members, are usually controlled by a male household head and personal fields, cultivated by individuals and respective hearth-hold dependents, also cater to the respective cultivators' needs. Generally, the larger common fields are prioritized with respect to labour input as well as technical and nutrient inputs.

Roles in cultivation and livestock keeping are distributed differently according to household members' gender and age. Working with a plough, which has been increasingly practised especially during the last ten years and reduces energy and time investments, is perceived as a male task. In contrast to northern research villages, women in Central Burkinabe research sites also frequently worked with ploughs drawn by cattle or donkeys, by themselves. While applying pesticides to crop fields is exclusively practised by men, other field tasks such as sowing, fertilizing, and weeding with a hoe are particularly often conducted by women. Furthermore, constructing rainwater management structures and harvesting were observed to contain several partly gender-differentiated tasks.

Growing vegetables in gardens around a suitable water source represents a rather new additional agricultural activity that has been increasingly practised in the last 15 years and generates comparatively high revenues for farmers during the dry season, the

agricultural off-season. Gardening is conducted by women as well as men, whereas access possibilities to scarce gardens appeared to favour men due to inheritance rights, their higher financial means, and better connection to village-external institutions and NGOs.

Access to related agricultural input resources such as organic and chemical fertilizer, improved seed varieties adapted to a shorter rainy season, and agricultural tools is acquired through market purchase or through development-oriented cooperations. Thus, the financial and social capital, which is determined by access constraints to land and livestock that disfavour women as well as by local social power structures, is crucial in order to obtain necessary input resources that allow women and men to increase their harvest outputs and meet their various responsibilities and needs.

Livestock is perceived as a very important additional security, especially in times of environmental insecurity deriving from rainfall variability and increasingly scarce natural resources. Currently, the value of livestock increases due to rising market prices and social changes such as high population growth and rising meat consumption. Therefore, caring activities such as alimentation and health care are more intensely practised in order to generate higher profits from market sales, which are exclusively conducted by men. Increased care particularly affects women's time and energy as they are primarily responsible for daily watering and feeding at the compound. Furthermore, rising care requires increasing financial investments in livestock farming and therefore leads to worse access possibilities to buying and keeping animals for poor farmers and in particular for women, if they are allowed to own livestock in their households.

These findings indicate that changes in a community's environmental, social, and economic vulnerability context as well as innovations in rainwater management and agriculture dynamically affect the livelihoods of women and men differently according to their age, social status, connection to social networks, and access possibilities to natural and physical assets. While men as well as women fulfil gender-specific roles and responsibilities in local crop-livestock systems with specific difficulties and different most-straining seasons, both provide relevant and necessary labour for their households' livelihoods. Therefore, their specific gender needs have to be recognised and better addressed by various cooperation partners in agricultural improvement initiatives. Including men as well as women into decision-making structures at all levels and considering and treating them as equal communication partners with experience in and expertise on life in resource-scarce settings can improve the effectiveness of various

initiatives on sustainable local wellbeing, reducing potential gender-specific disempowering effects. Generally, access to extension services (including input resources, information, and credit) and to markets, control over physical capital as well as membership in local social groups bear the most important empowerment potentials for local farmers, particularly for women.

## 11. References

- Adank, M., van Koppen, B., & Smits, S. (2012): Guidelines for Planning and Providing Multiple-Use Water Services. <http://www.musgroup.net> [last access 15.01.2014].
- Adato, M., & Meinzen-Dick, R. (2002): Assessing the Impact of Agricultural Research on Poverty using the Sustainable Livelihoods Framework. Washington, D.C. International Food Policy Research Institute. FCND Discussion Paper 128.
- AfDB & OECD & UNEP & UNECA (2012): African Economic Outlook 2012: Burkina Faso. [www.africaneconomicoutlook.org](http://www.africaneconomicoutlook.org) [last access 15.01.2014].
- Alderman, H., Hoddinott, J., Haddad, L., & Udry, C. (1995): Gender Differentials in Farm Productivity: Implications for Household Efficiency and Agricultural Policy. Washington, D.C.: International Food Policy Research Institute.
- Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A. R., Seymour, G., & Vaz, A. (2012): The Women's Empowerment in Agriculture Index. International Food Policy Research Institute. Discussion Paper 01240.
- Alsop, R., Bertelsen, M., & Holland, J. (2006): Empowerment in Practice. From Analysis to Implementation. Washington, DC: The World Bank.
- Amankwah, K., Klerkx, L., Oosting, S. J., Sakyi-Dawson, O., van der Zijpp, A. J., & Millar, D. (2012): Diagnosing constraints to market participation of small ruminant producers in northern Ghana: An innovation systems analysis. In: NJAS - Wageningen Journal of Life Sciences.
- Amerasinghe, P., & Van Koppen, B. (n.d.): Women's Access to Multiple-use Water Services (MUS): An Agenda for African and South Asian Countries. <http://www.apaari.org/events/activities-completed/gcwa.html> [last access 15.01.2014].
- Andah, W. E. I., & Gichuki, F. (2005): Volta River Basin Profile: Enhancing Agricultural Water Productivity Through Strategic Research. Colombo, Sri Lanka: CGIAR Challenge Program on Water and Food.
- Ayantunde, A. (2010): Project V2 profile: Integrated Management of rainwater for crop-livestock agroecosystems / Gestion intégrée des eaux pluviales pour les agro-écosystèmes agro-pastoraux. The Volta Basin Development Challenge.
- Baden, S. (2012): Women's Collective Action: Unlocking the Potential of Agricultural Markets. Oxfam International.
- Barry, B., Obuobie, E., Andreini, M., Andah, W., & Pluquet, M. (2005): The Volta River Basin: Comprehensive Assessment of Water Management in Agriculture. International Water Management Institute.
- Beuchelt, T. D., & Badstue, L. (2013): Gender, nutrition- and climate-smart food production: Opportunities and trade-offs. In: Food Security, 5, 705-721.
- Bezner Kerr, R. (2008): Gender and Agrarian Inequality at the Local Scale. In: S. Snapp & B. Pound (Eds.): Agricultural Systems: Agroecology and Rural Innovation for Development. Amsterdam [a.o.]: Elsevier.

- Bohle, H.-G. (2001): Neue Ansätze der geographischen Risikoforschung: Ein Analyserahmen zur Bestimmung nachhaltiger Lebenssicherung von Armutsgruppen. In: *Die Erde*, 132, 119-140.
- Bohle, H.-G., & Glade, T. (2007): Vulnerabilitätskonzepte in Sozial- und Naturwissenschaften. In: C. Felgentreff & T. Glade (Eds.): *Naturrisiken und Sozialkatastrophen*. München: Spektrum.
- Boris, E. (2007): *Gender after Africa!* In: C. M. Cole, T. Manuh, & S. F. Miescher (Eds.): *Africa After Gender?* Bloomington: Indiana University Press.
- Bryceson, D. F. (1995): African Women Hoe Cultivators: Speculative Origins and Current Enigmas. In: D. F. Bryceson (Ed.): *Women Wielding the Hoe. Lessons from Rural Africa for Feminist Theory and Development Practice*. Oxford/Washington D.C.: Berg Publishers.
- Burkina Vert (2011): Il était une fois... [http://www.burkinavert.com/Il-etait-une-fois\\_a20.html](http://www.burkinavert.com/Il-etait-une-fois_a20.html) [last access 15.01.2014].
- Carr, S. (2013): African Agriculture: Does farm size really matter? <http://wle.cgiar.org/blogs/2013/02/07/african-agriculture-does-size-really-matter/> [last access 15.01.2014].
- Castilla, C., & Walker, T. (2012): *Gender Roles and Intra-Household Allocation: Identifying Differences in the Incentives to Hide Money Across Spouses in Ghana*. Seattle: Agricultural & Applied Economics Association.
- CGIAR Fund (2013): CGIAR's Efforts to Reduce the Gendergap in Agriculture. <http://www.cgiarfund.org/node/395> [last access 10.03.2013].
- CGIAR Research Program 5 (2011): *Water, Land and Ecosystems: Improved natural resources management for food security and livelihoods*. Colombo, Sri Lanka: International Water Management Institute.
- Chambers, R. (1994): The origins and practice of participatory rural appraisal. In: *World Development*, 22(7), 953-969.
- Charusheela, S. (2003): Empowering work? Bargaining models reconsidered. In: C. K. Barker & E. Kuiper (ed.): *Towards a Feminist Philosophy of Economics*. s.l.: Routledge, 287-303.
- Coates, S. (1999): *A WaterAid Briefing Paper: A Gender and Development Approach to Water, Sanitation and Hygiene Programmes*.
- CORE Initiative (2006): *Project Cycle Management: CBO Training Toolkit*.
- CPWF (n.d.): Volta River Basin. <http://waterandfood.org/basins/volta> [last access 15.01.2014].
- CVTL (2005): *Training materials: VCA*. Dili, Timor-Leste.
- Davis, I., Haghebaert, B., & Peppiatt, D. (2004): *Social Vulnerability & Capacity Analysis (VCA): An Overview*. Geneva, Switzerland: ProVention Consortium.
- De Haan, L. J. (2012): The livelihood approach: a critical exploration. In: *Erdkunde*, 66(4), 345-357.
- Deji, O. F. (2011): *Gender and Rural Development*. Wien: LIT.
- DFID (1999): *Sustainable Livelihoods Guidance Sheets*.
- Dietze, G. (2013): Postcolonial Theory. In: C. von Braun & I. Stephan (Eds.): *Gender@Wissen. Ein Handbuch der Gender-Theorien* (3rd ed.) Köln/Weimar/Wien: Böhlau Verlag.

- Douma, A. (2012): Towards a workable approach to mainstream gender in natural resources management. Amsterdam.
- Douxchamps, S., Ayantunde, A., Andah, W., & Barron, J. (2011): Learning from the past: Rainwater management in the Volta Basin. Tshwane, South Africa: The 3<sup>rd</sup> International Forum on Water and Food.
- Douxchamps, S., Ayantunde, A., & Barron, J. (2012): Evolution of Agricultural Water Management in Rainfed Crop-Livestock Systems of the Volta Basin. Colombo, Sri Lanka: CGIAR Challenge Program on Water and Food.
- ECA (2011): The African Gender and Development Index 2011: Promoting gender equality in Africa. Economic Commission for Africa.
- Ekejiuba, F. I. (1995): Down to Fundamentals: Women-centered Hearth-holds in Rural West Africa. In: D. F. Bryceson (Ed.): Women Wielding the Hoe. Lessons from Rural Africa for Feminist Theory and Development Practice. Oxford/Washington D.C.: Berg Publishers.
- Farnworth, C. (2012): Better Value Chains: socially just, economically viable. In: World Water Week. Stockholm, Sweden: SIWI. [www.worldwaterweek.org](http://www.worldwaterweek.org) [last access 15.01.2014].
- GWA & UNDP (2006): Resource Guide: Mainstreaming Gender in Water Management.
- IFAD (2012): Gender equality and women's empowerment.
- Ilahi, N. (2000): The Intra-household Allocation of Time and Tasks: What Have We Learnt from the Empirical? Policy Research Report on Gender and Development. Working Paper Series No. 13.
- International Federation of Red Cross and Red Crescent Societies (1999): Vulnerability and Capacity Assessment: An International Federation Guide. Geneva, Switzerland.
- International Food Policy Research Institute (2000): WOMEN: The Key to Food Security: Looking Into the Household. Washington, D.C.
- International Food Policy Research Institute (2012): Women's Empowerment in Agriculture Index.
- Kabeer, N. (2001): Reflections on the Measurement of Women's Empowerment. In: A. Sisask (Ed.): Discussing Women's Empowerment - Theory and Practice (3rd ed.). Stockholm: SIDA studies.
- Kabeer, N. (2012): Women's economic empowerment and inclusive growth: labour markets and enterprise development. Department for International Development & International Development Research Centre.
- Kirby, M., de Condappa, D., Mainuddin, M., Eastham, J., & Thomas, M. (2010): Water-use accounts in CPWF basins. Simple water-use accounting of the Volta Basin. CGIAR Challenge Program on Water and Food. Working Paper BFP 04.
- Lemoalle, J., & de Condappa, D. (2009): Water Atlas of the Volta Basin. CGIAR Challenge Program on Water and Food & Institut de recherche pour le développement.
- Lemoalle, J., & de Condappa, D. (2010): Farming systems and food production in the Volta Basin. In: Water International, 35 (5), 655-680.
- Luttrell, C., Quiroz, S., Scrutton, C., & Bird, K. (2009): Understanding and operationalising empowerment. London: Overseas Development Institute.

- Marshall, M. N. (1996): Sampling for qualitative research. In: Family Practice, 13(6). <http://www.ncbi.nlm.nih.gov/pubmed/9023528> [last access 15.01.2014].
- Mayring, P. (2002). Einführung in die qualitative Sozialforschung. Eine Anleitung zu qualitativem Denken. Weinheim [a.o.]: Beltz.
- McCartney, M., Forkuor, G., Sood, A., Amisigo, B., Hattermann, F., & Muthuwatta, L. (2012): The Water Resource Implications of Changing Climate in the Volta River Basin. Colombo, Sri Lanka: International Water Management Institute.
- Miescher, S. F., Manuh, T., & Cole, C. M. (2007): Introduction: When was Gender? In: C. M. Cole, T. Manuh, & S. F. Miescher (Eds.): Africa After Gender? Bloomington: Indiana University Press.
- Moser, C. (1991): Gender Planning in the Third World: Meeting Practical and Strategic Needs. In: R. Grant & K. Newland (Eds.): Gender and International Relations. Open University Press, Milton Keynes.
- Nelson, S., & Chaudhury, M. (2012): Training Guide: Gender and Climate Change Research in Agriculture and Food Security for Rural Development. Food and Agriculture Organization of the United Nations.
- Pettman, J. J. (1996): Worlding Women: A Feminist International Politics. Oxon: Routledge.
- Quisumbing, A. R. (Ed.) (2003): Household Decisions, Gender, and Development: A Synthesis of Recent Research. Washington, D.C.: International Food Policy Research Institute. <http://www.ifpri.org/sites/default/files/publications/genderbook.pdf> [last access 15.01.2014].
- Quisumbing, A. R., & Smith, L. C. (2007): Intrahousehold Allocation, Gender Relations, and Food Security in Developing Countries. New York: Ithaca.
- Robertson, R. (1998): Glokalisierung: Homogenität und Heterogenität in Raum und Zeit. In: U. Beck (Ed.): Perspektiven der Weltgesellschaft. Frankfurt/Main: Suhrkamp.
- Samari, H. (2011): State of Climate Change Adaptation and Mitigation Efforts for Agriculture in Burkina Faso. National Survey. CGIAR Research Program on Climate Change, Agriculture and Food Security.
- Schiffer, E., & Hauck, J. (2010): Net-Map: Collecting Social Network Data and Facilitating Network Learning through Participatory Influence Network Mapping. In: Field Methods, 22(3), 231-249.
- Scoones, I. (1998): Sustainable Rural Livelihoods: A Framework for Analysis. Institute of Development Studies Working Paper 72.
- Sen, G., & Grown, C. (1987): Development, Crisis, and Alternative Visions. Third World Women's Perspectives. New York: Monthly Review Press.
- Shiferaw, B., Okello, J., & Ratna Reddy, V. (2009): Challenges of Adoption and Adaptation of Land and Water Management Options in Smallholder Agriculture: Synthesis of Lessons and Experiences. In: S. P. Wani, J. Rockström, & T. Oweis (Eds.): Rainfed Agriculture: Unlocking the Potential. Wallingford, UK/ Cambridge, USA: CAB International.
- Silverman, D. (2005): Doing qualitative Research (2nd ed.). London, UK/Thousand Oaks, California/New Delhi, India: SAGE Publications.
- Smith, L. C., & Chavas, J.-P. (1999): Supply Response to West African Agricultural Households: Implications of Intrahousehold Preference Heterogeneity. Washington, D.C.: FCND Discussion Paper No. 69.



- Tandon, N. (2007): Biopolitics, climate change and water security: impact, vulnerability and adaptation issues for women. *Agenda: Empowering Women for Gender Equity*, 21(73), 4–17.
- Terrasson, I., & Mojaisky, M. (2008): Yields and water productivity of rainfed agriculture in the Volta basin. Volta Basin Focal Project Report No. 12. Montpellier, France: IRD & Colombo, Sri Lanka: CPWF.
- The World Bank (2009): *Gender in Agriculture - Sourcebook*. Washington, DC: The World Bank.
- VBDC (2011): Project Document: Project V5: Coordination and Change Project. Volta Basin Development Challenge Program of the CPWF.
- Wahaj, R., Hartl, M., Lubbock, A., Cleveringa, R., & Nepveu, A. (2007): Gender and water: Securing water for improved rural livelihoods : The multiple-uses system approach. International Fund for Agricultural Development. <http://media.obvsg.at/p-AC06584244-1001> [last access 15.01.2014].
- Walpole, M., Smith, J., Rosser, A., Brown, C., Schulte-Herbruggen, et al. (2013): Smallholders, food security, and the environment. International Fund for Agricultural Development & United Nations Environment Programme.

## 12. List of figures

Figure 1: Agroecological zones in Burkina Faso (Source: <a href="http://www.fao.org/ag/agp/AGPC/doc/Counprof/BurkinaFaso/burkinaFeng.htm">http://www.fao.org/ag/agp/AGPC/doc/Counprof/BurkinaFaso/burkinaFeng.htm</a> ) ..	6
Figure 2: Improved <i>zai</i> technique applied on a household's field in the northern Yatenga province (Source: photo by author).....	10
Figure 3: Sustainable Livelihoods Frameworks (Source: <a href="http://www.fao.org/docrep/006/ad683e/ad683e03.htm">http://www.fao.org/docrep/006/ad683e/ad683e03.htm</a> ) .....	19
Figure 4: A woman digs <i>zai</i> in a field “en brousse” close to Koura-Bagre (Source: photo by author). .....	53
Figure 5: Distribution of compost to be filled in already constructed <i>zai</i> and half-moons in a household's collective field in Koura-Bagre at the beginning of the rainy season (Source: photo by author). .....	53
Figure 6: Open well with a motor pump in a private garden in Toeghin (Source: photo by author). .....	65
Figure 7 Cart specifically but not exclusively used to transport water canisters (Source: photo by author). .....	68
Figure 8: A closed, foot pedal pumped well for drinking water on the outskirts of Koura-Bagre (Source: photo by author).....	69
Figure 9: A man and his sons plough the field at the beginning of the rainy season in Koura-Bagre, while some women work with a hoe in another field behind (Source: photo by author). .....	74
Figure 10 Women sowing millet inside <i>zai</i> holes in their household's common field in Koura-Bagre (Source: photo by author).....	76

Figure 11 Seeding nursery next to the mosque in Koura-Bagre (Source: photo by author).....	83
--	----

### **13. Abbreviations**

ADEFAD	Association d'aide aux enfants et familles démunis
ATA	Agents techniques de l'Agriculture
AVLP	Association Vivre les Paysans
CGIAR	Consortium Reasearch Program on Water, Land & Ecosystems
CPWF	Challenge Program on Water and Food
DAWN	Development Alternatives of Women for a New Era
DFID	Department for International Development
FCFA	Franc de la Communauté Financière d'Afrique
FNGN	Fédération National des Groupements Naam
GAD	Gender and Development
INERA	Institut National de l'Environnement et des Recherches Agricoles
NGO	Non-Governmental Organization
OCADES	Organisation Catholique pour la Développement et la Solidarité
PDRDP	Projet de Développement Rural Décentralisé et Participatif (by the African Development Bank)
PRD	Projet pôles régionaux de développement
RWM	Rainwater Management
WEAI	Women's Empowerment in Agriculture Index
WID	Women in Development

## Appendices/Annex

### Interviews semi-structurées des femmes et des hommes dans des ménages engagés dans la production agro-pastorale

#### 1. Introduction

Explication de la recherche

Anonymat, enregistrement

#### 2. Information générale

Genre, âge, religion, éducation

Depuis quand habitez vous dans votre village?

Situation matrimoniale et nombre d'enfants (propre et pris à sa charge)

Quelles autres personnes vivent et mangent avec vous ? (relation)

Qu'est-ce que vous faites dans l'Agriculture et dans l'Elevage ?

Travaillez-vous avec FNGN/SNV/INERA ? Comment cette coopération a-t-elle commencée ?

#### 3. Situation agricole

*Narration exemplaire* → Qu'est-ce que vous pensez sur la situation agricole (champ et jardin) maintenant et sur les changements dans les 10 ans passés ? (– pour vous-même, au niveau du ménage et du village) Quelle est votre perception de tous ça? Pourquoi ?

- Activités agricoles – Comment (techniques, appareils)? Qui dans votre ménage? (préparation du champ, mise en œuvre des techniques (zaï etc.), amender, semer, désherber, irriguer, traitement phytosanitaire, moissonner, transformer, vendre, control du revenu)
- Accès aux ressources (terre, eau, semence, engrain, pesticides, crédits, aide)
- Accès aux services techniques – tests, information (projets, agents techniques, ...)
- Changements – moisson, ressources, variétés, techniques, marché

#### 4. Situation d'Elevage

*Narration exemplaire* → Qu'est-ce que vous pensez sur la situation d'Elevage maintenant et sur les changements dans les 10 ans passés ? (– pour vous-même, au niveau du ménage et du village) Quelle est votre perception de tous ça? Pourquoi ?

- Animaux et activités – Qui dans votre ménage?  
(élever, se charger, donner à boire, alimenter, pâturer, prendre soin de sa santé, traire, abattre, transformer, vendre (viande, lait, autres), control du revenu)
- Accès aux ressources (terre, eau, pâture, sel, médicaments, crédits, ...)
- Accès aux informations et services de la santé
- Changements – santé, épidémies, prix au marché

### **Focus group discussions – femmes/hommes**

#### **Pratiques et innovations dans/autour l'Agriculture et l'Elevage + changements et perceptions:**

Rôles (genre, âge), activités, techniques (collection de l'eau pluviale, irrigation, cultive)  
Accès aux ressources (terre, eau, semence, engrain, pesticides, animaux, service de la santé, crédit, appareils)

- **Carte du village (community map) :**  
Quels bâtiments, ressources et institutions sont important pour vous? Ils sont où ?  
*Dessin imaginaire*: participation de tous! Consensus! – explications (quoi et pourquoi)  
*Discussion* : Conditions, utilisations, fréquentations et relevances ? – pour qui ?  
Quels changements et effets pour vos vies et vos activités ? Relation : changements et problèmes ?
- **Calendrier (seasonal calendar/diagram):**  
Activités des participants eux-mêmes (!) dans l'Agriculture, le Jardinage & l'Elevage
- **Discussion sur des changements :**

Sujets importants pour eux, niveau de changement – explications (quoi et pourquoi)

- Eau pluviale
- Santé des animaux (maladies, vaccinations)
- Moisson + semences variétés
  - + engrain/fumier/compost
  - + pesticides
  - + collection de l'eau pluviale

- **Réseau social (relations map) :**

Quels acteurs, associations et institutions (dans votre village et à l'extérieur) sont important pour vos vies et pour vos travaux agricoles ?

- Centre = Agriculteur(/Jardinier)/Eleveur
- Couleurs (choisis par eux) : importance pour leurs vies
- Distance au centre : fréquentation

*Discussion:* Qu'est-ce que vous faits ? Pourquoi c'est important pour vous ?

## Abstract

Environmental changes like increasingly variable rainfall patterns and degrading land resources crucially affect women's and men's livelihoods in rural crop-livestock systems in the Burkinabe Nakanbé basin, a part of the wider West African Volta river basin. They are compounded by economic changes like increasingly dominant markets with rising prices for various agricultural products and livestock, and by social changes such as high population growth leading to increased competition over scarce land and water resources. The resulting vulnerability context affects local rural women's and men's livelihood strategies, implying various interdependent gender-differentiated opportunities and constraints for their practices in agriculture and livestock keeping.

This study analyses gender dynamics of practices in agricultural production, access to and use of land, water, knowledge, necessary input resources and markets, as well as respective innovations by using a Sustainable Livelihoods approach. Data was acquired by an empirical qualitative research in the context of the CGIAR *Challenge Program on Water and Food* and applied methods such as semi-structured personal interviews, field observations and various participatory methods in the course gender-differentiated focus group discussions.

Results suggest that access to crop and garden land, control of harvest outcomes and access to financial capital is particularly determined by male inheritance rights, gender-differentiated household fields and men's improved access to participation in development cooperation initiatives. Furthermore, opportunities to increase crop yields via access to material and immaterial input resources are constructed differently, while they are crucially necessary for men as well as women to fulfil their different societal roles and responsibilities. Especially access to physical capital including fertilizer, improved seed varieties, agricultural tools and livestock are important to provide for gender specific needs, households' sustainment and would provide disadvantaged women with considerable empowerment potentials.



## Zusammenfassung

Umweltveränderungen wie zunehmend variable Regenfälle und die Degradierung von knappen Landressourcen haben negativen Einfluss auf die Lebensbedingungen von Männern und Frauen in ruralen crop-livestock systems im Burkinabe Nakanbé Flusseinzugsgebiet. Diese Veränderungen werden durch ökonomische, wie die wachsende Dominanz von Märkten und steigende Preise für landwirtschaftliche Produkte und Vieh, sowie durch soziale Dynamiken, wie steigende Konkurrenz um natürliche Ressourcen durch ein hohes Bevölkerungswachstum, weiters verstärkt. Dieser daraus resultierende Vulnerabilitätskontext beeinflusst Lebenshaltungsstrategien von Frauen und Männern in diesen ruralen Gebieten, indem er interdependente, geschlechterdifferenzierte Möglichkeiten als auch Schwierigkeiten für landwirtschaftliche Praktiken schafft.

Diese Diplomarbeit analysiert Genderdynamiken in der landwirtschaftlichen Produktion, in Bezug auf Zugänge zu und Nutzung von Land, Wasser, Wissen, notwendigen Ressourcen und Märkten, sowie von diesbezüglichen Innovationen mithilfe des Sustainable Livelihoods Frameworks. Die empirische qualitative Forschung im Zuge derer diese Daten erhoben wurden, fand im Rahmen des CGIAR *Challenge Program on Water and Food* statt und wandte Methoden wie semistrukturierte persönliche Interviews, Feldbeobachtungen und verschiedene partizipative Methoden im Zuge von Focus Group Diskussionen an.

Ergebnisse dieser Forschung lassen darauf schließen, dass der Zugang zu Äckern und Gärten, die Kontrolle von Ernten und der Zugang zu finanziellem Kapital besonders durch patrilineales Erbrecht, genderdifferenzierte Äcker eines Haushaltes und durch den verbesserten Zugang zur Teilnahme an Entwicklungszusammenarbeitsinitiativen von Männern, beeinflusst werden. Des Weiteren sind notwendige Möglichkeiten um Ernteerträge durch den Zugang zu materiellen und immateriellen Ressourcen zu steigern, für Frauen und Männer unterschiedlich konstruiert, während sie aber entscheidend sind für die Erfüllung von unterschiedlichen sozialen Rollen und Verantwortungen. Speziell der Zugang zu physischem Kapital wie Dünger, verbessertes Saatgut, landwirtschaftliche Geräte und Vieh sind ausschlaggebend um genderspezifische Bedürfnisse zu erfüllen, Haushalte zu erhalten und würden speziell für benachteiligte Frauen Potenziale für ihr Empowerment bereithalten.

## Curriculum Vitae

### Personal details

Name	Karin Neumayer
Languages	German (native)
	English (fluent)
	French (fluent)

### Education

2008-2014	<b>International Development (Diploma)</b> University of Vienna, Austria Special interests: Sub-Saharan Africa, sustainability, environmental security, political and social change
2008-2014	<b>Cultural and Social Anthropology (BA)</b> University of Vienna, Austria Special interests: migration, medical anthropology, qualitative methods
2007	Matura (Graduation) Bundesgymnasium Tulln, Austria

### Experience

05/2013 – 08/2013	Research internship at the CPWF-Volta Ouagadougou, Burkina Faso
01/2008 – 06/2008	Volunteer internship at the Department of Social Welfare and the Department of Community Development Kade, Ghana