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Improving Smallholders' Food Security and Resilience to Climate Change in Burkina Faso

The Building Resilience and Adaptation to Climate Extremes and Disasters Programme (BRACED)

AVE-Study 19/2019

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Improving Smallholders' Food Security and Resilience to Climate Change in Burkina Faso

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AVE-Study 19/2019

Ways out of extreme poverty, vulnerability and food insecurity

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List of abbreviations

ANAM	Agence Nationale de la Météorologie (National Meteorological Agency)
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters
BRES	Building Resilience
DFID	Department for International Development of the British Government
FAO	Food and Agriculture Organization of the United Nations
FCFA	Franc des colonies françaises d'Afrique (655 FCFA = 1 Euro)
GADM	Database of Global Administrative Areas
GDP	Gross domestic product
HYDT	High Yielding Drought Tolerant
NGO	Non-governmental organisation
OHADA	Organisation pour l'harmonisation en Afrique du droit des affaires
PANA	Programme d'Action National d'Adaptation à la variabilité et aux changements climatiques (National Adaptation Programme of Action on Climate Change)
PNDES	Plan national de développement économique et social (National Plan for Economic and Social Development)
PRA	Participatory Rural Appraisal
SCADD	Stratégie de croissance accélérée et de développement durable (Strategy for Accelerated Growth and Sustainable Development)
SCOOP	Société Coopérative Simplifiée

Summary

Climate change induced weather extremes and disasters particularly affect the agricultural sector, thereby threatening the livelihoods of the most vulnerable people. Burkina Faso is frequently hit by such disasters, which affect especially its rain-dependent agriculture.

The Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) programme aims at building the resilience of vulnerable people against climate extremes and disasters in a total of 13 countries in Africa and Asia. In Burkina Faso, the programme was implemented from January 2015 to May 2019 by the non-governmental organisations (NGOs) Welthungerhilfe and Self Help Africa through a project called BRES (Building Resilience) and the successor project BRES-X. The main areas of intervention are the establishment of productive infrastructure aiming at market-oriented agricultural production, the support for soil conservation agriculture via natural resource management techniques and the building and strengthening of institutions for the provision of climate-related and phytosanitary information.

This study seeks to analyse the programme's perceived impacts on food security and poverty reduction in Burkina Faso. It is based on participatory focus group discussions with beneficiaries that were carried out in the BRACED project regions in Burkina Faso in January and February 2019. Hence, the study is not an evaluation of the efficiency or effectiveness of the BRACED programme and its implementation. Instead, it focuses on the beneficiaries' perceptions and evaluations in order to examine to what extent their food security, resilience to climate extremes and overall living conditions have improved due to the project.

Overall, the BRACED project in Burkina Faso positively affected people's lives. In all villages visited, the beneficiaries confirmed that the activities of the project contributed to an improvement of their food security and resilience to climate extremes and disasters. The improvements of people's food security situation can be traced back to all pillars of food security, i.e. the physical availability of food, the economic and physical access to food, food utilisation and the stability of these three dimensions.

Poverty was reduced by an increase of incomes through the sale of agricultural products from newly established productive infrastructure, such as market gardens, but also from farmers' own fields where they used High Yielding Drought Tolerant (HYDT) cereal seeds (also known as "certified improved seeds"[1]) and other seeds provided by BRACED. Market sales were also supported by training courses on market-oriented agricultural production and by (sometimes) helping farmers to establish links with potential buyers. In addition, beneficiaries were able to invest their generated incomes in their own small businesses.

Besides these impacts on food security and poverty reduction, beneficiaries particularly emphasised BRACED's social effects on the communities and above all on gender equality and women's empowerment. By organising beneficiaries in producer groups and motivating them to work together, the beneficiaries felt that the social relationships among them were enormously strengthened. Thereby, BRACED's activities have created a new spirit of open-mindedness, especially regarding women's involvement and participation in decision-making at the household but also at the community level. However, a certain degree of social cohesion

[1] These seeds should not be confused with hybrid seeds or genetically modified seeds produced by international agricultural conglomerates. For further information see section 4.2.

of the community as well as strong leader personalities have been identified as important factors that contributed to the success of the activities.

The project can be considered as a good practice given that it helped the poor rural population to reduce poverty and food insecurity and to become more resilient against climate threats. BRACED has laid a solid foundation for farmer groups to continue the activities initiated by the project though the sustainability of the interventions in the long-term, i.e. beyond the project duration, remains to be seen.

Food security, resilience, smallholder farmers, climate change, poverty reduction, gender, Burkina Faso

Zusammenfassung

Durch den Klimawandel bedingte extreme Wetterereignisse und Katastrophen schaden vor allem dem Agrarsektor und bedrohen damit die Lebensgrundlagen der vulnerabelsten Menschen. Burkina Faso ist regelmäßig von solchen Katastrophen betroffen, die vor allem die regenabhängige Landwirtschaft beeinträchtigen.

Das Programm *Building Resilience and Adaptation to Climate Extremes and Disasters* (BRACED) hat daher zum Ziel, die Widerstandsfähigkeit vulnerabler Menschen gegen Klimaextreme und Katastrophen in insgesamt 13 Ländern in Afrika und Asien zu verbessern. In Burkina Faso wurde das Programm von Januar 2015 bis Mai 2019 von den Nichtregierungsorganisationen (NGO) Welthungerhilfe und Self Help Africa über das Projekt BRES (*Building Resilience*) und dem Nachfolgeprojekt BRES-X umgesetzt. Die Hauptinterventionsbereiche sind der Aufbau einer produktiven Infrastruktur für eine marktorientierte landwirtschaftliche Produktion, die Unterstützung des Bodenschutzes durch Techniken des Managements natürlicher Ressourcen sowie der Aufbau und die Stärkung von Institutionen zur Bereitstellung von Wetter- und Pflanzenschutzinformationen.

Die vorliegende Studie soll die wahrgenommenen Projektwirkungen auf die Ernährungssicherung und Armutsbekämpfung in Burkina Faso analysieren. Sie basiert auf partizipativen Fokusgruppendiskussionen mit den Projektteilnehmenden, die im Januar und Februar 2019 in den BRACED-Projektregionen in Burkina Faso durchgeführt wurden. Die Studie ist daher keine Bewertung der Effizienz oder Effektivität des Projekts und seiner Umsetzung. Vielmehr liegt der Schwerpunkt auf den Wahrnehmungen und Bewertungen der Projektteilnehmenden, um zu untersuchen, inwieweit sich ihre Nahrungssicherheit, ihre Widerstandsfähigkeit gegen extreme Wetterereignisse und ihre allgemeinen Lebensbedingungen durch das Projekt verbessert haben.

Insgesamt hatte BRACED positive Wirkungen auf das Leben der Teilnehmenden in Burkina Faso. In allen besuchten Dörfern bestätigten die Projektteilnehmenden, dass die Projektaktivitäten zu einer Verbesserung ihrer Nahrungssicherheit und ihrer Widerstandsfähigkeit gegen extreme Wetterereignisse beigetragen haben. Die Verbesserung der Nahrungssicherheit der Menschen kann auf alle vier Säulen der Nahrungssicherheit zurückgeführt werden, d.h. auf die physische Verfügbarkeit von Nahrungsmitteln, den wirtschaftlichen und physischen Zugang zu Nahrungsmitteln, die Nahrungsverwendung und -verwertung und die Stabilität dieser drei Dimensionen.

Die Armut konnte durch Einkommenssteigerungen reduziert werden. Diese sind u.a. auf den Verkauf von Agrarprodukten, die beispielsweise aus den von BRACED angelegten Gemüsegärten stammen, zurückzuführen. Aber auch die Nutzung des von BRACED bereitgestelltem verbessertem Saatgut[2] führte zu Ertragssteigerungen, die wiederrum den Verkauf von Agrarprodukten ermöglichten bzw. erhöhten. Der Verkauf wurde auch durch Aus- und Fortbildungen in marktorientierter Landwirtschaft und durch die (partielle) Unterstützung der Kleinbäuerinnen und -bauern beim Aufbau von Geschäftsbeziehungen unterstützt. Darüber hinaus konnten die Begünstigten ihr erwirtschaftetes Einkommen in ihre eigenen kleinen Unternehmen investieren.

Neben der Armutsreduzierung und der Verbesserung der Nahrungssicherheit betonten die Projektteilnehmenden insbesondere die sozialen Wirkungen und die Verbesserung der

[2] Dieses Saatgut sollte nicht mit Hybridsaatgut oder gentechnisch verändertem Saatgut von internationalen Agrarkonzernen verwechselt werden, siehe auch Abschnitt 4.2.

Gleichstellung der Geschlechter. Indem die Projektteilnehmenden in Erzeugergemeinschaften organisiert und zur Zusammenarbeit motiviert wurden, konnten die sozialen Beziehungen zwischen ihnen enorm gestärkt werden. Durch die aktive Einbeziehung von Frauen in die Projektaktivitäten konnte BRACED zudem zur Stärkung der Rolle der Frauen beitragen, insbesondere in Bezug auf deren Mitwirkung an Entscheidungen im Haushalt, aber auch auf deren Beteiligung auf Dorfebene. Insgesamt wurden jedoch ein gewisses Maß an sozialem Zusammenhalt der Gemeinschaft sowie starke Führungspersönlichkeiten als wichtige Faktoren identifiziert, die zum Erfolg der Projektaktivitäten beigetragen haben.

Das Projekt kann als *Good Practice* angesehen werden, da es wirkungsvoll Armut und Ernährungsunsicherheit der ländlichen Bevölkerung reduzieren sowie deren Widerstandsfähigkeit gegen extreme Wetterereignisse verbessern konnte. Langfristig bleibt die Nachhaltigkeit der Interventionen noch abzuwarten. Jedoch hat BRACED die entsprechenden Voraussetzungen geschaffen, damit die Erzeugergemeinschaften auch nach Projektende die Aktivitäten fortsetzen können.

Ernährungssicherung, Resilienz, Kleinbäuerinnen und -bauern, Klimawandel, Armutsreduzierung, Gender, Burkina Faso

Resumé

Les catastrophes et les phénomènes climatiques extrêmes engendrés par le réchauffement climatique affectent particulièrement le secteur agricole, menaçant les moyens de subsistance des populations les plus vulnérables. Le Burkina Faso est fréquemment frappé par ces aléas climatiques, qui nuisent à une agriculture essentiellement tributaire de la pluviométrie.

Le programme *Building Resilience and Adaptation to Climate Extremes and Disasters* (BRACED) vise à renforcer la résilience des personnes vulnérables face aux phénomènes climatiques extrêmes et aux catastrophes naturelles dans 13 pays d'Afrique et d'Asie en tout. Au Burkina Faso, le programme a été mis en œuvre de janvier 2015 à mai 2019 par les organisations non gouvernementales (ONG) Welthungerhilfe et Self Help Africa, à travers le projet BRES (Building Resilience), puis le projet BRES-X qui lui a succédé. Les principaux domaines d'intervention sont la construction d'infrastructures agricoles efficaces dans le but de favoriser une production axée sur le marché, la promotion des mesures de conservation des sols par des techniques de gestion des ressources, et enfin la création d'institutions et leur renforcement pour la mise à disposition d'informations sur le climat et la protection phytosanitaire.

La présente étude vise à analyser les impacts du programme sur la sécurité alimentaire et la réduction de la pauvreté tels qu'ils sont perçus par les populations au Burkina Faso. Elle s'appuie sur des discussions participatives « Focus group » qui ont été menées avec les bénéficiaires dans les régions d'intervention du projet BRACED au Burkina Faso, en janvier et février 2019. Par conséquent, l'étude ne vise pas à évaluer l'efficacité du programme BRACED et des actions mises en œuvre. Elle se concentre avant tout sur la perception et l'évaluation des impacts du projet par les bénéficiaires, afin d'examiner dans quelle mesure la sécurité alimentaire, la résilience aux événements climatiques extrêmes et plus globalement, les conditions de vie de ces populations se sont effectivement améliorées.

Dans l'ensemble, le projet BRACED a eu un impact positif sur la vie des bénéficiaires au Burkina Faso. Dans tous les villages visités, les participants ont confirmé que les actions du projet avaient contribué à améliorer leur sécurité alimentaire ainsi que leur résilience aux phénomènes climatiques extrêmes et aux catastrophes naturelles. L'amélioration de la situation des populations en matière de sécurité alimentaire et de nutrition peut être attribuée aux quatre piliers de la sécurité alimentaire, à savoir la disponibilité physique de la nourriture, l'accès économique et physique à la nourriture, l'utilisation qui est faite de la nourriture et enfin, la stabilité de ces trois dimensions.

La pauvreté a pu être réduite du fait de l'augmentation des revenus des producteurs agroalimentaires. L'amélioration des revenus est due, entre autres, à la vente de produits agricoles issus notamment des cultures maraîchères nouvellement mises en place par le projet BRACED. Mais également la mise à disposition, par BRACED, de semences améliorées[3] dites « semences améliorées certifiées » et leur utilisation dans les champs ont permis d'augmenter les gains des producteurs, qui à leur tour, ont contribué à faire augmenter les ventes de produits agroalimentaires. Ces dernières ont également été favorisées par des mesures de formation aux techniques de production agricoles axées sur le marché et par le soutien (partiel) apporté aux agriculteurs pour établir des relations d'affaires avec des acheteurs

[3] Ces semences ne doivent pas être confondues avec les semences hybrides ou génétiquement modifiées des multinationales agricoles. Pour de plus amples informations, voir la section 4.2.

potentiels. En outre, les bénéficiaires ont pu investir les revenus additionnels ainsi générés dans leur propre petite entreprise.

Hormis l'amélioration de la sécurité alimentaire et la réduction de la pauvreté, les participants ont particulièrement mis en avant les effets positifs du projet BRACED sur le plan social, de l'égalité des sexes et de l'autonomisation des femmes. En organisant les bénéficiaires en associations de producteurs et en les motivant à collaborer davantage à l'échelle communautaire, le projet a considérablement renforcé les liens sociaux. En outre, grâce à l'implication active des femmes dans les activités du projet, BRACED a favorisé un changement des mentalités et créé une ouverture d'esprit, en particulier en ce qui concerne le rôle des femmes et leur participation à la prise de décisions au sein du ménage, ainsi qu'au niveau de la communauté villageoise. De plus, un degré certain de cohésion sociale et de solidarité au sein de la communauté, ainsi que la présence de fortes personnalités de meneurs ont été identifiés par les bénéficiaires comme d'importants facteurs de réussite des interventions.

Le projet peut être considéré comme un *Good Practice* (Bonne pratique), étant donné qu'il a contribué de manière efficace à réduire la pauvreté et l'insécurité alimentaire des populations rurales, et à renforcer leur résilience face aux phénomènes climatiques extrêmes. La pérennité des interventions sur le long terme reste cependant à vérifier. Néanmoins, les actions du projet BRACED ont permis de créer les conditions nécessaires pour permettre aux associations de producteurs de poursuivre les activités après la fin du projet.

Sécurité alimentaire, résilience, petits/-tes producteurs/-trices agricoles, réchauffement climatique, réduction de la pauvreté, égalité des sexes, Burkina Faso

1. Introduction

1.1 Context of the study

Despite worldwide efforts and noticeable progress in the past decades, poverty rates in the Global South are still at high levels. In some of these countries, the number of poor people is even on the rise. Therefore, the research project "Ways out of extreme poverty, vulnerability and food insecurity"[4] aims at identifying good practice approaches for poverty reduction and food security. Based on literature analyses, surveys of expert organisations in development cooperation and intensive field research, the project develops recommendations for the development cooperation community on how to better reach extremely poor, food insecure and vulnerable population groups and improve their lives in a sustainable manner.

The focus of the research project's work is on the following issue areas: (i) access to land and tenure security; (ii) local value chains and resilience; and (iii) social security. In a first step, the project's research team has identified *good practice* projects in these issue areas in the project's five focus countries Benin, Burkina Faso, Cambodia, Ethiopia, and Kenya. In a second step, the effects of these projects and their approaches were analysed during intensive on-site field visits in the respective countries.

In Burkina Faso, the *Building Resilience and Adaptation to Climate Extremes and Disasters* (BRACED) programme funded by the British Department for International Development (DFID) was among the selected projects. This programme aims to improve food security and increase climate resilience by explicitly targeting the poorest and most vulnerable people.

As a result, the overarching goal of this study is to analyse to what extent the programme BRACED as implemented in Burkina Faso can be considered as a good practice for food security and poverty reduction.

The study aims at the following research questions:

1) Food security: How did BRACED contribute to improving the food security situation in both quantitative and qualitative terms?
2) Poverty reduction: How did BRACED contribute to improving the beneficiaries' living conditions?
3) Gender impacts and targeting: To what extent did BRACED include women in the project's planning and implementation processes and how did this affect them? How were beneficiaries selected?

1.2 The BRACED programme

Climate change induced weather extremes and disasters particularly hit the agricultural sector, thereby threatening the livelihoods of the most vulnerable people in the Global South (FAO 2018). Environmental degradation of natural resources and a growing world population exacerbate this situation, compromising food security and poverty reduction in these countries.

[4] The research project is based at the Institute for Development and Peace (INEF) at the University of Duisburg-Essen and was funded by the Federal Ministry for Economic Cooperation and Development (BMZ) from 2015 to 2019.

Against this background, the adaptation to climate extremes and disasters of the most vulnerable people becomes ever more crucial in order to build and increase their resilience against such threats and at the same time improve their food security.

This is the point of departure of the BRACED programme. The programme has been implemented in 13 countries in Africa and Asia via 15 consortia that include more than 120 organisations. It started in January 2015 and aims at building the resilience of vulnerable people against climate extremes and disasters. The programme was originally funded for three years with a budget of £110 million[5] and is among the largest resilience programmes worldwide. The successor project BRACED-X continued the work from BRACED from January 2018 to May 2019 (Silva Villanueva et al. 2018).

One of the 13 target countries is Burkina Faso, where a consortium of Welthungerhilfe and Self Help Africa has implemented BRACED[6] in around 192 villages in four provinces in the centre of the country.[7] BRACED's main areas of interventions are the establishment of productive infrastructure aiming at market-oriented agricultural production, the support for soil conservation agriculture via natural resource management techniques as well as the building and strengthening of institutions for the provision of climate-related and phytosanitary information (see Figure 1).

Productive infrastructure was established for activities such as irrigated vegetable production (during the dry season), wetland rice production, as well as cassava production and cassava processing. In the vegetable gardens, BRACED constructed hand dug wells, basins and, at least in some cases, a network of pipes to transport water to all corners of the gardens. In collaboration with the beneficiaries BRACED also installed some light solar pumps and a few conventional motor pumps. Reinforced dikes and sluices were constructed in low-lying areas suitable for rice production. Poultry producers received materials and equipment for the construction of poultry shelters. In addition, BRACED trained beneficiaries, among others, on the different cultivation techniques for rice production or the vegetable gardens and on poultry breeding.

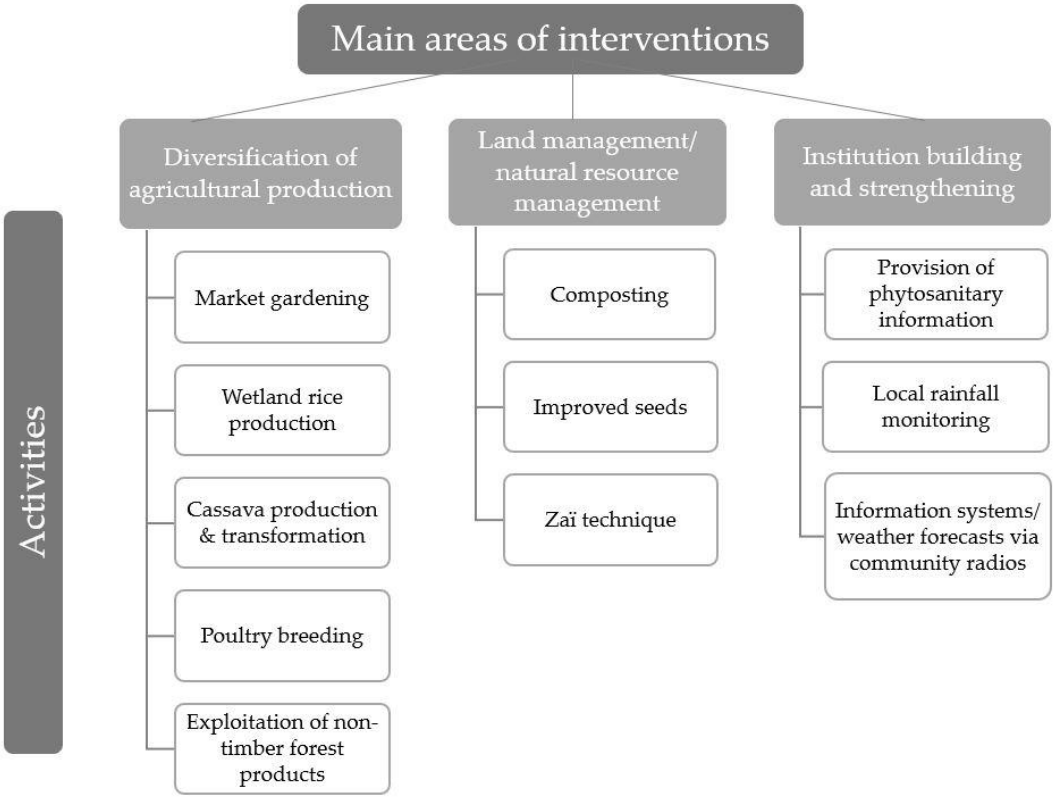
The support for soil conservation agriculture included courses on the different natural resource management techniques, such as composting or the Zaï technique. With the Zaï technique, small planting pits are filled with organic matter, e.g. compost or manure. It is a traditional soil and water conservation measure of the Sahel zone that helps to collect runoff, to improve groundwater recharge, root penetration and soil fertility, leading to improved yields of the crops (Motis et al. 2013, UNEP 2019). It can be applied manually, which is more labour intensive, but also mechanically using ploughs. BRACED promoted both types of techniques. In 2018, the project also distributed ripper-ploughs to support donkey-drawn ripping of fields for the Zaï practices, which led to further improvements.

[5] Approximately 127,777,390 € (11/04/19).

[6] While the BRACED project in Burkina Faso is officially called "BRES" (Building Resilience) and "BRES-X" by DFID and the BRACED Fund Manager, the beneficiaries in Burkina Faso call it BRACED. Therefore, in this study, BRACED is used to refer to the BRES / BRES-X project carried out in Burkina Faso.

[7] All villages are situated on the densely populated Mossi plateau. Initially, the programme aimed at targeting 900 villages. In early 2017, the number of the targeted villages was reduced to around 192 villages in 24 communes in order to better focus the activities on a smaller number of beneficiaries, thereby enhancing the project's impact.

Figure 1: BRACED's main areas of intervention and activities in Burkina Faso



Source: Author's illustration based on an interview with Welthungerhilfe officers in Ouagadougou (Burkina Faso), November 2018

Furthermore, BRACED supported the provision of climate-related and phytosanitary information and training courses on rainfall monitoring and weather forecasts in order to strengthen beneficiaries' capacity to anticipate and adapt to climate extremes.

1.3 Burkina Faso's socioeconomic situation

Burkina Faso has a population of around 19,193,382 inhabitants (2017), of which more than half are younger than 25 years (World Bank 2019a). The population is growing quickly with a growth rate of around 3% per year (as of 2017, World Bank 2019a).

Despite an increase of Burkina Faso's Human Development Index by 48% from 2000 to 2017, the country still remains at the end of the global ranking (position 183 out of 188 countries) (UNDP 2019a). Likewise, with respect to its Gender Inequality Index, Burkina Faso also ranks only at 145 out of 160 countries (UNDP 2019a).

Apart from its main export goods gold and cotton, Burkina Faso has only few natural resources, a weak industrial sector, and a poor infrastructure and transportation system that makes its economy vulnerable to shocks like volatile prices or weather extremes (World Bank 2019b).

With a share of 32% of Burkina Faso's gross domestic product (GDP), agriculture is a very important sector. Most of the rural population work in this sector (World Bank 2016). However, productivity is comparatively low and subsistence farming dominates (World Bank 2016). Besides, the country's rain-dependent agriculture is increasingly affected by climate

change induced weather extremes, particularly droughts. Further factors compromising agricultural production, and hence Burkina Faso's overall development, are overgrazing, poor soil quality, and deforestation (CIA 2019).

According to the international poverty line of 1.90 US$ a day (in 2011 PPP), 43.7% of Burkina Faso's population can be considered as poor (as of 2017, World Bank 2019a). While relative poverty has decreased from 51.1% (2001) to 40.1% (2017), the absolute number of poor people has increased due to the fast population growth (World Bank 2019a). Poverty is particularly pronounced in rural areas, where 90% of the poor live (World Bank 2016: 43). In the two regions of the BRACED's interventions – the Plateau Central and Centre Nord (see Figure 2) – the poverty rate is between 47% and 59%, thus also above the national average (INS 2018).

Burkina Faso's current development strategy for the period of 2016 to 2020, the National Plan for Economic and Social Development (*Plan national de développement économique et social*, PNDES), focuses on agriculture and livestock as key sectors for food security and economic development (GoBF 2016). This focus is in line with the previous development strategy, the Strategy for Accelerated Growth and Sustainable Development 2011-2015 (*Stratégie de croissance accélérée et de développement durable*, SCADD), which aimed at reducing poverty by accelerating GDP growth particularly through the agricultural sector (IMF 2012). Against this background, Burkina Faso's National Adaptation Programme of Action on Climate Change (*Programme d'Action National d'Adaptation à la variabilité et aux changements climatiques*, PANA) also aims at adaptation measures and monitoring systems to reduce risks related to climate change and natural hazards and to increase people's resilience (GoBF 2007).

2. Food security

2.1 The concept of food security

The international community commonly acknowledges that food security is a state that

> "[…] exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern" (FAO 2010: 8).[8]

In contrast, "food insecurity exists when people do not have adequate physical, social or economic access to food as defined above" (FAO 2010: 8). A further distinction can be made between transitory and chronic food insecurity. While "transitory food insecurity is a temporary decline in a household's access to enough food, […] chronic food insecurity is a continuously inadequate diet caused by the inability to acquire food" (World Bank 1986: 1).

The concept of food security can be divided into four pillars: food availability, food access, food utilisation, and stability (see Table 1). While food availability represents the supply side and access the demand side, food utilisation refers to adequate nutrition and an adequate quality of food and water. Moreover, the stability dimension implies that food availability, access and utilisation are not jeopardised by unexpected shocks, such as economic crises or crises induced by climate extremes and disasters (FAO 2006).

Table 1: Pillars of food security

FOOD SECURITY		
AVAILABILITY	**ACCESS**	**UTILISATION**
- Domestic production - Trade - Stocks - Food aid, transfers	- Physical access (infrastructure, markets, health centres) - Economic access (income, employment, prices) - Knowledge, norms	- Nutritional knowledge - Nutritional behaviour - Health status - Hygiene
STABILITY		
- Natural / climate change induced disasters - Political instability, civil wars - Economic factors like unemployment, rising food prices		

Source: Author's illustration based on FAO 2008: 1, Weingärtner / Trentmann 2011: 48-49

The concept of food security emerged for the first time in light of the international food crisis in the 1970s when international prices of food commodities rose steeply, especially for rice, soybeans, wheat and maize (see also Headey / Fan 2010). During that time, the concept was focused on the supply side and food insecurity was linked to "insufficient and unstable production" (Barrett / Lentz 2009: 6). However, technical progress, particularly through the

[8] See also Mahla et al. 2018.

Green Revolution, showed that improvements in food production did not suffice to eradicate hunger and malnutrition. In fact, food insecurity was mainly linked to a lack of access. This caused an incorporation of the demand side into the concept (Clay 2002: 25-26). The inclusion of this access component was also inspired by an essay of Amartya Sen (1981). He argued that hunger and famines were mainly caused by food distribution and not by a global lack of food. Therefore, he focused on the entitlements of individuals and households' access to food (Clay 2002: 26, FAO 2006: 1, Sen 1981). Thus, throughout the past decades, the definition and concept of food security changed, and its focus shifted from the supply side to the demand side.

However, the four dimensions of food security are interdependent given that without the availability of food, it cannot be accessed, and without access to food, it cannot be utilised. In order to improve food security, it is hence important to address all dimensions (FAO 2008: 1, Weingärtner / Trentmann 2011: 50, World Bank 2007: 94).

Food insecurity has severe consequences. It can lead to malnutrition[9], stunting[10], and wasting[11], among other adverse effects. Furthermore, food insecurity does not only lead to negative effects on people's state of health. It also has effects in educational and economic terms. For instance, in educational terms, malnutrition can lead to reduced school performance. In economic terms, malnutrition can negatively affect the households' income due to reduced productivity at the individual level. Consequently, it also negatively affects a country's economic output at the aggregate level. Finally, these impacts can lead to higher costs in the health sector, to a poor performance of the educational sector and to a reduced (economic) productivity (CIA 2019, FRAC 2017). Therefore, food insecurity is also related to high public and private costs and constitutes a significant constraint to a country's development.

2.2 Burkina Faso's state of food security

Food insecurity has been a perennial problem in Burkina Faso. Between 2015 and 2017, almost a quarter of the Burkinabe population (23.8%) were severely food-insecure (FAO 2019). This share has even increased in comparison to the average from 2014 to 2016 (19.9%) (FAO 2019). Like poverty, food insecurity particularly hits the rural population, with half of the rural population being (severely or moderately) food-insecure. Furthermore, especially women and children suffer from food insecurity. For instance, 23% of the women between 15 and 19 years are underweight (USAID 2017: 47). Moreover, in 2016, 27% of the children under five years suffered from stunting (FAO 2019).

Food insecurity in Burkina Faso is both chronic and transitory, particularly during the rainy season when the crops are in the fields, but they have not yet matured and are not ready to be harvested (between July and the end of August). The rainy season is usually from mid-May/June to September/October while the dry season lasts from mid-October to April/May or even early June.

In Burkina Faso, a combination of different factors causes food insecurity. First, agricultural production is insufficient due to low agricultural productivity as well as adverse

[9] "Malnutrition results from deficiencies, excesses or imbalances in the consumption of macro- and/or micronutrients" (FAO 2008: 3).

[10] "Moderate and severe – below minus two standard deviations from median height for age of reference population" (UNICEF 2019).

[11] "Moderate and severe – below minus two standard deviations from median weight for height of reference population" (UNICEF 2019).

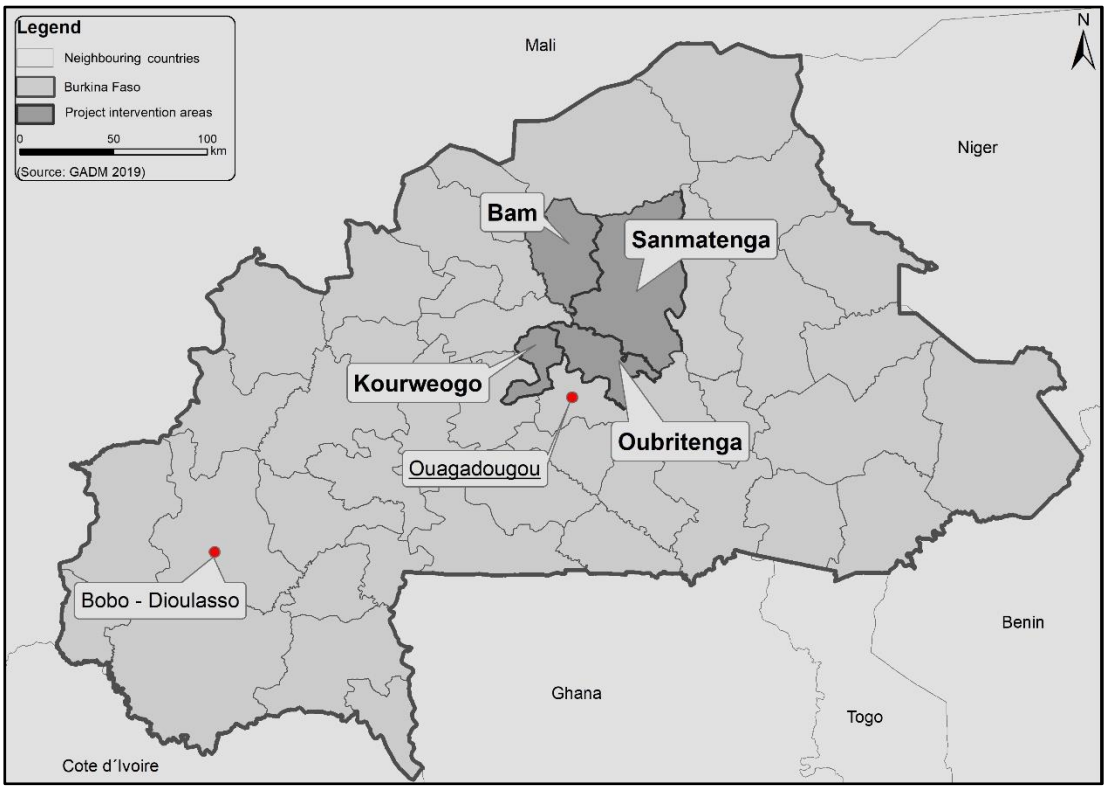
weather phenomena and plant diseases, which further impair agricultural production (food availability). Second, the poor physical infrastructure prevents the distribution of agricultural goods across the country and long distances hamper people's access to markets (food access). Third, economic access to food can be threatened by food price variations that further compromise a household's purchasing power (food access). Fourth, unbalanced diets due to a lack of food diversity impede food security in terms of its nutritional and health aspects (food utilisation). Finally, shocks have an effect on all three dimensions of food security (food stability). Due to its climate, many households in Burkina Faso are especially hit by natural shocks or hazards, like droughts and floods (World Bank 2016: 34-37). Of these, it is especially the rural population that is exposed to natural hazards, which makes them extremely vulnerable due to their strong dependency on agriculture (World Bank 2016: XV). Predictions further show that climate change is accelerating, and that the occurrence of extreme weather events will continue to increase (UNDP 2019b).

3. Methodology

This study presents findings of the field research on the BRACED project in Burkina Faso. It is important to note that this study is not an evaluation of the efficiency or effectiveness of the BRACED programme and its implementation in Burkina Faso. Instead, it focuses on the beneficiaries' perceptions and evaluations in order to examine to what extent their food security, resilience to climate extremes and overall living conditions have improved due to the project's activities. It also aims at analysing the beneficiaries' opportunities for participation in the project's implementation and whether the most vulnerable people were included.

Jana Herold, researcher at the Institute for Development and Peace, carried out the field research in Burkina Faso in January and February 2019. Data was collected in collaboration with the local consultants and translators Aboubakar Barbari, Albert Nazé, and François Ouédraogo in four villages of the provinces Bam, Kourweogo, Oubritenga, and Sanmatenga (see Figure 2).[12]

Figure 2: The four provinces targeted by BRACED



Source: Cartography by Fabio Pruß based on GADM 2019

In each of the provinces, the research team selected one village where different types of project activity were carried out (see Table 2). This enabled the research team to get an overview of the variety of activities and their effects on the household and community level.

[12] The Welthungerhilfe office in Burkina Faso facilitated the organisation of the field visits.

Table 2: Selected villages for the focus group discussions

Village	Commune	Province	Activities
Balbo	Boussouma	Sanmatenga	- Production and processing of cassava - Zaï technique and composting - High Yielding Drought Tolerant (HYDT) seeds
Guela	Sourgoubila	Kourweogo	- Irrigated vegetable production / market gardens
Koassanga	Ziniaré	Oubritenga	- Market gardens for the dry and the rainy season - Poultry production - Zaï technique and composting - HYDT seeds
Koukoubghin	Rouko	Bam	- Rice production (2017-2018) - Zaï technique and composting - Poultry production

Source: Author's illustration

In all villages visited, a participatory outcome mapping was undertaken by carrying out in-depth focus group discussions that included *Participatory Rural Appraisal* (PRA) instruments (see Figure 3).

Figure 3: Participatory outcome mapping exercise

These focus group discussions were based on BRACED's participatory outcome mapping toolbox, which included the following components:

1. Cross-cutting themes:
    1.1. Access to tools/equipment, agricultural inputs and infrastructure
    1.2. Access to markets
    1.3. Access to land
    1.4. Nutrition and dietary diversity
2. Trend analysis
3. Gender considerations

The cross-cutting themes (1) and the trend analysis (2) were addressed in open focus group discussions that were usually carried out with around 10 to 20 BRACED beneficiaries in each village (both women and men). The gender considerations (3) were discussed with women and men in separate focus group discussions, respectively. The trend analysis aimed at measuring the changes and impacts of BRACED's activities with regard to a range of pre-defined criteria at the output, outcome and impact level (see Table 3).

Table 3: Items queried during the trend analysis

	Progress indicators	**Before the project (August 2014)**	**Today (January / February 2019)**	**Main reasons for change**
A	Output level			
1	Access to seeds and/or other agricultural inputs			
2	Access to tools and agricultural equipment (including pumps and micro-irrigation systems)			
3	Access to productive infrastructure (wells, wetlands, enclosed garden plots)			
4	Secure access to land			
B	Outcome level			
5	Technical experience in relation to agriculture or poultry keeping			
6	Organisational capacity and the management of groups or co-operatives			
7	Access to markets			
8	Diversified sources of agricultural production and income			
9	Soil fertility / agricultural productivity			
10	Nutrition / dietary diversity			
11	Capacity to anticipate climate extremes			
12	Capacity to adapt to climate extremes			
13	Farmers' resilience			
14	Gender equality in decision-making			

Table 3: Items queried during the trend analysis (continued)

	Progress indicators	Before the project (August 2014)	Today (January / February 2019)	Main reasons for change
C	Impact level			
15	Food security			
16	Income			
D	*Others*			
17	Suggestion by beneficiaries			

Source: BRACED Burkina Faso Participatory Outcome Mapping Toolbox

For each criterion, participants were asked to evaluate the situation before the start of the project activities by BRACED (2014) and the situation as of today (January/February 2019). For eacht of the two time periods, participants could evaluate the situation on a scale from 1 (very bad") to 5 ("very good / excellent") using stones (see Table 4 and Figure 4).

Table 4: Evaluation scale

Number of stones	Evaluation category
1	Very bad
2	Bad
3	Neutral / not sure
4	Good
5	Very good / excellent

Source: Author's illustration based on the BRACED Burkina Faso Participatory Outcome Mapping Toolbox

Each participant was encouraged to express her/his opinion. After the evaluation of each criterion, participants were asked to explain their evaluations and the reasons and driving forces that led to potential changes of the current situation.

Figure 4: Evaluation exercise using stones

4. Results of the study

4.1 Overall impact

Overall, the BRACED project in Burkina Faso positively affected the beneficiaries' lives, both in economic and social terms. Additionally, the project has had some positive ecological effects. The introduction of economic activities such as vegetable gardens or poultry breeding, coupled with measures to conserve soil and water, led to the beneficiaries' occupation throughout the year. In Burkina Faso, this is particularly important given that traditional agriculture is only carried out during the rainy season from May to September. During the dry season, however, farmers usually have hardly any economic activities.

Furthermore, during the field research, participants of the focus group discussions emphasised BRACED's social effects on the communities and above all on gender equality and women's empowerment. In the context of the project activities, women and men jointly participated in training courses and started to work together in producer groups. This led to an improvement of the social cohesion, mutual help and support in the villages. In addition, the project activities created a new spirit of open-mindedness, especially regarding women's involvement and participation in decision-making at the household level.

Regarding their opportunities for participation, beneficiaries indicated that they were constantly accompanied and supported by BRACED and its local partners. Therefore, they were very satisfied with the activities of the project. They felt that they had been well informed about each step of the project, that they were given the opportunity to express their needs and that their requests were considered.

Difficulties during the project implementation occurred above all regarding the timely provision of inputs, the quality of some of the tools and equipment provided, particularly the poor construction of some of the storage facilities, and the wells, which – in some villages – were not dug deep enough and, consequently, dried up during the cropping season.

The project's particular implications for food security are discussed in the following section (4.2), followed by BRACED's impacts on poverty reduction (4.3). Moreover, BRACED's activities have had positive effects on the participation of women and their economic progress and development, which are discussed in the subsequent section (4.4). The beneficiaries' participation and the project's targeting (4.5) are discussed thereafter.

4.2 Impacts on food security and resilience to climate extremes

In all villages visited, the beneficiaries indicated that their food security situation as well as their resilience to climate extremes and disasters had improved since the start of the project. This improvement can be traced back to all pillars of food security, i.e. the physical availability of food, the economic and physical access to food, food utilisation and the stability of these three dimensions.

Physical availability of food

Compared to the situation before the start of the BRACED project, food production has increased in all four villages. This improvement on the supply side of the food security concept was brought about by a range of activities (see Figure 5).

Figure 5: Food availability

FOOD AVAILABILITY
Increased production by - Provision of HYDT seeds and other seeds - Improved farming techniques - Establishment of productive infrastructure (for vegetable gardens, rice production, cassava production)

Source: Author's illustration

At the *output level*, BRACED has provided HYDT seeds (particularly for sorghum, millet, maize, rice, cowpeas, and sesame) and other seeds (e.g. for onions[13]), other agricultural inputs, tools and equipment[14], such as pumps and micro-irrigation systems, as well as productive infrastructure, such as enclosed garden plots, wells and wetlands for rice cultivation (Figure 6).

Figure 6: Market garden with solar pump

HYDT seeds are also known as "certified improved seeds" in Burkina Faso. These seeds are better adapted to shorter rainy seasons with more variable climatic conditions, and they have better yields under drier sub-optimal conditions than conventional seeds. The seeds are cultivated by selected *local* seed producers using seed selection and seed multiplication techniques under the supervision of seed inspectors of the Ministry of Agriculture. The seed

[13] The onion seeds are "Violet de Galmi" seeds supplied on the Burkinabe market by international companies.

[14] Tools and equipment were mostly donated for free. During the second and third year of the first phase of BRACED, beneficiaries also bought some of the seeds themselves, sometimes out of their own initiative or out of necessity given that in some cases the seeds which were donated arrived late. At a later point, BRACED also started to mobilise the beneficiaries to make contributions to a joint cash box or savings account for the purchase of seeds and inputs. The BRACED team, however, decided that the contributions that would be made by the beneficiaries should be kept by the beneficiaries so that they could be used for investments for the next season when the project has ended.

producers tend to be organised in provincial or regional unions and need to get their seeds tested and certified as "improved seeds" by the Ministry of Agriculture before they are marketed as such. Therefore, these certified improved seeds should not be confused with hybrid seeds or genetically modified seeds produced by international agricultural conglomerates.

Beneficiaries indicated that especially the seeds provided, which are used for both self-consumption and for sale, have made a considerable difference. With the traditional seeds, the cultivation of cereals (millet, sorghum) used to take around 100 to 120 days until the crops could be harvested, whereas maize could be harvested after 95 to 110 days and cowpea after approximately 70 days. With the HYDT seeds, these crops can be harvested already after 90 to 100 days (sorghum and millet), 70 to 84 days (maize) and 60 days (cowpea). Consequently, production has been accelerated and increased. Beneficiaries further explained that by using the seeds donated by BRACED, their harvest almost doubled and increased from formerly four bags to a current total of seven bags. Moreover, due to the improved resistance of the seeds, cultivation is less demanding in terms of the agricultural inputs required and the harvest is ensured. Thus, these activities positively contributed to farmers' physical availability of food.

The establishment of productive infrastructure aimed, in the medium and long term, at market-oriented production. However, the harvest was also used for self-consumption, particularly in the beginning of the project. When seeking to develop agricultural value chains it is extremely important that smallholders still have staple foods at their disposal given that they greatly rely on their production for self-consumption and cannot immediately buy all staple foods with their newly generated income.

Figure 7: Women working in their market garden (cultivation of onions)

Besides these different donations, beneficiaries were trained in a range of soil and water conservation measures (e.g. the Zaï technique or composting), farming techniques adapted to the respective productive infrastructure as well as in techniques how to anticipate and adapt to climate extremes. The latter included, among others, training courses on local rainfall

monitoring and the interpretation of seasonal and daily weather forecasts. In selected districts, farmers, extension officers and local authorities were in this regard trained in the identification of climate scenarios based on seasonal forecast by the National Meteorological Agency (*Agence Nationale de la Météorologie*, ANAM) and on appropriate adaptation measures that farmers and institutions could adopt for each of the scenarios, including the selection of land suitable for cultivation, the selection of HYDT seeds and the before mentioned soil and water conservation measures. Beneficiaries of selected market gardens additionally received training on the post-harvest storage of onions in storage facilities (see Figure 8).

Figure 8: Storage facilities for onions ("Arziki")

The BRACED project disseminated various weather forecasts in collaboration with ANAM and six community radio stations. A private sector service provider (ECODATA) assisted with the translation of ANAM's forecasts in "easy French" (*français facile*) and *Mooré* (one of the main local languages spoken in Burkina Faso). Furthermore, ECODATA supported the dissemination of the translated forecasts to the six radio stations, and the dissemination of the daily weather forecast to mobile telephone clients (vocal messages). The community radio stations are supported and financed by local authorities or religious institutions. A few radio stations are run by the private sector. However, community radio often relies on volunteers to operate due to limited financial means.

Hence, at the project's *outcome level*, these training courses led to increased technical capacities of smallholders that had positive effects on the physical availability of food in two ways. On the one hand, soil fertility and agricultural yield increased. For instance, in 2018, yields for sorghum (the main staple crop in the project area) were approximately 50% higher than the regional average while maize yields in the Plateau Central region were even around 123% higher than the regional average. Cowpea data revealed a mixed picture, as yields in the Plateau Central region were only 16% above the regional average, whereas they were 208%

above the average in the Centre Nord region.[15] On the other hand, the training courses, the tools and equipment provided as well as the climate information helped farmers to anticipate climate extremes. For instance, farmers receiving climate information have started to modify their agricultural calendar (e.g. by planting or sowing earlier or later in order to avoid losing seeds after a dry spell following early rains) or invest time and effort in composting and Zaï techniques or in the construction of dikes. Sometimes, though, it can be difficult for farmers to implement their decisions during the current season, given that time is too short to prepare the implementation once the seasonal forecast is made public by ANAM. In addition to improving the physical availability of food, the provision of climate information coupled with these different techniques has, therefore, also improved the stability of the agricultural production, i.e. the stability of the physical availability of food.

Consequently, BRACED's activities have not only increased agricultural production. They have also improved the stability of this production, which is an important factor in regions affected by climate change and natural disasters.

Economic and physical access to food

Participants of the focus group discussions indicated that both their physical and economic access to markets has improved since the start of BRACED. This improvement is owed to BRACED but also to other developments (the latter are presented in italics in Figure 9).

Figure 9: Food access

FOOD ACCESS

- Establishment of links between producer groups and buyers
- Increases in income
- Change of farmers' attitudes
- *Improvements of physical infrastructure (roads, means of transport) (not part of the BRACED activities)*
- *Increase of the quantity and frequency of markets (not part of the BRACED activities)*

Source: Author's illustration

In Burkina Faso, the roads, means of transport, distances to and frequencies of markets strongly determine the *physical access* to food. Especially in the rainy season, roads are often inaccessible. Rural areas and poor households are mostly affected by this situation. In recent years, road constructions by the government and the increase of the quantity and frequency of markets have, however, (slightly) improved physical access to markets, and hence, to food. Yet, poor infrastructure is still a serious problem. BRACED was able to benefit from such developments while further contributing to improvements in this domain. By the augmentation of incomes due to BRACED (described below), people were able to further invest these incomes in the acquisition of means of transport such as bikes, motorbikes and tricycles. The beneficiaries described that the availability of such means of transport greatly facilitated physical access to markets.

The beneficiaries further stated that the *economic access* was improved by increases in the agricultural production supported by BRACED. Before the start of the project, harvest yields

[15] Numbers are based on internal project reports.

were rather low. If and when farmers decided to sell any crops, they tended to do so directly after the harvest, when prices were generally low. By using the HYDT seeds, cereal yields improved, and farmers have more staples to stock or store for home consumption or sale. The dry season vegetable gardens additionally helped to generate income. In consequence, farmers have produce at their disposal during the pre-harvest months (*saison de soudure*), i.e. when market prices are higher. The beneficiaries confirmed that this development strongly alleviated their living conditions during this critical time of the year.

Consequently, since the start of the BRACED activities, farmers have been able to sell (a higher quantity of) produce on the markets and consequently to increase their incomes. BRACED additionally helped with the establishment of direct relations with (private) buyers to facilitate the sale of the produce. Due to the organisation in producer groups, farmers could increase their bargaining power vis-à-vis buyers. It is, however, also important for farmers to have access to storage facilities where they can store their produce until the demand is higher. In addition, participants of the focus group discussions indicated that their spirit and motivation to engage in these business activities has greatly increased with the different BRACED activities and training courses.

Moreover, the general availability of micro-credits (beyond BRACED's intervention) contributed to further improvements of market outlets. People have increasingly started to use micro-credits to buy larger quantities of produce on the market in order to resell it afterwards. Thereby, demand has increased, enabling farmers to sell (more of) their produce. Hence, they have been able to increase their incomes with which they are, eventually, able to buy more and/or different types of food.

Food utilisation

In Burkina Faso, the traditional staple food is *tô*, a type of porridge made of millet, sorghum or corn. A sauce made of leaves, okras, peanuts or other ingredients typically accompanies it. Poorer people's diet usually includes only *tô* and/or *baabenda* (a dish made of leaves and some type of cereal, depending on availability). Moreover, poor people can usually afford only one or two meals a day. Especially during the end of the dry season, adults often eat only one meal a day so that their children have enough food. Overall, they have a reduced quantity of food at their disposal and their diet is not diversified at all.

Participants of the focus group discussions indicated a noticeable improvement regarding the diversification of their nutrition since the start of BRACED, mainly caused by its activities (see Figure 10).

Figure 10: Food utilisation

FOOD UTILISATION

- Diversification of diets due to the provision of HYDT seeds and other seeds enabling a diversified production
- Increase of incomes, particularly for women
- Animated video projections
- Live cooking demonstrations
- Awareness-raising sessions

Source: Author's illustration

BRACED donated a variety of seeds to all community members (not only to members of the producer groups). These included for instance seeds of millet, sorghum, maize, cowpea, green beans, and onion. At the beginning of the project, BRACED also supplied a range of other market garden seeds, such as tomato, cabbage, okra, courgette, and eggplant. The participants of the focus group discussions indicated that the cultivation of these crops increased not only the quantity of available food but also its variety. Coupled with training courses and awareness-raising, this led to a greater diversity of their nutrition. In addition, the installation of equipment to irrigate vegetable production keeps farmers occupied throughout the year and has further increased their production, income and ultimately food intake and nutrition.

To improve people's nutrition in qualitative terms, BRACED also organised awareness-raising sessions in the communities which were based on an animated video projection. The video presented a cooking demonstration covering topics like nutritional diversity, the preparation of healthy balanced meals and "enriched porridge" (*bouilli enrichie*). Besides, a few live cooking demonstrations were carried out in 2016 and 2017. Beneficiaries remarked that these video projections and cooking demonstrations raised their awareness on the necessity to diversify their diets and showed them new methods of preparation and recipes for the preparation of the different vegetables that they started to grow due to BRACED, e.g. cassava.

Women stated that their inclusion in the BRACED activities greatly contributed to the improvement of their families' nutrition. They emphasised that a family's food situation and nutrition always start with the women given that they are traditionally responsible for buying the condiments (*la popote*) and preparing the meals. Due to the different training courses and awareness-raising sessions, however, men also contribute to the families' nutrition, for instance by giving money to the *popote* or by buying meat or fish on the market.

Today, after a normal to above average rainy season, many poorer farmers are able to eat three meals a day throughout the whole year, even during pre-harvest months. Many beneficiaries indicated that they also have coffee for breakfast and besides *tô*, their diet now includes beans, rice, cassava, Bambara groundnuts (*pois de terre*), peanuts, spaghetti, and occasionally meat or fish. This improvement, in turn, has further implications. People stated that they have more energy and, therefore, are able to work more productively and longer hours. This improvement notwithstanding, income diversification is still a precondition. In years of less favourable climate conditions, the increases in cereal production through the Zaï and composting practices might not be enough to ensure that poor farmers have an adequate diet.

The increases in income, particularly of women, have also been invested in health care. These investments have additionally contributed to an improvement of people's food security in terms of their state of health and further highlight the importance of targeting women in food security and resilience programmes.

A major problem still exists regarding potable water due to an insufficient number of wells in the villages visited and a growing population. Furthermore, (physical) access to health centres can be very problematic due to the distance and the poor roads.

Stability of the three pillars of food security over time

For many people in Burkina Faso, the stability of food availability, access and utilisation is mostly jeopardised by climate change and natural hazards and disasters. These factors adversely affect the harvest and consequently farmers' incomes as well as other livelihoods.

BRACED has increased people's resilience via its institution building and strengthening activities, but also indirectly by supporting the diversification of their incomes and livelihoods, e.g. by poultry farming.

In all villages visited, participants emphasised above all the importance of the local rainfall monitoring and the weather forecasts via community radios. These services, coupled with the respective training courses, increased their capacities to anticipate adverse climate conditions, and to adapt to and tackle climate change.

At the same time, the improved farming techniques, like the composting and Zaï techniques, adapted irrigation systems and the HYDT seeds, also helped to increase production and ensure its stability. The participants explained that the improved farming techniques have brought about positive environmental effects by improving soil fertility and reducing desertification. In order to achieve systemic ecological impacts, it is, however, necessary to increase these techniques to larger surfaces. Given the labour intensity of the manual Zaï technique, an extended surface can only be tilled by applying the mechanical Zaï technique. Ideally, this technique should be combined with contour stone bunds to further increase soil fertility. This combination has already proved successful in other agricultural development projects in Burkina Faso (Herold / Gaesing 2019) and Benin (Gaesing 2018).

Overall, in the majority of the villages visited, participants of the focus group discussions indicated solid improvements in terms of their resilience due to the BRACED activities. They stated that in case of climate extremes, there have been so far no famines anymore due to improved and increased production and diversification of their incomes. Furthermore, they feel that they are prepared and have the capacities to anticipate and tackle climate extremes due to the training courses, the rainfall monitoring and weather forecasts. Moreover, even in case of crop failures they can buy food because they earn money via the market gardens and are even able to save money. In addition, they can sell assets like animals, which they have bought with their revenues.

However, another village was more hesitant when evaluating the effects of BRACED's activities on their resilience. On a scale from 1 to 5, they evaluated it at only 2. Although they attribute the positive change from 1 to 2 to BRACED's activities (above all to the improved farming techniques like Zaï and composting), they are still cautious and refrain from labelling themselves as resilient yet. Despite increased capacities, they still feel that they are not yet strong enough to get onto their feet quickly after an adverse climate event or natural disaster without any external support.

To sum up the effects on food security and resilience, Box 1 below presents a case study on BRACED's cassava production and processing activities.

Box 1: Cassava production for food security and resilience

BRACED (re-)established cassava production and, subsequently, its processing in the two villages of Balbo and Biguissi. These villages belong to the commune of Boussouma, which is located in the province Sanmatenga, northeast of Ouagadougou. In former times, cassava used to be cultivated but cultivation had to be suspended for several reasons. Traditional cassava cultivar could no longer be produced well under the changing climatic conditions and farmers lacked the technical capacities to improve the production. In addition, peasant farmers were not able to protect the fields from the animals of the nomadic herders and local farmers. Since wood resources had become increasingly scarce due to climate change, overgrazing and population growth, people were not able to build fences to protect their fields (nor did they have the financial means to buy them somewhere else). Furthermore, the relatively strict regulations of the Ministry of Environment and the necessity to apply for a permit to cut wood had considerably affected the willingness to invest time and money in cutting of thornbushes (acacia), which could well have been used to create natural fences around the gardens. Demotivated by these developments, farmers progressively started to suspend the cultivation of cassava.

However, cassava is considered an important food plant that contributes to household food security, particularly during food shortage periods (Guira et al. 2016). The cassava plant is drought resistant and also grows on depleted soils. The BRACED project had identified its importance and therefore invested in the revival of the cassava production.

BRACED established 49 hectares of cassava fields in each of the two villages. In Balbo, twenty producer groups work on plots of one to two hectares each (see Figure 11).

Figure 11: Cassava field in Balbo

Box 1: Cassava production for food security and resilience (continued)

These producer groups sometimes existed before the start of BRACED. Each producer group currently contains around 17 to 19 members (with 10 to 11 women and 7 to 8 men). Before constructing fences and starting with the installation of the cassava plots, however, BRACED ensured that the landowners officially granted access to the land.

Due to the fences and the different water and soil conservation techniques, cassava is being cultivated in considerable quantities. Therefore, the farmers can use cassava for both their own diet and for income generation. Producer groups sell their produce on the markets, but they have also established direct relationships with private buyers who come to the village to pick up the cassava.

Farmers indicated that they use the revenues generated by the sale of cassava to pay school fees, health expenditures and a more diverse diet including meat. Moreover, they also make investments, e.g. by buying bikes or other means of transportation. In a workshop organised by BRACED, women have also learned the different preparation methods of cassava and are now able to cook a variety of different recipes. Thus, overall, the cassava production coupled with the complementary activities offered by BRACED has both quantitatively and qualitatively improved people's diet.

Furthermore, the cassava wood can be used to make potash, which is used as an ingredient for local dishes, and for firewood. The latter use also contributes to the prevention of desertification and thus also has a positive ecological effect.

Just recently, BRACED has installed a cassava processing unit in Balbo to add further value to the cassava production. In this processing unit, a women's producer group has started to process the cassava roots into *attiéké*, a fermented granular cassava product used for the local dishes. The unit currently represents the major client of the local cassava producing farmers. In the first few months of 2019, the revenue generated by selling to the processing unit comprised 60% of the total producers' revenue. More specifically, out of a total production of 202,000 kg cassava, 117,000 kg were sold to the local processing unit while only 41,000 kg were sold at the local market or at the farm gate. After initial technical problems and disagreements over the price for buying cassava from husbands, relatives and neighbours, such sales seem to suggest that the processing activity is taking off.

The re-establishment of the cassava production in Balbo and Biguissi is a good example of a comprehensive approach to increase food security and resilience. The cultivation and the newly established processing units have increased the physical availability of this crop and the different products derived from it. Together with the revenues and the different training courses and awareness-raising activities, people's food security and living conditions improved. Resilience was additionally increased due to the diversification of income resources given that people could invest their revenues from cassava production in further small businesses.

4.3 Impacts on poverty reduction

As described in the previous sections, BRACED made a positive contribution to poverty reduction in all of the four villages visited (see Figure 12).

Figure 12: Income ranking (progress indicator C16, see Table 3) in one of the villages visited

Beneficiaries confirmed that their incomes increased through the sale of agricultural products from the market gardens but also from their own fields where they used the HYDT cereal seeds. The usage of the latter enabled them to produce higher quantities above the subsistence level. Furthermore, some women could generate additional income by poultry farming. Market sales were also supported by training courses in market-oriented agricultural production and by (sometimes) helping farmers to establish links with potential buyers. In addition, some beneficiaries were able to invest their generated incomes in their own small businesses. For instance, some women mentioned that they bought the equipment to produce *dolo*, the traditional local beer. In doing so, they have generated an additional source of income by producing and selling *dolo* across the villages. These increases in income notwithstanding, it should be noted that most beneficiaries still live below or near the poverty line.

4.4 Impacts on gender equality and women's empowerment

The international community has commonly acknowledged that women are key to development (UN 2019). Overall, BRACED's activities had two principal effects regarding women, which will be described in more detail below. First, they helped them to generate and increase their incomes[16], which positively affected their state of nutrition and health including their families as well as the schooling of their children. The reason is that, traditionally, men are responsible for the expenditures related to the schooling of the children and the family's health. With the newly generated income, women are now able to contribute to these

[16] However, it should be remarked that when women are provided with new income-generating activities, they usually still have to follow their daily duties and tasks, which include the work on the family fields and all tasks related to the household, among other things. Hence, depending on the activities, these might likewise present an additional burden to them.

expenditures, too. Second, BRACED's activities strengthened women's involvement and participation at the household and community level by enhancing their capacities and by explicitly including them in the different project activities.

Most importantly, women were included in all producer groups that were supported by the BRACED project. As a matter of fact, when BRACED initiated the establishment of producer groups, they made a clear condition on the composition of the groups: they should include more women than men. In one of the villages visited, the producer group of a dry season market garden consisted almost exclusively of women (30 women and 6 men, see Figure 13).

Figure 13: Producer group in Guela consisting almost exclusively of women

Beneficiaries stated that especially the irrigated vegetable gardens had an important effect because they allowed women (and men) to generate income during the dry season (*saison morte*).[17]

The donation of HYDT seeds was a further activity that favoured women's empowerment. In the first three years, BRACED donated them to women only so that they could use them in

[17] Normally, farmers sell part of their produce after the harvest in September/October to pay the school fees and school supplies. The rest of the harvest is stored (if possible) and then sold in June in order to buy the agricultural inputs for the next season. Between October and June, they usually sell their produce only if there is an urgent need of a family member. However, production quantities before BRACED were often so low that farmers had to sell everything already after the harvest without any buffers during the dry season.

their own fields. While women in Burkina Faso are often provided with a piece of land by their husband, this is not the case in all households.[18] Because the women received these seeds directly from BRACED, however, men were practically "forced" to give their wives a piece of land so that they could use the seeds. Thereby, the women were able to generate or increase their own income, which they spent above all on school and health-related costs. For instance, many women stated that with the use of the HYDT cowpea seeds, they were able to generate income that they used to pay their children's school fees and supplies.

Yet another activity that empowered women was the introduction of poultry farming, which BRACED explicitly limited to women. Each beneficiary of poultry farming received a kit with seven hens, one cock and some basic equipment in order to carry out poultry farming. In Burkina Faso, however, livestock farming used to be a traditional activity of men (at least amongst the Mossi of the Central Plateau). While in some villages or households, poultry farming carried out by women is accepted, this is not yet the norm. Therefore, this activity had two important effects. On the one hand, it helped the participating women to increase their incomes. On the other hand, it also helped to make poultry farming an increasingly accepted women's activity, though it is still not normality. During the discussions with the female beneficiaries, some women stated that they were still not allowed to buy their own livestock for breeding or that they need at least the permission of their husbands if they want to engage in livestock rearing. Therefore, they expressed the wish to have further awareness-raising measures to make men consider livestock farming as an activity for women that benefits the entire household. Most men, however, stated that they have started to realise the positive effects of women's engagement in livestock rearing. They have noticed that with the income generated by the poultry farming, women contribute to the household's income and – above all – the meals prepared taste better now. Therefore, they have become supportive of their wives practicing poultry farming and have overall come to more strongly appreciate their wives' contribution to and value for their families.

Similar to the conditions set for the establishment of the producer groups, BRACED also set the condition that the majority of participants in the training courses provided should be women. This not only helped to increase women's capacities. In fact, men also started to take them more into account in decision-making. Women confirmed that, due to their acquired knowledge during the training courses, men have started to ask their wives for advice. This was further promoted by awareness-raising sessions in the communities where BRACED showed a video that was based on a theatre performance addressing women's role in agricultural decision-making. Moreover, by mixing women and men in the training courses and producer groups, participants of the focus group discussions remarked that gender equality has become a socially accepted practice and further strengthened the relationships between women and men (see Figure 14).

[18] In Burkina Faso, women use their own "women's fields" to grow above all peanuts and legumes for the sauce of the daily meal. On the family fields, the husband – with the help of his wife – usually grows staple foods like maize, millet or sorghum. Women also sell parts of the harvest of their fields – provided that there is a good harvest. Contrary to what men sometimes say, it is important for women to generate income in order to pay for the school and health expenses for their children (especially in polygamous marriages), or the ingredients of the sauce of their daily meals, among other things.

Figure 14: Women and men working together to install a solar pump in their market garden

As discussed above, BRACED had a positive impact on the food security of women and their families. While men often invest their income in motorbikes or other things for their own needs, women predominantly invest their incomes in the nutrition and health care of their families, but also spend it on their children's school-related costs. Thus, by helping women to generate and/or increase their incomes, BRACED (indirectly) made an important contribution to the nutrition and state of health of the beneficiaries' families and their children's education.

Finally, these described effects and field observations again confirm the importance of empowering women as a key to development.

4.5 Participation, targeting and spill-over effects

The participants of the focus group discussions were overall satisfied regarding the targeting of the project, i.e. the inclusion of those people most in need and the opportunities for participation in the project's implementation.

They had the impression that the poorest and most vulnerable people were selected as beneficiaries. For instance, in one of the villages visited, the village leader had selected beneficiary households together with the local development committee based on criteria of poverty and vulnerability. Due to this open and participatory process, the village was satisfied with the selection of beneficiaries. However, it has to be noted that one further condition also impeded the participation of a certain type of vulnerable people, namely those that are physically handicapped. In order to join the producer groups and work in the market gardens or rice fields, a certain physical fitness was required.

The beneficiaries also indicated that they had discussed their needs with the BRACED agents in advance and were informed about the support they would receive. Therefore, all people interviewed indicated that they felt well-informed about the individual stages of the project implementation. Nevertheless, in some villages, the quality and quantity of some of the tools and equipment as well as the timing of certain donations – particularly the HYDT seeds – were criticised. While some tools were broken after a short time of usage, the quantity of other tools was not enough for all beneficiaries. Furthermore, the HYDT seeds often arrived late so that farmers had to start the sowing at their own expenses or start it at a later point in

time. Thus, at the "logistical level", there is still room for further improvement and continuous monitoring is particularly important here.

Moreover, participants of the focus group discussions also remarked that there are still quite a few people in the villages who should receive support. For instance, in one village they noted that a whole neighbourhood had not been included in the BRACED project. This is consistent with a general demand of the villages: in all focus group discussions, participants called for an extension of the surface areas of the productive infrastructure and an increase of the support in order to include more people of the villages as well as the neighbouring villages.

BRACED has also had certain spill-over effects. Some training courses were offered to only one or a few persons per village or producer group. After the training courses, this person then trained other members of the producer group. In addition, and most importantly, participants of the focus group discussions mentioned that non-beneficiaries also acquired knowledge from the beneficiaries. For example, non-beneficiaries learned composting and the Zaï technique, which they now apply in their fields.

4.6 Challenges

A principal challenge posed to the successful implementation of BRACED – and most probably to many resilience projects in Burkina Faso and the Sahel zone in general – is the availability of water. Water for irrigation is absolutely essential for vegetable production during the dry season. Thus, securing water availability via functioning wells and appropriate irrigation systems is an important condition. However, in some villages, wells were not dug deep enough. Consequently, they dry up before the end of the dry season. BRACED worked on the deepening of the wells in 2018 and 2019, but the problem was not fully solved until April 2019. In consequence, in one of the villages visited, farmers started to deepen the well by themselves in order to get water to secure the harvest of their vegetable garden (see Figure 15).

Moreover, the water problem is crucial for people's food security. In all villages visited, people stated that they do not have enough wells to provide the community with potable water. While potable water provision was not a direct activity of BRACED, it also had an effect on how people rated their state of food and nutrition security today.

While BRACED's initial coverage of 900 villages had been strongly reduced, the adjusted coverage of the project implementation (192 villages) is still impressive. A further reduction of the villages and a simultaneous extension of beneficiaries per village could possibly lead to even greater impacts because the work in each village could be more focused and transaction costs could be economised.

Nevertheless, the greatest challenge is posed by the future of the BRACED activities beyond 2019 when BRACED-X ends. It is essential to continue with the monitoring and evaluation of the current activities in order to ensure that beneficiaries continue the activities started by BRACED and that, in the long run, BRACED's achieved results are maintained. Furthermore, local extension services only get involved if a project pays the operating costs, particularly the transport costs. Therefore, it is necessary to raise enough funding, something which is currently still in the air due to the Brexit.

Figure 15: Market garden producer group deepening a well in order to get water to irrigate their onions

Related to the end of the project is the question whether smallholders are able to obtain seeds and inputs when project funding has ended. The programme's activities have in principle laid the foundation to continue the purchase of the seeds and the necessary agricultural inputs, as beneficiaries indicated that they have increased their incomes and made different investments in order to diversify their income and livelihoods. Access to and the affordability of seeds are however issues to consider. While market garden seeds can be purchased in local shops[19], the HYDT seeds are not freely available in stores. They have to be obtained from unions of seed producers or through the subsidised redistribution of the seeds by the Ministry of Agriculture. The Ministry, however, does not necessarily meet farmers' local demand for certified HYDT seeds. The demand of the Ministry and NGOs may also exceed the supply by the unions. It is also not clear if farmers are willing to buy these inputs at their own expense. Thus, these factors might challenge the sustainability of the project's impact beyond project duration.

However, BRACED made considerable efforts to take precautions for the future. Since 2017, the project has advised farmer groups to raise funds to procure seeds and inputs for the next seasons and to cover the costs of maintenance and petrol for the pumps. As a result, a considerable number of groups has saved 200,000 to 300,000 FCFA as operating capital. In addition, BRACED has provided technical support to a total of 40 farmer groups to get

[19] Prices are higher than in the capital though.

registered as formal cooperatives[20] to prepare them to be eligible for agricultural loans. At present, nine groups already have their registration as a simplified cooperative (*Société Coopérative Simplifiée*, SCOOP), 21 have submitted their complete file to the relevant authorities (*Haute Commissaire*) and 10 files are being finalised for submission during the month of June 2019. All cooperatives already have a board and a system of member contributions in place, which has the purpose of assisting in the procurement of inputs and the maintenance of equipment.

Beyond these challenges described above, the recent deterioration of Burkina Faso's security situation is also worrying given that the correlation between poverty and conflicts is well known to be very high and could impair what has been achieved so far.

[20] The registration as formal cooperatives is based on the Cooperative Act by the OHADA (*Organisation pour l'harmonisation en Afrique du droit des affaires*), which aims at harmonising the cooperative law in the OHADA member countries in order to improve the legal environment and economic development (OHADA 2019).

5. Conclusion

This study analysed how the BRACED programme in Burkina Faso has improved people's food security and living conditions by focusing on the beneficiaries' perceptions and evaluations.

According to the beneficiaries, BRACED has made important contributions to their food security in terms of food availability, food access, food utilisation and its stability. Concurrently, the activities have contributed towards improving their economic situation and reducing poverty. Thereby, their resilience was strengthened.

Moreover, BRACED's social effects on the communities and above all on gender equality and women's empowerment should be particularly emphasised. Since beneficiaries were organised in producer groups and motivated to work together, they felt that the communities have been pulled together more strongly, which led to an improvement of the mutual help and support in the villages. Beneficiaries also stated that BRACED's activities have created a new spirit of open-mindedness, particularly concerning women's involvement and participation in decision-making at the household level. The activities and their results have made most men understand the importance of their wives' contribution to the household's wellbeing as well as their importance for the general development of the village, although participation in decision-making at the village level requires more efforts and much more time.

Hence, the findings of this study confirm the widely acknowledged importance of putting women in the centre of development, particularly regarding projects that aim at food security. Women responsibly invest their incomes in those areas that are crucial for food security and development in general. In addition, the study further highlights the importance of openly and transparently discussing the selection of beneficiaries, their needs and the individual stages of the project implementation.

Overall, the participants of the focus group discussions underlined a certain level of social cohesion of the community and strong leader personalities as important factors that contributed to the success of the interventions. Therefore, the social component behind the implementation of projects should not be underestimated.

However, these positive effects concern above all the project's beneficiaries and the broader impact of the project on the population is hence rather limited. In addition, it should be noted that the beneficiaries' assessments and evaluations have hardly taken into account the future of the activities initiated by the programme. Sustainability beyond project duration is an important factor that has to be considered and the programme's impact in the long run remains to be seen. By supporting farmer groups in establishing cooperatives with a board and a system of member contributions in place, BRACED has sought to lay a solid foundation for farmer groups to continue the activities initiated by the project. Nevertheless, it usually requires some time for cooperatives to be fully operational. Therefore, it would be desirable to continue the support of these farmer groups at this early stage.

Bibliography

Barrett, Christopher B. / Lentz, Erin C. (2009): Food Insecurity. In: Robert Denemark et al.: The International Studies Compendium Project. Oxford.

Clay, Edward (2002): Food Security: Concepts and Measurement. Paper for FAO Expert Consultation on Trade and Food Security: Conceptualizing the Linkages Rome, 11-12 July 2002.

CIA. Country (2019): The World Fact Book. Burkina Faso. https://www.cia.gov/library/publications/the-world-factbook/geos/uv.html [8/2019].

FAO. Food and Agriculture Organization of the United Nations (2006): Food Security. Policy Brief, Issue 2. Rome.

FAO. Food and Agriculture Organization of the United Nations (2008): An Introduction to the Basic Concepts of Food Security. Food Security Information for Action. Practical Guides. Rome.

FAO. Food and Agriculture Organization of the United Nations (2010): The State of Food Insecurity in the World. Addressing Food Insecurity in Protracted Areas. Rome.

FAO. Food and Agriculture Organization of the United Nations (2018): The Impact of Disasters and Crises on Agriculture and Food Security 2017. Rome.

FAO. Food and Agriculture Organization of the United Nations (2019): FAOSTAT. Burkina Faso. http://www.fao.org/faostat/en/#country/233 [8/2019].

FRAC. Food Research & Action Center (2017): Impact of Poverty, Food Insecurity, and Poor Nutrition. Washington.

GADM (2019): GADM maps and data. https://gadm.org/ [8/2019].

Gaesing, Karin (2018): Restauration de la fertilité des sols dans la région nord du Bénin. Institute for Development and Peace (INEF), University of Duisburg-Essen (Good Practice 12b/2018, Ways out of extreme poverty, vulnerability and food insecurity).

Guira, Flibert / Some, Koussao / Kabore, Donatien / Sawadogo-Lingani, Hagrétou / Traore, Yves / Savadogo, Aly (2016): Origins, production, and utilization of cassava in Burkina Faso, a contribution of a neglected crop to household food security, In: Food Science & Nutrition 5 (3), pp. 415-423.

GoBF. Government of Burkina Faso (2007): Programme d'Action National d'Adaptation à la variabilité et aux changements climatiques (PANA du Burkina Faso). Ouagadougou.

GoBF. Government of Burkina Faso (2016): National Plan for Economic and Social Development (PNDES) 2016 - 2020. Ouagadougou. http://www.pndes2020.com/pdf/06-en.pdf [3/2019].

Headey, Derek / Fan, Shenggen (2010): Reflections on the Global Food Crisis. How Did It Happen? How Has It Hurt? And How Can We Prevent the Next One? Washington.

Herold, Jana / Gaesing, Karin (2019): Burkina Faso: Bodenverbesserung durch den Bau von Steinwällen. Institut für Entwicklung und Frieden (INEF), Universität Duisburg-Essen (Good Practice 18/2019, Wege aus extremer Armut, Vulnerabilität und Ernährungsunsicherheit).

IMF. International Monetary Fund (2012): Burkina Faso Strategy for Accelerated Growth and Sustainable Development 2011-2015 (SCADD). IMF Country Report No. 12/123. Washington.

INS. Institute National de la Statistique (2018): Annuaire Statistique National 2017. Ouagadougou. http://www.insd.bf/n/index.php/publications?id=36 [8/2019].

OHADA. Organisation pour l'harmonisation en Afrique du droit des affaires (2019): Acte uniforme relatif au droit des sociétés coopératives. http://www.ohada.com/actes-uniformes/939/acte-uniforme-relatif-au-droit-des-societes-cooperatives.html [8/2019].

Mahla, Anika / Gaesing, Karin / Bliss, Frank (2018): Ernährungssicherung: Eine entwicklungspolitische Bewertung ausgewählter Handlungsfelder. Institut für Entwicklung und Frieden (INEF), Universität Duisburg-Essen (AVE-Studie 8/2018, Wege aus extremer Armut, Vulnerabilität und Ernährungsunsicherheit).

Motis, Tim / D'Aiuto, Chris / Lingbeek, Brandon (2013): Zai Pit System. ECHO Technical Note 78. https://www.echocommunity.org/resources/d676d269-5f1f-47f1-812a-ed6d3e253989 [8/2019].

Sen, Amartya (1981): Poverty and Famines. An Essay on Entitlement and Deprivation. Oxford.

Silva Villanueva, Paula / Phillips Itty, Ruth / Sword-Daniels, Victoria (2018): Routes to Resilience. Insights from BRACED Final Year. Synthesis Paper. London.

UN. United Nations (2019): Goal 5: Achieve gender equality and empower all women and girls. https://www.un.org/sustainabledevelopment/gender-equality/ [8/2019].

UNDP. United Nations Development Programme (2019a): Human Development Data. http://hdr.undp.org/en/data [8/2019].

UNDP. United Nations Development Programme (2019b): UNDP Burkina Faso. https://www.adaptation-undp.org/explore/western-africa/burkina-faso [8/2019].

UNEP. United Nations Environment Programme (2019): Sourcebook of Alternative Technologies for Freshwater Augmentation in Africa. http://www.unep.or.jp/ietc/publications/techpublications/techpub-8a/zay.asp [8/2019].

UNICEF. United Nations International Children's Emergency Fund (2019): Definitions. Nutrition. https://www.unicef.org/infobycountry/stats_popup2.html [8/2019].

USAID (2017): Food Security Desk Review for Burkina Faso. Washington.

Weingärtner, Lioba / Trentmann, Claudia (2011): Handbuch Welternährung. Bonn.

World Bank (1986): Poverty and Hunger. Issues and Options for Food Security in Developing Countries. A World Bank Policy Study. Washington.

World Bank (2007): Agriculture for Development. World Development Report 2008. Washington.

World Bank (2016): Burkina Faso Poverty, Vulnerability, and Income Source. Washington.

World Bank (2019a): World Bank Open Data. https://data.worldbank.org/ [8/2019].

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