

Farm Typologies, Off-Farm Income and Food Security in Small Scale Farming Systems of West Africa: A Case Study on the Province of Bassitenga in Burkina Faso

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Abstract: Bassitenga province, close to Ouagadougou, faces increasing demographic and land pressure that is weakening family farming systems, the main livelihood for rural households. National cereal output keeps rising, yet food insecurity has not eased, and households keep diversifying their income beyond farming itself. Three bodies of knowledge speak to this issue, namely farm typologies, off-farm income, and indicators of household economic viability, but they are rarely brought together in Sahelian literature. This review draws together the agronomic, socio-economic and humanitarian literature on these three themes, focusing on how farm typologies are built, how much off-farm income contributes to covering food needs, and how economic viability is measured, notably through the cereal coverage rate and the survival and sociability thresholds. Off-farm income covers 13 to 27% of food needs among Sahelian farm households and makes up 35 to 45% of their total income, playing an especially important role during the lean season. Yet its contribution by farm type is rarely documented, and neither are the interactions between farming systems, income diversification and food security. This dynamic is particularly pronounced in Bassitenga, where proximity to the capital and small-scale mining open under-explored avenues for diversification. This review suggests developing differentiated typologies that combine farming systems with off-farm income, quantifying their respective contribution to food security by farm type, and assessing, at the local level, integrative frameworks such as the Humanitarian-Development-Peace Nexus and the AGIR Alliance.

Key words: Bassitenga, farm typology, off-farm income, food security, survival and sociability thresholds, economic viability.

1. Introduction

In sub-Saharan Africa, family farming remains the main pillar of food production and the leading source of rural employment [1, 2]. It accounts for 74% of Burkinabe households and supports the livelihoods of nearly 63% of the country's active population [3, 4]. This economic weight does not, however, guarantee the food security of rural households. From June 2019 to June 2024, the number of people affected by food insecurity in Burkina Faso quadrupled, rising from 672,000 to approximately 2.8 million [5], even if

national cereal production grew by 30% over the same period [6]. Such a gap raises questions about the limits of a policy focused mainly on the volume of production [7].

Bassitenga province ranks among the most densely populated areas of the country [8], which compounds the difficulties common to rural Burkina Faso: soil fertility depleted by continuous cultivation [9], increasingly fragmented farming plots and exposure to climatic and security shocks. Its proximity to Ouagadougou nonetheless gives it advantages that other provinces lack, notably a commercial outlet for market gardening and agricultural products [10], as well as off-farm activities such as artisanal gold mining and craft trades.

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It is specifically this link between farm typologies, the weight of off-farm income, and household food security that studies conducted in Burkina Faso and Niger have rarely explored jointly, each dimension typically being addressed separately [11-14]. This raises the question of the extent to which, off-farm income shapes food security in Bassitenga households, depending on farm type. We hypothesize that a cross-characterization of farming systems and off-farm income sources would help to better target food-resilience interventions while taking household heterogeneity into account [15, 16].

2. Materials and Methods

2.1 Study Area

The study covers Bassitenga province in the Oubri

region of Burkina Faso (12°35'N, 1°25'W) (Figure 1). Covering 2,778 km², the province had 314,514 inhabitants at the 2019 census, a density of 113.2 inhabitants/km², well above the national average [3]. Family farming under rainfed conditions dominates. Also, these farming systems are practiced on increasingly small plots because of this demographic pressure [8]. Ziniaré, the provincial capital, is less than 35 km away from Ouagadougou, and this proximity shapes households' economic choices, which readily turn to peri-urban market gardening or non-farm activities [10]. The province has also recently benefited from institutional agricultural investment, notably the deployment of input storage infrastructure in Ziniaré under the Emergency Project to Strengthen Agricultural Production [17].

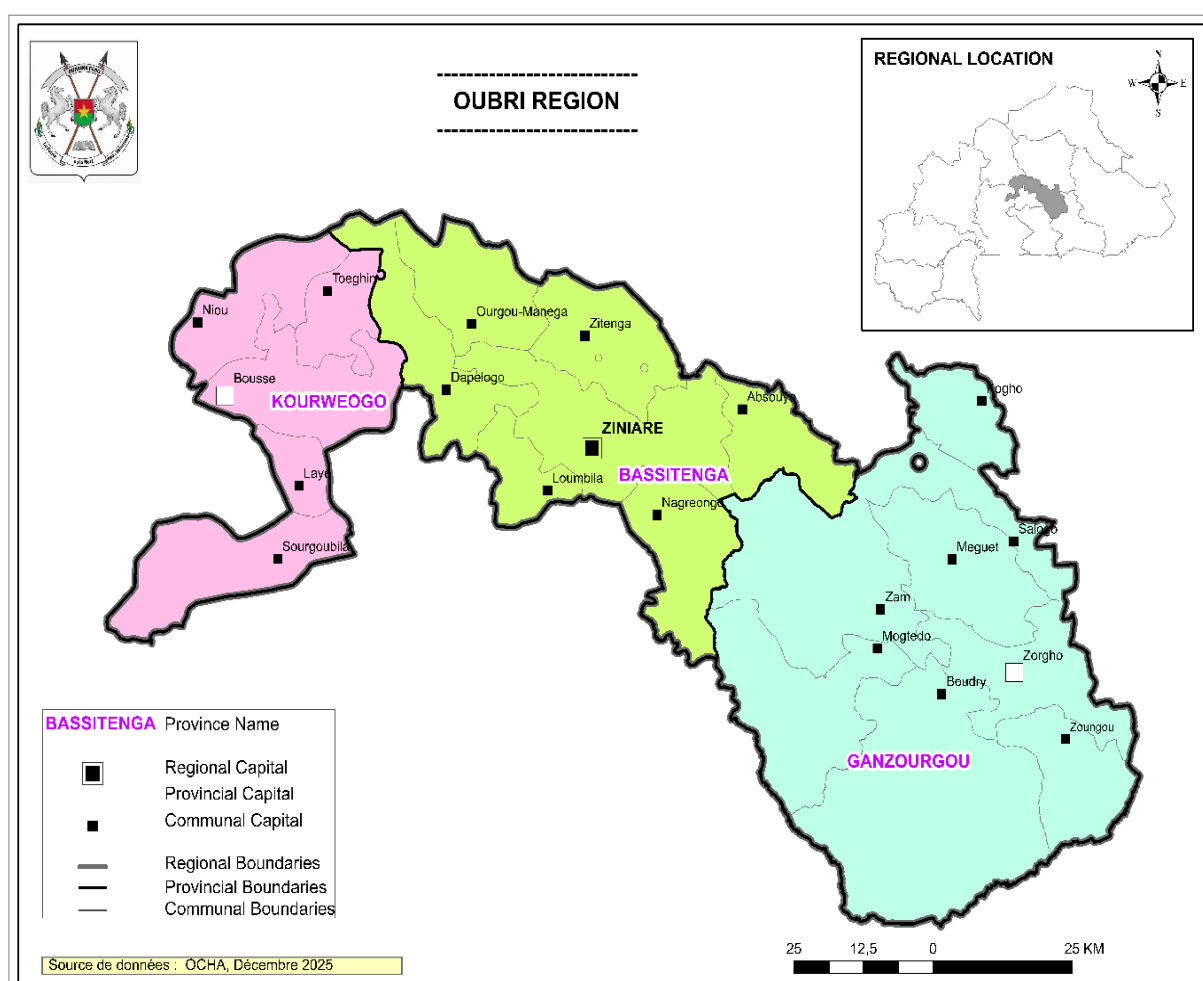


Fig. 1 Oubri region and study area.

Source: OCHA, December 2025.

2.2 Literature Search and Analysis Approach

This review draws on a documentary analysis of the agronomic, socio-economic and humanitarian literature published between 1995 and 2025. It draws on institutional databases (FAO, INSD, World Bank, Cadre Harmonisé, FSIN, AfDB) as well as indexed scientific journals, including the International Journal of Biological and Chemical Sciences, Cahiers Agricultures, World Development, Food Security, and others. These sources were supplemented by institutional reports and project activity reports relating to sub-Saharan Africa in general and Burkina Faso in particular, notably Bassitenga province.

3. Results

3.1 Potential and Limitations of Family Farming in Burkina Faso

Family farming relies primarily on unpaid family labor, and its output is firstly used to feed the household before being sold [1]. The statistical concepts a “smallholding”, is defined solely by a farm-size threshold below 2 ha [2]. Globally, family farms accounted for 70 to 80% of farmland worldwide, encompassing 608 million family farms, which generated 80% of the world’s food value [2, 18]. In sub-Saharan Africa, smallholder family farms alone supplied more than three-quarters of the food produced [19].

In Burkina Faso, most farms are under 5 ha and operate as low-value-added subsistence agriculture [8]. Largely rainfed and limited to a 4-to-6-month rainy season, this type of farming remains vulnerable to

climatic hazards and land pressure, particularly pronounced in Bassitenga [8]. In addition to the security crisis, which complicates access to farming areas and markets for households (host, displaced, and returnee), along with a growing disinterest among rural youth in family farming in favor of artisanal gold panning or migration [7, 8].

3.2 Methods for Building Farm Typologies

Characterizing farms by type is a critical step, as it allows targeted responses according to farming systems typology rather than standardized interventions which do not take into account the socio-economic diversity of households [20]. Work on this topic has distinguished two methodological approaches. On one hand, participatory approaches built on in-depth discussions with farming stakeholders; on the other hand, multivariate statistical approaches combining Principal Component Analysis (PCA) and Hierarchical Ascending Classification (HAC), widely used in West Africa [13, 14, 21]. Table 1 presents the main approaches and the variables they use.

In the Sahelian context, these typologies have generally been structured around land tenure, farm equipment, available labor, cropping systems, and soil fertility management practices [15]. Such typologies have revealed substantial gaps in productivity and strategy between farm types. They have, however, rarely translated into operational recommendations genuinely tailored to each type, as confirmed by the literature reviewed [13, 21].

Table 1 Approaches to farm typology construction.

Method	Variables used	Principle / Objective	References
Participatory approach	Farmer perceptions, available resources, stated strategies	In-depth discussions with stakeholders to build locally recognized homogeneous groups	[15, 22]
RHOMIS (Rural Household Multi-Indicator Survey)	Standardized multi-dimensional indicators (production, income, food security)	Rapid, comparable typology across sites, suited to large-scale surveys	[23]
PCA (Principal Component Analysis)	Land area, equipment, livestock, labor, cropping systems	Reduces the number of variables to retain only the axes that discriminate between farms	[13, 21]
HAC (Hierarchical Ascending Classification)	Principal axes derived from PCA	Groups farms into homogeneous types, often validated by multinomial regression	[14, 24]

Table 2 Weight of off-farm income in household food security.

Indicator	Documented value	Context	References
Share of non-farm income in total household income	35 to 45%	Rural farm households, sub-Saharan Africa	[26-29]
Contribution of off-farm income to food needs	13 to 27%	Multi-country study including Sahelian countries (20 African countries)	[30]
Role in food consumption indicators (FCS, HDDS)	Significant improvement in scores	Burkina Faso	[31]
Role during the lean season	Inter-seasonal smoothing mechanism, increased reliance on markets	Sahel, post-harvest / lean season	[29, 32]
Role in adoption of agroecological practices (zaï, stone bunds, agroforestry)	Financial prerequisite for purchasing equipment and labor	Northern and North-Central Burkina Faso; Mali	[33, 34]

Table 3 Food security and economic viability indicators.

Indicator	Definition / Formula	Interpretation	References
Cereal coverage rate (CCR)	$CCR (\%) = \frac{\text{Net cereal production}}{\text{Total cereal needs}} \times 100$. Needs = $\Sigma (\text{household members} \times \text{adult-equivalent coefficient}) \times 190 \text{ kg/year}$	Measures only the "availability" pillar; covers neither access nor utilization	[5, 8, 14]
Survival threshold	Minimum living cost (food, clothing, basic healthcare, housing) per worker, estimated locally	Below it, critical viability and structural food insecurity	[15, 22]
Sociability threshold	Survival threshold plus compulsory social expenses (funerals, weddings, schooling, dues)	Between survival and sociability, food-viable but socially marginalized; above it, economically and socially viable	[13, 22]

3.3 Nature and Weight of Off-Farm Income

Sahelian farm households do not live off the land alone. Ellis [25], in a now-classic typology, distinguished three broad sources of income mobilized by rural households: agriculture in the strict sense (livestock and crop production), wage labor on other farms, and non-farm activities such as trade, crafts, or gold panning. This is nothing new in Burkina Faso's Plateau Central. As early as 1995, a study conducted in the neighboring province of Passoré showed that rural households' food strategies, in a context of structural adjustment, went well beyond farming alone [11]. Table 2 summarizes studies on the weight of off-farm income and its role in household food security.

These studies converge on a shared finding: off-farm income, far from being a mere supplement, has become an essential link in the food security of Sahelian farm households, especially during the lean season, when household cereal stocks are depleted [29]. Frelat et al. [30] put forward a stronger hypothesis, namely that supporting off-farm activities

and market access would be more effective for food security than agricultural intensification alone. None of the studies reviewed, however, measured the contribution of this income by farm type.

3.4 Indicators for Measuring Food Security and Economic Viability

Two complementary categories of indicators are used to assess the situation of farm households: those that measure food availability in the strict sense, and those that assess the economic viability of the farm. The cereal coverage rate (CCR) remains the most widely used, both in national surveys and in Cadre Harmonisé analyses [5, 8, 35]. It relates a household's net cereal production to its annual needs, calculated on the basis of 190 kg/person/year [8, 14]. It only captures the "availability" pillar of food security, however, leaving aside access and utilization.

To move beyond this limitation, Ferraton and Touzard [22] proposed two complementary concepts, the survival threshold and the sociability threshold, which assess whether farm income covers a household's basic needs. Traoré et al. [15] and Koutou

et al. [13] applied these concepts in the West African context. Table 3 details how they are calculated.

Combined with farm typologies, these indicators would, in principle, allow households to be classified by degree of vulnerability. In practice, the literature reviewed rarely linked the CCR and the survival/sociability thresholds to an explicit measure of off-farm income by farm type.

4. Discussion

4.1 Three Siloed Bodies of Knowledge

A joint reading of Tables 1, 2 and 3 highlights an imbalance in the literature reviewed. On one hand, typology-building methods are solidly established [13, 14, 21], as is the overall weight of off-farm income in household income and food security [26, 30]. Per-worker economic viability indicators, particularly the Ferraton and Touzard [22] and Traoré et al. [15] thresholds, offer a robust framework for distinguishing households by their capacity to cover basic and social needs. Yet these three bodies of knowledge remain largely siloed: typological studies rarely quantify the share of off-farm income by farm type, and studies on income diversification rarely draw on an explicit typology of farming systems [12, 16, 28].

This compartmentalization limits the operational reach of available knowledge. As Giller et al. [20] show clearly, the same agricultural performance can have very different food security outcomes depending on context, market access, or a household's other activities. Building farm types that integrate both the farming system and off-farm income sources therefore appears to be a promising avenue for sharpening intervention targeting.

4.2 The Case of Bassitenga: A Setting Suited to Integrated Analysis

Bassitenga precisely meets the conditions needed to resolve this misalignment between farm typologies, off-farm income, and food security. Its strong

demographic land pressure, along with poor farming technologies [8] reduce the viability of strategies based on agricultural intensification alone, which strengthens the potential role of off-farm income. Its proximity to Ouagadougou eases market access for selling market-garden products, with high economic value compared to staple crops (rainfed crops) [10]. This proximity also allows smooth access to a wider range of non-farm activities than more remote rural areas. Institutional investment follows this same dynamic, as shown by the recent deployment of input storage infrastructure in Ziniaré under the Emergency Project to Strengthen Agricultural Production in Burkina Faso, Phase 2 (PURPA-BF-2) [17].

It can therefore be assumed that the weight of off-farm income exceeds the average one reported in the literature [30]. However, this hypothesis has to be cross-checked. It also raises the question of whether the types of farming systems in Bassitenga are not specific to its context, for instance combining limited landholdings with strong non-farm diversification, that would not necessarily match typologies established in more remote areas.

4.3 Toward Integrated Intervention Frameworks: The HDP Nexus and the AGIR Alliance

On the institutional response side, the historical sequential approach linking relief, rehabilitation and development (LRRD) has shown its limits in addressing Sahelian food insecurity. Resources are lacking to carry out both sequences, and the approach remains poorly suited to households' structural needs [36, 37]. The Humanitarian-Development-Peace Nexus, formalized at the 2016 World Humanitarian Summit, instead advocates simultaneous rather than sequential responses [38, 39].

Led since 2012 by CILSS, UEMOA and ECOWAS, the Global Alliance for Resilience Initiative (AGIR) puts part of this nexus into practice through four pillars, including Pillar 1 (social protection and livelihoods) and Pillar 3 (agricultural productivity and

household income) [40]. Available evaluations are fairly encouraging: households that benefited jointly from actions under these two pillars for three consecutive years showed greater resilience to food insecurity during the following lean season [41]. This finding points to a synergy between support for farming systems and support for non-farm livelihoods. Achieving this, however, requires a sound understanding of the targeted household types, a body of knowledge that remains to be built for Bassitenga and other provinces of Burkina Faso and the Alliance of Sahel States (AES).

5. Conclusion

Three bodies of knowledge emerge from this review: the construction of family farm typologies, the characterization of off-farm income, and the measurement of food security among Sahelian rural households. Off-farm income covers a significant share of food needs (13 to 27%) and plays a central role in smoothing consumption across seasons, yet its contribution by farm type remains poorly documented. The survival and sociability thresholds would offer a relevant framework for this differentiation, but they are rarely combined with an explicit typology that incorporates off-farm income sources.

Bassitenga province, where strong land pressure and proximity to the capital converge, offers a favorable setting for studying these interactions. We identify four research avenues: (a) developing farm typologies that combine farming systems with off-farm income sources in Bassitenga; (b) quantifying, by farm type, the contribution of the cereal coverage rate and off-farm income to the survival and sociability thresholds; (c) analyzing the interactions between farming systems, income diversification, and household food resilience, particularly during the lean season; and (d) assessing, at the local level, the relevance of integrative frameworks such as the Humanitarian-Development-Peace Nexus and the AGIR Alliance for targeting interventions differentiated by household type.

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