

Article

Responses of Rural Households to the Cotton Crisis in Benin

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Abstract: Relying on one source of income puts the livelihood system of rural households at risk. In Benin, cotton has long been the core cash crop of rural livelihood systems—until the mid-2000s, when multiple constraints led to the demise of cotton production. This paper investigates the responses of rural households to the economic shock resulting from the collapse of the cotton sector and the consecutive decrease of income from cotton. The primary data collection was carried out between 2009 and 2012 and included a household survey and focus group discussions with groups of farmers. The results reveal that households diversified their sources of income on farm, with food crops increasingly gaining a cash function. However, because the production system still depended heavily on cotton for access to fertilizers and other inputs for food crops, farmers continued to grow cotton despite its decreasing returns. In addition, because of their multiple extra-domestic activities, women seemed to be less vulnerable than men when coping with livelihood shocks; indeed, their contribution to providing for household needs increased. Further results revealed that young men devised their own ways of dealing with the crisis by temporary migration.

Keywords: cotton production; income decline; livelihood diversification; rural Benin

1. Introduction

Benin is a former French colony situated in West Africa that has a long history of cotton production for export, dating from 1905 during the colonial period [1]. Cotton production has for a long time been a vital livelihood activity for rural households in Benin, where it has constituted a smallholder cash crop for the last three decades. Until the first half of the 1980s, the crop had a marginal status, but it steadily grew in importance to become the backbone of the country's economy from the beginning of the 1990s. The production quadrupled from 105,000 tons in 1990 to 427,000 in 2005 before dropping again to the 1990s level around 2010. The increase in cotton production went along with its growing economic importance, both for the State and for farmers. It accounted for an important share of the State's revenues and farm households' cash earnings, providing up to 80% of rural households' income, mainly in the north. The share of cotton exports represented 75% of the country's total exports during the first half of the 2000s before dropping to 40% in 2008. In the period 1995–2000, cotton exports accounted for about 80% of the country's total agricultural exports and generated 25% of fiscal revenues [2]. Being the main cash crop and a critical livelihood asset, the crop dominated the country's agricultural policies, determining, among other things, the input supplies and use among farmers, and farmer organizations in rural areas [3]. Benin then led Central and West Africa's major producers of cotton lobby group, known as C-4 (Cotton-4): Benin, Burkina Faso, Mali, and Chad. For these countries, cotton held an important place in agriculture, with a influential farmer organizations of farmers [4,5]. The sector directly or indirectly offered a source of living to millions of people, with the

cotton industry representing 60% of the country's industrial sector—including ginning factories, textile mills and cotton oil extracting factories [6].

Cotton was critically important to rural welfare, since about 45% of rural households depended on cotton revenues for about 80% of their income. It constituted a source of livelihood for more than 325,000 rural households, i.e., about 3 million people [7–9]. During the cotton boom of the 1990s and the first half of the 2000s, the average acreage allotted to the crop steadily increased to 64% of the total cropped land [10,11]. During the 2000s, one-third of the farming households in Benin grew cotton, allotting about 18% of the total cultivated area to cotton. In the northeastern and central departments of Borgou and Alibori, which are the main cotton-producing areas, cotton farmers had on average 2.62 to 3.15 hectares of cotton [12].

The income generated by cotton has the comparative advantage of being received in important amounts at once, which allows for large expenditures and investments such as the construction of houses, weddings, school fees, motorcycles and cars. These features of cotton revenues made the crop critical for poverty alleviation among poor rural households, and created a large dependency on cotton income for their livelihoods [13,14]. Minot and Daniels [10] (p. 460) found that a “40% fall in the cotton prices resulted in an 8% rise in the incidence of poverty”. The World Bank [9] and the United Nations Development Programme (UNDP) [15] linked 12% of the increase of the incidence of poverty in the North during the early 2000s to the decline of cotton prices on international markets. Thus, the cotton sector constituted the backbone of the country's economy. However, about two decades after the boom, the demise set in.

From the mid-2000s onwards, the returns from cotton began to dwindle [9] due to a combination of constraints that overwhelmed the production. Among other constraints were the fall of cotton prices on international markets, mismanagement of cotton organizations, and long-term arrears of payment to farmers. Cotton had become an erratic and insecure source of living, especially in the northeastern provinces, where an 18% reduction in per capita income resulted in an equivalent increase of the incidence of poverty [9]. Therefore, farmers became disenchanted and massively abandoned cotton production, thereby drastically narrowing the basis of their livelihood. To the growing disillusionment of producers, the State offered no or very few solutions [9]. The alternatives explored to remedy the country's high dependency on (conventional) cotton and to release both the State and farmers from their woes were diversification of agriculture, the export of products like cashew nuts, and organic cotton production [16]. The first, diversification, seemed like an empty proposition, since the governmental incentives (support, inputs supplies, market, etc.) to promote alternative crops were lacking and consequently, the sectors remained unorganized. Additionally, farmers have always diversified their agricultural production to absorb social, economic and environmental shocks, despite their dependency on cotton for cash [17,18]. As for organic cotton production, it has been promoted since 1996 by NGOs as a sustainable solution to the environmental side effects imputed to conventional cotton. However, the higher price of organic cotton does not compensate for its lower yields. Hence, the role of organic cotton appears to be marginal.

The objective of this paper is to identify farmers' strategies to deal with the shortage of income resulting from the demise of cotton in the northeastern and central departments of Benin. The research was guided by two central questions. First, how did households adapt to or cope with the decline in cotton revenues? Second, how did changes in income patterns modify the gender relations within the household? The remainder of this article is structured as follows. Section 2 discusses theoretical perspectives on livelihood and household. Section 3 describes the study area and study design. Section 4 presents and discusses the results. The concluding section wraps up the discussion and looks at the agricultural policy implications derived from the findings.

2. Livelihoods and Households

During the past decades, unraveling the logic of family and household production and consumption has received increasing attention from scientists and policy makers. In an attempt

to uncover the dynamics of urban economies in Africa, two types of approaches have been documented: the informal sector approach and the survival approach. The first uses three dominant perspectives—the reformist, the institutionalist, and the neo-Marxist—to shed light on the economic situation of people participating in the informal sector. The informal sector approach “played a crucial role in drawing attention to the poverty and the plight of the people involved in such activities, the employment potential of the sector, and the creativity and entrepreneurial skills of informal sector participants who make it amidst inappropriate state regulations” [19] (p. 451). While the formal sector approach focuses more on economic activities than on the people performing these activities, the informal sector approach captures the variety of people involved and the ways they shape their activities to make a living.

The survival strategy approach has the merit of analysing both people’s responses to economic hardship and the context of their decision-making processes. The approach is mostly applied to rural contexts and exclusively to poor communities to whom a rationality in risk minimization is attributed. It has been widely used to analyze people’s strategic responses to economic crises, showing its value “for exploring the dynamic nature of the environment in which livelihood decisions are made” [19] (p. 452). However, poor people with few assets are severely limited in their options and, hence, have little scope to “strategize.” Because of the conceptual limitations of the two approaches briefly discussed above, livelihood approaches gained momentum.

Livelihood is a “multi-faceted concept, being both what people do and what they accomplish by doing it, referring to outcomes as well as activities” [20] (p. 322). It refers to “the mix of individual and household strategies, developed over a given period of time, that seeks to mobilize available resources and opportunities” [19] (p. 452). According to the International Fund for Agricultural Development (IFAD) [18] (p. 52), “the livelihoods of poor rural households reflect on the one hand the opportunities and constraints characterizing the areas where they live [...] and on the other, their own profiles and characteristics as households.” Livelihood approaches help us to appreciate the many ways of raising extra income through additional activities. The unstable and adverse economic conditions in many parts of sub-Saharan Africa have led households to search for additional income by engaging in multiple activities [19], a common strategy among vulnerable rural populations [20,21]. Unfavorable natural conditions, such as low and erratic rainfall, drought and poor and infertile soils, are considered severe constraints to the improvement of the situation of rural communities [22], forcing them to strategize to improve their livelihood. Compared to the previous approaches, livelihood approaches are thus more encompassing, since they are directed at discovering the interactions between the domestic unit and its environment [23].

The household can be seen as the locus of livelihood generation, being the immediate context for the strategic management and allocation of resources to provide for the daily needs of its members [20]. Consequently, most livelihood studies use the household as the unit of analysis, but its conceptualization has changed over time. Unitary models perceived the household as “a collective of individuals who agree over the broad principles of intra-household resources allocation” [24] (p. 28). However, in such models, the interaction between household members and their unequal power positions tend to be glossed over. This has prompted alternative conceptualizations of the household. Niehof [25] notes that households have fluid and adaptable boundaries and that household ties are not underpinned by law. This makes them more fragile than families and, contrary to families, makes the exit option relatively easy. The joint utility model of the household could shed more light on the internal dynamics of the household as unit of consumption [26], but the assumption of joint utility failed to take into account the agency of household members as social actors who face the dilemma of cooperation and conflict in household production and livelihood generation [27,28]. The bargaining approach focuses on power relations in the distribution and allocation of resources within the household [29,30]. Following Rudie [31] (p. 228), we see the household as a family-based co-residential unit that takes care of resource management to satisfy the primary needs of its members. We also acknowledge that household members may have conflicting interests and unequal power

positions, which necessitates bargaining and can result in household members leaving the household temporarily or permanently [28,29].

Conceptualizing the household livelihood system has led to the emergence of two closely related concepts: diversification and adaptation. Though not synonymous, the two concepts are sometimes used interchangeably, both being referred to as strategies. Evidence has shown the strategic role of diversification in rural livelihood systems [20]. Diversification is defined as “the process by which rural families construct a diverse portfolio of activities and social support capabilities in order to survive and to improve their standards of living” [21] (p. 4). In this process, not only income but also social institutions, gender relations, and property rights that contribute to living standards are included. Diversification should not be limited to sources of income, as in many studies, but should include diversification of assets as well [21]. It can occur as a purposive strategy or as a response to a crisis. In the case of the latter, we shall use the concept of coping: diversification of income sources out of necessity, or for “bad” reasons, which can be accompanied by the selling (de-diversification) of assets [20]. The first is diversification by choice, which aims at strengthening livelihoods, the accumulation of assets and risk management. Diversification as an individual or household-level strategy is neither a rural phenomenon nor the preserve of developing countries [21,27]. Rural livelihood diversification is realized through on-farm, off-farm and nonfarm activities, thereby generating different types of income and assets. Barrett et al. [32] used a three-way classification of rural households’ sources of income and use of productive assets: by sector (e.g., on-farm versus nonfarm), by function (wage versus self-employment), and according to space (local versus migratory). Abdulai and CroleRees [33] found that the income of poor households is less diversified due to their lack of capital, which limits their ability to take advantage of nonfarm work.

Livelihood adaptation is perceived as adjusting consumption and production patterns in response to observed or expected economic and social hardship, such as income decline. Ellis [34] (p. 298) defines livelihood adaptation as the continuous process of “changes to livelihoods which either enhance existing security and wealth or try to reduce vulnerability and poverty.” Adaptation is broader than diversification because first, it includes adaptation of consumption patterns, which diversification does not, and second, adaptation is not always diversification. Adaptation can be by choice (positive) or of necessity (negative), the latter being constrained by limited options (as in coping). Ellis [34] (p. 290), argued that the distinguishing features of rural livelihood strategies in poor countries are the “maintenance and continuous adaptation of a highly diverse portfolio of activities.” The scope for diversification and adaptation depends on the vulnerability of the individual or household concerned. Vulnerability is dynamic and multi dimensional. It is determined by external threats and internal assets. Consequently, vulnerability “measures the resilience against a shock [and] is primarily a function of a household’s asset endowment and insurance mechanisms” [35] (p. 139).

This article analyzes the ways in which farm households in the study area strategized to deal with the economic shock to their livelihoods caused by the decline in cotton profitability. It focuses mainly on on-farm income diversification as the main strategy of the rural households, given the scarcity of nonagricultural income-earning opportunities in the area.

3. Research Area and Methodology

3.1. Research Area

The research area indicated on the map (Figure 1) covered two agro-ecological zones in the north of Benin: the cotton zone of the northern Benin, commonly called the “cotton belt,” and the food belt of southern Borgou, which corresponds to the central zone of the North. Relatively low rainfall, suitable soil types and relatively high temperatures made the area suitable for cotton production. Throughout this region, households have always been heavily dependent on cotton for their income and livelihoods. Siaens and Wodon [36] (p. 174) found a 7% reduction in the probability of being poor for

cotton-producing households compared to nonproducing ones, and concluded that “cotton producers fared relatively well” over the 1990s. This explains why people have been reluctant to abandon cotton.

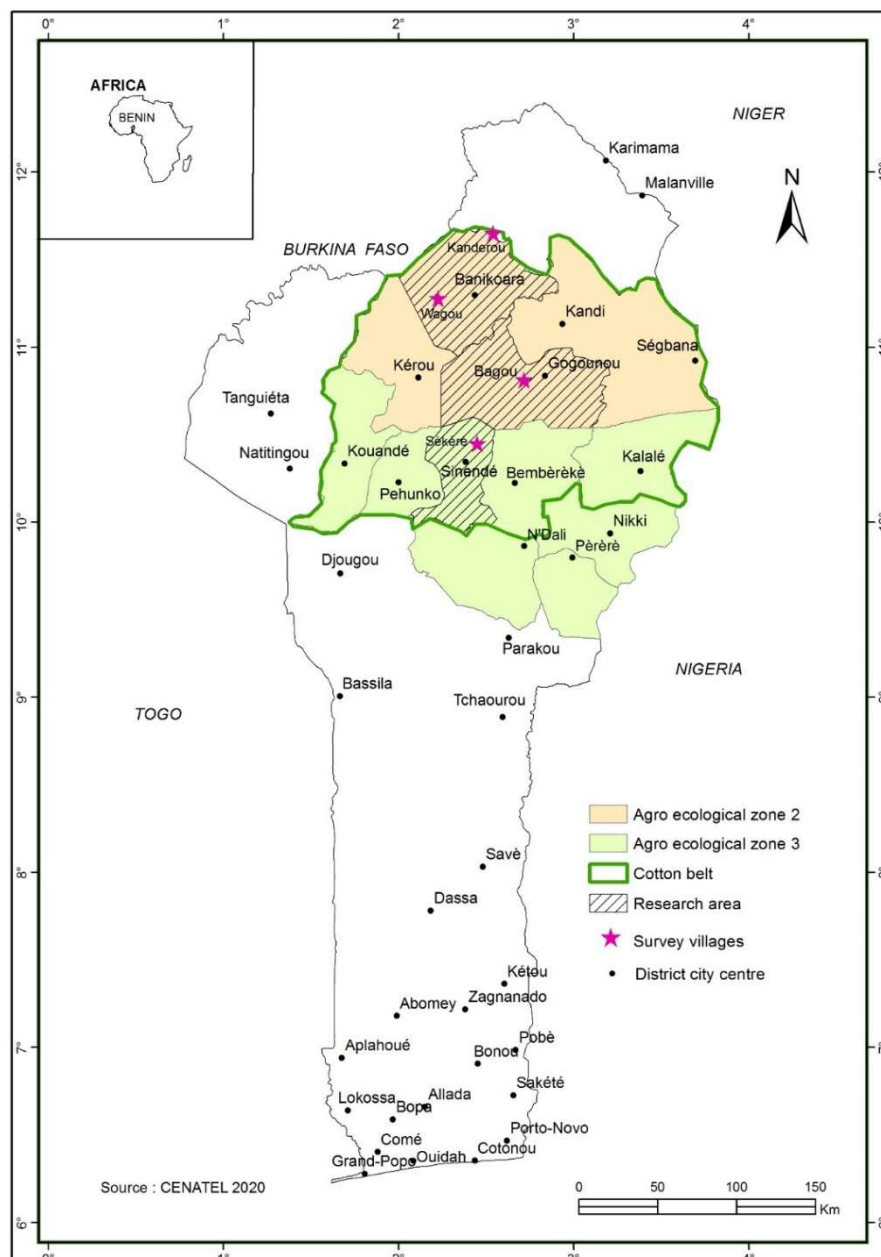


Figure 1. Map of Benin displaying the location of the research sites.

The fieldwork was conducted in four villages within three of the largest cotton-producing districts of the cotton belt: Wagou and Kanderou in Banikoara, Bagou in Gogounou and Sekere in Sinende. The three districts’ population is predominantly Baatombu [37], a sociocultural group that practices mainly farming and owns the land. They cohabit with Fulani, who are cattle breeders and herders, and the majority of whom speak the same language as the Baatombu.

Banikoara contributes up to 45% to the national production, which makes the district the heartland of the cotton belt. Gogounou represents the third biggest producer, while Sinende is the largest cotton producer within the food belt. In 2004, Banikoara and Gogounou together supplied 64% of the national cotton production, while the production of the north-central zone comprising Sinende represented 29% of the national production [38]. The research was carried out during 2009–2012, a few years after the

precipitous decline of cotton production had set in. The decline led the government to re envision the management of the sector, which had been completely left to private monopolies since the beginning of the 1990s.

3.2. Methodology

The study is a cross-sectional one that included retrospective questioning and used a mixed-methods approach comprising (i) secondary data collection and (ii) primary data collection including focus-group discussion, surveys, in-depth interviews and participant observation. The districts and villages were selected to cover zones of various levels of cotton production, areas with different levels of cotton abandonment, and both accessible and remote villages, in order to comprehend the various dynamics. The four villages were selected to capture the variation in cotton-growing areas to prevent biased conclusions. The villages were not selected for comparing and contrasting. In fact, the four villages together constitute one case: a sample to get an insight into households' responses to the cotton crisis in the cotton belt. Table 1 provides the distribution of the respondents and participants in the research by village.

The secondary data were collected from agricultural extension agencies and farmer organizations' boards, and included published and unpublished data on cotton production by districts over the last decades, the evolution of cotton networks in terms of membership and coverage of area, the evolution of the inputs credit allocation by district, other reports, etc. The focus group discussions consisted of interviews with groups of farmers with no pre-established relationships, using a checklist of cotton-related issues to collect qualitative data. Two focus group discussion sessions were held in each village: one with men and the second with women. The discussions were organized one after the other, but more often simultaneously. During these discussions, we investigated the institutional mapping of the village, the importance of cotton and the interactions between cotton and non-cotton organizations, etc. For the household survey, a sample of 148 cotton farmers was constituted through a systematic sampling from member lists of cotton farmer groups. The survey used a semi-structured questionnaire that addressed issues of household livelihood: household livelihood assets, the evolution of household's income sources, the evolution of spouses' contribution to household expenditures, etc. Only the household heads were interviewed about household strategies. Household membership included all adults participating in the household's daily life for at least one year and their dependents. The number of workers in the households was calculated in male adult equivalents using the conversion table by Norman [39]. According to this table, women's contribution to agricultural labor force represents three-quarters of that of men. Based on observations in the field, however, it was decided to assign equal weights to men and women. For the in-depth interviews, a few respondents were selected to elaborate on the dynamics of migration, the power play among household members, etc.

For analytical purposes, we distinguished the prime period of cotton production from the decline. The cotton prime started with the boom at the beginning of the 1990s and ended around 2005. During this period, cotton production had high economic returns—although some inputs, such as family labor, were not always taken into account by cotton growers. The decline began when farmers experienced ineffective inputs, mainly bad-quality pesticides. This resulted in low yields and led to indebtedness.

Although there was a high ratio of male to female respondents in the sample (124/24), we tried to avoid using only a male perspective (masculism) [40]. We investigated the farmers' perceptions of changes in the respective contributions of husbands and wives to the provision for household needs between the period of the cotton prime and that of the decline. By analyzing these according to gender, a gender subjectivity in appreciating the spouse's contributions could be documented. For example, in the appreciation of wives' contribution to household provision, men denied their wives' contribution during the cotton prime—while, according to the women, wives did contribute [3].

Table 1. Distribution of the sample.

	Agricultural Population and Sample Sizes per Village				Total	
	Sekere	Bagou	Kanderou	Wagou		
Agricultural Households	313	545	121	165	1144	
Focus Groups	Men	34	14	27	26	101
	Women	6	12	9	25	52
Survey Sample	42	70	10	26	148	
In-depth Interviews	7	9	4	5	25	

Source: Field survey, 2009–2012 and INSAE (2004).

The sample represented about 13% of the agricultural households, which were not all growing cotton, for the rate of cotton abandonment was quite critical. Households that went through the in-depth interview were selected among the surveyed ones.

3.3. Household Structure and Characteristics

In the study area, household structures proved to be complex. We could distinguish three types of households: (i) the nuclear family household with one male adult head, his wife (or wives) and dependents; (ii) a household where brothers share a homestead that is headed by the eldest brother, with limited autonomy for the younger brothers; and (iii) households where two or more brothers do not share a homestead but share some resources, produce jointly but are relatively autonomous in managing the nonfood outcomes. The different arrangements of the household and homestead aim at joining efforts in growing labor-intensive crops such as cotton, allowing for a minimum level of autonomy for brothers, strengthening household food security and protecting the honor of the family.

The arrangements illustrate the central position of kinship ties. Kinship ties are strengthened through working together on food production and sharing the granary. Hence, the criterion of co-residence in the definition of household used does not necessarily imply living under one roof, but the proximity of household members has to be such that they share—at least a major part of—household resources and daily activities, of which sharing the granary is fundamental. In the study area, different domestic units in one homestead or different homesteads in one domestic unit can, in fact, constitute one household, provided they share crucial resources and jointly manage these to provide for their primary needs. Therefore, in our case a household can be defined as a group of people who eat from the same granary, pool the necessary basic resources, and abide to a certain extent by the designated head's decisions about the management of resources.

Table 2 offers an overview of the characteristics of surveyed households in the study area. Regarding education, male heads of households had a higher literacy rate than female heads of households, and, while there were no women with university-level education, about 3% of men in the sample had higher education. In both groups, however, secondary school education represented the largest category. The difference between men's and women's education was significant ($p < 0.05$).

Table 2. Characteristics of surveyed households.

Description of Variables		Female-Headed (<i>n</i> = 24)	Male-Headed (123 ≤ <i>n</i> ≤ 124)	χ^2 and <i>t</i>
Education of the head (level)	No education	20 (83.3%)	63 (50.8%)	9.05 *
	Primary school	1 (4.2%)	26 (21.0%)	
	Secondary school	3 (12.5%)	31 (25.0%)	
	University	0 (0.0%)	4 (3.2%)	
Household Size (person)		11.33 (5.62)	17.33 (11.96)	−2.40 ***
Labor Available (male adult equivalents)		6.75 (3.33)	10.96 (9.32)	−2.18 ***
Dependency Ratio		1.70 (0.39)	1.70 (0.54)	0.096
Experience in Cotton Production of the Head (years)		14.17 (6.98)	21.32 (10.45)	−3.22 **
Ratio of the Head's Experience in Cotton Production by his Experience in Agriculture		0.86 (0.16)	1.17 (0.92)	3.48 **

Source: Field survey, 2009-2012, Note: * = $p < 0.5$, ** = $p < 0.01$, *** = $p < 0.001$. Figures in parentheses are percentages and standard deviation of means.

As Table 2 shows, overall, the mean household size is high, which confirms the general opinion that northern Benin has the largest households in the country [41]. Minot and Daniels [10] found that cotton-growing households in Benin had more dependents than those that do not grow cotton. The larger household size is due to the agricultural orientation of the region, since agriculture has a high labor demand. Cotton is particularly labor-intensive and requires the involvement of all able household members, including women. In addition to their agricultural work, women also prepare the food for the workers on the farm. Hence, the success of farm activities is related to the performance of domestic activities. Female heads of households are solely responsible for their (cotton) plots, on which they have to perform all the work, male-headed households are significantly ($p < 0.001$) larger than female-headed ones. Male-headed households have significantly ($p < 0.001$) more labor available than female-headed households. The prevailing tradition of polygyny in the region, where men often have more than one wife, even among Christians [42,43], is part of the explanation. No significant difference was found in the household dependency ratio between male- and female-headed households.

Table 2 also shows that men have significantly ($p < 0.001$) more experience (by a factor of 1.17) in cotton production as part of their agricultural experience than women. Experience refers to autonomy in decision-making about the production system and the use of the yields. Since cotton is a cash crop and a major source of income, already during adolescence boys used to have their own cotton plots, independently from the household plots, which they fully control from sowing and planting to harvesting and the use of the yields. Their interest in cultivating food crops usually only starts when they are heads of their own household. On average, women have fewer years of experience in cotton production as part of experience in agriculture (by a factor of 0.86) and their involvement in cotton starts later than that of men. Indeed, girls rarely own a plot for cropping before they get married.

4. Results and Discussion

Agriculture remains the main economic activity in the study area. Raw agricultural products and some locally processed foods constitute the bulk of the items sold in the rural markets. Few local farmers engage in (informal) business activities. Manufactured products are mostly sold by traders coming from nearby urban centers or by traders who came to settle in the villages. For the indigenous population, agriculture remains the cornerstone of their livelihood, often providing their total income, with cotton as the major cash crop.

4.1. Land Allocation to Cotton

Of the sample of 148 cotton farmers, about three-quarters were still producing cotton and one-quarter had abandoned cotton production. However, the dynamics of cotton production make it difficult for farmers to abandon it completely. Indeed, about 58% of those who abandoned cotton production (about 14% of the total sample) were willing to resume it if the conditions of production improved. These dynamics attest to the economic importance of cotton, which played a crucial role in the monetization of the rural economy from the beginning of the 1990s onwards [9]. Despite this importance, between 2006 and 2010 a decline in the average level of cotton production and a net decrease in the average size of cotton plots could be observed (Table 3). This overall decrease points to a general trend of cotton abandonment in 2006–2010, as a consequence of the troubles in the sector since about 2005.

Table 3. Evolution of cotton production between 2006 and 2010.

Production Parameters	N	M	SD	Min.	Max.
Household's cotton plot in 2006 (Ha)	132	3.67	4.50	0.00	30.00
Household's cotton plot in 2010	146	2.27	2.37	0.00	12.00
Household's cotton production in 2006 (Tons)	127	5.15	8.03	0.00	60.00
Household's cotton production in 2010	134	2.38	2.53	0.00	10.00
Average area of cotton plot (2006–2010) (Ha)	147	3.30	3.70	0.00	30.00
Average cotton production (2006–2010)	132	4.48	5.71	0.00	49.20

Source: Field survey, 2009–2012.

4.2. Structure of Cotton Farmers' Income

Among the wide range of sources of income of farmer households in the study area are kitchen gardens, animal husbandry, processing of agricultural products, marketing of raw food products, selling of condiments, handicraft, and salaries and pensions. There was no statistically significant difference between male- and female-headed households with regard to the average number of sources of income (Table 4). In each category, the average household has at least two sources of income.

Table 4. Structure of income sources of male- and female-headed households.

Parameters	Men (111 ≤ N ≤ 124)	Women (19 ≤ N ≤ 24)	t
Mean number of sources of income	2.02 (0.71)	2.13 (0.68)	0.69
Average percentage of agricultural income in total income	73.83 (31.01)	65.17 (24.76)	−1.26
Average share of cotton in agricultural income	47.78 (26.18)	36.43 (19.77)	−1.80

Source: Field survey, 2009–2012. Note: Figures in parentheses are standard deviations.

However, the women's livelihood portfolio tends to be richer than that of men. In addition to agricultural activities and handicraft, in which both men and women are involved, food processing and the trading of food products are exclusively women's activities. This provides women with more opportunities for adaptation than men.

Of all activities, agriculture has remained the main income-generating activity, providing about 74% of income to male-headed households and 65% to female-headed households. As Table 3 shows, the shares of income from cotton in agricultural income were 36% for female-headed households and 48% for male-headed households, making the latter more dependent on income from cotton than the former. These figures represent a steep decline from the share of cotton income before 2006, though the averages hide considerable differences between households. Some still earn up to 100% of their income from cotton, while others reported that cotton no longer provided them with income, although they continued growing it. The reasons for the decline are the lower profitability of the crop and the problems with getting paid for the produce.

4.3. Importance of Cotton for Strengthening the Household's Asset Base

Cotton brought much wealth and well-being to the north of Benin during the 1990s and the early 2000s, such that it was referred to as “white gold.” Apart from the income derived from it, cotton production enabled people to receive relatively large amounts of money at once, which they could use for big investments. Most of the households surveyed reported improved living conditions, which they acknowledged to originate from cotton production. Concrete houses, roofs of corrugated sheets, agricultural equipment (grinding mills), motorized transport, all sorts of equipment and appliances, and weddings, were reportedly financed from cotton income. Cotton had become the backbone of the country's economy and the source of rural households' assets.

By enhancing assets and resources endowment, cotton has had enduring effects for individuals, households, and communities in the north, and, at a national level, for the State. An increase in houses with corrugated roofs, a symbol of “rural ease,” and the construction of community infrastructures are, among others, visible signs of the improvement in farmers' living conditions driven by cotton production [9]. For a long time, cotton production shaped people's life. Around the year 2005, the high dependency on cotton began to show its limits, which required farmers, individually as well as collectively, to devise new ways of generating income.

4.4. Adapting to and Coping with the Cotton Crisis

The causes as well as outcomes of diversification are shaped by location, asset ownership, income opportunities and social relations [21]. Three types of livelihood assets are relevant for people's adapting and coping strategies and capacities in rural areas: natural, social and human capital, to which access is mediated by rules and social norms [44]. These assets are the main instruments for diversification of income and resources. Motives such as the reduction of risk, the experience of shocks and the availability of opportunities drive the choice of diversification [17]. In the cotton zone of Benin, the fall of prices and the erratic payment for cotton yields resulted in a shortage of income that created an economic shock. Consequently, both cotton producers and those who (pretended to have) abandoned it had to adapt to or cope with the new situation by diversifying in various ways to compensate for the reduction in income (Table 5).

Table 5. Patterns of adaptation and coping strategies in cotton zone.

Adaptation (Choice)	Coping (Necessity)
Commercial food crop production	Reduction of cotton area
- Increasing economic importance of marginal cash crops	Diversion of fertilizers to food crops
Emergence of organizations around food crop production	More freedom for wives' entrepreneurship
	Seasonal migration of teenagers

Source: Field survey, 2009–2012.

To mitigate the economic shocks or reduce the risk of failure, the main strategies of adaptation and coping are changing agricultural production patterns, migration and granting de facto more freedom to women. The first strategy is exemplified by: (i) the shift of purpose in cotton production, (ii) the increased economic role of previously marginal cash crops, and (iii) food crops gaining a cash function and becoming particularly profitable after the food crisis of 2008. Whether these strategies are sustainable remains to be seen.

On-farm diversification. The first two adaptation strategies in Table 5 are a diversification by choice, and aim at managing risk. They consist of conferring a cash function to food crops, such as maize, sorghum, yam, cassava, and cowpeas, which in the past were produced primarily for home consumption, selling only the surpluses. Rice, which was produced both as food and as a cash crop, soybeans, and groundnuts have seen their cash function increasing (Table 6).

Table 6. On-farm income diversification among cotton farmers.

Crops	Frequency (% of Farmers)			
	1st Rank	2nd Rank	3rd Rank	4th Rank
Maize	60.9	28.7	4.3	1.7
Groundnut	2.6	12.2	16.5	8.7
Rice	2.6	13.9	20.0	7.8
Sorghum	1.7	3.5	7.0	8.7
Soybean	0.9	3.5	10.4	9.6
Yam	-	6.1	4.3	-
Cowpea	-	3.5	1.7	3.5
Cashews	-	-	1.7	1.7
Total	68.7	71.3	67.0	41.7

Source: Field survey, 2009–2012.

About 69% of the respondents cited a food crop as their current first income-generating crop, of which maize represented more than half, followed by groundnuts and soybeans, then rice and sorghum. This implies that less than one-third of farmers still have cotton as their first cash crop. Maize is the second-highest income-generating crop, followed by rice and groundnuts.

Cultivating these food crops provides additional income and offers compensation for the loss of income from cotton. However, their growth requires fertilizers that, until recently, were difficult to access for non-cotton producers. Those who can afford fertilizers on the black market, or can access fertilizers through their social contacts in the formal cotton organization, have completely given up cotton production in favor of maize. Those who cannot do so continue to grow cotton, albeit in small quantities. In this way, they can continue to receive fertilizers that are subsequently partly or fully diverted to food crops. Therefore, for a considerable number of farmers, the primary purpose of cultivating cotton has changed from earning income to accessing inputs. However, following the disqualification of farmer organizations from cotton production, the extension agencies have exerted a closer control on the use of inputs. This has led farmers to devise new strategic behaviors to access the critical inputs in the context of decreasing land fertility, displaying a combination of adaptation and coping strategies.

The strategies to access inputs (coping) aim at increasing the effectiveness of diversifying income sources (adaptation), showing that there is no rigid boundary between adaptation and coping. In the case of a full diversion of cotton fertilizers to food crops, the yields of the beneficiary food crops are expected to cover the inputs debts. However, this can be risky. Whenever there is an overproduction of maize and concomitant low prices, or when the agricultural season is struck by a natural contingency, farmers become heavily indebted. Up to half of the maize produced may be used to pay back such debts. There is a high covariate risk [34] between these alternative cash crops. When fertilizers are partially diverted, farmers drastically reduce the area planted with cotton to produce just enough to cover the inputs debts. However, this strategy does not always work. If cotton is not sufficiently attended to and yields are below the expectations, farmers have to use their food crop production to pay back for the inputs, thereby reducing the profitability of the alternative crop.

Youth male migration as nonfarm diversification. Out-migration has been identified as an important strategy for improving livelihood systems in Africa. Factors such as limited employment opportunities, increased poverty and the pressure on natural resources are drivers, intertwined with social dynamics [45,46]. However, migration is rarely a first choice or preferred option. Farmers resort to migration when on-farm diversification does not result in better prospects.

Rural-(semi-)urban migration was observed in some villages, where the seasonal migration of teenagers has become an emergent phenomenon and de facto part of the livelihood system when on-farm diversification failed to improve livelihoods. Food crops that become cash crops cannot generate enough income to meet all needs, particularly those arising from the aspirations of the youth to have motorbikes and mobile phones. Acknowledging this, some households allowed their boys

to temporarily migrate to Nigeria. About 9% of surveyed households had up to three such absent members. The migration to Nigeria takes place through clandestine networks of traffickers, who may have no previous direct connection with these teenagers whom they recruit by chance.

In villages where about 62% of the respondents reported experience with (a) migrant child(ren), we could observe two patterns of decision-making in the migration of young people. The first is migration as the outcome of the migrant's personal decision, which occurs in about 78% of the cases. Someone said in an interview: *"They usually leave the village in small groups by night and their absence is only noticed the following morning. Sometimes, it is after many days that the parents become convinced that their children have migrated."* The second pattern concerns children who inform their parents of their decision to migrate. In some of these cases, the parents accept this since they cannot afford to give their children what they want, thereby becoming passive. In other cases, the parents have a more active role because they discuss the issue with their children and advise them.

In all cases, the migration was a trans-border movement to Nigeria and lasted on average for about six months. During this period, the migrants send no remittances and have no contact with their parents. Parents are usually ignorant about the whereabouts of their children and do not know whether the children intend to return and when. The migrants are commonly known to work primarily in agriculture, with construction in second place, and probably in illegal employment in high-risk work such as mining as well. They return in small groups, just as they left, each of them riding his motorbike. They travel at night on rural roads like smugglers, to avoid being arrested by custom officers who would fleece them, requesting substantial amounts of money.

Unlike seasonal migration, which takes place during specific periods [47,48], this migration can take place at any time of the year. It is also not cyclical; the reproduction of the process is fed by new migrants. Successful and experienced migrants recount their adventures to their peers, who then decide to try it themselves. In contrast to commonly known processes of migration in which the flow is maintained by a network of social relations (conf. [49]), in this case the temporary migration revolves around established networks. Although it does not provide the household with direct cash, it constitutes a diversified source of income if it is assumed that the head of household should provide for the desired assets. When he cannot do so, outmigration becomes an option for boys to afford their needs. Although their absence from home for several months reduces the supply of household labor, their return in possession of what they wanted releases the parents from a pressure on the household means.

Additionally, the use of the motorbikes is manifold. Not only does possessing a motorbike confer a sense of achievement on its owner, motorbikes also become productive assets when used for "taxi-moto," an important means of transportation in rural areas. The boom in the cotton sector engendered expectations that could no longer be met after the demise. To hold on to their aspirations of modernity while living in a rural area, the young people found a way out in the form of temporary migration (conf. [50]).

Institutional diversification as livelihood adaptation strategy. Cotton organizations have lost their pre-eminent position and are now competing with farmer organizations that focus on crops with added value. The emergence of these crops also benefited from the support of NGOs that, apart from those lobbying for organic cotton, were excluded from the highly regulated and fully controlled cotton sector. Thus, organizations involved in the production of maize, rice, groundnuts, cashews, cassava and soybeans, or beekeeping, emerged in the villages to compete with the cotton organizations that were overwhelmed by debts and mismanagement. Pre-existing associations that were on the verge of collapse, such as those of traditional dancers and craftsmen, also benefitted from this development. Cotton organizations had made farmers familiar with organizations. Being a member of an organization became part of their lives. Farmers, once involved in managing cotton organizations, used their experience to structure and lead the new organizations.

Clearly, although cotton production has declined and its organizations are fading, cotton has contributed to building human capital, a resource that farmers use to organize themselves in other

areas of production. The new organizations, therefore, contribute to improving farmers' livelihoods, given that participating in a wide array of associations increases the ability to smooth livelihood fluctuations [51]. In addition, leading an organization enables mediating between donors and NGOs on the one hand and fellow farmers on the other [52]. It also entitles leaders to manage common resources of which the use can be diverted from public needs to private purposes, as happened in cotton production. Although farmers are complaining about lower income, not having to deal with cotton anymore satisfies some of them.

4.5. Effects on Intra-household Resource Allocation and Gender Roles

The decline of cotton production has modified the shares of men's and women's contribution to provision for household needs and expenditures. Men's higher dependency on cotton income made them less proficient in using alternative income sources than women, at the expense of their purchasing power. This is reflected in men's lower contribution to the provision for household needs, which is not without consequence for the spousal relationship.

Women's purchasing power benefits from the wide range of income-generating activities they perform over the course of their lives. Women in Benin are economically very active. They start to earn their own income as young as 15 and continue to work into their 70s [42,53]. Therefore, after the demise of cotton, their contribution to providing for household needs increases relative to men who have fewer income-earning opportunities in absolute terms. Table 7 presents the perceived changes in the contribution of wives to the provision for household needs from the women's perspective.

Table 7. Evolution of wives' contribution to household needs (%).

Women's Perspective (N = 24)		High	Average	Low to Negligible
Schooling Fees	During the cotton prime	21.7	43.5	34.8
	After the decline (2005)	26.1	56.5	17.4
Clothing	During the cotton prime	59.1	18.2	22.7
	After the decline	68.2	18.2	13.6
Health Care	During the cotton prime	9.1	9.1	81.8
	After the decline	31.8	13.6	54.5
Daily Feeding	During the cotton prime	22.7	22.7	54.5
	After the decline	40.9	22.7	36.4

Source: Field survey, 2009–2012.

However, women's increased contribution to the provision for household needs does not necessarily result in empowerment. Husbands still dominate intra-household decision-making. Cultural beliefs and social practices not only impose on husbands to provide for their wives and children, but also endow them with rights over their wives. Although the younger generation may find this old-fashioned, the culturally underpinned subordination of wives turns out to be thriving. A male head of a cotton-farming household strongly believed that: "Just because a wife contributes to clothing and feeding the children at home does not mean that she and her husband will have an equal status." This statement reflects the endurance of traditional cultural definitions of gender in northern Benin [54].

At the same time, bargaining within households does take place, though neither in the form of an explicit negotiation of rights and entitlements nor as an open conflict for control of resources. Rather, it is a permanent repositioning of household members for mutual respect and self-esteem. Although men would not publicly acknowledge this, the important role played by wives in the household economy confirms that women act as a shock absorber in times of economic hardship [55]. This implies a tacit handover of some power to women within households.

5. Conclusions

The decline in cotton production and its consequences for income, resources and livelihood assets have brought about shifts in the diversity of income sources. When an economic shock occurs, farmers first tend to devise strategies using the resources available on the farm. They only look beyond the farm when on-farm opportunities turn out to be inadequate. Both on-farm and nonfarm diversification took place in the study area. The heads of households control on-farm diversification because they allocate land to household members, but off- and nonfarm diversification to complement on-farm income is beyond their control. Wives engage in extra-domestic income-earning activities and sons can decide when and where to migrate to meet their needs as well. This made these categories of household members less vulnerable to shocks than adult men, and increased their contribution to the provision for household needs and expenditures.

In spite of the wide range of activities performed by rural households to make their living, the low average number of income sources attests to the relatively poor household livelihood portfolio, or, in other words, the precariousness of the livelihood systems. Food crops are of paramount importance in diversification strategies and are actually taking over the role of traditional cash crops in providing income to households in the area. Notably, maize, whose consumption has grown steadily, has gained a cash function in addition to its food function and now ranks higher than cotton with regards to its income-generating potential. However, this double function as food and cash crop also constitutes a covariate risk. Cotton is now grown to access inputs to enhance the yields of the other crops. Therefore, to make the food crops profitable and to reduce the dependency on cotton, policy makers should pay more attention to the supply of inputs for promising food and cash crops and to improving the marketing options of these crops.

The plurality of household responses to the cotton crisis in northern Benin shows that there is no ideal type of diversification. Diversification is dynamic and contextual, which explains why households adopt more than one diversification strategy. However, two strategies can basically be distinguished in the study area: first, on-farm diversification of income sources, and, second, allowing more household members to decide upon and engage in (additional) income-generating activities.

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