



Food and Agriculture  
Organization of the  
United Nations

ANALYSING RESILIENCE FOR BETTER TARGETING AND ACTION

FAO RESILIENCE  
ANALYSIS **No. 2**



**RESILIENCE  
ANALYSIS  
IN**



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**1998 &  
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## ACRONYMS

<b>ABS</b>	Access to Basic Services
<b>AC</b>	Adaptive Capacity
<b>AGIR</b>	Global Alliance for Resilience
<b>AST</b>	Assets
<b>BF</b>	Burkina Faso
<b>CSLP</b>	Strategic Framework for Poverty Reduction
<b>FA</b>	Factor analysis
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>FAPDA</b>	Food and Agriculture Policy Decision Analysis
<b>FHH</b>	Female headed households
<b>FL</b>	Factor loading
<b>GDP</b>	Gross domestic product
<b>IFA</b>	Income and Food Access
<b>IMF</b>	International Monetary Fund
<b>MDG</b>	Millennium Development Goals
<b>MHH</b>	Male headed households
<b>NEPAD</b>	New Partnership for Africa's Development
<b>NPCA</b>	NEPAD Planning and Coordinating Agency
<b>NRP</b>	National Resilience Priorities
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PCA</b>	Principal component analysis
<b>PNSR</b>	Programme National du Secteur Rural
<b>PRS</b>	Poverty reduction strategies
<b>PRSP</b>	Poverty reduction strategy paper
<b>R</b>	Resilience



<b>RIMA</b>	Resilience Index Measurement and Analysis
<b>RMTWG</b>	Resilience Measurement Team Working Group
<b>S</b>	Sensitivity
<b>SCADD</b>	Strategy for accelerated growth and sustainable development
<b>SDR</b>	Rural development strategy
<b>SEM</b>	Structural Equation Model
<b>SSN</b>	Social Safety Nets
<b>WB</b>	World Bank

## EXECUTIVE SUMMARY

Burkina Faso is a landlocked country where adverse climatic conditions and the degradation of soil and water resources result in low agricultural productivity and in major limitation to economic growth. The country also suffers from the negative effects of a population growth rate averaging at 3 percent, which is among the highest in the world. These factors contribute to high poverty rates and severe food insecurity, particularly among rural households whose activities highly depend on a considerably volatile rainfall performance (FAO, 2014).

The country achieved a Gross Domestic Product (GDP) growth approaching, on average, about 5 percent per year (or 2.5 percent *per capita*) in the past decade. Growth has been mainly driven by the primary sector, with a recovery in cotton production and an increase in mining activities, particularly gold. Meanwhile, the country has been hit by a mix of climatic shocks (droughts in 2004 and 2007, floods in 2009 and 2010) and external (food and oil crisis in 2007) and internal (economic downturn in 2008/09) economic shocks (World Bank, 2013a). Since the economic activities in the country are strongly dependent on exogenous factors, its population is vulnerable, in particular in rural areas (World Bank, 2013b).

Against this background, the reinforcement of household resilience against food insecurity is a key objective to be taken into account in any poverty reduction intervention. Resilience is defined according to the Resilience Measurement Team Working Group - (RMTWG) as “the capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences” (RMTWG, 2014). FAO has been pioneering resilience measurement and analysis with respect to food insecurity through the Resilience Index Measurement and Analysis (RIMA) model, which has been adopted in the present analysis.

FAO-RIMA model identifies and weights pillars and their related elemental variables that contribute to render household resilient to shocks affecting their food security. The pillars constituting the FAO-RIMA model for Burkina Faso are the following: Income and Food Access (IFA), Access to Basic Services (ABS), Assets (AST), Safety Nets (SSN), Sensitivity (S) and Adaptive Capacity (AC). Additionally, the model allows tracing the stability of pillars over time. Finally, it provides evidence for more effectively designing, delivering, monitoring and evaluating assistance to populations in need, based on what they need most.

Data employed in this study come from two surveys collected in 1998 and 2003.

In brief, the resilience analysis of Burkina Faso serves three purposes:

- Assessing the resilience capacity over the years.
- Critically reviewing the different policies for increasing resilience put in place by the Government of Burkina Faso between 1998 and 2003.
- Serving as a baseline for more actual analysis.

## KEY HIGHLIGHTS

1. Findings provided by this analysis show that **the distribution of the Resilience Index is asymmetric both in 1998 and 2003**, meaning that some households are likely to respond much better than others to shocks. **However, inequality in resilience capacity between the most and the least resilient households decreased between 1998 and 2003.**
2. **AC, ABS, AST and IFA are the most relevant pillars in determining resilience score.** Such a result is consistent between the two years analysed.
3. **The dramatic difference in both resilience capacity and structure between urban and rural households persists over the five years span traversing the two analyses.** The main drivers of the higher resilience in the urban population are higher correlation of **IFA, ABS, AC** with resilience, while rural areas score better only in AST. Indeed urban populations have higher income and expenditure *per capita*, lower share of food expenditure and better access to household facilities (such as drinking water, improved sanitation and electricity) as well as lower distance to public services. Furthermore, they register much higher education attainment rate and labour force *per capita* than rural populations, thus determining their higher AC.
4. **Female-headed households (FHH) are slightly more resilient than male-headed households (MHH) both in 1998 and in 2003.** However, this result should be attributed **to the households' location** rather than to gender of household head per se. Indeed the difference in resilience structure is mainly driven by **ABS**, since households with female heads ensures to their members greater access to household facilities and basic services; **AC**, due to higher level of education of female heads; and **IFA** since FHH have higher average income and expenditure *per capita*. Furthermore, FHH rely much more on transfers **SSN** than MHH.
5. **In both the analysed years, the resilience capacity of households living in the Central region is the highest in the country.** On the contrary, Sud-Ouest and Plateau-Central result to be the least resilient. The better performance in terms of resilience capacity in the Central region, followed by Hauts-Bassin and Cascades, is related to the relatively higher income (**IFA**), good access to household facilities and basic services (**ABS**), higher education scores (**AC**) and lower income sensitivity (**S**).
6. The analysis of the dynamics of **Resilience underlines that resilience capacity is persistent over time.** In other words, highly resilient households are likely to remain resilient over the next years.

## POLICY IMPLICATIONS

**The findings of the analysis are examined in relation to the major policy initiatives put in place by the Government of Burkina Faso in the last two decades.** The political frameworks emphasize agricultural growth, especially within a poverty reduction perspective. In order to achieve this, the priorities of the Government have targeted directly policies affecting the poor, particularly in **rural areas, with a strong focus on improving access to essential social services** such as basic education, health, clean water, and sanitation. Burkina Faso's Poverty Reduction Strategies (PRS) of the 2000s focused on four pillars: (i) accelerating broad based growth, (ii) expanding access to social services for the poor, (iii) increasing employment and income generating activities for the poor and (iv) promoting good governance.

**In addition, the findings emerging from the analysis are also put into perspective with the new priorities and the major EU resilience initiative “Global Alliance for Resilience” (AGIR).** The National Resilience Priorities (NRP) for Burkina Faso envisages four priority areas for interventions, aiming at building resilience in the most vulnerable groups: social protection; nutrition and health; agropastoral production and food availability; and food and nutrition security governance. Given that these sectors are highlighted also by the present analysis as very important areas of intervention in the reference period (1998-2003), it is recognized that, despite improvements, more remains to be done to improve people livelihoods and resilience capacity through long-term investments in such sectors.

## 1

## PURPOSE OF THE ANALYSIS

Burkina Faso is a landlocked country where adverse climatic conditions and the degradation of soil and water resources result in low agricultural productivity and in major limitation to economic growth. The country also suffers from the negative effects of a population growth rate averaging at 3 percent, which is among the highest in the world. These factors contribute to massive poverty rates and severe food insecurity, particularly among rural households whose activities highly depend on a considerably volatile rainfall performance (FAO, 2014).

The country achieved a GDP growth approaching, on average, about 5 percent per year (or 2.5 percent per capita) in the past decade. Growth has been mainly driven by the primary sector, with a recovery in cotton production and an increase in mining activities, particularly gold. Meanwhile, the country has been hit by a mix of climatic shocks (droughts in 2004 and 2007, floods in 2009 and 2010) and external (food and oil crisis in 2007) and internal (economic downturn in 2008/09) economic shocks (World Bank, 2013a). Since the economic activities in the country are strongly dependent on exogenous factors, its population is vulnerable, in particular in rural areas (World Bank, 2013b).

Against this background, the reinforcing of household resilience against food insecurity is a key objective to be taken into account in any poverty reduction intervention.

This resilience analysis is based on the two national surveys conducted by the National Bureau of Statistics and Demography of Burkina Faso in 1998 and 2003.

The analysis presented in this report provides an overview of the resilience capacity of households in Burkina Faso in the two years analysed and identifies the importance of the different pillars and their related contributing factors, thus laying out the country's resilience structure. It also briefly presents the findings of the dynamic analysis of resilience, investigating the persistence of resilience over time.







## 2 RESILIENCE MEASUREMENT

*This section introduces the FAO resilience measurement framework. It briefly describes the econometric framework underlying the Resilience Index Measurement and Analysis (RIMA) estimation approach and provides substantive details on the construction of specific resilience components and variables employed in the analysis.*

The Resilience Index is estimated through the FAO-RIMA model. Within this framework, household resilience, not measureable *per se*, is estimated through latent variable model as a function of six pre-determined pillars. Such pillars are not directly measurable either, and are therefore estimated through factor analysis from the observed variables.

The six pillars represent both physical and capacity dimensions. While Income and Food Access (IFA), Access to Basic Services (ABS), Assets (AST) and Social Safety Nets (SSN) constitute the physical pillars, Adaptive Capacity (AC) and Sensitivity (S) form the capacity pillars. Detailed definitions of such components can be found in Table 1.

RIMA methodology allows analysing both resilience capacity and structure. Resilience capacity score permits ranking population's households from the most to the least resilient, thus allowing understanding which are the most disadvantaged social groups in terms of resilience capacity and what household profiles should be prioritized in the endeavors to increase resilience. In turn, resilience structure informs about the relevance of each pillar and observed variable in determining the resilience capacity of the households, allowing for designing appropriate policy indications in terms of areas of investments necessary for enhancing the resilience capacity.

Technically, the estimation procedure consists of two steps. During the first step, resilience pillars are estimated from the set of variables listed in Table 2 through factor analysis.<sup>1</sup>

During the second step, the predicted scores for particular pillars are employed in the estimation of household resilience capacity (i.e. the Resilience Index itself), following the model shown in Figure 1. The Resilience Index is estimated through the structural equation model (SEM).

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<sup>1</sup> The same set of variables has been employed for the two years of analysis.

Table 1. Resilience pillars

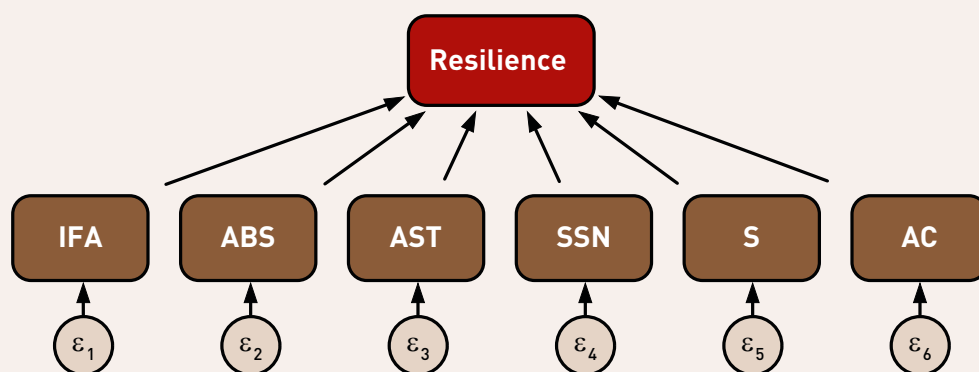
	Pillars of resilience	Definition
Physical pillars	<b>Income and Food Access (IFA)</b>	IFA approximates household's economic status and secure livelihood. Examples of indicators include income, expenditure and food security indicators.
	<b>Access to Basic Services (ABS)</b>	ABS shows the ability of a household to meet basic needs and to access and effectively use basic services, i.e. access to schools and health facilities, possibility of selling products on a market, access to improved sanitation, drinking water and electricity, and other minimum requirements.
	<b>Assets (AST)</b>	AST comprise both productive and household assets. Productive assets are the key elements of a livelihood, as they enable households to produce consumable or tradable goods. Examples of indicators include land, livestock and durables. Other tangible assets such as house, vehicle and household amenities reflect living standards and wealth of a household.
	<b>Social Safety Nets (SSN)</b>	The SSN pillar measures the ability of households to timely access reliable assistance provided by international agencies, charities and non-governmental organizations, as well as help from relatives and friends.
Capacity pillars	<b>Sensitivity (S)</b>	S measures (i) the degree to which a household is affected by a shock (e.g. a household deriving a large part of its total income from shock-affected activities has higher sensitivity than others do), (ii) the self-assessed degree to which a household has been affected by shocks in the recent past (e.g. level of income decreasing significantly vs. staying unchanged) and (iii) the quantified financial loss caused by specific shocks.
	<b>Adaptive Capacity (AC)</b>	AC is the ability of a household to adapt to new scenarios and develop new strategies of livelihood. For instance, higher income diversity insures against the risk of losing income-generating activities as an effect of an unexpected shock.

Table 2. Resilience variables and factors

	Pillars of resilience	Variables
Physical pillars	<b>Income and Food Access (IFA)</b>	Income <i>per capita</i> ; Expenditure <i>per capita</i> ; Share of food expenditure in total expenditure.
	<b>Access to Basic Services (ABS)</b>	Access to potable water; Improved sanitation; Improved electricity; Distances to public services (health facility, school, market).
	<b>Assets (AST)</b>	Tropical Livestock Unit; Crops cultivated; Owning land; Using seeds; Access to extension services; Using fertilizers; Owning house; Household assets; Vehicle assets.
	<b>Social Safety Nets (SSN)</b>	Transfers received.
Capacity pillars	<b>Sensitivity (S)</b>	Sensitivity of income.
	<b>Adaptive Capacity (AC)</b>	Education of household head; Labour force <i>per capita</i> ; Income diversity.



Figure 1. Resilience Index and pillars









# 3

## DATA

*This section describes the datasets employed in this analysis, taking advantage of their strengths and limitations for the ultimate goal of this study.*

Data employed in this study came from two national surveys conducted by the National Bureau of Statistics and Demography of Burkina Faso in 1998 and 2003. The 1998 survey is composed of 8 478 households, while the 2003 collection covers a sample of 8 500 households. Data are representative at national level.

The two surveys do not constitute proper panel data, in which the same households are followed over time, but are two repeated cross sections collecting the same information after an interval of a certain time, covering the same population, but not necessarily the same households. This creates some limitations when comparing directly the two datasets and estimating a dynamic model of resilience. In absence of genuine panel data, measuring dynamics of resilience requires involving a more complicated econometric framework, suited for repeated cross sections, that relies on synthetic panel data estimators.

Another inconvenience associated with using the present data in the resilience analysis is the limited information on SSN and S, which are actually approximated using only one variable each (respectively, transfers received and sensitivity of income), instead of a wider range of economic outcomes usually employed in the estimation of the two pillars.







# 4

## RESILIENCE ANALYSIS

*This section provides the results of the resilience analysis. First, it describes resilience capacity and structure in the two years analysed. Then, it presents the results disaggregated by location of household, region and gender of household head. It also briefly summarizes the findings from the analysis of the dynamics of resilience and the association between resilience and consumption in the following periods.*

### 4.1 ANALYSIS AT NATIONAL LEVEL

**The distribution of resilience capacity in Burkina Faso is asymmetric both in 1998 and 2003.**

Figure 2 and Figure 3 show the distribution of the Resilience Score in the overall sample for both years analysed. The dispersion of the distribution is stark, implying that there exist significant differences in the resilience ability of households in Burkina Faso. Namely, some households are likely to respond much better than others to shocks. Notably, significant fractions of households score much above the average, implying that inequality in resilience capacity is driven mostly by the upper part of the distribution, i.e. by households that are supposed to perform much better than the average.

**However, resilience capacity in Burkina Faso is less unequal in 2003 when compared to 1998.**

Indeed, the Resilience Index is more concentrated around the mean in 2003 with respect to 1998 (see the different ranges in the horizontal axis). In other words, disproportions between the most and the least resilient households decreased between 1998 and 2003.<sup>2</sup>

**There is a small difference in resilience structure between the 1998 and 2003 samples, driven by a slightly different role of IFA and S** (as shown in Figure 4 and Figure 5). Indeed, whereas IFA is an important determinant of resilience in both analyses, it has a slightly higher role in 1998 than in 2003. In turn, S plays a minor role in explaining resilience in both the years considered, nevertheless its correlation with the Resilience Index is notably higher in 1998 than in 2003, where it is close to zero. On the other hand, **AC, ABS and AST are important determinants of resilience** in both years.

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<sup>2</sup> This result is aligned to the World Bank estimates, which suggest a declining income inequality between 2003 and 2009 (World Bank, 2013a).

Figure 2. Resilience Index in Burkina Faso (1998)

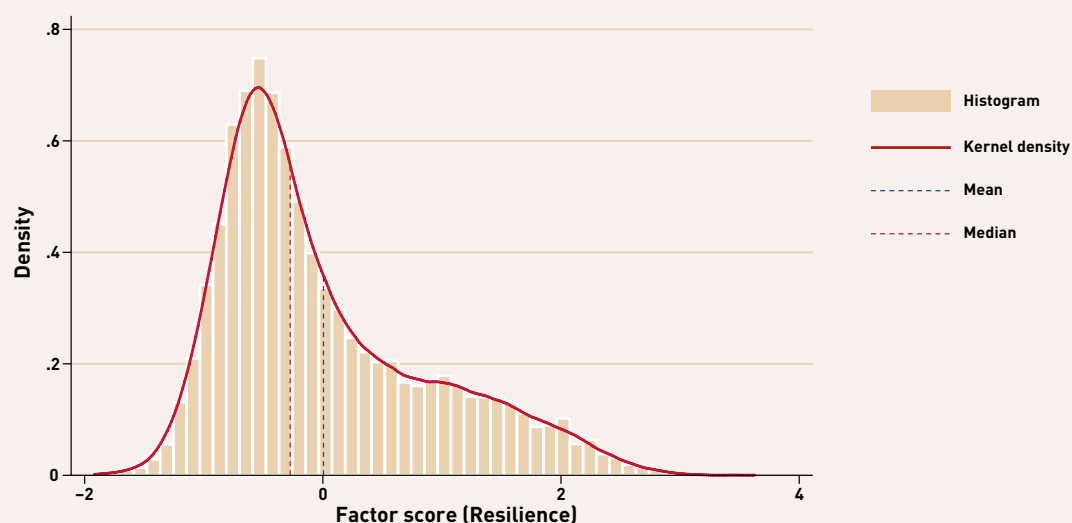
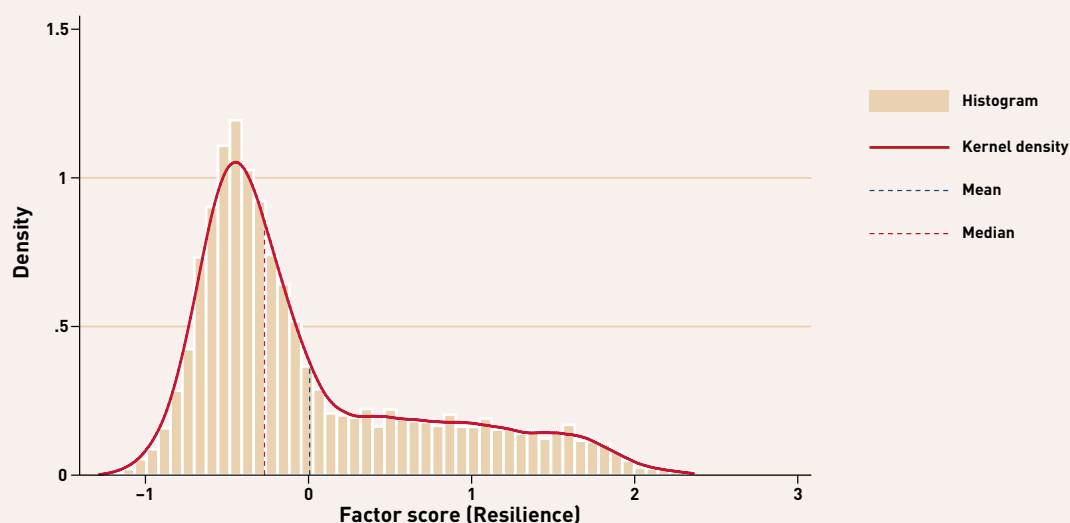


Figure 3. Resilience Index in Burkina Faso (2003)



Annex tables clearly show that the overall economic situation of households in Burkina Faso improved markedly between 1998 and 2003. A notable difference is evident in terms of income, access to basic services, assets and education. Significantly, there is a visible increase in the economic wellbeing of households in terms of income and expenditure *per capita*. Additionally, access to agricultural assets and a household wealth indicator<sup>3</sup> increased over time. There are more animals, more crop production, more land cultivated, more seeds and fertilizers. A minor flection has been reported in the income diversification indicator.<sup>4</sup>

<sup>3</sup> Household and vehicle assets are composite indices created through principal component analysis out of a number of single items that are employed as proxy for well-being.

<sup>4</sup> Putting together the number of income sources.

Figure 4. Resilience structure in Burkina Faso (1998)

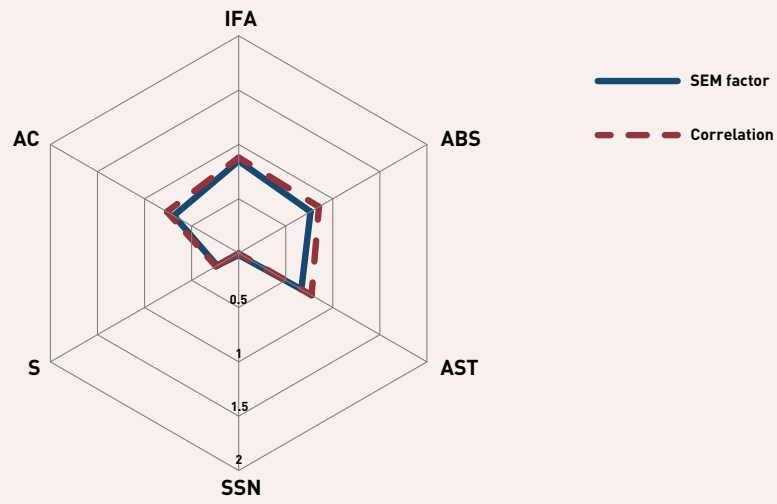
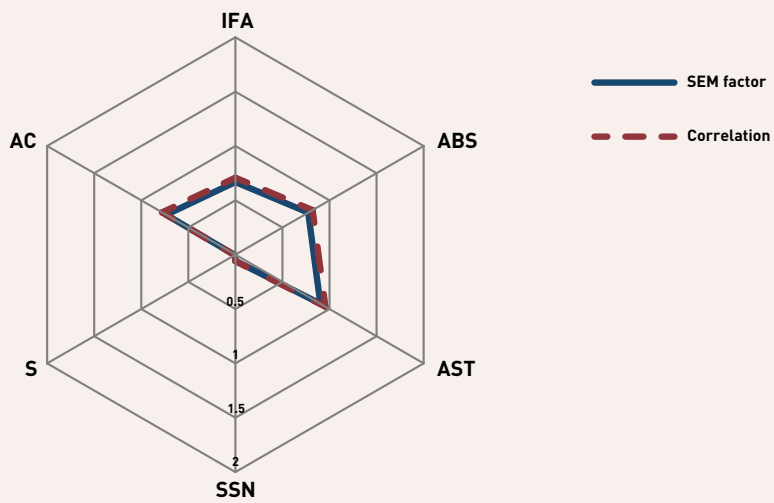


Figure 5. Resilience structure in Burkina Faso (2003)



## 4.2 RESILIENCE PROFILING

This section aims to identify the differences in resilience capacity between social groups and to isolate the more relevant pillars, as well as variables determining such disparities. Knowing the socio-economic profiles of the least and the most resilient households is of crucial importance for shaping proper policies aiming to increase resilience capacity of the households in need.

### By urban status

A much higher incidence of poverty in rural areas (59 percent compared to 35 percent in urban areas in 2003, according to World Bank, 2013a) seems to be reflected in the resilience capacity of rural households. Indeed, **there is a dramatic difference in resilience capacity between rural and urban households.**

**First, urban households are, on average, much more resilient than rural households in both years.** This result is clearly represented by Figures 6 and 7 illustrating the mean Resilience Index

Figure 6. Resilience capacity by urban status in Burkina Faso (1998)

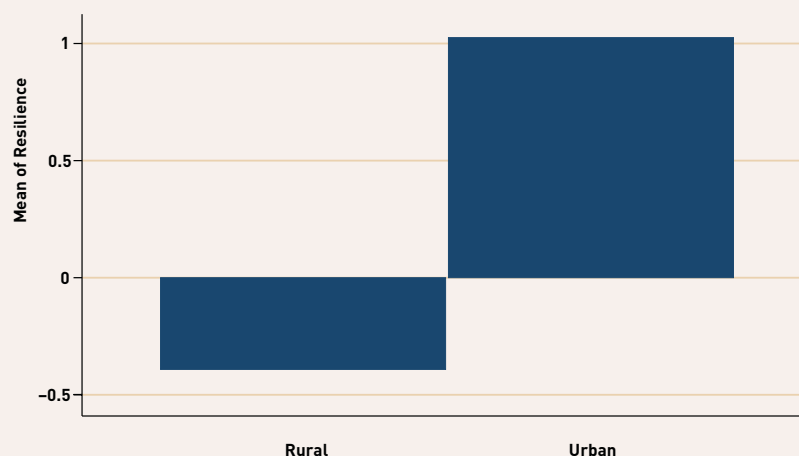
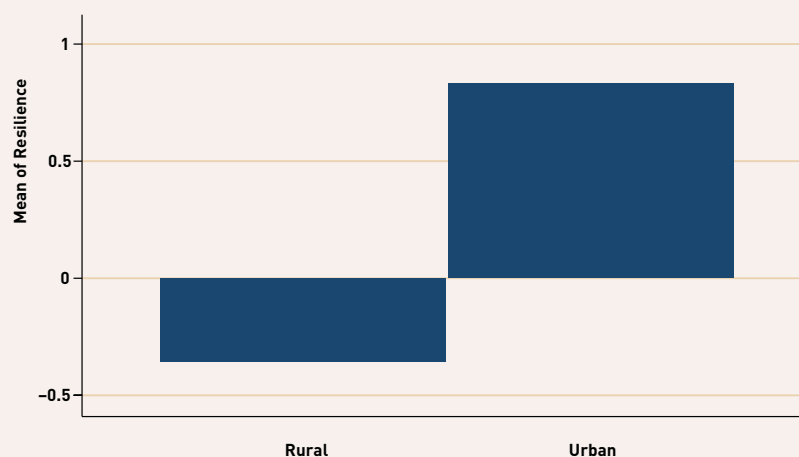


Figure 7. Resilience capacity by urban status in Burkina Faso (2003)





by household location in 1998 and 2003.

**Secondly, the resilience capacity of rural households is mostly concentrated around the lowest scores of resilience, whereas in case of urban households the distribution is more symmetric.**

Such a result is consistent between the two samples studied. Indeed, Figure 8 and Figure 9 illustrate explicitly high accumulation of rural households in the lowest range of the resilience score. On the opposite side, the resilience distribution for urban households is flatter, suggesting more heterogeneity in the resilience capacity of urban households. Overall, this implies that rural households are consistently less resilient than urban and that rural areas should be primarily targeted with activities aiming to strengthen resilience capacity.

Figure 8. Resilience Index by urban status in Burkina Faso (1998)

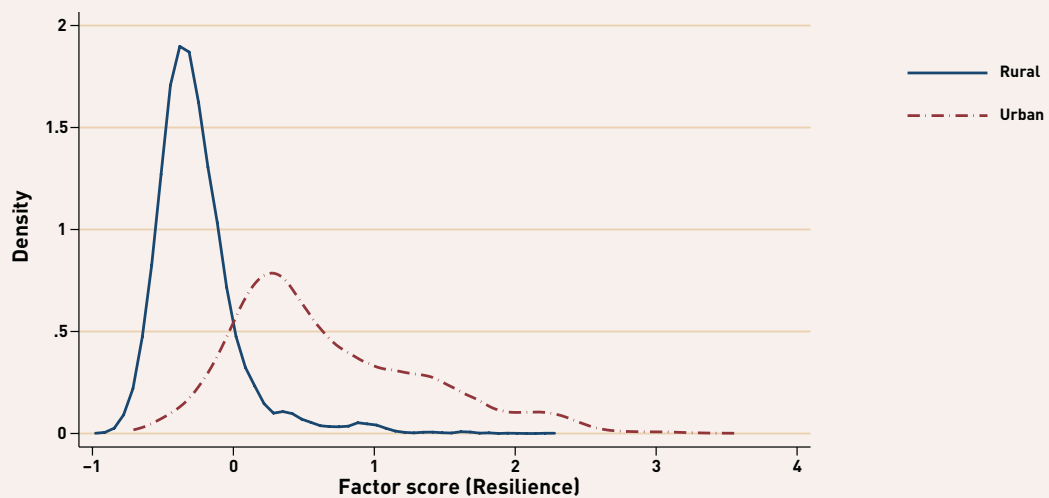
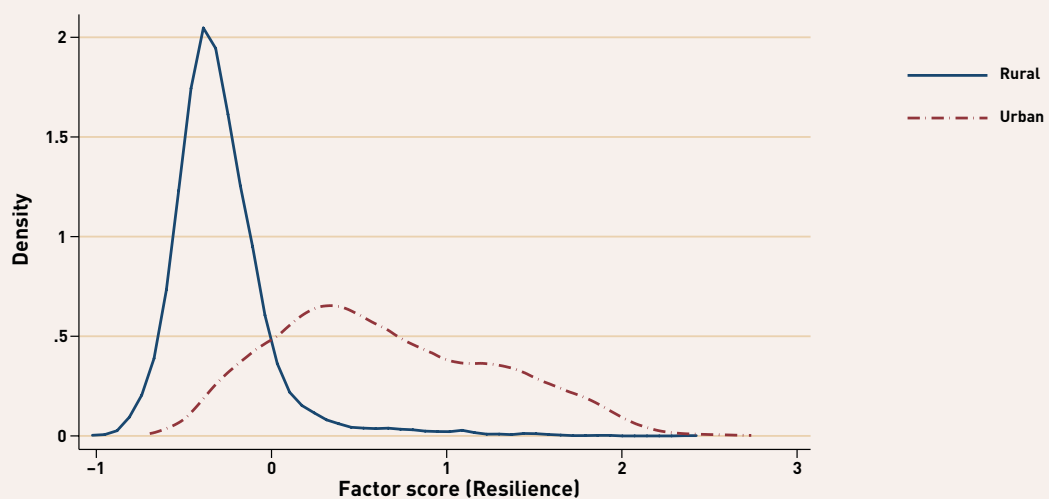


Figure 9. Resilience Index by urban status in Burkina Faso (2003)



The significant disparities in resilience capacity among urban and rural households is coupled with **the significant disparities in their resilience structure**. In order to better understand the determinants driving the great difference in resilience capacity between rural and urban areas, the mean of pillars scores for 1998 are depicted by Figure 10 and for 2003 by Figure 11 (while the summary statistics of variables used in the analyses for both years may be found in the Annex). **Urban areas score better in terms of IFA, ABS and AC, while S** (which is adversely associated with the resilience score) **and SSN play only a marginal role**. This pattern is repeated in both years studied.

Figure 10. Average pillar scores by urban status in Burkina Faso (1998)

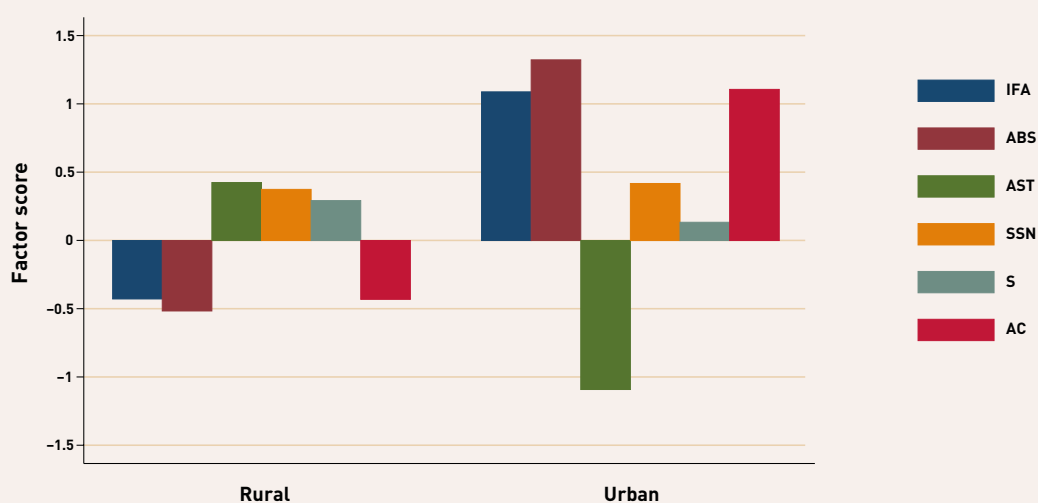
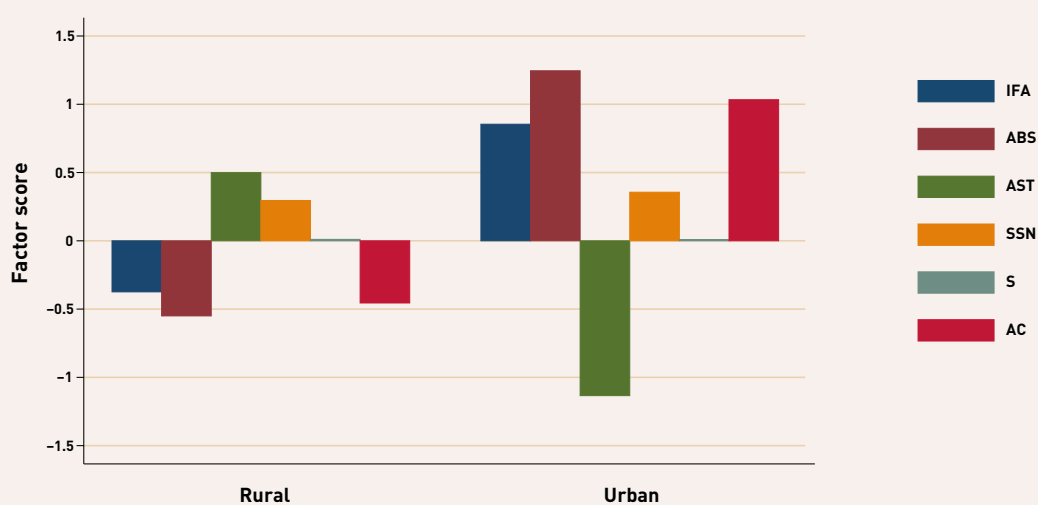


Figure 11. Average pillar scores by urban status in Burkina Faso (2003)



Analysing the role of single variables in order to explain the differences of resilience capacity between the rural and urban areas, the following conclusions emerge.

- The notably higher score for IFA for urban households is explained by better scores in all variables constituting the pillar, namely: higher income and expenditure *per capita*, and lower share of food expenditure in total expenditure.
- The better score in ABS for urban households is driven mostly by significantly lower distances to public services and by much better access to improved sanitation and electricity. Slightly better access to drinking water also favors urban households, although in both locations the great majority of population reported access to drinking water and the difference between them is not striking (99 percent in urban vs. 87 percent of respondents in rural areas). Notably, the data analysed reveal that such access to all household facilities improved between 1998 and 2003, as evidenced in Annex in Table A1 and A4.

The gap in AC between the rural and urban locations is mostly due to a dramatic difference in educational attainments of household heads. Additionally, the higher labour force *per capita* associated with lower number of children in urban families contributes to higher AC score for urban households. The general pattern of the differences in variables determining AC is the same for both samples, however there is also here a visible significant improvement in terms of education scores, which occurred between 1998 and 2003.

Differences in SSN and S, although minor ones, are also in favor of urban households. Whereas levels of SSN remain roughly unchanged over the 5 years span, the levels of sensitivity in income decreased notably between 1998 and 2003.

Overall, the above findings imply an urgent need of investments in education, access to basic services and local infrastructure aiming to increase resilience in rural zones, and reducing the great gap between the rural and urban areas.

### By household head gender

This section aims to assess whether significant differences exist in the resilience of households associated with the gender of their head.

**In fact, female-headed households (FHH) appear to be slightly more resilient than male-headed (MHH) households both in 1998 and 2003.** Figure 12 and 13, depicting the mean resilience of households headed by males and females, suggest that that FHH report, on average, slightly higher resilience score than MHH.

Figure 12. Resilience capacity by gender of household head in Burkina Faso (1998)

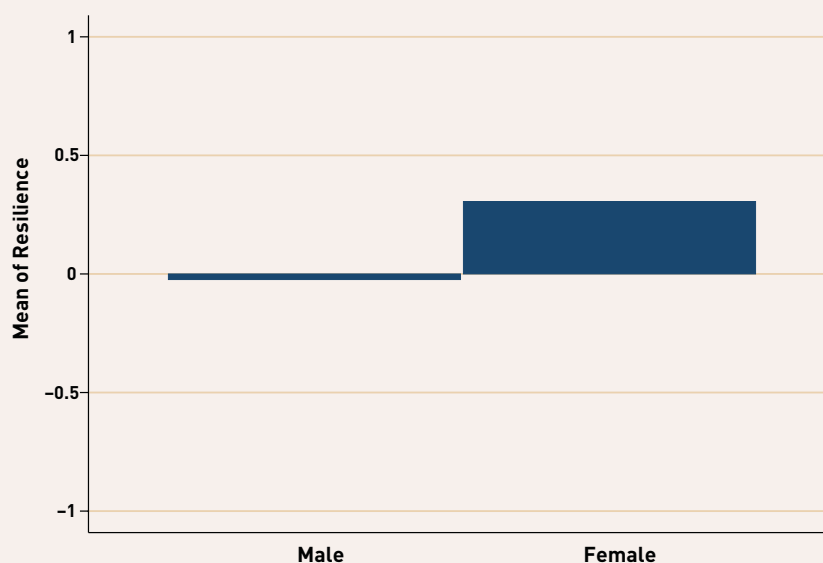
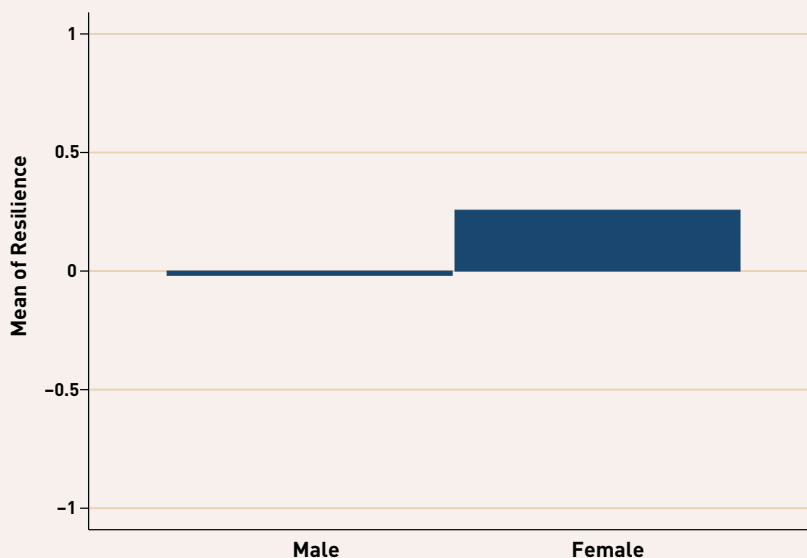


Figure 13. Resilience capacity by gender of household head in Burkina Faso (2003)



Furthermore, **there are no other major disparities across the distribution of the Resilience Index among FHH and MHH**, as shown in Figure 14 and Figure 15. This means that the most resilient households in the subsample of MHH have a resilience capacity very similar to the most resilient FHH. This holds true also for the least resilient households headed by males and females.

Figure 14. Resilience Index by gender of household head in Burkina Faso (1998)

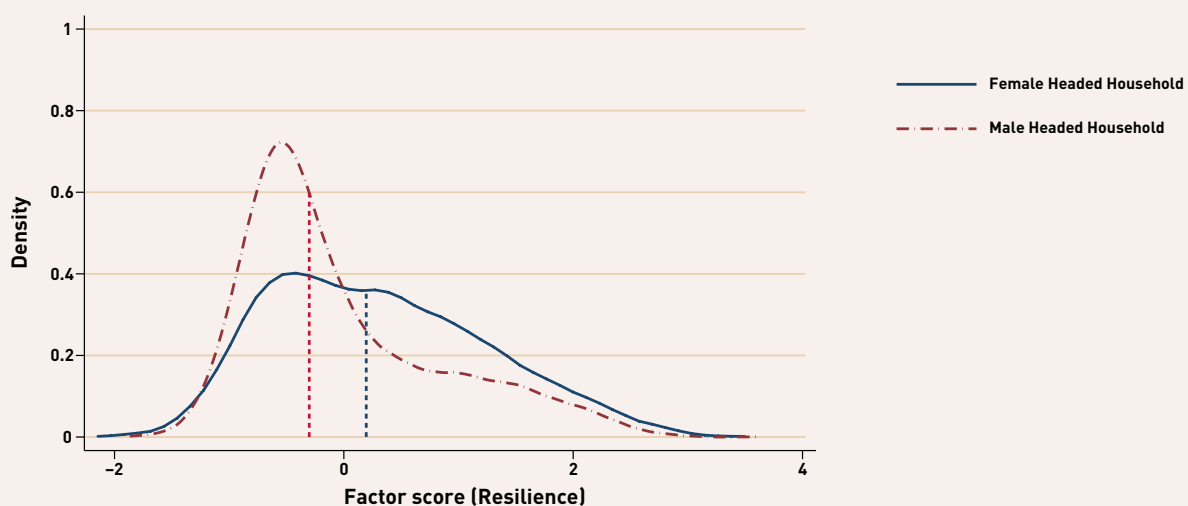
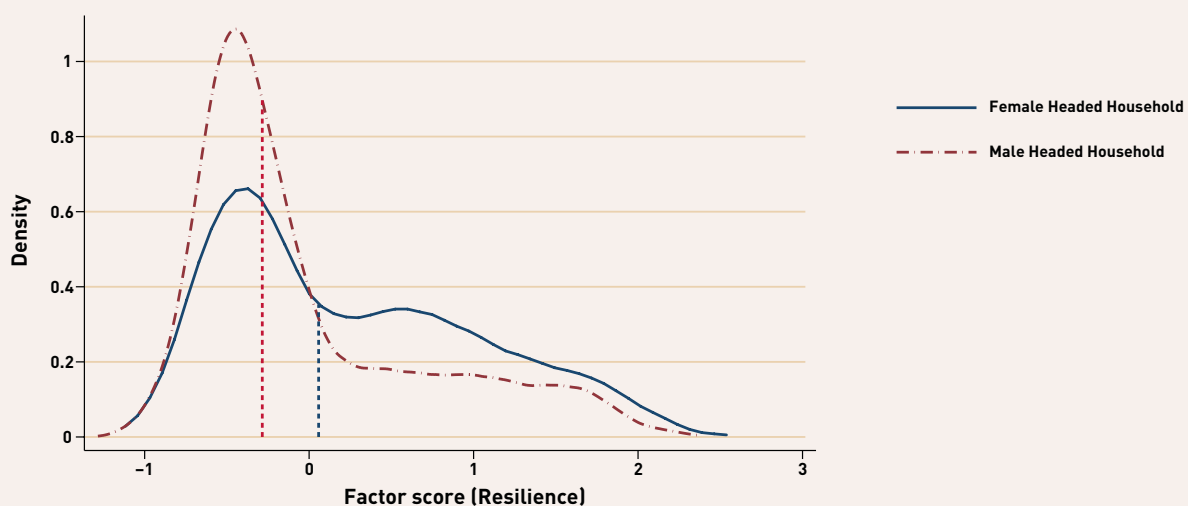


Figure 15. Resilience Index by gender of household head in Burkina Faso (2003)



Despite the similarity in resilience capacity, there are relevant differences in the resilience structure between male-headed households (MHH and FHH), as shown by the differences in pillars scores by gender of household head (Figure 16 and Figure 17). For female-headed households, which are slightly more resilient than MHH, IFA, ABS, AST and SSN play the major role. A very similar picture emerges for both years analysed.

Figure 16. Average pillar scores by gender of household head in Burkina Faso (1998)

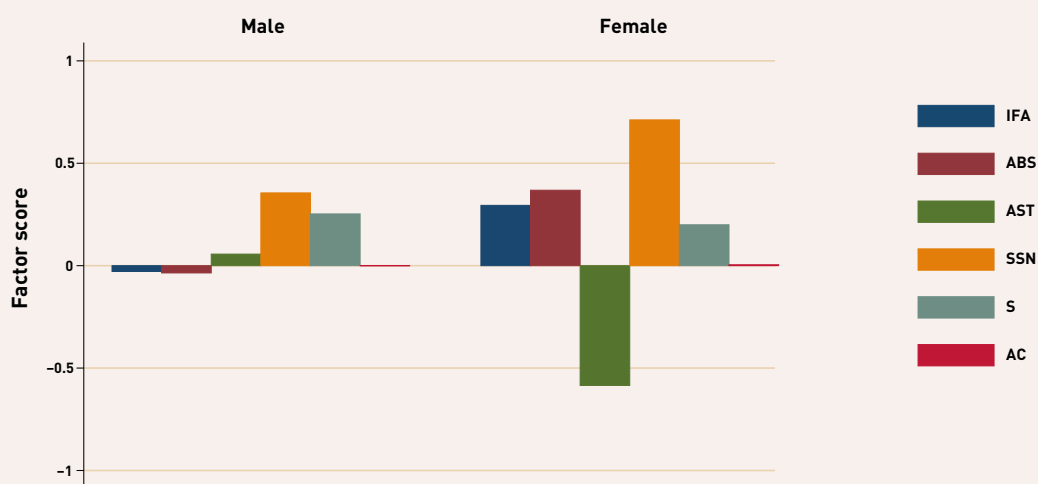
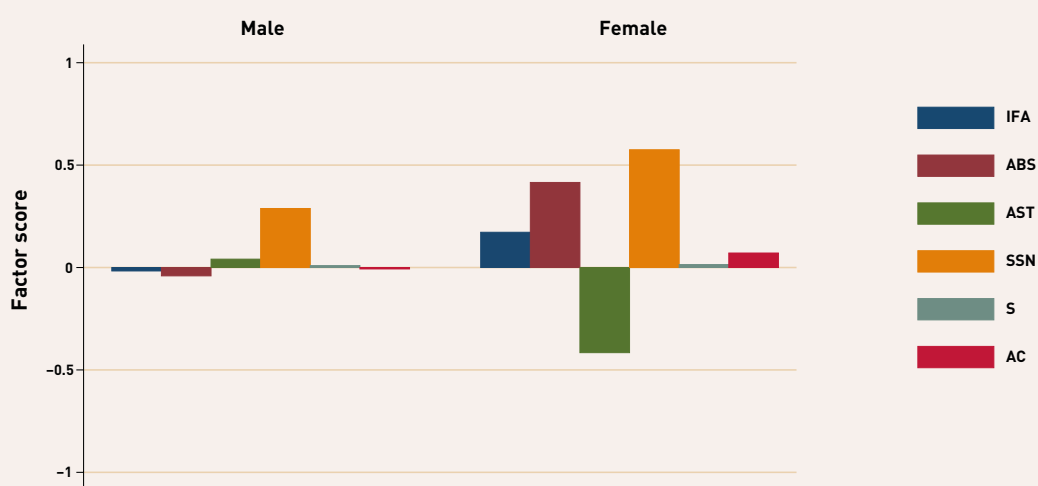


Figure 17. Average pillar scores by gender of household head in Burkina Faso (2003)



Looking at the location of FHH, it appears that actually they are mostly located in urban areas, specifically, a high concentration of FHH is visible in the Central and Hauts-Bassins regions. As will be presented later, these two regions are characterized by higher average resilience capacity than other regions, which supports the conjecture that the high score for FHH is inflated by attributing the effect of the households' location to gender of household head.

As for variables underlying IFA, FHH occur to have both higher average income and expenditure *per capita*, whereas sensitivity of income is comparable for both types of households. Also in terms of ABS, FHH score better in all the variables characterizing access to household facilities (such as drinking water, improved sanitation and electricity) as well as distance to public services. They also declare to receive much higher transfers, which determines SSN.

However, when looking at the pillars underlying resilience, it appears that scores for female-headed households are consistent with the scores for urban households (Figures 10 and 11). This leads to a conjecture that female-headed households tend to be located in urban areas or in specific regions in which households tend to be more resilient and therefore the higher average resilience score should be attributed to the location of the households rather than to the gender of household heads *per se*.

### By region

**The Central region (the capital region) features the highest resilience capacity, followed by Hauts-Bassins and Cascades, both placed in the south west of the country.** Figure 18 and Figure 19 show the Resilience Index for the 13 regions of Burkina Faso, respectively in 1998 and 2003. The brightest shade corresponds to the lowest mean score, while the colour gets darker as the mean score increases. Such a pattern is consistent between both years analysed.

Figure 18. Resilience capacity map - Average Resilience Index by region in Burkina Faso (1998)

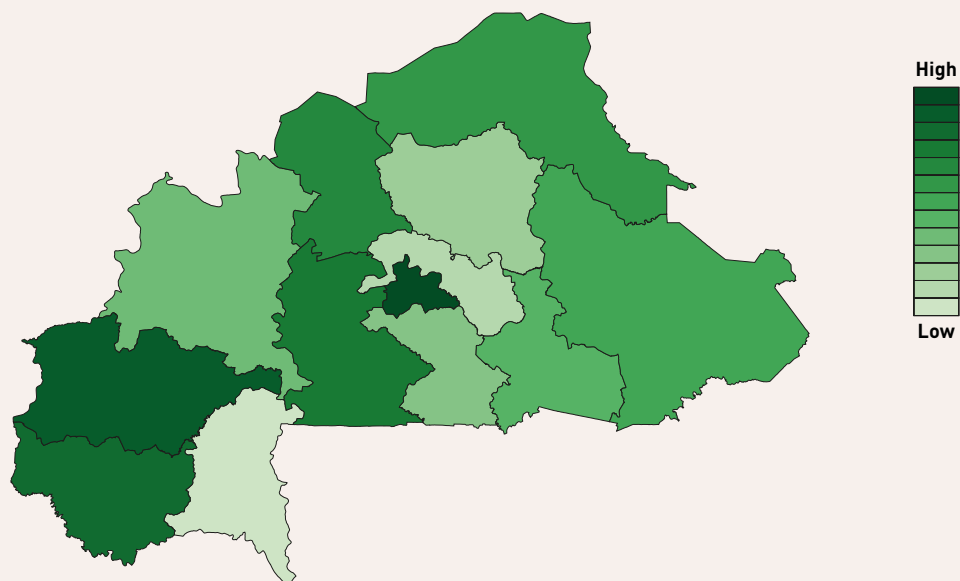
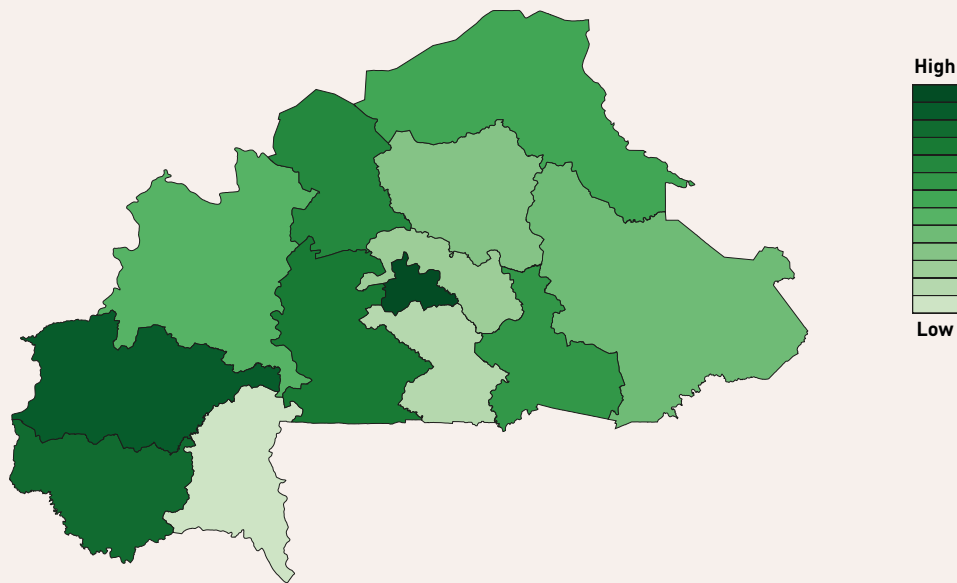


Figure 19. Resilience capacity map - Average Resilience Index by region in Burkina Faso (2003)



Looking at the pillars (Figure 20 and Figure 21) and variables contributing to the resilience score of the most resilient regions, it appears that their resilience capacity is mainly driven by **IFA**, as they show the highest income and expenditure *per capita*, low ratio of food expenditure to total expenditure, as well as low income sensitivity. Their higher capacity is also characterized by relatively good access to basic services and household facilities – significantly, 100 percent of the sample declared to have access to drinking water – as well as shorter distances to public services, which determines **ABS**. It is noteworthy that, in terms of **AC**, heads of households in the most resilient regions have high education scores. Such findings are consistent across the two samples analysed.

**The three regions with the lowest average resilience score, Sud-Ouest, Centre-Sud and Plateau Central are rural regions.** This result is aligned to World Bank poverty estimates for 2009, which show that these two regions have relatively high poverty rates, well above the national average (World Bank, 2013a). They are characterised by relatively low income and low transfers, as well as high sensitivity of income. They have also limited access to basic services, compared to other regions, including relatively low access to drinking water. Low education, combined with extreme low labour force *per capita*, suggests that they score low in terms of adaptive capacity.

Overall, the features of households that are associated with high score of resilience are income *per capita* and its sensitivity, education and access to basic services. The endeavours aiming to increase resilience should focus on strengthening these capacities in the regions.



Figure 20. Average pillar scores by region in Burkina Faso (1998)

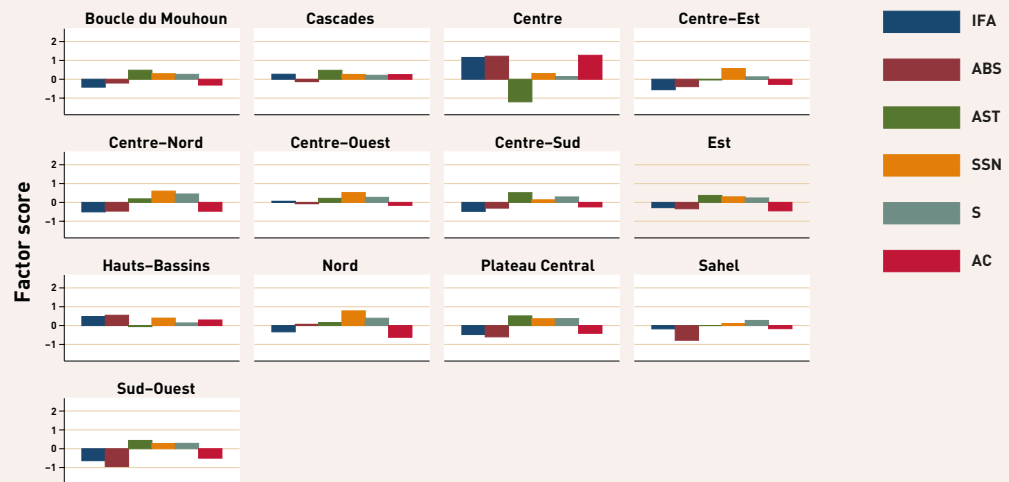
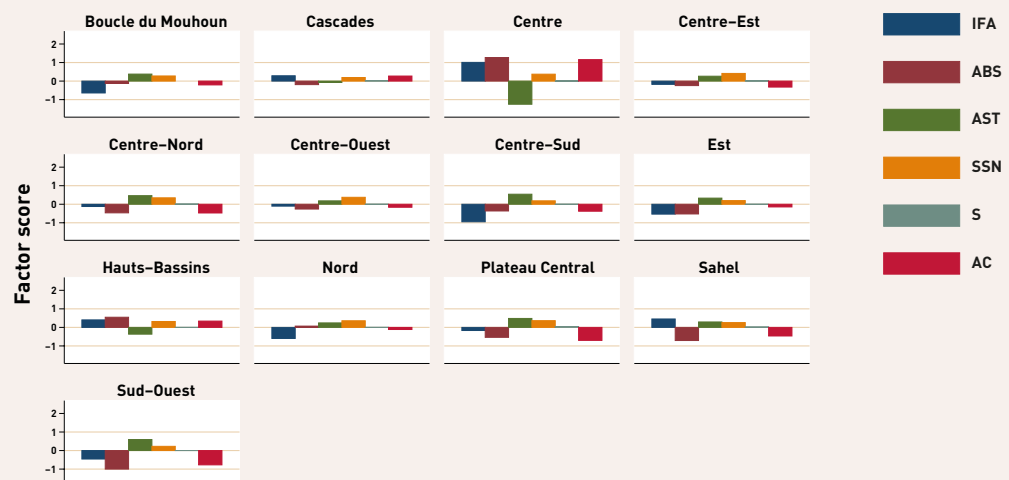


Figure 21. Average pillar scores by region in Burkina Faso (2003)



### 4.3 DYNAMICS OF RESILIENCE OVER TIME

There is a shared agreement on the fact that resilience is not a static concept. Thus, assessing resilience dynamics over time is crucial for designing policies aiming to enhance long-term household resilience. However, a proper dynamic analysis of resilience requires panel data following households over time. Unfortunately, in the case of Burkina Faso, such data are not available. Recent advances in econometric literature offer solutions enabling dynamic analysis in a framework of repeated cross-sections. In this study, we follow the “synthetic panel” approach proposed by (Deaton, 1985; Moffit, 1993; Verbeek and Vella, 2005; Verbeek, 2008) adapted in the empirical studies by (Dang *et al.*, 2011). While further details of this analysis are reported in the extended version of this paper (d’Errico and Kozłowska, 2015), we give here a brief summary of the main findings.

**Highly resilient households are likely to remain resilient in the next years;** therefore investments in strengthening resilience are supposed to have long-lasting effects. The results of the model estimated through the Instrumental Variable technique suggest that resilience depends to a large extent on its value in previous period. This finding has strong consequences in terms of policy planning. When designing policies, long-term processes should be taken into account. The results pointing towards high persistence of resilience strongly motivate long-term programmes aiming at enhancing resilience capacity of households.

**When looking at the association between consumption and resilience, it appears that there is positive link between the two.** An analysis in a synthetic panel setting, merging data on consumption in a one period with resilience in a previous period based on synthetic cohorts (cohorts sharing similar characteristics) reveals that resilience is a good predictor of future consumption.

# 5

## MAIN CONCLUSIONS FROM THE ANALYSIS AND POLICY IMPLICATIONS

*This section summarizes the main findings of the resilience analysis, provides final assessments and delivers relevant implications for policy design and implementation.*

This analysis employs the FAO-RIMA methodology in order to measure the resilience of households in Burkina Faso in 1998 and 2003. The results are presented, for both years, at national level, by region, gender of household head and household location in rural or urban areas.

- Inequality in resilience capacity between the most and the least resilient households decreased between 1998 and 2003. Nevertheless, some households still remain more likely to respond better than others to shocks.
- AC, ABS and AST are constantly relevant when determining resilience, while IFA plays a major role in 1998, but not in 2003.
- The higher resilience capacity of urban households is mainly driven by ABS, IFA and AC dimensions, where they perform better than households in rural areas in both years. Indeed, urban population has higher income and expenditure *per capita*, lower share of food expenditure and relatively good access to household facilities and public services. Furthermore, they register a much higher education attainment level and labour force *per capita* than rural households. On the opposite side, rural households perform better than urban only in AST.
- FHH are slightly more resilient than MHH households both in 1998 and in 2003. This is mainly explained by their location in urban areas. The difference in the resilience structure between FHH and MHH is mainly driven by ABS (since FHH ensure to their members greater access to household facilities and basic services), AC, due to their higher level of education, and IFA, since FHH have higher average income and expenditure *per capita*.

- In both years, the region with the highest resilience capacity of households is Centre, followed by Hauts-Bassins and Cascades. The most resilient regions are characterized by the highest level of income and expenditure, access to household facilities, basic services, as well as the highest level of education.
- Resilience capacity is persistent over time in Burkina Faso: highly resilient households are likely to remain resilient in the subsequent years.

**The analysis shows that in both years (1998 and 2003), the resilience capacity was lower in rural areas when compared to urban areas, where households scored much better in terms of IFA, ABS, AC.** Such disparities suggest that interventions increasing resilience should build up on existing assets (land and livestock) and increase income-generating sources, while improving access to basic services, especially in rural areas. The economy of the country heavily depends on the primary sector (agriculture and livestock farming, forestry, and fishery), which has been one of the main targets of the socio-economic reforms that Burkina Faso adopted since early 1990s. This sector is dominated by small-scale farmers and it employs more than 86 percent of the working population, while contributing at least 30 percent to national wealth. Nevertheless, this sector still faces major challenges, such as difficult access to land, agricultural inputs and equipment, poor infrastructure and financing, inadequate agricultural extension and natural resource degradation (OECD 2013). In line with the findings of this analysis and its suggested priorities, the Poverty Reduction Strategies (PRS) of Burkina Faso focused in the 2000s on four pillars: (i) accelerating broad based growth, (ii) expanding access to social services for the poor, (iii) increasing employment and income generating activities for the poor and (iv) promoting good governance.

**Moreover, given that AC is highly relevant in explaining resilience, the findings of the analysis suggest that long-term policies should focus on improving education, health and on diversifying livelihood strategies.** The government recognizes that, in order to reduce the incidence of poverty, not only economic growth is important but also great attention should be directed toward accelerated growth in the agricultural sector and toward enabling the poor to benefit from such growth. In order to achieve this, the Government has prioritized policies targeting directly the poor, especially in **rural areas, with a strong focus on improving access to essential social services** (mainly basic education, health and sanitation). Consistently, the agricultural sector share of the budget funded by the Government's own resources has been well above 10 percent between 2000 and 2003 (OECD, 2013). It is worth noting that, although funding to the agricultural sector is still very much dependent on international aid, the country is one of the few African countries to have met the Maputo commitment made at the NPCA / NEPAD summit in 2003 to allocate at least 10 percent of national budgetary resources to agriculture within 5 years (FAO, 2014).

**Furthermore, the analysis finds that, in both years, the average resilience of households located in Central region was above the average resilience score of all the other regions in the country.** Sud-Ouest and Plateau-Central result to be the least resilient in the country. Given that the Central region is the capital region, this finding confirms major differences in resilience between rural and urban areas, mainly due to lack of access to social services in the former. In line with this, the Poverty Reduction Strategy Paper of 2000-2003 was particularly aiming at reducing the level of poverty, vulnerability to a variety of crisis and inequalities among different regions and socio-economic groups (IMF, 2000). In order to achieve this, the focus was particularly on reducing the gap in social services, improving food security and ensuring that the poor have access to drinking water, education and health. Moreover, great emphasis was given to the development of the rural sector through the modernization and intensification of agricultural activities, diversification and increase of rural income, and development of infrastructure, especially roads for opening up rural areas.

**As highlighted in the International Monetary Fund (IMF) Poverty Reduction Strategy Papers (PRSP) Progress Report of 2004, about 16 percent of national resources and 19 percent of official development assistance were devoted to promote social services. Nevertheless, it must be noted that the country still suffers from a huge gap in social services.** For instance, even if the gross enrolment ratio in primary school was 47.5 percent at the beginning of 2002/2003 year compared to 42.7 percent in 2000/2001, the ratio was still one of the lowest in the sub-region (IMF, 2005). Moreover, it is interesting to note the regional disparities in access to education. Improvements have also been achieved in access to clean drinking water, with 40.5 percent of households using tube wells as water sources in 2003, compared to 31 percent in 1998 among all residential environments. When considering only rural areas, the increase was from 37.9 percent to 48.8 percent (IMF, 2005).

In addition to the PRS, **Burkina Faso also adopted the Strategic Framework for Poverty Reduction (CSLP 2000-2010)**, which is the main reference framework for economic and social development for the period of 2000-2010. This has set targets for the agricultural sector to increase agricultural production and productivity and to establish a favorable environment for business environment (Angelucci *et al.*, 2013). In 2003, in order to translate the CSLP objectives into actions, it was developed the *Stratégie de Développement Rural* (SDR 2003-2015). It aims to achieve sustainable growth for the agricultural sector, thus ensuring food security and promoting rural development.

**In 2011, the government drafted and adopted a new development strategy to replace the CSLP, the “Stratégie de croissance accélérée et de développement” (SCADD-2011-2015).** This strategy is the instrument to operationalize the “Vision Burkina 2025” on a five-year period. The strategy aims to boost economic growth (targeting 10 percent annual GDP growth rate) and to reduce poverty to less than 35 percent by 2015. Within this framework, priorities and objectives for the agricultural sector over the period 2010-2015 are set in the *Programme national du secteur rural* (PNSR). The overall aim is to contribute in ensuring food and nutrition security, sustained economic growth and poverty reduction. Against this framework, among the five main action areas, four are particularly consistent with the findings of this analysis: (1) improving food security and sovereignty, (2) increasing income for rural communities, (3) sustainable development of natural resources and (4) improving access to drinking water and healthy environment (New Alliance for Food and Nutrition Security: Feed the Future).

**Moreover, in 2012, the European Union launched the resilience initiative for the Sahel and West Africa, namely the Global Alliance for Resilience (AGIR).** At a country level, the initiative is translated into country strategies named the National Resilience Priorities (NRP). For Burkina Faso, the overall objective is to reduce food insecurity particularly for the poor and the very poor within the next five years (2015-2020), as presented in the last Food Crisis Prevention Network (RPCA) meeting in Brussels in December 2014. Among the specific objectives, great emphasis is given to improving social protection for vulnerable households and communities, enhancing nutritional and health status of the vulnerable, improve the agropastoral production and food availability, and improve food and nutrition security governance. As part of the social protection measures envisaged, the NRP emphasizes the need to build food security stocks, and to improve access to social safety nets and financial services as well as access to health facilities, schools and drinking water. Additional interventions will focus on agricultural and pastoral production, as well as fisheries with the aim of increasing not only food availability and access, but also increasing income and employment opportunities in rural areas.

Evidence provided by this analysis shows that increasing income generating activities and promoting livelihood diversification interventions, as well as increasing access to basic services particularly health facilities, schooling and sanitation appear to be the most relevant type of interventions that are also promoted by the relevant policy frameworks and donor initiatives.

Furthermore, the dynamic analysis clearly shows how resilience increasing programs may be, by nature, long-term intervention.

These findings are in line with recent economic overview of World Bank; in fact, the overview reports that “despite major market economy reforms, a lack of support for the private sector and access to basic services remain of major concern. The challenge lies in expanding growth poles in key sectors that have export potential and will help boost revenue in rural areas. To this end, the establishment of private sector-led growth poles in the mining sector would be beneficial” (World Bank, 2013a).

## REFERENCES

- Angelucci, F., Baliè, J., Gourichon, H., Aparisi, A.M. & Witwer, M.** 2013. *Monitoring and analysing food and agriculture policies in Africa. MAFAP Synthesis report 2013.*
- Dang, H.-A., Lanjouw, P., Luoto, J. & McKenzie, D.** 2011. *Using repeated cross-sections to Explore Movements in and out of Poverty.* Policy Research Working Paper, Washington, DC, The World Bank.
- Deaton, A.** 1985. Panel data from time series of cross-sections. *Journal of Econometrics*, 30: 109-126.
- d’Errico, M. & Kozłowska, K.** 2015. *dynamic resilience analysis through synthetic panel - case study Burkina Faso.* Rome, FAO (forthcoming).
- Food and Agriculture Organization of the United Nations (FAO).** 2014. *Burkina Faso country fact sheet on food and agriculture policy trends.* (available at <http://www.fao.org/docrep/field/009/i3760e/i3760e.pdf>).
- International Monetary Fund (IMF).** 2000. *Burkina Faso. poverty reduction strategy paper.* Washington, DC. (available at <http://www.imf.org/external/np/prsp/2000/bfa/01/>).
- IMF.** 2005. *Burkina Faso. Poverty reduction strategy paper.* IMF Country Report No. 05/338. Washington, DC.
- Moffitt, R.** 1993. Identification and estimation of dynamic models with a time series of repeated cross-sections. *Journal of Econometrics*, 59: 99-123.
- Organisation for Economic Co-operation and Development (OECD).** 2013. *Policy framework for investment in agriculture in Burkina Faso.* Paris. OECD Publication.
- Verbeek, M.** 2008. Pseudo panels and repeated cross-sections. *Advanced Studies in Theoretical and Applied Econometrics*, 46: 369-383.
- Verbeek, M. & Vella, F.** 2005. Estimating dynamic models from repeated cross-sections. *Journal of Econometrics*, 127(1): 83-102.
- World Bank.** 2013a. *Burkina Faso. Poverty trend and profile - 2003-2009. A police note 1.* Washington, DC.
- World Bank.** 2013b. *Burkina Faso. Perceived shocks, vulnerability, food insecurity and poverty. A police note 2.* Washington, DC.
- World Bank.** 2014. *Burkina Faso overview.* (available at <http://www.worldbank.org/en/country/burkinafaso/overview>). Washington, DC.

[All links last accessed on 17 August 2015]







## ANNEX

Tables below show averages for observed elemental variables. Variables are presented at national level and disaggregated by gender of household head, location (rural or urban) and regions.

Table A1. Mean values of variables by gender of household head and location in Burkina Faso (1998)

			GENDER		LOCATION	
		National	Male	Female	Rural	Urban
IFA	Log of <i>per capita</i> income	8.25	8.23***	8.39***	7.84***	9.29***
	Log of <i>per capita</i> expenditure	8.51	8.47***	8.93***	8.06***	9.70***
	Food expenditure/Total expenditure	0.55	0.55***	0.53***	0.60***	0.42***
ABS	Improved sanitation	0.36	0.34***	0.50***	0.15***	0.90***
	Potable water	0.91	0.91***	0.94***	0.88***	0.99***
	Improved electricity	0.11	0.10***	0.17***	0.01***	0.37***
	Distances to services	0.00	0.03***	-0.29***	0.35***	-0.91***
AST	Tropical Livestock Units (TLU)	2.87	3.11***	0.36***	3.73***	0.66***
	Crops	2.66	2.78***	1.48***	3.43***	0.70***
	Land	0.77	0.80***	0.53***	0.92***	0.38***
	Seeds	0.18	0.20***	0.03***	0.24***	0.04***
	Extension services	0.20	0.21***	0.07***	0.26***	0.05***
	Fertilizers	0.22	0.24***	0.06***	0.28***	0.07***
	House	0.87	0.88***	0.76***	0.96***	0.63***
	Household assets	0.14	0.15	0.14	0.08***	0.30***
	Vehicle assets	0.16	0.17***	0.09***	0.13***	0.23***
SSN	Transfers	0.39	0.36***	0.70***	0.38***	0.42***
S	Sensitivity of income	0.25	0.25***	0.20***	0.29***	0.13***
AC	Education of HH head	1.73	1.70**	2.01**	0.64***	4.52***
	Livelihood diversification	2.02	2.01***	2.15***	2.03**	1.98**
	<i>Per capita</i> labour force	0.54	0.55	0.54	0.50***	0.64***

T-test is used for assessing whether the mean differences are statistically different for male and female headed households, and rural and urban households.

\*\*\* indicates statistical significant mean differences at 1%, \*\* at 5% and \* at 10%.

Table A2. Mean values of variables by gender of household head and location in Burkina Faso (2003)

			GENDER		LOCATION	
		National	Male	Female	Rural	Urban
IFA	Log of <i>per capita</i> income	9.03	9.02	9.09	8.74***	9.69***
	Log of <i>per capita</i> expenditure	8.50	8.48***	8.75***	8.11***	9.40***
	Food expenditure/Total expenditure	0.57			0.59***	0.53***
ABS	Improved sanitation	0.42	0.40***	0.57***	0.21***	0.91***
	Potable water	0.96	0.96**	0.97**	0.94***	0.99***
	Improved electricity	0.15	0.14***	0.25***	0.01***	0.46***
	Distances to services	0.00	0.03***	-0.30***	0.38***	-0.85
AST	Tropical Livestock Units (TLU)	3.14	3.40***	0.50***	4.20***	0.72***
	Crops	3.29	3.43***	1.86***	4.35***	0.87***
	Land	0.91	0.92***	0.83***	0.98***	0.74***
	Seeds	0.19	0.20***	0.05***	0.26***	0.03***
	Extension services	0.36	0.38***	0.13***	0.46***	0.12***
	Fertilizers	0.42	0.43***	0.36***	0.55***	0.13***
	House	0.82	0.84***	0.71***	0.92***	0.60***
	Household assets	0.23	0.23*	0.22*	0.15***	0.40***
	Vehicle assets	0.21	0.21***	0.13***	0.16***	0.30***
SSN	Transfers	0.32	0.29***	0.58***	0.30***	0.36***
S	Sensitivity of income	0.01	0.01	0.01	0.01***	0.01
AC	Education of HH head	1.86	1.83**	2.19**	0.58***	4.78***
	Livelihood diversification	0.56	0.56	0.56	0.52***	0.65***
	<i>Per capita</i> labour force	2.06	2.06	2.10	2.16***	1.84***

T-test is used for assessing whether the mean differences are statistically different for male and female headed households; rural and urban households.

\*\*\* indicates statistical significant mean differences at 1%, \*\* at 5% and \* at 10%.

Table A3. Mean values of variables by region in Burkina Faso (1998)

REGION														
	Hauts Bassins	Boucle du Mouhoun	Sahel	Est	Sud Ouest	Centre Nord	Centre Ouest	Plateau Central	Nord	Centre Est	Centre	Cascades	Centre Sud	
IFA	Log of <i>per capita</i> income	8.91	7.70	8.35	8.19	7.78	7.59	8.26	7.56	7.95	7.89	9.25	8.40	7.00
	Log of <i>per capita</i> expenditure	8.90	8.09	8.35	8.10	7.64	8.15	8.58	8.17	8.22	7.75	9.81	8.70	8.38
	Food expenditure/ Total expenditure	0.47	0.56	0.71	0.57	0.54	0.67	0.52	0.64	0.64	0.55	0.41	0.40	0.59
	Improved sanitation	0.62	0.22	0.15	0.15	0.10	0.20	0.26	0.15	0.32	0.20	0.85	0.35	0.15
ABS	Potable water	0.98	0.99	0.66	0.90	0.64	0.92	0.96	0.76	0.97	0.89	1.00	0.91	0.97
	Improved electricity	0.18	0.04	0.01	0.03	0.01	0.07	0.08	0.01	0.06	0.07	0.34	0.09	0.00
	Distances to services	-0.34	0.10	0.61	0.08	0.81	0.59	-0.01	0.36	-0.26	0.35	-0.86	0.20	-0.01
	Tropical Livestock Units (TLU)	2.44	3.14	5.98	5.95	2.17	2.79	4.15	3.33	3.11	2.92	0.19	2.97	2.08
AST	Crops	1.90	2.80	2.66	4.13	3.86	3.19	3.46	3.72	3.53	2.64	0.55	3.08	3.54
	Land	0.65	0.90	0.93	0.95	0.94	0.91	0.84	0.92	0.86	0.90	0.29	0.85	0.96
	Seeds	0.33	0.41	0.03	0.18	0.21	0.03	0.23	0.32	0.02	0.05	0.03	0.43	0.35
	Extension services	0.25	0.27	0.07	0.13	0.20	0.29	0.24	0.35	0.26	0.14	0.04	0.36	0.30
	Fertilizers	0.44	0.45	0.05	0.15	0.22	0.15	0.28	0.24	0.25	0.10	0.03	0.57	0.23
	House	0.77	0.95	0.96	0.95	0.96	0.95	0.88	0.93	0.91	0.93	0.65	0.85	0.98
	Household assets	0.19	0.09	0.05	0.09	0.07	0.09	0.15	0.10	0.13	0.11	0.30	0.16	0.08
	Vehicle assets	0.19	0.14	0.08	0.13	0.11	0.12	0.17	0.15	0.18	0.13	0.24	0.21	0.13
	Transfers	0.40	0.30	0.11	0.30	0.28	0.60	0.54	0.38	0.78	0.59	0.31	0.26	0.18
	Sensitivity of income	0.14	0.27	0.27	0.24	0.29	0.45	0.27	0.38	0.39	0.13	0.15	0.22	0.36
	Education of HH head	2.11	1.25	0.41	0.99	0.66	0.80	1.66	0.76	0.91	1.16	4.68	1.52	0.34
	AC	Livelihood diversification	1.83	2.08	1.56	2.36	2.63	2.26	2.41	1.97	2.73	2.25	1.73	1.48
	<i>Per capita</i> labour force	0.58	0.50	0.54	0.50	0.53	0.50	0.53	0.49	0.49	0.52	0.65	0.57	0.50

Table A4. Mean values of variables by region in Burkina Faso (2003)

REGION														
	Hauts Bassins	Boucle du Mouhoun	Sahel	Est	Sud Ouest	Centre Nord	Centre Ouest	Plateau Central	Nord	Centre Est	Centre	Cascades	Centre Sud	
IFA	Log of <i>per capita</i> income	9.41	8.37	9.84	8.26	9.13	9.06	8.78	9.01	8.21	9.04	9.82	9.12	8.04
	Log of <i>per capita</i> expenditure	8.89	7.91	8.81	8.04	7.79	8.33	8.42	8.19	8.17	8.28	9.53	8.80	7.80
	Food expenditure/ Total expenditure	0.54	0.61	0.59	0.54	0.59	0.59	0.53	0.52	0.68	0.61	0.50	0.51	0.74
	Improved sanitation	0.67	0.35	0.26	0.15	0.14	0.28	0.27	0.20	0.38	0.28	0.91	0.38	0.25
ABS	Potable Water	0.97	0.99	0.99	0.95	0.74	0.93	0.98	0.98	0.99	0.96	1.00	0.91	0.96
	Improved electricity	0.29	0.05	0.02	0.04	0.01	0.06	0.09	0.02	0.07	0.09	0.47	0.14	0.00
AST	Distances to services	-0.32	-0.09	0.90	0.27	0.88	0.44	0.13	0.44	-0.35	0.12	-0.88	0.19	0.07
	Tropical Livestock Units (TLU)	3.46	3.29	7.63	5.48	2.29	4.34	2.42	4.02	1.88	2.73	0.54	3.55	2.21
	Crops	2.29	4.02	3.43	4.31	4.36	4.69	3.83	4.10	4.01	4.15	0.72	2.61	4.11
	Land	0.83	0.95	0.98	0.97	0.95	0.97	0.98	0.99	0.96	0.95	0.72	0.89	0.97
	Seeds	0.27	0.30	0.18	0.05	0.23	0.35	0.18	0.40	0.16	0.11	0.02	0.28	0.23
	Extension services	0.42	0.57	0.61	0.20	0.32	0.56	0.29	0.33	0.47	0.27	0.05	0.61	0.30
	Fertilizers	0.34	0.47	0.15	0.70	0.84	0.19	0.61	0.71	0.43	0.55	0.12	0.28	0.78
	House	0.69	0.93	0.84	0.91	0.94	0.91	0.79	0.89	0.88	0.91	0.64	0.81	0.96
	Household assets	0.31	0.20	0.14	0.18	0.11	0.17	0.20	0.18	0.20	0.18	0.42	0.24	0.12
	Vehicle assets	0.24	0.19	0.12	0.16	0.13	0.17	0.20	0.18	0.17	0.17	0.34	0.26	0.14
SSN	Transfers	0.32	0.28	0.26	0.20	0.23	0.35	0.38	0.36	0.37	0.41	0.38	0.19	0.18
S	Sensitivity of income	0.01	0.00	0.03	0.00	0.00	0.01	0.00	0.05	0.01	0.01	0.01	0.01	0.00
AC	Education of HH head	2.73	1.12	0.37	0.96	0.56	0.73	1.55	0.68	1.20	1.41	5.08	2.17	0.30
	Livelihood diversification	1.96	1.88	2.31	1.64	2.72	2.32	2.20	2.62	1.84	2.38	1.81	1.71	1.87
	<i>Per capita</i> labour force	0.60	0.51	0.57	0.52	0.50	0.54	0.55	0.51	0.53	0.54	0.67	0.57	0.53











This report is part of a series of country level analysis prepared by the FAO Resilience Analysis and Policies (RAP) team. The series aims at providing programming and policy guidance to policy makers, practitioners, UN agencies, NGO and other stakeholders by identifying the key factors that contribute to the resilience of households in food insecure countries and regions.

The analysis is largely based on the use of the FAO Resilience Index Measurement and Analysis (RIMA) tool. Structural equation models are applied to estimate resilience capacity and structure. Findings are integrated with other more traditional measures of poverty and food insecurity.

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