Food and Agriculture Organization of the United Nations

ANALYZING RESILIENCE FOR BETTER TARGETING AND ACTION

FAO RESILIENCE ANALYSIS No. 3

RESILIENCE ANALYSIS IN NIGER 2011

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Food and Agriculture Organization of the United Nations. Rome, 2015

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ACRONYMS

3N	Nigeriens Nourishing Nigeriens
ABS	Access to Basic Services
AC	Adaptive Capacity
AGIR	Global Alliance for Resilience Initiative.
AST	Assets
ECVMA	Enquête Nationale sur les Conditions de Vie des Ménages et l'Agriculture
FAO	Food and Agriculture Organization of the United Nations
FEWSNET	Famine Early Warning Systems Network
IFA	Income and Food Access
LSMS-ISA	Living Standards Measurement Study – Integrated Surveys on Agriculture
NIS	National Institute of Statistics (Niger)
NPR	National Resilience Priorities
PDES	Economic and Social Development Plans
RIMA	Resilience Index Measurement and Analysis
RMTWG	Resilience Measurement Technical Working Group
S	Sensitivity
SEM	Structural equation model
SSN	Social Safety Nets
TLU	Tropical livestock units
UNCCD	United Nations Convention to Combat Desertification
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Niger is a landlocked country historically prone to natural crises – notably droughts, floods and locust infestations – and to political instability. These factors increasingly contribute to chronic food insecurity and high poverty rates. The dangerous interplay between climate change, conflicts, population growth and food price volatility is compounded by the frequency with which they tend to occur and risks pushing Niger and the already poor Sahelian region into a state of permanent crisis.

This state of affairs and the international community's awareness of the need for more integration between humanitarian aid and development assistance have catalyzed an increased interest toward resilience building. Furthermore, it is important to further clarify the meaning of Resilience in order to better understand the root causes of vulnerability of the affected populations, thereby enabling better designed interventions.

FAO has been on the front line of resilience measurement since 2008. Together with other key partners, FAO has been pioneering resilience measurement and analysis with respect to food insecurity through the Resilience Index Measurement and Analysis (RIMA)[1] model, which has been used for undertaking the present analysis. This RIMA identifies and weighs the six pillars and relating factors that contribute to make household resilient to shocks affecting their food security.

The resilience analysis in Niger will become part of the World Bank Flagship Report on "The Economics of Resilience in Dry Land Africa".

The purpose of this study is to explain the role of key variables in determining the current level of resilience of the population in Niger and to provide decision makers with actionable information to inform response planning. This analysis is based on 2011 household data obtained from the National Survey of Household Living Conditions and Agriculture (or ECVMA, according to the French acronym), as part of the Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA) in collaboration with the Niger National Institute of Statistics (NIS). Data are representative at the national- and urban/rural-level.

The resilience analysis in Niger can be used as baseline to:

- Critically review the different policies and resilience-building initiatives currently endorsed, promoted and implemented by the Government of Niger with the support of major stakeholders.
- Assess the evolution of resilience capacity over the years.

[1] The Resilience Measurement Technical Working Group (RMTWG) has been established under the Food Security Network Initiative (FSIN).

KEY HIGHLIGHTS

1. In Niger, **the most significant dimensions of the resilience structure are Assets (AST), Income and Food Access (IFA)**, followed by Access to Basic Services (ABS), Adaptive Capacity (AC), Sensitivity (S) and Social Safety Nets (SSN), which contribute to a lower extent. Such lower contribution is most probably due to the lack of (or limitation in) access to certain services by households, thus resulting in the more limited impact of certain specific dimensions.
2. **The regional disparities in resilience capacity and resilience structure are considered in the analysis**: the Diffa region is the most resilient, followed by Zinder and Tillaberi. Dosso and Maradi show a significantly lower resilience capacity, whereas Tahoua and Agadez rank as the least resilient regions. It is evident that AST is the most correlated dimension to the Index in all regions.
3. **The geographical classification of households according to the Aridity Index** (i.e. most arid, less arid, and least arid) **is applied as an indicator of exposure to shocks**. It shows that households in the least arid regions are more resilient than those in the most arid areas. Nevertheless, the Resilience Index is lower for those who live in the most arid areas almost in all regions.
4. **The difference in resilience capacity between such areas mostly depends on AST, IFA, and AC**. Consistently with the national and regional level analysis, AST are among the most important components of the resilience structure in all aridity-related locations.
5. An additional noteworthy difference among households in different arid areas is the ABS. More specifically, **greater disparities are found in the access to schools, health centers and financial facilities**, with families living in the most arid areas forced to cover much longer distances in order to access such services.

POLICY IMPLICATIONS

Finally, **the findings of the analysis are examined in relation with the major policy initiatives of the Government of Niger**. The proposed resilience analysis enables to identify the key priority areas on which internal and external efforts should focus in order to provide the necessary support. These areas are: (i) agricultural and livestock production; (ii) food and nutrition security; and (iii) basic social services.

The findings of the analysis are in line with the **Economic and Social Development Plan (PDES) 2012-2015**, which defines the strategic guidelines for short- and medium-term interventions, particularly with respect to Social Development, Food Security, and Agricultural Development. Moreover, there is a considerable alignment between the measures of the **AGIR National Resilience Priorities (NPR)** and the **3N Initiative of "Nigeriens Nourishing Nigeriens"** under the domains of Social Protection for most vulnerable households and communities; Nutrition; and Agricultural Production for improved resilience, food and nutrition security outcomes of the population. Additional details are provided in the final section of the report.

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1 PURPOSE OF THE ANALYSIS

Niger is a large landlocked country of 1.27 million square kilometers and a population (approximately 16 million) growing at one of the fastest rates in the world (3.4 % per year). The country has been historically prone to natural shocks – notably droughts, floods and locust infestations – and political instability, which have often resulted in widespread food crises. Natural hazards and man-made factors increasingly contribute to chronic food insecurity and high poverty rates. The poverty rate, assessed at 56% of the population, establishes Niger as one of the world's poorest countries (WB, 2014).

Against this background, building the resilience of people to deal with recurrent and often complex shocks is a key element to be taken into account in order to better tackle the root causes of vulnerability of affected people, thereby enabling better designed interventions.

The FAO Resilience Index Measurement and Analysis (RIMA) model (FAO, 2014) is applied here. The analysis identifies the importance of different pillars and their related contributing factors to resilience at the time of the survey and compares the findings with the key policies and resilience-oriented initiatives developed and put in place by the Government of Niger in the last few years. Additionally, a forward-looking analysis of the policies to be implemented in the next five years is carried out in order to consistently relate the findings and the policy implications to the evolving political context of Niger.

The resilience analysis using the FAO RIMA model provides the evidence for more effectively designing, delivering, monitoring and evaluating assistance to populations in need, based on what they need most.

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2 RESILIENCE MEASUREMENT

This section introduces to 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 particular resilience components and variables used in this analysis.

Resilience is defined according to RMTWG's (RMTWG, 2014) definition, namely: *"Resilience as the capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences".*

The RIMA identifies the household resilience capacity and is estimated through a latent variable model as a function of six pre-determined components that constitute the main pillars of Resilience. It is important to note that the Resilience Index allows the comparison between different categories of households in relative terms. However, it does not provide absolute values on the level of resilience capacity that could allow comparisons between countries.

The six main components representing both physical and capacity pillars of Resilience are: Income and Food Access (IFA), Access to Basic Services (ABS), Assets (AST), Social Safety Nets (SSN), Sensitivity (S) and Adaptive Capacity (AC). Detailed definitions of these components are provided in Table 1.

The estimation procedure consists of two steps. During the first step, resilience pillars are estimated and they are subsequently employed in the estimation of household resilience capacity (i.e. the Resilience Index itself).

Table 1. **Resilience pillars**

	Pillars of resilience	Definition
Physical pillars	**Income and Food Access (IFA)**	These are aspects of a livelihood, showing a household's capacity to earn a living. Examples of indicators include income, food consumption score (FCS) and total expenditure.
	Access to Basic Services (ABS)	ABS shows the ability of a household to meet needs, such as sending children to school, accessing health care, selling products at the market, accessing toilets, water and electricity, and other minimum requirements.
	Assets (AST)	Productive assets are the key elements of a livelihood, enabling households to produce consumable or tradable goods. Examples of indicators include Assets Index (e.g. agricultural tools), Agricultural Wealth Index (e.g. agricultural equipment), Wealth Index (e.g. non-agricultural equipment – e.g. car, phone). The indicator is an aggregated measure obtained through principal component analysis used as proxy for access to productive assets and non-productive assets.
	Social Safety Nets (SSN)	The SSN dimension measures the ability of households to access timely and reliable assistance provided by international agencies, charities and non-governmental organizations, as well as help from friends and relatives.
Capacity pillars	**Sensitivity (S)**	S measures: (i) the degree to which a household is affected by a shock (i.e. a household deriving a large part of its total income from shock-affected activities has higher sensitivity than others do) and (ii) the degree to which a household has been affected by shocks in the recent past.
	Adaptive Capacity (AC)	AC is the ability of a household to adapt to a new situation and develop new sources of livelihood. For instance, having multiple sources of income may decrease the negative effects of a shock on a household. The observable variables included in this dimension are education, diversification of income and food ratio.

The pillars, likewise the resilience, are not directly measurable and are themselves considered latent variables. There are different techniques that can be employed for modelling latent outcomes, i.e. the class of latent variable models: principal component analysis, factor analysis and structural equation model.[2] FAO RIMA employs factor analysis for estimating resilience pillars. During factor extraction, the shared variance of a variable is partitioned from its unique variance and error variance to reveal the underlying factor structure; only shared variance appears in the solution. factor analysis allows expressing a set of observed variables, used as proxy for a pillar, as a single variable, the component of interest. A sufficient number of factors are considered in order to make sure they account for at least 95% of the explained variance. Table 2 lays out number of factors used to construct each dimension in the two analyses.

The Resilience Index is estimated through the measurement part of the structural equation models, in order to control for correlation between the residual errors of the pillars.

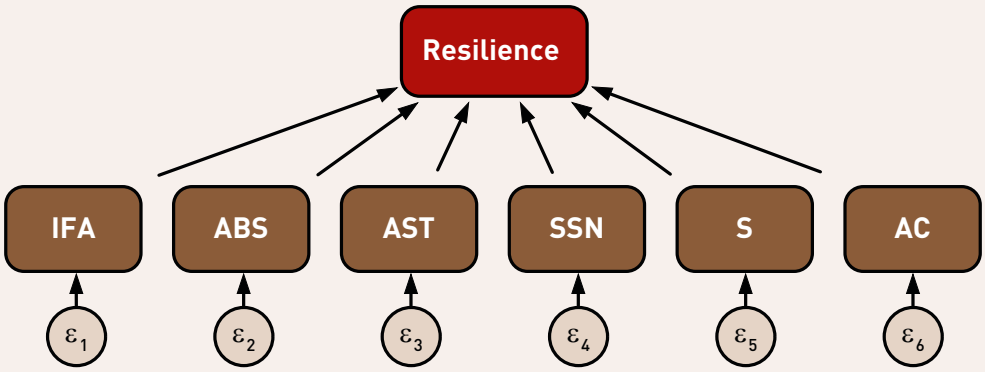
[2] The variables reduction mechanism relies on finding cross-correlations between the observed variables, identifying a number of (unobservable) factors reflected in correlations and predicting the latent outcome (dimension) as a linear combination of underlying factors. If all the variables defining the dimension are closely correlated, they may be represented well enough by a single factor. In case of the variables clustering into a few groups of closely related variables, they are represented by more than one factor. The number of factors should be chosen in a way according to which at least 95% of total variability is explained.

Table 2. **Resilience variables and vectors**

	Pillars of resilience		Variables
Physical pillars	**Income and Food Access (IFA)**	Expenditure per capita.	NA[5]
	Access to Basic Services (ABS)	Household Facilities index;[6] Distance to water; Distance to school; Distance to doctor; Distance to hospital; Distance to transport; Distance to market; Distance to telecenter; Distance to internet cafe.	1factor
	Assets (AST)	Tropical Livestock Units (TLU); Land; House; Agricultural assets; Vehicle assets; Household assets.	3 factors
	Social Safety Nets (SSN)	Social Network Index.	NA[7]
Capacity pillars	**Sensitivity (S)**	Poverty in the community; Sensitivity of food consumption; Sensitivity of health; Sensitivity of revenue.	1 factor
	Adaptive Capacity (AC)	Education; Health; Labor force per capita.	1 factor

In accordance to the abovementioned procedures, the following model has been estimated to perfectly fit the observed variables.

Figure 1. **Resilience Index and pillars**



This model satisfies every goodness-of-fit test and perfectly represents the underlying structure of the observed variables.

[3] No factor analysis was run.

[4] Household Facilities Index is created through factor analysis. A list of variables is used assuming value 1 or 0 depending on whether or not a household has a certain facility. Examples can be electricity, water, landlines, etc.

[5] No factor analysis was run

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3 DATA

This section describes the data used in the analysis, the ECVMA-2011 survey, and the reasons for their suitability for this study; data limitations are introduced as well.

The research employs the 2011 household data from the National Survey of Household Living Conditions and Agriculture (or ECVMA, according to the French acronym), as part of the Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA), in collaboration with the Niger Institut National de la Statistique (INS). Data are representative at the national and urban/rural-level.

The survey covers 2 343 households (in this work, only the rural households have been used). All sampled households are administered a multi-topic Household Questionnaire that collects detailed information on demographics, education, health, wage and non-farm self-employment, household food consumption and food security, durable and agricultural assets, shocks and coping mechanisms, and social protection, among other topics.

In this report, an Aridity Index has been adopted (Trabucco and Zomer, 2009; Zomer *et al.*, 2007; and Zomer *et al.*, 2008), given by the ratio between mean annual precipitation and mean annual potential evapo-transpiration. For values of the index in the range 0.05 – 0.2, land is classified as "Arid"; as "Semi-arid" for values in the range 0.2 – 0.5; and as "Dry sub-humid" for values in the range 0.5 – 0.65.

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4 RESILIENCE ANALYSIS

This section provides the resilience analysis results. First, it describes the analysis of the resilience structure of Niger at a national level, spelling out the relevance of each pillar in explaining the Resilience Index. Subsequently, it presents the results disaggregated by location of household, region and gender of household head, identifying and explaining the existing disparities in resilience capacity between different profiles of households.

This section provides the resilience analysis results. First, it describes the analysis of the resilience structure of Niger at a national level, spelling out the relevance of each pillar in explaining the Resilience Index. Subsequently, it presents the results disaggregated by location of household, region and gender of household head, identifying and explaining the existing disparities in resilience capacity between different profiles of households.

Two analyses are allowed by using the RIMA methodology:

- **The analysis of resilience structure** uses the **pillar**[6] **(and variable)**[7] **weights** in order to assess which pillars (and variables) are the most relevant in determining resilience (and related pillars);
- **The analysis of resilience capacity** is useful for assessing which **profiles of households** are the most resilient, by comparing their resilience indices.

The two analyses are complementary: the analysis of resilience capacity shows **who** is more resilient and the analysis of resilience structure shows where to detect the reasons **why** it is so. Indeed, by focusing on the most relevant pillars and variables (according to the analysis of the resilience structure), the pillar scores and the mean values of observed variables by profiles of households assess why specific profiles are the most resilient (as emerged from the analysis of resilience capacity).

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[6] The pillar weights are the Beta coefficients obtained through SEM estimation.

[7] The variable weights are the factor loadings estimated through factor analysis (FA) to explain 95% of variables' variance. If the latter is explained by more than one factor, the variable weights are a weighted sum of the loadings of all used factors, where the weights are the explained variances.

The present report is based on information collected on a specific timeframe, therefore the analysis captures the contribution to resilience of different dimensions and variables at that specific moment, thus creating a static analysis. In order to achieve a more dynamic analysis of resilience, which would increase the robustness of the findings, another round of survey would be needed. Moreover, since female-headed households represent only the 10% of the entire rural sample, such difference is not statistically significant. Nevertheless, findings on female-headed households' resilience capacity and resilience structure are analyzed.

4.1 ANALYSIS AT NATIONAL LEVEL

Figure 1 shows the different contributions of the pillars in determining the resilience structure of households. In Niger, the most significant dimensions are AST, IFA, followed by AC, ABS, S and SSN. The lower contribution of these dimensions is not due to their irrelevance (generally speaking) towards specific dimensions of resilience, but to the lack of access to some basic services (e.g. significant distance to health centers or other services) that may, in fact, limit the household level of resilience.

Figure 2. **Resilience structure – Pillars weights in Niger (2011)**

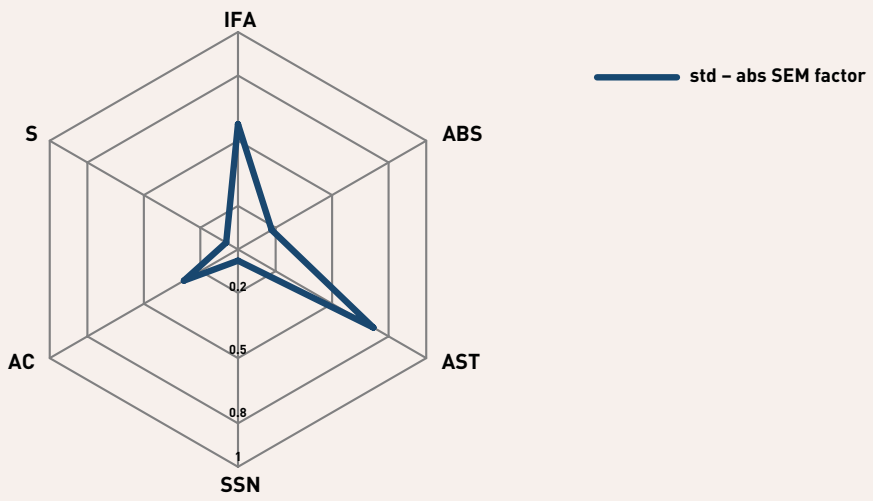


Figure 2 depicts the role played by each pillar in determining resilience; higher values mean a greater role.[8]

[8] In radar graphs, factor loadings are reported; the higher the distance from center, the greater the role played by the observed variable.

AST is the most relevant dimension in the resilience structure of Nigeriens' households. The main relevant variables employed in constructing this pillar are the following: agricultural tools owned by the households, Wealth Index (based on non-agricultural equipment), total land owned and total number of livestock owned.[9]

IFA Per capita expenditure seems to be the most relevant variable for this dimension. Considering the FCS, it appears that, on average, at rural level households are food secure. This may be partially explained by the fact that, on average, households spend some 70% of their total expenditure on food items. In conclusion, it may be established that the actual capacity of spending is greatly relevant for this dimension.

AC plays a minor role in building resilience compared to the other two dimensions. The observable variables contributing the most in determining this dimension are education, diversification of income, and food ratio. As shown in Table A1, the level of education is rather low (10 years on average).[10] Regarding the different sources of income, evidence suggests that households can only rely on few sources of income, thus impairing their ability to cope with shocks. Food ratio (ratio between food expenditure and total budget of the household) is on average 0.72 (Table A1) or 72% of the household budget spent on food consumption. This reduces the share of budget dedicated to non-food expenditure (both durable and non-durable) and, consequently, it nearly deletes their savings propensity.

From the analysis, it emerges that **ABS** contributes to resilience in a less significant way than other dimensions. From Table A1, it emerges that access to electricity makes the higher contribution to households' resilience, while it is clear that access to water and sanitation contribute to a very limited extent. Additionally, from the analysis it is clear that households have a very poor access to water and sanitation facilities, which are measured through the Infrastructure Index within ABS dimension (Table A1). Moreover, distances to basic facilities are also valuable indicators of resilience: the findings highlight that on average long distances (km) have to be covered for reaching primary and secondary schools as well as health services, postal offices and banks (these last two variables have been employed as proxy for access to credit services and infrastructures).

S does not play a significant role in terms of resilience structure. There is a low number of shocks experienced on average by households (Table A1). This results in low sensitivity to shocks and, as a consequence, in a greater capacity to deal with them.

SSN contribution to resilience is also limited. Households do not highly rely on remittances, which is the variable considered in the analysis of social safety nets, or do not receive much of them. It is reported that in 2011 remittances dropped significantly when compared to 2010 (USAID 2011).

[9] Calculated in tropical livestock units (TLU).

[10] According to UNICEF statistics on education (UNICEF, 2014), Niger has a very low level of education attainment.

4.2 ANALYSIS OF GEOGRAPHICAL LOCATION: REGIONS

Interesting results may be obtained from a disaggregated analysis. RIMA model is usually disaggregated by gender of household head or by livelihoods strategies. However, in Niger's dataset, livelihood strategies have been found quite homogeneous and therefore this categorization has been avoided. Similarly, disaggregation by gender has been omitted as female headed households represent only the 10% of the entire rural sample, thus the difference is not considered statistically significant.

The map shown in Figure 3 illustrates the regional average resilience. The brightest shade corresponds to the lowest mean score, while the color gets darker as the mean score increases. From the two figures shown below, it is clear that the Diffa region is the most resilient, followed by Zinder and Tillaberi. A significant lower resilience capacity is observed in Dosso and Maradi. Finally, Tahoua and Agadez are the least resilient regions.

Figure 3. **Resilience capacity map – Average Resilience Index by region in Niger (2011)**

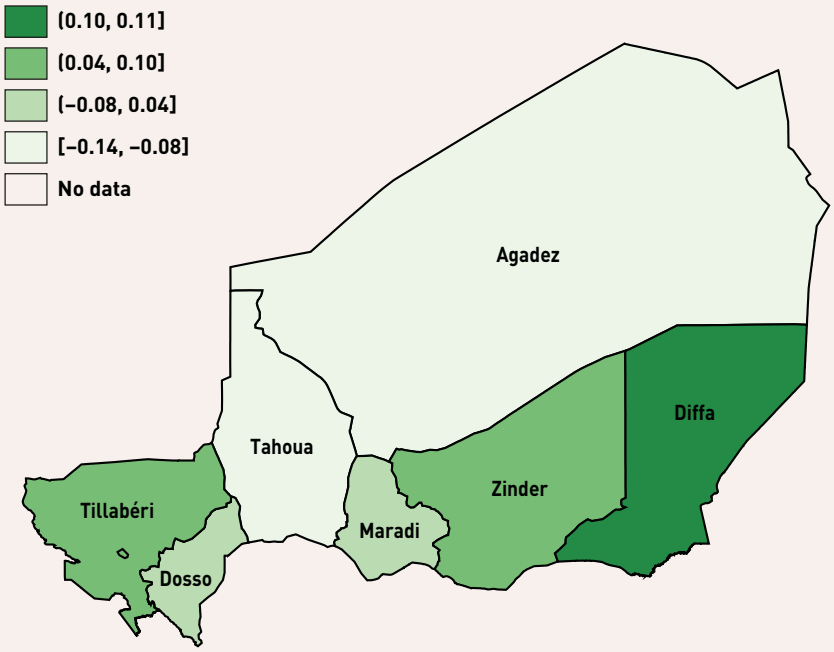


Figure 4. **Resilience capacity by regionsin Niger (2011)**

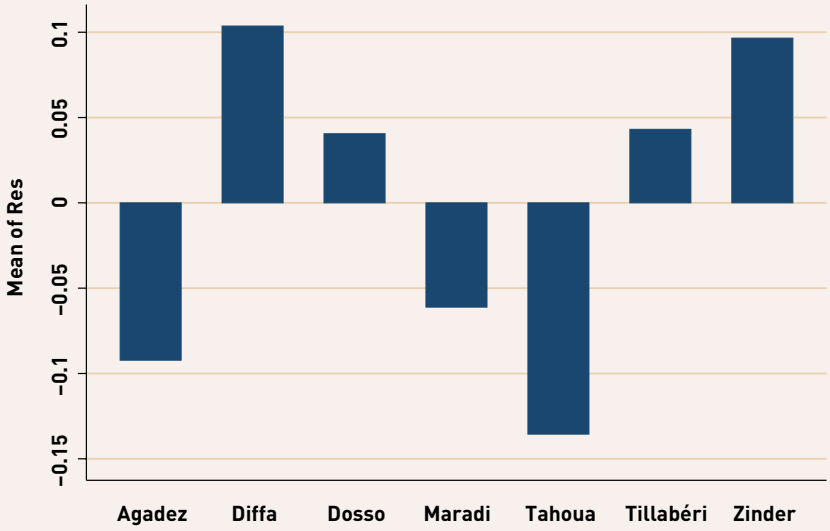


Figure 5 presents the regional disparities in the resilience structure. It is evident that **AST** is the most relevant dimension in all regions. It is interesting to breakdown the variables within this dimension to further elaborate on this.

The four more resilient regions are located where the most differentiated livelihood strategies are found (see Figure 6). As shown in Table A1, their greater resilience capacity is driven by more intense agricultural activities. For instance, Diffa has the highest value of livestock owned, an average value for crop expenditure and the highest grade of Agricultural Wealth Index (a clear description of high intensity and added-value agricultural system). Zinder has a more farming-oriented system (great extension of cultivated land), which is supported by intensive use of agricultural inputs (fertilizers and pesticides). On the other hand, Agadez appears to be the less resilient region. The low resilient capacity is driven mainly by very low access to high-intensity farming techniques and, possibly, to very difficult living conditions (Figure 5 and Figure 6 suggests this region is arid with typical pastoralist livelihood). The resilience capacity analysis for Tahoua region[11] shows a more farming-oriented system in place when compared to Agadez. However, agriculture is not supported by adequate access to high-intensity techniques. Low TLU level is reported (Table A1), but good average cultivated land extension with low values of agricultural assets, inputs and Wealth Index.

[11] In the 80s and 90s, in Tahoua and Tillaberi regions some 250 000 ha of land were rehabilitated resulting in a huge increase of yields per ha (e.g. between 400 kg and 1 500 kg/ha depending on rains).

Figure 5. **Regional disparities in the resilience structure in Niger (2011)**

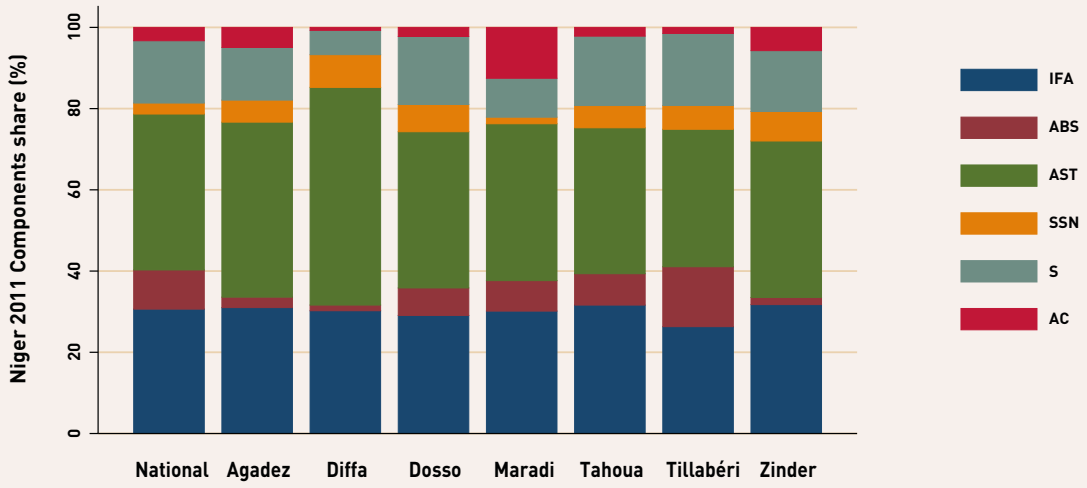
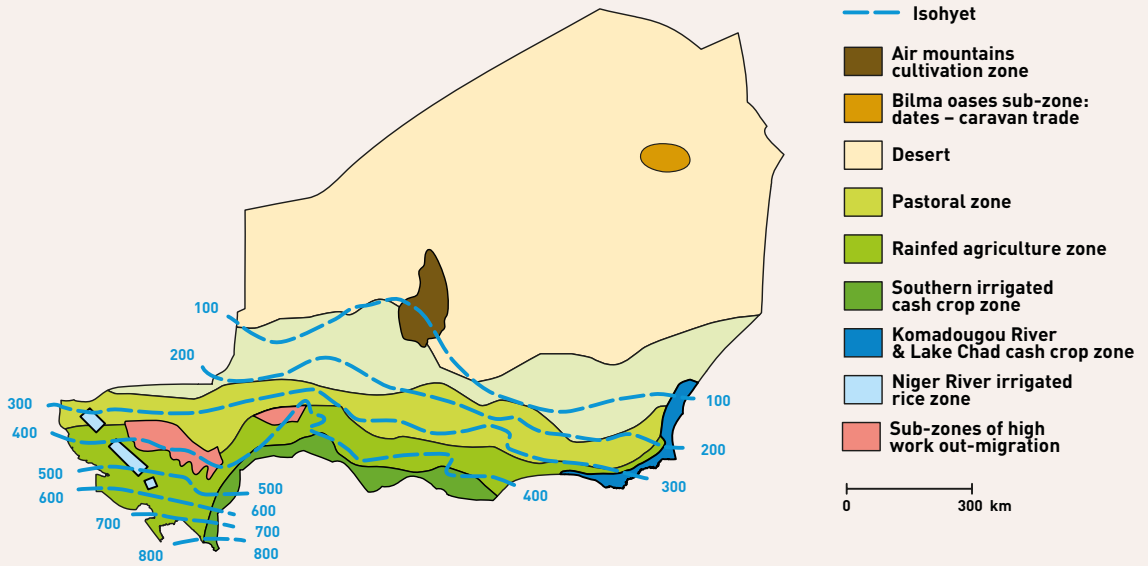


Figure 6. **Nigerian livelihood zones (2011)**



source: FEWSNET

In terms of **IFA**, there are no major differences among regions and compared to national average. On the other hand, significant disparities among regions exist in **ABS**: better scores are reported in Tillaberi compared to other regions, whereas the lowest access to services is registered in Zinder, Diffa and Agadez. In the latter case, it is important to note the highest distances from primary schools, health services, as well as from financial facilities such as banks and post offices. Similarly to Agadez, Maradi shows the greater distances from primary schools, while Diffa shows high distance from health centers. In terms of access to water and sanitation facilities, households in Tahoua appear to be the lowest scoring.

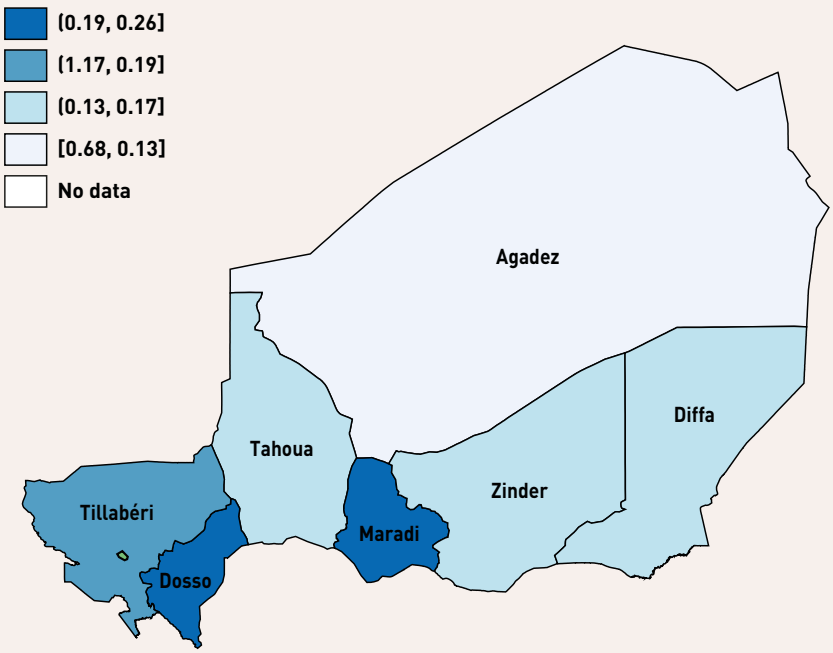
Furthermore, levels of **S** to shocks are dramatically higher when compared to other regions in Agadez and Dosso. Finally, while Agadez and Diffa are the regions with the most dramatic losses of livestock both compared to all other regions and to the national average, Dosso, Tahouua and Tillaberi experience the greater damages to crops.

4.3 ANALYSIS OF GEOGRAPHICAL LOCATION: ARIDITY INDEX

The analysis of resilience in Niger is part of an extensive study on dry lands area in Africa in which the classification adopted is based on the Aridity Index.[12] This approach[13] defines dry lands as regions having an AI of 0.65 or less. In Niger, all surveyed households fall into a narrow dry land classification. The Aridity Index has been selected as indicator of exposure to shocks. The rationale behind this is that a significantly low Aridity Index may be turned into a higher frequency environmental shock (e.g. extreme droughts). In Niger, the differences between terciles are narrowed around a tight range. Nevertheless, interesting findings emerge.

The map depicted in Figure 7 illustrates the aridity level in the different regions: the brightest shade corresponds to the most arid areas, whereas the color gets darker as the aridity decreases.

Figure 7. **Aridity index map at regional level in Niger (2011)**



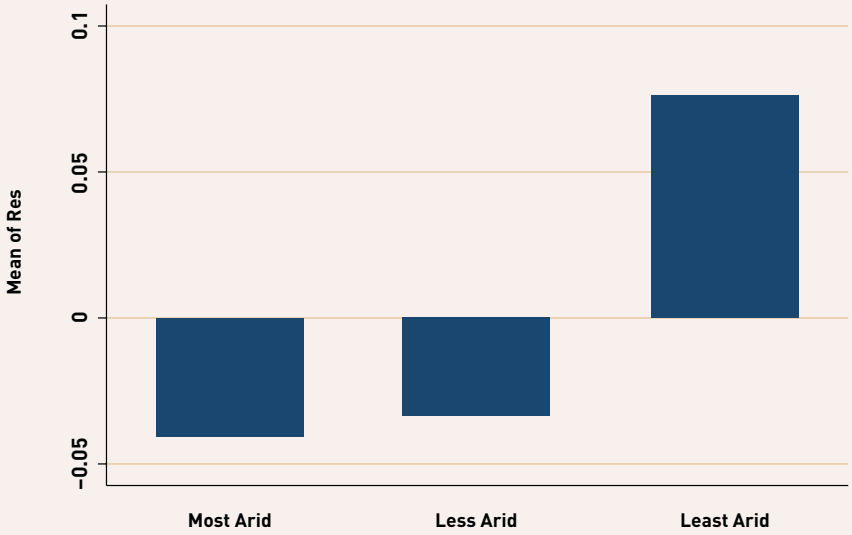
Comparing the map of the resilience capacity (Figure 3: green color) with the map of the Aridity Index (Figure 7: blue color), it is evident that households in the least arid regions (darker blue) are more resilient than households in the most arid areas (lighter blue).

[12] Categories have been constructed using the terciles of the Aridity Index distribution, i.e.: first tercile: most arid; second terciles: less arid; third terciles: least arid.

[13] The Aridity Index approach has been endorsed by the 195 parties to the United Nations Convention to Combat Desertification (UNCCD) and it is being used by the United Nations Food and Agriculture Organization (FAO).

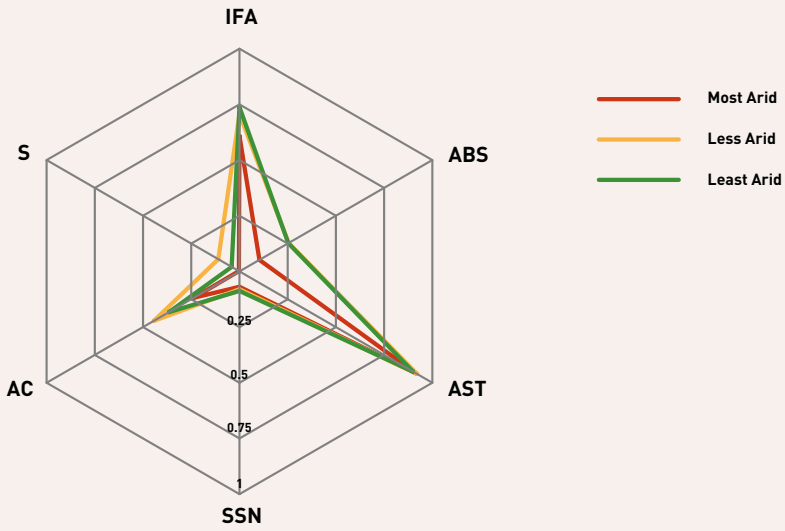
However, almost in all regions the Resilience Index is lower for those who live in the most arid area. It is also reported that almost more that 55% of the households in the sample live in most arid areas. Figure 8 below illustrates the average levels of resilience according to the three terciles. It clearly shows that households in least arid areas (tercile 3) are on average much more resilient than households in the two other terciles (most and less arid).

Figure 8. **Resilience capacity by aridity categories in Niger (2011)**



Given the emerging differences, it could be interesting to assess whether or not the resilience structure varies according to where people live. Figure 9 shows the correlation value (on average) of the six pillars of resilience in each sub-group.

Figure 9. **Resilience structure - pillars weights by aridity categories in Niger (2011)**



Differences in the pillars are mainly driven by Income and Food Access (IFA), Assets (AST) and Adaptive Capacity (AC).

The analysis shows that **AST** are, among all, the most important component of the resilience structure in all of the three terciles. Those inhabiting the most arid areas own a greater numbers of animals compared to those inhabiting less arid zones (Table A1: TLU). Indeed, they also face higher losses in terms of livestock compared to the other sub-groups. On the other hand, less arid areas (tercile 2) have more cultivated land and consequently are those reporting the highest values of crop damages. Expenditures on crop inputs are higher in most arid locations, where households seem also to have a much higher Agricultural Wealth Index in comparison with the other areas. Similarly, the Wealth Index in the most arid areas is also above the national average and above the levels reported in less and least arid ones.

In terms of **IFA**, a comparison between the three groups shows that food consumption score is lower in the second tercile (most arid areas), while lower per capita expenditure is also recorded. In fact, food rations are slightly smaller than in the other two zones.

Concerning **ABS**, distance plays a significant role: families far from main services (e.g. health centers) appear to be less resilient. Great differences are observed between households in the diverse arid zones concerning their access to schools, health centers and financial facilities (Table A1), with the families living in most arid areas forced to cover the longest distances. Considered this, it is clear that ABS is an important element to be taken into account especially in those disadvantaged areas. As clearly shown in Table A1, households in most arid areas are approximately 40 km far from primary schools, while those in the least arid areas are approximately 21 km far. Another striking difference is the distance from bank offices: 56 km in most arid areas *vis-à-vis* 17 km in least arid ones (please refer to Table A1 for more details).

Finally, all three sub-groups score similar values for **AC**. However, a closer look at the variables shows that households in the most arid locations have less years of education, particularly when compared to the less arid areas. This is in line with the findings on the longer distances from primary and secondary schools in these areas. Similarly, the level of diversification of income between the three groups clearly shows the more disadvantaged position of households situated in those locations in comparison to the others.

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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.

As highlighted in the analysis, Niger clearly faces major challenges in the fields of development, security and nutrition. The households' resilience analysis of Niger enables to identify the key principal priority areas on which internal and external efforts should focus in order to provide the necessary support for overcoming them. These areas are: (i) support of ownership and productivity of agricultural assets and (ii) improvement of access to basic services.

This section aims to analyze the overall policy environment of Niger—as existing policy framework and political processes—in order to align the recommendations and the policy implications of this analysis to such environment, thus ensuring consistency with the strategic pillars and objectives of national policies.

Niger's strategic choices, as expressed by the highest Nigerien authorities, seek to reconcile short-term solutions to urgent concerns and to the need of adopting a long-term strategy able to optimize natural and human resources in order to promote sustainable economic, social development and inclusive growth. Against this background, the concept of resilience and resilience-oriented policies and programmes provide a viable framework for integrating humanitarian and long-term development initiatives.

Consistently with the findings of the RIMA, the **Economic and Social Development Plan (PDES) 2012-2015**, which defines the strategic guidelines for short- and medium-term, emphasizes specifically social development as one main priority for the Government and focuses on measures aiming to improve access to basic services.

Moreover, the **AGIR National Resilience Priorities (NRP)** and the **3N Initiative of "Nigeriens Nourishing Nigeriens"** align activities under the domains of social protection for the most vulnerable households and communities, nutrition and agricultural production in order to improve resilience and food and nutrition security outcomes for the population. Accordingly, implications of the RIMA particularly support the Government's goal to sustainably ensure resilience by increasing and diversifying agricultural and livestock production, providing regular supplies to rural and urban markets, improving the resilience of vulnerable groups and improving

the nutritional conditions through social support interventions aimed at increasing health conditions and sanitation.

Policy recommendations supporting the Government's objectives are consistently drawn from the analysis of the most relevant dimensions for households' resilience.

Given that **AST** is the most relevant dimension of the resilience structure in Niger, the analysis provides important policy implications, particularly relevant to AGIR – Strategic Objective 3: «*Renforcer durablement la productivité agricole et alimentaire, les revenus des ménages vulnérables et leur accès aux aliments*», as well as to the 3N-Component 1: «*Accroissement et diversification des productions agro-sylvo-pastorales et halieutiques*». Significant findings to be considered in the framework of such policies are summarized below:

- Households living in the most arid areas have greater numbers of animals compared to those living in less arid places (Table A1: TLU) with Agadez and Diffa showing greater livestock ownership. Thus, due to the importance of livestock in determining resilience, interventions in these areas should focus on improved livestock productivity (e.g. through animal health services, forage provision, etc.); relevant value chains, infrastructure increasing supply to local city markets as well as improving coverage of livestock health services. Additional interventions include the rehabilitation of market infrastructure, the support of internal livestock migration (e.g. construction of livestock movement tracks) and the development of capacity of stakeholders/actors.
- Furthermore, evidence suggests the importance of improving access to agricultural equipment, crop inputs and fertilizers in regions where access to land is greater but the Agricultural Wealth Index scores much lower than in other areas (e.g. Maradi, Zider and Tillaberi). There is an evident need to invest in modern technologies for agriculture and in rural infrastructure in such specific areas. In accordance with this need, the AGIR PRP and 3N initiative envisage relevant activities to support increased revenues for the most vulnerable in the rural sector, together with the adoption of improved agricultural techniques for increasing agricultural productivity and enhancing marketization of production.

Moreover, the PDES is particularly focused in ensuring greater access to basic social services through the provision of access to education, health and safe drinking water. In line with these objectives, the resilience analysis suggests the importance of access to basic services with great emphasis on health care services. Distance has a critical role as families far from facilities such as health centers score lower levels of resilience.

- Recommendations advise the consolidation of the road network in order to increase physical access to services. Additionally, they also highlight the need to increase the coverage of better quality services for most vulnerable groups and to ensure them a greater supply of health services and facilities, such as drinking water, hygiene and sanitation. Particularly, efforts should be focused on communities in most arid areas.
- Moreover, the Government recognizes that the successful reduction of acute and chronic malnutrition depends also on investments on the above-mentioned sectors, particularly on sanitation and water. Relevant measures in those areas are designed under AGIR, particularly "Strategic Objective 2: «*Renforcer la nutrition des ménages Vulnérables*»" and the "3N Component 4: «*Amélioration de l'état nutritionnel des nigériennes et nigériens*»". Additionally, in order to improve the nutritional status of children, AGIR promotes school feeding programmes under its Strategic Objective 1, a measure also aiming to increase educational levels.

In terms of access to basic services, the RIMA also highlights major constraints in accessing schools (both primary and secondary), as well as services such as postal offices and banks, resulting in low access to credits and financial services. The latter can be instrumental to the design of insurance services against shocks affecting production, as envisaged under AGIR Strategic Objective 1. The resilience analysis reports that the lack of such services holds particularly true for households living in the most arid areas who need to cover much longer distances in order to access basic services, especially compared to less arid areas. The analysis details also the most disadvantaged regions in terms of specific services, thus helping in implementing more focused and targeted interventions.

Finally, the analysis shows the relatively important correlation of the **AC** dimension to resilience. It is evident that the determinants negatively affecting AC are low levels of education, reliance on few sources of income as well as a high share of food expenditure, which in turn reduces the allocation of budget to non-food expenditures (including education).

- Policy implications from the RIMA analysis support measures designed under AGIR – Strategic Objective 1 «*Améliorer la protection sociale des communautés et ménages les plus vulnérables pour une sécurisation des moyens d'existence*». Social protection measures are critical to support vulnerable groups in improving their access to food. On the other hand, given the reduced share of non-food expenditure highlighted above, the provision of targeted cash transfers can enable household with limited non-food expenditure to rely on a stable and constant amount of money that can pave their way out of poverty. The analysis shows that such measures are particularly important in most arid areas and least resilient regions such as Agadez and Tahoua. The most arid areas in Niger record the lowest productivity levels, together with high levels of undernutrition. Policies aiming to increase the resilience capacity in such areas should focus more on income generating activities, for instance, supporting young and female employment rates.

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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. **Observed variables; descriptive statistics by region in Niger (2011)**

		REGION										
		National	Agadez	Diffa	Dosso	Maradi	Tahoua	Tillabéri	Zinder	Most Arid	Less Arid	Least Arid
IFA	Weekly total income	558 242	764 568	607 912	537 926	475 913	454 754	469 469	603 952.3	598 431	497 810	520 768
	Expenditure *per capita*	421 537	5771 267	434 785	370 356	347 961	397 948	397 181	432 969	4522 423	375 559	390 776
	Food consumption score	49.71	48.23	55.38	50.45	56.70	34.67	46.48	55.77	49.70	44.81	54.42
ABS	Improved electricity	0.02	0.03	0.02	0.01	0	0.01	0.05	0.02	0.02	0.02	0.02
	Improved sanitation	0.06	0.03	0.01	0.04	0.05	0.14	0.08	0.06	0.05	0.05	0.07
	Distance to primary school	32.18	78.87	17.49	24.80	50.37	10.04	24.54	20.36	40.09	24.13	21.26
	Distance to secondary school	21.30	71.25	20.13	11.51	10.25	6.92	13.60	17.35	29.74	10.08	12.52
	Distance to health service	9.03	27.10	15.58	2.33	5.80	5.64	6.50	1.29	14.29	2.65	2.79
	Distance to bus stop	29.11	72.75	26.67	20.50	21.84	33.22	16.31	14.71	36.06	26.84	15.47
	Infrastructure index	-0.41	-0.82	-0.35	-0.36	-0.47	-0.27	-0.29	-0.34	-0.49	-0.32	-0.32
	Distance to bank office	39.92	111.40	46.53	19.24	38.13	9.67	28.05	29.28	56.63	22.68	17.61
	Distance to post office	44.28	92.47	49.34	34.15	27.43	32.47	46.01	29.89	56.56	30.30	28.81
AST	Asset index	-0.45	-0.52	-0.57	-0.39	-0.51	-0.40	-0.32	-0.44	-0.49	-0.41	-0.40
	Wealth index	-0.02	0.04	-0.18	-0.05	-0.17	-0.02	0.20	0.01	-0.05	0.04	-0.01
	Pesticides	0.07	0.08	0.06	0.07	0.09	0.04	0.06	0.06	0.07	0.05	0.07
	Improved seeds	0.02	0	0.00	0.03	0.02	0.01	0.02	0.03	0.01	0.03	0.02
	Fertilizers	0.43	0.10	0.22	0.77	0.70	0.38	0.46	0.38	0.26	0.55	0.74
	Land	3.92	1.01	3.61	3.65	4.70	3.72	5.98	4.61	4.00	4.26	3.46
	Expenditure in crop inputs	23 248	42 746	22 602	24 154	13 843	17 399	18 093	24 535	25 052	16 824	22 737
	Tropical Livestock Units(TLU)	1.92	3.28	4.73	1.07	1.02	0.61	1.02	1.82	2.77	0.82	0.96
	Agricultural wealth index	0.12	0.17	0.60	0.22	0.12	-0.37	-0.03	0.13	0.21	-0.12	0.13
SSN	Transfers	-0.16	-0.21	-0.31	-0.05	-0.2	-0.01	-0.13	-0.22	-0.22	-0.08	-0.1
S	Number of shocks	1.38	1.42	1.02	2.06	1.08	1.07	1.84	1.12	1.25	1.26	1.78
	Value of livestock	56 832	102 404	220 657	18 444	9 926	2 949	7 474	42 634	95 311	7 531	14 691
	Crop shock - percentage damaged	60.09	9.83	49.61	71.70	70.38	77.86	75.05	63.84	49.69	74.40	70.70
	Share of crop in total income	4.16	0.29	1.50	6.15	8.03	4.32	3.39	5.21	2.76	5.70	6.02
AC	Education	1.23	0.95	0.36	1.63	1.55	1.01	1.55	1.50	0.94	1.41	1.70
	Livelihood diversification	2.90	2.23	2.33	3.46	3.45	2.62	3.02	3.10	2.59	3.13	3.40
	Food ratio	0.72	0.71	0.75	0.73	0.73	0.69	0.71	0.71	0.72	0.71	0.72

Graphic designer: Tomaso Lezzi

This report is part of a series of country level analysis prepared by the FAO Resilience Analysis and Policy (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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EUROPEAN UNION

Contacts:
Luca Russo, FAO Senior Economist
luca.russo@fao.org

Marco d'Errico, FAO Economist
marco.derrico@fao.org

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