

ABSORBTIVE RESILIENCE

Identification of Principal Components

The Absorptive Resilience dataset that was prepared for Principal Components Analysis consisted of 44 variables and 817 records. Eleven components were retained and described as latent variables, explaining 63.1% of variance in the dataset:

- Component 1: Avoidance of Negative Coping Strategies in Times of Food Scarcity
- Component 2: Daily Access and Consumption of Nutritious Food
- Component 3: Monthly Food Security
- Component 4: Absence of Conflict, and Household Assets
- Component 5: Precarious Food Security
- Component 6: Moderate Food Security, and Household Assets
- Component 7: Families with Absence of Conflict
- Component 8: Precarious Food Security, Assets and Land
- Component 9: Self-sufficiency of Food
- Component 10: Good Prenatal Nutrition
- Component 11: Prenatal Food Scarcity

Absorptive Resilience Principal Component 1: Avoidance of Negative Coping Strategies in Times of Food Scarcity

Households that score highly on this PC are those that avoid negative coping strategies in times of food scarcity. Households that score low on this PC do not use (or perhaps do not have access to) positive coping strategies. Such results can be used to identify households that are less or more resilient in terms of coping strategies in times of food scarcity. But this component also points to targets for programming and validates some of the work done by World Vision since the 2015 survey was undertaken. For example, in November of 2017 one project beneficiary stated, “We no longer fear July,” which in the past has been a month of scarcity. This is due to work to reinforce, and to make possible, positive coping strategies. For example, World Vision staff trained project participants to build storage facilities that are resistant to pests, rain and dampness, providing for both stores of food to draw upon in lean seasons, and to sell at market to generate income. Building social capital is another programming opportunity indicated by these results, as drawing upon social networks to feed household members is a better coping strategy than, e.g., selling liquid assets, harvesting immature crops or simply going hungry.

Appendix 1: Principal component descriptions and variable loadings

Table 1.1: Variance explained for Absorptive Resilience PC1

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
1	7.453	16.939	16.939

Table 1.2: Variables defining Absorptive Resilience PC1

Variable	Component Loading	Survey Questions
q2512	0.707	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.12 Restrict consumption by adults so children can eat more?
q2511	0.703	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.11 Send household members to beg?
q254	-0.692	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.4 Borrow food or rely on help from a friend or relative?
q2510	-0.692	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.10 Send household members to eat elsewhere?
q259	0.681	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.9 Harvest immature crops (e.g. green mealies)?
q256	0.663	2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.6 Purchase food on credit, or take a loan to purchase food?
q258	-0.644	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.8 Gather unusual types/amounts of wild food or hunt?

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Variable	Component Loading	Survey Questions
q2514	0.632	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.14 Sale of liquid assets e.g. Goats, sheep, pigs, etc. Mattress, bicycles
q253	0.617	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.3 Skip entire days without eating?
q2515	0.605	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.15 Sale of productive assets e.g. seeds, land, large animals
q2513	-0.576	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.13 Rely on casual labour for food?
q252	0.546	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.2 Reduce number of meals eaten per day?
q255	-0.523	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.5 Rely on less expensive or less preferred foods?
q251	0.515	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.1 Limit portion size at meal times?
q233_23 4	0.429	Q 2.3.3 In the past four weeks did anyone in your household go to sleep hungry?; Q 2.3.4 How often did this happen?
q235_23 6	0.415	Q 2.3.5 Did anyone go without food for a full day in the past month?; Q 2.3.6 How often did this happen?
q231_23 2	0.406	Q 2.3.1 In the past 4 weeks, were there no food?; Q 2.3.2 How often did this happen?
q257	-0.380	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.7 Use food from granary or store

Appendix 1: Principal component descriptions and variable loadings

Variable	Component Loading	Survey Questions
q24411	0.347	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 11) Any sugar or honey?
q24412	0.322	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 12) Any other foods such as, coffee or tea?
q2611	0.301	Q 2.6.11 Over the past month, did anyone in the household ever go without food for a whole day because there wasn't enough?

Absorptive Resilience Principal Component 2: Daily Access and Consumption of Nutritious Food

Households that are positively correlated to this principal component are those that report that persons in their household ate a variety of foods in the previous day, such as dairy, protein, and carbohydrates. The weakest relationship was for consumption of vegetables.

Table 1.3: Variance explained for Absorptive Resilience PC2

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
2	6.194	14.078	31.017

Table 1.4: Variables defining Absorptive Resilience PC2

Variable	Component Loading	Survey Questions
q2449	0.785	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 9) Any cheese, yogurt, milk or other milk product?
q2446	0.774	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 6) Any eggs?

Appendix 1: Principal component descriptions and variable loadings

Variable	Component Loading	Survey Questions
q2448	0.771	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 8) Any food made from beans, peas, nuts?
q24410	0.767	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 10) Any foods made with oil, fat or butter?
q2447	0.753	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 7) Any fresh or dried fish?
q2445	0.739	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 5) Any beef, pork, lamb goat, rabbit, chicken, duck or other birds, liver, kidney, or other meats?
q24412	0.737	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 12) Any other foods such as, coffee or tea?
q24411	0.705	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 11) Any sugar or honey?
q2444	0.667	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night? ; 4) Any fruits?
q2442	0.522	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 2) Any potatoes, yams, cassava or any other foods made from roots or tubers?
q2443	0.330	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 3) Any vegetables?

Absorptive Resilience Principal Component 3: Monthly Food Security

This component describes households that did not experience hunger in the last month, but had a (weak) tendency to draw upon social capital (sending household members to eat elsewhere) to access food. There is also a weak indication that these households have enough income to afford basic goods (shoes). There is a weak tendency of households scoring low on this component to sell productive assets to access food.

Table 1.5: Variance explained for Absorptive Resilience PC3

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
3	2.773	6.303	37.32

Table 1.6: Variables defining Absorptive Resilience PC3

Variable	Component Loading	Survey Questions
q233_234	0.676	Q 2.3.3 In the past four weeks did anyone in your household go to sleep hungry?; Q 2.3.4 How often did this happen?
q231_232	0.658	Q 2.3.1 In the past 4 weeks, were there no food?; Q 2.3.2 How often did this happen?
q235_236	0.658	Q 2.3.5 Did anyone go without food for a full day in the past month?; Q 2.3.6 How often did this happen?;
q2611	0.487	Q 2.6.11 Over the past month, did anyone in the household ever go without food for a whole day because there wasn't enough?
q2614	0.346	Q 2.6.14 Does every member of the household have at least one pair of shoes?
q2510	0.323	2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.10 Send household members to eat elsewhere?
q2515	-0.302	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.15 Sale of productive assets e.g. seeds, land, large animals

Absorptive Resilience Principal Component 4: Absence of Conflict, and Household Assets

Households that score high on this component tend (weakly) to have enough income/resources to have basic goods (shoes, clothes) and domestic animals. At the other end of the scale, households that score low on this component have moderate tendencies to have experienced and been affected by conflict and economic loss. It seems reasonable to speculate that these characteristics show up in this PC in this way if conflict impedes a household’s ability to accumulate or retain assets such as clothes and domestic animals. Some programming in the FEED project has dealt with the situation of conflict by establishing “peace committees” in some villages. This PC implies that such programming is on the right track.

Table 1.7: Variance explained for Absorptive Resilience PC4

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
4	2.001	4.547	41.866

Table 1.8: Variables defining Absorptive Resilience PC4

Variable	Component Score	Survey Questions
q71_q72n	-0.564	Q 7.1. Do you have any conflicts within your community? Q 7.2. If yes, what types of conflicts are within your community?
q74	-0.527	Q7.4. Is your household directly affected by above conflicts?
q2612	0.417	Q 2.6.12 Does every member of the household have at least two sets of clothes?
q269a	-0.400	Q 2.6.9 In the last 12 months (mention the month) did the household experience any adverse event that led to an economic loss?
q58_all	0.397	Q 5.8 What nutritious supplementary infant foods do you know about?
q2614	0.324	Q 2.6.14 Does every member of the household have at least one pair of shoes?
q43	0.306	Q 4.3. Does your household own any domestic animals?

Absorptive Resilience Principal Component 5: Periodic Food Scarcity

Households that score highly on this component had a weak tendency to report consuming vegetables, roots and tubers in the previous day, and to have used food stores to cope with food scarcity over the last month. Other foods such as meats and dairy are not related to this component. These households have tended (weakly) not to be affected by conflict. Households scoring low on this component have a weak to moderate tendency to indicate that children had not eaten in the previous day and that the household head was not able to provide food for family members at some point in the previous year.

Table 1.9: Variance explained for Absorptive Resilience PC5

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
5	1.757	3.994	45.861

Table 1.10: Variables defining Absorptive Resilience PC5

Variable	Component Loading	Survey Questions
sqrt_q56_all	-0.497	Q 5.6 Now I would like to ask you about the type of foods that the child ate yesterday during day and the night?
q2443	0.375	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 3) Any vegetables?
q257	0.372	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.7 Use food from granary or store;
q261	-0.355	Q 2.6.1 In the past 12 months, was the household head able to provide three meals daily for all family members, through own production purchase or other sources without assistance from other family members, relatives or NGO?
q74	0.343	Q 7.4. Is your household directly affected by above conflicts?
q2442	0.311	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day

Variable	Component Loading	Survey Questions
		and night?; 2) Any potatoes, yams, cassava or any other foods made from roots or tubers?

Absorptive Resilience Principal Component 6: Moderate Food Security, and Household Assets

Households that score highly on this component tend not to experience hunger that requires them to reduce the number of meals or limit portion sizes. They tend (weak to moderate) to have access to land, own basic goods such as shoes, and may have some training in proper diet. Households that score low on this component have a (weak) tendency to rely on less expensive or less preferred foods to deal with food scarcity. Though the tendencies are weak to moderate, this PC demonstrates the situation that household assets tend to provide, or at least indicate, some buffer against food scarcity.

Table 1.11: Variance explained for Absorptive Resilience PC6

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
6	1.597	3.629	49.489

Table 1.12: Variables defining Absorptive Resilience PC6

Variable	Component Loading	Survey Questions
q266	0.476	Q 2.6.6 Does the household have access to land?
q251	0.444	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.1 Limit portion size at meal times?
q252	0.420	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.2 Reduce number of meals eaten per day?
q255	-0.391	Q 2.5 In the past 30 days, how frequently did your household use the following strategies in order to access food?; 2.5.5 Rely on less expensive or less preferred foods?

Variable	Component Loading	Survey Questions
q241	0.382	Q 2.4.1 Anyone trained in proper diet?
q2614	0.300	Q 2.6.14 Does every member of the household have at least one pair of shoes?

Absorptive Resilience Principal Component 7: Families with Absence of Conflict

Households that score highly on this component tend (moderately) to not experience conflict, and tend (weakly) to have children that ate some form of nutritious food in the previous day. There is also a weak tendency to be able to afford basic goods (clothes). Note that this PC seems to identify a set of households that have different and contrasting relationships among conflict and household assets than does PC 4. This may be due to survey questions associated with this PC addressing “conflicts within your community” rather than simply referring to “conflict” which could be interpreted as associated with armed conflict (which is prevalent in South Sudan due to civil war).

Table 1.13: Variance explained for Absorptive Resilience PC7

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
7	1.518	3.45	52.94

Table 1.14: Variables defining Absorptive Resilience PC7

Variable	Component Loading	Survey Questions
q71_q72n	0.588	Q 7.1. Do you have any conflicts within your community; Q 7.2. If yes, what types of conflicts are within your community?
q74	0.578	Q 7.4. Is your household directly affected by above conflicts?
q2612	0.339	Q 2.6.12 Does every member of the household have at least two sets of clothes?
q58_all	0.338	Q 5.8 What nutritious supplementary infant foods do you know about?

Variable	Component Loading	Survey Questions
sqrt_q56_all	0.329	Q 5.6 Now I would like to ask you about the type of foods that the child ate yesterday during day and the night

Absorptive Resilience Principal Component 8: Precarious Food Security, Assets and Land

Households that score strongly on this component have a weak tendency to report having eaten vegetables in the previous day, but all other types of foods consumed are not related to this component. Households that score low on this component tend not to have access to land and not to own domestic animals.

Table 1.15: Variance explained for Absorptive Resilience PC8

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
8	1.168	2.655	55.595

Table 1.16: Variables defining Absorptive Resilience PC8

Variable	Component Loading	Survey Questions
q43	-0.417	Q 4.3. Does your household own any domestic animals?
q266	-0.395	Q 2.6.6 Does the household have access to land?
q2443	0.366	Q 2.4.4 Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and night?; 3) Any vegetables?

Absorptive Resilience Principal Component 9: Self-sufficiency of Food

This component is defined by a single variable that describes (strongly) households that have reported a main source of (how they obtained) food in the past month. Both the coding of the input variable and some very weak negative loadings (<.3) imply that this is related to the security that households derive from growing their own food.

Appendix 1: Principal component descriptions and variable loadings

Table 1.17: Variance explained for Absorptive Resilience PC9

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
9	1.132	2.574	58.169

Table 1.18: Variables defining Absorptive Resilience PC9

Variable	Factor Score	Survey Questions
q2610	0.730	Q 2.6.10 Over the past month, what has been the MAIN source of food consumed by your household?

Absorptive Resilience Principal Component 10: Good Prenatal Nutrition

This component describes a moderate tendency in female respondents to have adequate food consumption during pregnancy. Households that score low on this component tend to lack knowledge about nutritious infant foods.

Table 1.19: Variance explained for Absorptive Resilience PC10

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
10	1.105	2.511	60.68

Table 1.20: Variables defining Absorptive Resilience PC10

Variable	Component Loading	Survey Questions
q510	0.590	Q 5.10. During the most recent pregnancy, how much food did you consume?
q2610	0.425	Q 2.6.10 Over the past month, what has been the MAIN source of food consumed by your household?
q58_all	-0.329	Q 5.8 What nutritious supplementary infant foods do you know about?

Absorptive Resilience Principal Component 11: Prenatal Food Scarcity

Households that score highly on this component have weak tendencies not to have experienced economic loss, and to have fed their children in the previous day. Households that score low on this component have a moderate tendency to report lack of adequate food during pregnancy.

Table 1.21: Variance explained for Absorptive Resilience PC11

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
11	1.053	2.393	63.073

Table 1.22: Variables defining Absorptive Resilience PC11

Variable	Component Loading	Survey Questions
q510	-0.519	Q 5.10. During the most recent pregnancy, how much food did you consume?
q269a	0.331	Q 2.6.9 In the last 12 months (mention the month) did the household experience any adverse event that led to an economic loss?
sqrt_q56_all	0.307	Q 5.6 Now I would like to ask you about the type of foods that the child ate yesterday during day and the night?

ADAPTIVE RESILIENCE

Identification of Principal Components

The Adaptive Resilience dataset that was prepared for Principal Components Analysis consisted of 23 variables and 800 records. Eight components were retained and interpreted as latent variables, explaining 67.2% of variance in the dataset. These were identified as:

- Component 1: Organized Disaster Management
- Component 2: Disaster Management (not organized)
- Component 3: “Other” Environmental Conservation and Farming
- Component 4: “Other” Environmental Conservation and Charcoal Burning
- Component 5: High Education and Income
- Component 6: Awareness of conservation, disaster and conflict
- Component 7: Stable Income and Education
- Component 8: Secure Income

Adaptive Resilience Principal Component 1: Organized Disaster Management

Households that score highly on this PC are those that tend (strongly) to have and are aware of village disaster management committees. They tend (moderately to weakly) to employ and be aware of disaster management, conservation and beneficial farming practices, and to be aware of practices that cause environmental destruction. Households that score low on this component tend (strongly) to have faced a disaster in the last 12 months and (moderately) not to have employed an effective disaster-risk reduction or positive coping strategy. The associations evident in the variables that define this PC suggest that capacity at the community level has mitigated against the impact of disasters, and this is why household level responses about awareness of adaptive strategies and disaster management committees seem to be opposed to the actual experience of disaster in the last 12 months.

Table 1.23: Variance explained for Adaptive Resilience PC1

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %
1	4.015	17.458	17.458

Table 1.24: Variables defining Adaptive Resilience PC1

Variable	Component Loading	Survey Questions
q719	0.806	Q7.19. If yes, does this community have a disaster management committee?
q718	0.799	Q7.18. Have you ever heard about a disaster management committee?
q715	-0.788	Q7.15. Did you household face any disaster in the past 12 months?
q714	0.587	Q7.14. Do you know of any potential disasters that are likely to occur in your community?
q717	-0.493	Q7.17 Was your household able to employ an effective disaster-risk reduction or positive coping strategy to avoid disaster at the household level?
Log10_q35_all	0.491	Q 3.5 Which of the following farming practices did this household use during the last farming season?
Log10_q318_all	0.473	Q3. 18. Which of the following farming strategies that reduce risk to disaster and climate change does this household use?
q31	0.417	Q 3.1 Did you plant any crops during the last farming seasons?
q723c	0.371	Q7.23. What is your household doing to promote environment conservation in this area?; adopting good farming practices
q721	0.371	Q7.2. If yes, what types of conflicts are within your community?
q722c	0.356	Q7.22. What are the practices in this area that are contributing to environment destructions?; poor farming methods
q722a	0.334	Q7.22. What are the practices in this area that are contributing to environment destructions?; Cutting of trees
q723a	0.317	Q7.23. What is your household doing to promote environment conservation in this area?; Planting tree
q723b	0.307	Q7.23. What is your household doing to promote environment conservation in this area?; Not burning charcoal

Adaptive Resilience Principal Component 2: Disaster Management (not organized)

Households that score highly on this PC tend (moderately) to have employed an effective disaster-risk reduction or positive coping strategy. They tend (moderately to weakly) to employ and be aware disaster management, conservation and beneficial farming practices, and to be aware of practices that cause environmental destruction. Households that score low on this component tend (moderately) not to have community disaster management committees, nor to have heard of them. This PC contrasts with PC1 and could identify a target for programming. With the caveat that the sampling design of the 2015 survey was not designed to be representative at the village (*boma*) level, future work should pay attention to this question, to understand and contrast the experience of households in different communities with and without disaster management adaptive capacities.

Table 1.25: Variance explained for Adaptive Resilience PC2

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
2	2.709	11.777	29.234

Table 1.26: Variables defining Adaptive Resilience PC2

Variable	Component Loading	Survey Questions
q717	0.533	Q7.17 Was your household able to employ an effective disaster-risk reduction or positive coping strategy to avoid disaster at the household level?
q723b	0.515	Q7.23. What is your household doing to promote environment conservation in this area? ; Not burning charcoal
q719	-0.510	Q7.19. If yes, does this community have a disaster management committee?
q722b	0.508	Q7.22. What are the practices in this area that are contributing to environment destructions?; Charcoal Bunning
q722a	0.506	Q7.22. What are the practices in this area that are contributing to environment destructions?; Cutting of trees
q723a	0.485	Q7.23. What is your household doing to promote environment conservation in this area?; Planting tree

Variable	Component Loading	Survey Questions
q718	-0.471	Q7.18. Have you ever heard about a disaster management committee?
q723c	0.457	Q7.23. What is your household doing to promote environment conservation in this area?; adopting good farming practices
q715	0.397	Q7.15. Did you household face any disaster in the past 12 months?
q31	0.335	Q 3.1 Did you plant any crops during the last farming seasons?
q722c	0.326	Q7.22. What are the practices in this area that are contributing to environment destructions?; poor farming methods
Log10_q35_all	0.321	Q 3.5 Which of the following farming practices did this household use during the last farming season?
Log10_q318_all	0.320	Q3. 18. Which of the following farming strategies that reduce risk to disaster and climate change does this household use?

Adaptive Resilience Principal Component 3: “Other” Environmental Conservation and Farming

Households that score highly on this component tended (low to moderately) to report action to conserve the environment in the “other” category, and to be aware of “other” category practices that are harmful to the environment. Households that score low on this component tended (moderately) not to have planted crops in the previous season, nor to have employed farming conservation practices or disaster and climate change risk reduction strategies. Though most respondents in the villages surveyed will derive their livelihoods from the land, it may be that this PC identifies respondents who are not farmers.

Table 1.27: Variance explained for Adaptive Resilience PC3

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %
3	2.218	9.643	38.878

Table 1.28: Variables defining Adaptive Resilience PC3

Variable	Component Loading	Survey Question
Log10_q35_all	-0.686	Q 3.5 Which of the following farming practices did this household use during the last farming season?
q31	-0.679	Q 3.1 Did you plant any crops during the last farming seasons?; Q 3.1 Did you plant any crops during the last farming seasons?
Log10_q318_al 1	-0.638	Q3. 18. Which of the following farming strategies that reduce risk to disaster and climate change does this household use?
q722d	0.454	Q7.22. What are the practices in this area that are contributing to environment destructions?; Others (specify)
q723d	0.416	Q7.23. What is your household doing to promote environment conservation in this area?; others (specify)

Adaptive Resilience Principal Component 4: “Other” Environmental Conservation and Charcoal Burning

Households that score highly on this component tended (strongly) to report action to conserve the environment in the “other” category, and to be aware of “other” category practices that are harmful to the environment. Households that score low on this component tended (weakly) not to have reported charcoal burning as environmentally damaging.

Table 1.29: Variance explained for Adaptive Resilience PC4

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %
4	1.658	7.21	46.088

Table 1.30: Variables defining Adaptive Resilience PC4

Variable	Component Loading	Survey Questions
q723d	0.794	Q 7.23. What is your household doing to promote environment conservation in this area?; others (specify)
q722d	0.754	Q 7.22. What are the practices in this area that are contributing to environment destructions?; Others (specify)
q722b	-0.318	Q 7.22. What are the practices in this area that are contributing to environment destructions?; Charcoal Bunning;

Adaptive Resilience Principal Component 5: High Education and Income

Households scoring strongly on this component have moderate tendencies for higher levels of education, alternative sources of income and a (weak) tendency for at least one adult in the household to be earning a regular income. Households that score low on this component tended (weakly) not to have reported adopting good farming practices. Though education is indicated as high in households scoring strongly on this PC, it may point to need for programming such as education and training of farmers on “good farming practices” for conservation.

Table 1.31: Variance explained for Adaptive Resilience PC5

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
5	1.526	6.635	52.723

Table 1.32: Variables defining Adaptive Resilience PC5

Variable	Component Loading	Survey Questions
q114	0.654	Q 1.14 What is the highest level of education that head of the household have completed?
q113	0.600	Q 1.13 What is the highest level of education that you have completed?

Variable	Component Loading	Survey Questions
q265	0.507	Q 2.6.5 Does the household have an alternative source of income to rely on, should the main source of income be lost?
q41	0.372	Q41Is there one or more adults, over 18 years, in the household that is earning a regular income to meet the needs of the household?
q723c	-0.363	Q 7.23. What is your household doing to promote environment conservation in this area?; adopting good farming practices

Adaptive Resilience Principal Component 6: Awareness of conservation, disaster and conflict

Households that score highly on this component have (weak) tendencies to be aware of potential disasters and conflicts, and to report undertaking environmentally beneficial household practices (not burning charcoal, planting trees). Households that score weakly on this component have a moderate tendency not to report poor farming practices as contributing to environmental destruction. As with PC5, this PC may point to a need for programming such as education and training of farmers on “good farming practices” for conservation.

Table 1.33: Variance explained for Adaptive Resilience PC6

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
6	1.17	5.088	57.812

Table 1.34: Variables defining Adaptive Resilience PC6

Variable	Component Loading	Survey Questions
q722c	-0.560	Q 7.22. What are the practices in this area that are contributing to environment destructions?; poor farming methods
q721	0.379	Q 7.2. If yes, what types of conflicts are within your community?
q714	0.362	Q 7.14. Do you know of any potential disasters that are likely to occur in your community?

Variable	Component Loading	Survey Questions
q723b	0.349	Q 7.23. What is your household doing to promote environment conservation in this area?; Not burning charcoal
q723a	0.326	Q 7.23. What is your household doing to promote environment conservation in this area?; Planting tree

Adaptive Resilience Principal Component 7: Stable Income and Education

Households that score strongly on this component report stable sources of income and higher levels of education (weak to moderate). Households that score low on this component have (weak) tendencies for a lack of alternate sources of income and adults earning regular income. Programming around income generating activities, such as skills development in carpentry, tailoring, and business practices (e.g., to support sale of produce at market) may be identified for households that score low on this PC.

Table 1.35: Variance explained for Adaptive Resilience PC7

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
7	1.105	4.804	62.616

Table 1.36: Variables defining Adaptive Resilience PC7

Variable	Component Loading	Survey Questions
q264	0.480	Q 2.6.4 What is the main source of household income?
q113	0.463	Q 1.13 What is the highest level of education that you have completed?
q114	0.330	Q 1.14 What is the highest level of education that head of the household have completed?
q41	-0.327	Q41Is there one or more adults, over 18 years, in the household that is earning a regular income to meet the needs of the household?; Yes = 1, No = 0, DK = 2

Variable	Component Loading	Survey Questions
q265	-0.308	Q 2.6.5 Does the household have an alternative source of income to rely on, should the main source of income be lost?

Adaptive Resilience Principal Component 8: Secure Income

This component describes households that report (strongly) a stable source of income (e.g., remittances and casual labour are not secure, whereas hiring out labour on other farms, and informal and formal business are relatively more secure). They also have a moderate tendency for adults to earn regular income, and a weak tendency for access to alternative sources of income. As with PC7, programming around income generating activities, such as skills development in carpentry, tailoring, and business practices (e.g., to support sale of produce at market) may be identified for households that score low on this PC. The FEED project has already been undertaking such work in South Sudan, and these results both validate the appropriateness of such work and may help to better target project beneficiaries.

Table 1.37: Variance explained for Adaptive Resilience PC8

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
8	1.042	4.53	67.146

Table 1.38: Variables defining Adaptive Resilience PC8

Variable	Factor Score	Survey Questions
q264	0.722	Q 2.6.4 What is the main source of household income?
q41	0.426	Q4.1 Is there one or more adults, over 18 years, in the household that is earning a regular income to meet the needs of the household?
q265	0.323	Q 2.6.5 Does the household have an alternative source of income to rely on, should the main source of income be lost?

TRANSFORMATIVE RESILIENCE

Identification of Principal Components

The transformative resilience dataset that was prepared for Principal Components Analysis consisted of 30 variables and 804 records. Nine principal components were retained and described as latent variables, explaining 68.4% of variance in the dataset:

- Component 1: Gender and Women’s Empowerment
- Component 2: Community-level Social Capital
- Component 3: Agricultural Success and Access to Financial Institutions
- Component 4: Gender Awareness
- Component 5: Absence of Gender-based Violence
- Component 6: Access to Financial Services
- Component 7: Access to Land for Cultivation
- Component 8: Gender and Equal Opportunity
- Component 9: Women’s Empowerment and Access to Farming Inputs

Transformative Resilience Principal Component 1: Gender and Women’s Empowerment

Households that score highly on this PC responded positively to a large number of questions relating to gender and women’s empowerment. These are more resilient with respect to transformative resilience than households that score low on this PC. Thirteen such questions define this component, and all are strongly or moderately correlated to the component. These point to potential programming pertaining to gender equality to support transformative resilience.

Table 1.39: Variance explained for Transformative Resilience PC1

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
1	4.015	17.458	17.458

Table 1.40: Variables defining Transformative Resilience PC1

Variable	Component Loading	Survey Questions
q68n	0.761	Q 6.8 Women’s views are taken into consideration by the community?
q69n	0.733	Q 6.9 Women participate freely in community events?

Variable	Component Loading	Survey Questions
q610n	0.709	Q 6.10 Women and men are equally targeted for development activities?
q66n	0.704	Q 6.6 Men and women are given equal opportunity to develop their skills?
q614n	0.701	Q 6.14 Women have a role in decision making about farming activities for their households, public speaking, and policy making?
q67n	0.671	Q 6.7 Local leaders aware of the different needs of women and men
q612n	0.664	Q 6.12 Women have control over land?
q611n	0.635	Q 6.11 Women have access to land
q613n	0.612	Q 6.13 Women have control over agricultural produce and proceeds their households, public speaking, and policy making?
q65n	0.583	Q 6.5 Respondent appreciates the different gender roles in the community?
q61n	0.534	Q 6.1 Boys and girls are equally valued by the community?
q63n	0.521	Q 6.3 Boys and girls are given equal protection in families?
q62n	0.456	Q 6.2 Boys and girls are given equal opportunity to attend school?

Transformative Resilience Principal Component 2: Community-level Social Capital

Households that score highly on this PC are those in which males and females participate in “common interest groups” (such as farmers groups, cooperatives, market, horticultural or traders’ groups, or local NGOs), and which have access to financial institutions, land and agricultural inputs. Participation in common interest groups defines this component (strongly), more than do the access variables (weakly).

Appendix 1: Principal component descriptions and variable loadings

Table 1.41: Variance explained for Transformative Resilience PC2

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
2	2.709	11.777	29.234

Table 1.42: Variables defining Transformative Resilience PC2

Variable	Component Loading	Survey Questions
Q3.7m_binary	0.870	Q 3.7m List types of common interest groups to which the respondent belongs (male)
q36_binary	0.868	Q 3.6 Are you aware of any common interest group in this area?
Q3.7f_binary	0.811	Q 3.7f List types of common interest groups to which the respondent belongs. (female)
q38m+f_all	0.800	Have you or anyone in your household completed a training cycle? (If you belong to one of the above groups)
q267b	0.366	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; B) Land Cultivated
q629-q630_all_binary	0.338	Q6.29-6.30 Which group or community structures do you hold leadership position in?
q267a	0.337	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; A) Land Owned;
q47b	0.327	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Female

Variable	Component Loading	Survey Questions
q33_all_binary	0.308	Q 3.3 During the last planting season (six months), which of the following farming inputs were you able to access/receive?

Transformative Resilience Principal Component 3: Agricultural Success and Access to Financial Institutions

This component is (moderately) defined by households that sold agricultural produce in the last year, and tended (strongly) to get a high price for those products. Male and female access to financial services also weakly contribute to the definition of this component. The relationship of access to self-selected village savings and loans groups (self-help groups), or bank loans, to this component suggests that this may be an area for further investigation and potential programming.

Table 1.43: Variance explained for Transformative Resilience PC3

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
3	2.218	9.643	38.878

Table 1.44: Variables defining Transformative Resilience PC3

Variable	Component Loading	Survey Question
q321b	0.877	Q 3.22 Did you or any member of this household obtain high prices/returns on the sale of agricultural produces in the last 6 months?; Female
q321a	0.868	Q 3.22 Did you or any member of this household obtain high prices/returns on the sale of agricultural produces in the last 6 months?; Male
q319	0.582	Q 3.20 Did you sell any of your crop harvests last season?
q47a	0.382	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Male

q47b	0.381	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Female
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Transformative Resilience Principal Component 4: Gender Awareness

This component describes households that did not experience nor know of gender violence (moderate) and that value boys and girls equally (weakly). Access to land also (weakly) helped to describe this component. Households that scored low on this component are those in which women tend (weakly) not to have control over agricultural products and proceeds, and in which the respondent would tend (weakly) not to report gender violence.

Table 1.45: Variance explained for Transformative Resilience PC4

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
4	1.658	7.21	46.088

Table 1.46: Variables defining Transformative Resilience PC4

Variable	Component Loading	Survey Questions
q623	0.619	Q 6.23 Over the last 6 months, have you heard of any community member who experienced Gender based Violence
q621	0.560	Q 6.21 Over the last 6 months, did you or any female household member experience any form of Gender based violence
q267a	0.392	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; A) Land Owned
q267b	0.389	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; B) Land Cultivated
q627	-0.351	Q 6.27 If you suspected that a girl child or woman in the community was being abused (physically or sexually), would you willing to report such an incident?
q61n	0.332	Q 6.1 Boys and girls are equally valued by the community?

Variable	Component Loading	Survey Questions
q613n	-0.304	Q 6.13 Women have control over agricultural produce and proceeds their households, public speaking, and policy making?

Transformative Resilience Principal Component 5: Absence of Gender-based Violence

Households scoring strongly on this component tend (moderately) not to have experienced, nor know of, gender-based violence in the community. Households that score low on this component tend (weakly) not to have access to land for cultivation.

Table 1.47: Variance explained for Transformative Resilience PC5

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
5	1.526	6.635	52.723

Table 1.48: Variables defining Transformative Resilience PC5

Variable	Component Loading	Survey Questions
q621	0.530	Q 6.21 Over the last 6 months, did you or any female household member experience any form of Gender based violence
q623	0.506	Q 6.23 Over the last 6 months, have you heard of any community member who experienced Gender based Violence
q267b	-0.347	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; B) Land Cultivated
q267a	-0.316	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; A) Land Owned

Transformative Resilience Principal Component 6: Access to Financial Services

The most strongly contributing variables to this component are (moderately) female and male access to financial services. Households scoring strongly on this component also tend (weakly) to have access to land for cultivation. Households that score low on this component tended (weakly) to report that boys and girls were not valued equally in the community.

Table 1.49: Variance explained for Transformative Resilience PC6

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
6	1.17	5.088	57.812

Table 1.50: Variables defining Transformative Resilience PC6

Variable	Component Loading	Survey Questions
q47b	0.526	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Female
q47a	0.491	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Male
q267a	0.395	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; A) Land Owned
q267b	0.376	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; B) Land Cultivated
q61n	-0.331	Q 6.1 Boys and girls are equally valued by the community?

Transformative Resilience Principal Component 7: Access to Land for Cultivation

Households that score highly on this component tend (weak to moderately) to have access to land for cultivation (both land owned and other land cultivated). Households that score low on this component have weak tendencies to lack access to financial services and agricultural inputs.

Table 1.51: Variance explained for Transformative Resilience PC7

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %
7	1.105	4.804	62.616

Table 1.52: Variables defining Transformative Resilience PC7

Variable	Component Loading	Survey Questions
q267a	0.461	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; A) Land Owned
q267b	0.451	Q 2.6.7 During the last agricultural season, how many acres of land did the household own and cultivate?; B) Land Cultivated
q47a	-0.431	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Male
q47b	-0.369	Q 4.7 Did any member of this household access a service from a self-selected village savings and loans groups or bank loans within the last 12 months?; Female
q33_all_binary	-0.302	Q 3.3 During the last planting season (six months), which of the following farming inputs were you able to access/receive?

Transformative Resilience Principal Component 8: Gender and Equal Opportunity

This component describes households that report (weak to moderate) tendencies for both boys and girls have opportunities to attend school, and for women to participate in household decision making. Households that score low on this component report (weak) tendencies for local leaders not to be aware of different needs of women and men.

Table 1.53: Variance explained for Transformative Resilience PC8

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %
8	1.042	4.53	67.146

Table 1.54: Variables defining Transformative Resilience PC8

Variable	Component Loading	Survey Questions
q62n	0.488	Q 6.2 Boys and girls are given equal opportunity to attend school?
q619	0.398	Q 6.19 Do you participate in decision making in this household (ask only if respondent is a woman)
q67n	-0.330	Q 6.7 Local leaders aware of the different needs of women and men

Transformative Resilience Principal Component 9: Women’s Empowerment and Access to Farming Inputs

This component describes households that have weak to moderate tendencies for women participate in decision-making and for the household to have access to farming inputs. There are also weak tendencies for women not to have experienced household violence, to hold leadership positions and to indicate that they would report gender-based violence.

Table 1.55: Variance explained for Transformative Resilience PC9

Component	Initial Eigenvalues	Extraction Sums of Squared Loadings	
		% of Variance	Cumulative %
9	1.004	3.345	68.418

Table 1.56: Variables defining Transformative Resilience PC9

Variable	Component Loading	Survey Questions
q619	0.460	Q 6.19 Do you participate in decision making in this household (ask only if respondent is a woman)
q33_all_binary	0.376	Q 3.3 During the last planting season (six months), which of the following farming inputs were you able to access/receive?
q629-q630_all_binary	0.373	Q 6.29-6.30 Which group or community structures do hold leadership position in?
q627	0.363	Q 6.27 If you suspected that a girl child or woman in the community was being abused (physically or sexually), would you willing to report such an incident?
q621	0.305	Q 6.21 Over the last 6 months, did you or any female household member experience any form of Gender based violence