

iDE's Market Systems Resilience Index: Assessing Market Systems in Mozambique- Beira corridor 2021

Report | Sofala and Manica Provinces |



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Lead writers: Lina Henao, Nate Odendahl,

Analysis conducted by: Isa Chiconel, Nate Odendahl.

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EXECUTIVE SUMMARY

The Market Systems Resilience Index (MSRI) measures the market's ability to react, withstand, and change in response to shocks and stressors. Understanding the different needs and vulnerabilities that households and market actors are required to overcome, can help identify channels through which effective interventions can be adopted. iDE's MSRI tool measures the resilience of market systems, providing an opportunity for adaptive management, and at the same time, enables iDE to develop metrics to monitor and assess improvement.

The MSRI tool provides useful insights and evidence for making policy and programmatic recommendations to strengthen market systems. MSRI results describe the market system of the Manica and Sofala provinces that make up the Beira Corridor. The primary goal of using the MSRI in Mozambique is to examine how market system factors affect resilience at both systems and household levels in the Beira Corridor, in central Mozambique over time.

Resilience levels of all actors slightly decreased from 2020 to 2021 in the provinces of Manica and Sofala. Households continue to be the least resilient among actors and input suppliers had the largest drop in resilience levels. Climate shocks and stressors have made market actors equally vulnerable, and preparedness levels have not improved. It was observed that low resilience levels in households are driven by relatively low connectivity to markets and financial viability of market actors; suggesting low collaboration and integration among households in addition to low profitability and access to financial services. This highlights the need for continued engagement with the private sector and market linkages strengthening.

Moreover, inclusivity is significantly low among households and market actors, indicating that efforts should be channeled to actively engage and benefit women and systematically excluded groups so that they can participate more in the market. While there is relatively high support from the Public and NGO sector to the households and smallholders sampled, there is a lack of support for supply-side market actors that could benefit market resilience. Additionally, there is a limited enabling environment affecting business growth and new entrants into the market system, suggesting regulatory frameworks could be improved to lower entry and operating barriers for business.

On the other hand, households scored relatively well in both the environment and market structure determinants, indicating households are supported by a robust and diverse market system as well as enabling physical environmental conditions. Market actors score relatively well in market diversity, feedback loops and redundancy, indicating a healthy number of products and value chains in the area and proper information mechanisms between sellers and buyers regarding their products.

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ACRONYMS

COVID	Coronavirus disease
FAO	Food and Agriculture Organization of the United Nations
HH	Household
HCD	Human Centered Development
iDE	International Development Enterprises
IGA	Income Generating Activities
MA	Market Actors
MSRI	Market Systems Resilience Index
MSR	Market Systems Resilience
NGO	Non-Government Organization
SHARP	Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists
TA	Technical Assistance
USD	United States Dollars

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CHAPTER 1: INTRODUCTION

1.1 Market Systems Resilience Index Conceptual Framework

The Market Systems Resilience Index (MSRI) is a holistic approach to measuring the resilience of the market at multiple levels and accounts for various exogenous factors (e.g., the ecological environment). It was first developed by iDE in 2018 and subsequently evolved into the current MSRI 2.0, bringing together core elements of resilience to measure and evaluate the effectiveness of any market system to anticipate, withstand, and adjust to external and internal shocks and stresses.

While the initial version of the MSRI tool was innovative and useful for project management and adaptation, iDE and others working in the MSR space recognized that it lacked a household-level resilience component. With this in mind, Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP) is a tool developed by the UN's Food and Agriculture Organization (FAO). SHARP addresses the need to better understand and incorporate situations, concerns and interests of farmers and pastoralists relating to climate resilience and agriculture at the household level. With this in mind, the SHARP tool was integrated into the MSRI 1.0. Hence, MSRI 2.0 has built upon the experiences gained from previous resilience measurement tools and frameworks, including earlier piloted versions of MSRI.

Table 1.1 shows how iDE has integrated the MSRI and SHARP tools by mapping the 13 SHARP agroecosystem indicators¹ across the nine determinants of MSRI 1.0. iDE has reviewed and updated the determinants for MSRI 2.0 which now includes one additional determinants shaded gray) related to natural environmental and financial considerations based on previous deployments in Bangladesh and Mozambique.

MSRI 2.0 has been applied to iDE projects in Mozambique, Bangladesh, Nepal, and Cambodia, and is poised for broader deployment. This work provides the international development sector with an opportunity to learn from an innovative measurement tool that improves adaptive management and guides systems change.

¹ 13 agroecosystem indicators of resilience at the household used in the [FAO SHARP](#) tool

Table 1.1 Harmonized MSRI 2.0 tool including both market and household levels in the assessment of resilience

MSRI Principle	MSRI Determinant	MSRI Description	13 agroecosystem indicators from SHARP at the household level ²	
1. Structure of the market	1.1 Redundancy (R)	Surplus of market actors performing the same functions in the market system	3: Appropriately connected	5: Optimally redundant
	1.2 Diversity (D)	Diversity in the value chains and in the available market channels	6. Spatial and temporal heterogeneity	3: Appropriately connected
	1.3 Functionality (F)	Flow of goods and services in, out, and through market spaces	4. Functional and response diversity	
2. Connectivity of the market	2.1 Inclusion (Ic)	Participation of women and other systemically groups in the market system	9. Reflective and shared learning	11. Honors legacy
	2.2 Integration (Ig)	Different groups' involvement in relevant processes	11. Honors legacy	3: Appropriately connected
	2.3 Collaboration (C)	Collaboration among actors of the market system	10. Globally autonomous and locally interdependent	3: Appropriately connected
3. Support of the market	3.1 Feedback loops (FL)	Ability to learn from experience through control mechanisms	9. Reflective and shared learning	7. Exposed to disturbance
	3.2 Enabling environment (EE)	Transparent market governance is in place	12. Builds human capital	1. Socially self-organized
	3.3 Preparedness (P)	Ability of the system to promptly react to disturbances	9. Reflective and shared learning	2. Ecologically self-regulated
4. Environment	4.1 Physical environment (PE)	Environmental condition of the market area	8. Coupled with local natural capital	2. Ecologically self-regulated
5. Financial	5.1 Financial viability of market actors (FV)	Financial sustainability of market actors' activities	13. Reasonably profitable	

²Framework from Cabell and Oelofse 2012

1.2 Objectives of MSRI

The primary objective of MSRI is to examine how robust market systems can affect resilience at both the systems and household levels and to provide more detailed information regarding future program priorities. MSRI can provide comprehensive evidence to project managers that inform future decisions related to project implementation, while also providing the project team and donors with evidence related to the direct impact and spillover effects the project has on resilience. By using MSRI to measure the resilience of the market system at two or more points in time, projects can identify needed adjustments after the first round of measurement and test whether the adjusted activities led to changes in the market system. The tool bridges a specific gap in literature and practice, and in so doing may ease some of the tension in the development field between balancing short-term gains of project activities, long-term development goals, and the sustainability of projects in the age of anthropogenic climate change. Moving forward, MSRI may aid in the development field's ultimate goal of reducing chronic vulnerability and promoting inclusive growth within the bounds of socio-ecological systems.

In a more local context, iDE's primary goal for using the MSRI in the Beira Corridor is to examine how market system factors affect resilience at both systems level and household level. Information regarding the temporal change in these factors will inform future program improvements and policy decisions.

For this round of MSRI implementation in Mozambique 2021/2022, the key objectives were to:

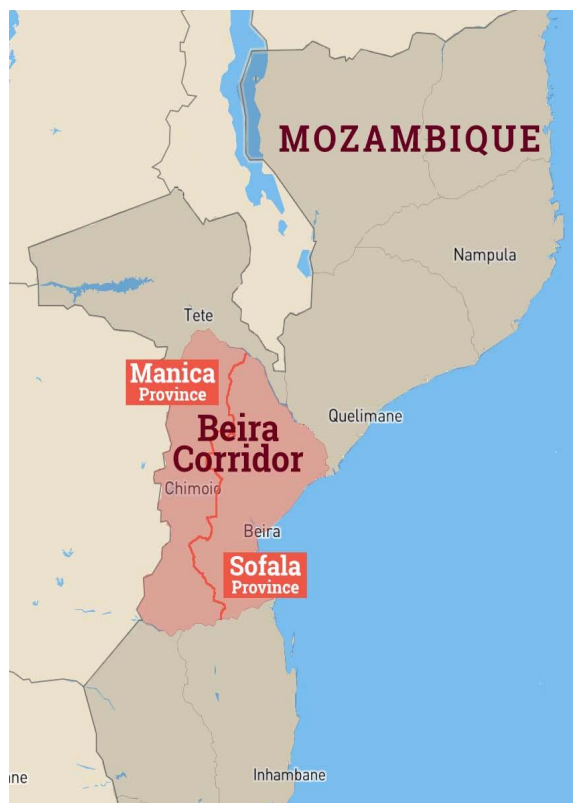
- 1. Analyze market system resilience across various sectors and subgroups for potential strengthening of distribution networks necessary to provide inputs to farmers in rural markets;**
- 2. Understand the impact of climatic shocks and other stressors on market system resilience along with regular climatic disasters faced by the project;**
- 3. Build on, further establish, and confirm the market system level resilience metric from the previous survey and analysis conducted in the Sofala and Manica provinces;**
- 4. To adapt and implement the MSRI as a quantitative resilience assessment tool; and**
- 5. Understand changes in resilience determinants over time.**

1.3 Methodology

iDE uses a defined geographic and market area and includes market actors (including households) in the assessment of the market system. Survey questions are mapped to the MSRI 2.0 Indicators, Determinants, and Principles. Questions were developed using the existing MSRI 1.0 set of questions, questions from SHARP as well as adaptations through previous iterations of deployment.

1.3.1 Geographic Selection

As one of the main areas of iDE Mozambique intervention, the Beira Corridor, Manica and Sofala provinces, was chosen for MSRI analysis.



1.3.2 Sampling Design

The goal of the MSRI sampling strategy is to obtain representative samples of the agricultural market systems actors in the Beira Corridor. The 2021 MSRI assessment is built on the information collected from the Sofala and Manica Provinces from the 2020 assessment. In doing so, the round 2 analysis could determine the level of precision and consistency in the tool's ability to measure the state of the market system. Additionally, our comparison analysis can determine if and by how much resiliency has changed over time.

Prior to Round 1, brief market assessments were conducted to determine the most important types of market actors to be included in the Beira Corridor MSRI Analysis. iDE identified four main actor types that represent fundamental pillars of the agricultural market system. While all four market actor types simultaneously fulfill supply and demand roles in the market system, the demand side consists primarily of Households while the supply side consists of Input Suppliers, Retailers, and Output Market actors. The table below offers more detail on the role of the particular market actors selected for MSRI.

Table 1.2: Description of Demand Side and Supply Side Market Actors

Market Actor Type		Description of Market Actor
Demand Side	Households	Group of persons who make common provision of food, shelter and other essentials for living.
Supply Side	Input Suppliers	Main international, national, or regional agricultural business that sell agricultural inputs.
	Retailers	Smaller businesses that commercialize and distribute agricultural inputs to more remote and rural areas.
	Output Market	Businesses that buy and aggregate agricultural products from farmers and sell to consumers.

The team took steps to further disaggregate these groups. Households were disaggregated based on geographic district and household income. Supply side market actors were disaggregated based on business revenue, and number of employees. After identifying the actors and disaggregations, four sets of questionnaires were designed for each different type of market actor. The four sets of questions were then translated into Portuguese and coded.

The 2021 assessment was focused on the market systems' resilience within the two provinces that make up the Beira Corridor. For Households, two focus districts were selected from Manica and three from Sofala. While fewer districts were sampled compared to the eight districts included in the Round 1 assessment, the more focused data collection effort allowed the team to collect larger samples per district for a more effective statistical analysis for households at the district level. The supply side market actors were also located in the Manica and Sofal provinces, with six districts in Manica province and three districts in Sofala province. Actors were selected from iDE's current stakeholder database in the region and were confirmed to operate within the same regions. That is, there is interaction between demand side and supply side market actors.

1.3.3 Questionnaire Design

The original adapted MSRI questionnaire was designed through collaboration between iDE HQ and the Mozambican teams in 2020, contextualizing the standard MSRI questions and responses to the local context. Based on the findings from the first round of data collection, specific wordings for some questions, the order of questions, and answer options were updated for both households and market actors for Round 2. Additional details on these changes are included later in this report in the comparison of Round 1 vs. Round 2 results. The questionnaires were piloted with households and different types of market actors to understand if all the surveys and answer options would capture the depth and breadth of situations experienced by Beira Corridor market actors. Fields for supplementary qualitative answers were also added for further contextual understanding and analysis.

1.3.4 Data Collection, Analysis, and Quality Assurance

Data collection was done using Taroworks, a mobile data platform for phones and tablets. Surveys were available in both English and Portuguese and administered by iDE trained representatives. For the demand side actors, household data collection took place at iDE managed Input Trade and Technology Fairs (ITTFs). Supply-side actors were identified with a simple market assessment and were surveyed either at the ITTFs or in their offices or warehouses. In order to ensure responsible and ethical data collection procedures, informed consent was collected prior to survey of all survey participants.

The data collection took place from October 2021 to December 2021. The collected data was then analyzed using Stata and R statistical software programs.

1.3.5 Study Limitations

A main limitation of the analysis is that the data for the household analysis was collected at iDE managed ITTFs. Participants in ITTFs are registered for iDE programming that includes technical assistance, ITTF spending vouchers, and support in access to inputs and supplies. This presents a selection bias that affects the generalizability of the analysis.

There is no overlap of household respondents between round one and round two, and there is some overlap among market actors between the two rounds. Additionally, there is not complete overlap among the districts surveyed. Without panel data, it presents limitations to identifying the causality that drives year over year change. The baseline characteristics of the market actor respondents, however, suggests that there is a fair amount of comparability to the Round 1 respondents. Because of this, we can infer that the MSRI analysis provides an accurate snapshot of the state of resilience in the Beira Corridor.

In two instances, additional questions and indicators were added to better inform the determinant scores for the second round MSRI analysis. This slightly affects the comparability of some indicators between the two rounds. This will be further detailed in the Comparison Analysis section. Another limitation is the relatively smaller sample sizes for the Output Market and Input Supplier subgroups in the second round that limit the comparability of resilience scores over time.

While MSRI as an analytical tool is continually being developed, improved, and adapted to multiple global contexts, the iteration used in Round 2 is the highest quality version of MSRI to date. While these limitations affect the depth of the comparative analysis in some places, the data and analysis included in this report provides a rich resource to determine the strengths, weaknesses, and opportunities of the Beira Corridor's agricultural market system.

CHAPTER 2: DEMOGRAPHIC OVERVIEW OF THE SAMPLE

2.1 Sample Overview

A total of 321 households (HHs), and 52 market actors (MA) of which 11 input suppliers, 32 retailers, and 9 output market vendors, were interviewed for the Beira Corridor market systems resilience analysis. The tables below show the geographic distribution (Table 2.1) and gender breakdown (Table 2.2) of the sample.

Table 2.1: Sample Based on Location of Market Actor

Market actor type	Manica	Sofala	Total
Households	118	203	321
Input Suppliers	8	3	11
Retailers	22	10	32
Output Market	7	2	9
Total	155	218	373

Table 2.2: Sample based on gender breakdown

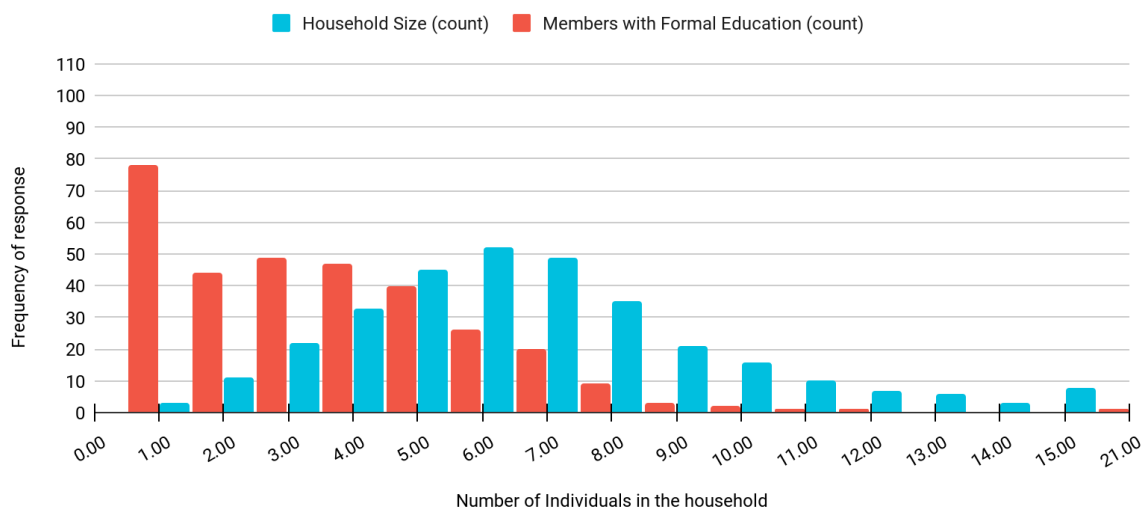
Market actor type	Male	Female	Total
Households	156	165	321
Input Suppliers	10	1	11
Retailers	23	9	32
Output Market	9	0	9
Total	197	175	373

2.2 Household (HH) Demography

Household Size and Education

The distribution of household size is displayed in the blue bars in the histogram below. The mean household size is 6.78 individuals while 95% of households have between 3-13 members. Household education is represented in the red bars. On average, 38% of household members had received a formal education, translating to 2.6 members per household. However, 78 households in the 321 household sample (24%), have no formally educated members.

Figure 2.1 Distribution of Household Size and Household Education



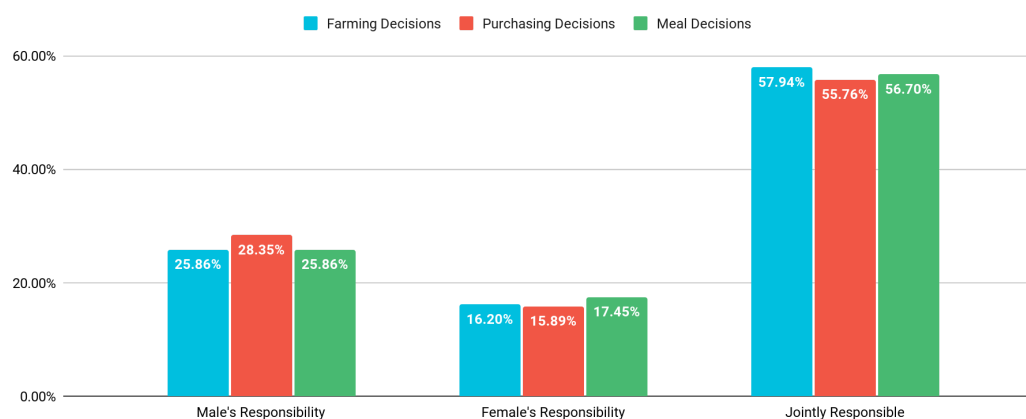
Household Decision Making

Of the respondents, 32% reported being female heads of the household while 43% of respondents reported being both male and the head of their respective households. Only 11% of males interviewed reported not being the head of their household while 38% of the females interviewed reported not being the head of the household. Decision making responsibilities at the household level are commonly shared among males and females.

Table 2.3: Head of household gender breakdown

Respondent	Frequency		Percentage	
	Male	Female	Male %	Female %
Respondent is the head of the household	139	103	43.30%	32.09%
Respondent is not the head of the household	17	62	5.30%	19.31%
Total	156	165	48.60%	51.40%

Figure 2.2: Breakdown of Farming, Purchasing, and Meal Decision-making in the Household



Household Income and Income Generating Activities

95% of households earn less than the equivalent of \$160 USD per month. This is equivalent to less than five and a half dollars per day for a household with an average size of nearly 7 people.

Table 2.4: Household income distribution

Monthly household income	Frequency	% of Sample
Less than 32 USD	102	31.78%
From 32 USD to 160 USD	198	61.68%
More than 160 USD	21	6.54%
Total	321	100.00%

Crop production is clearly the most popular income generating activity, with 97% of households participating. The other main income generating activities undertaken by respondents are livestock rearing (26%) and operating a business (23%). A majority of households have multiple income streams. 48% of households reported crop production as their sole source of income, while livestock production and business ownership were always paired with two to four additional income generating activities.

Table 2.5: Top household income generating activities

Activity	Frequency	% of Sample
Crop Production	311	96.88%
Livestock	84	26.17%
Own Business	73	22.74%
Firewood Collection	21	6.54%
Charcoal Production	18	5.61%
Casual Labor/Biscate	15	4.67%
Other	13	4.05%
Fishing	6	1.87%
Aquaculture	1	0.31%
Migrate to City for Work	1	0.31%
Apiculture	1	0.31%
Total	544	169.47%

Land Access and Topography

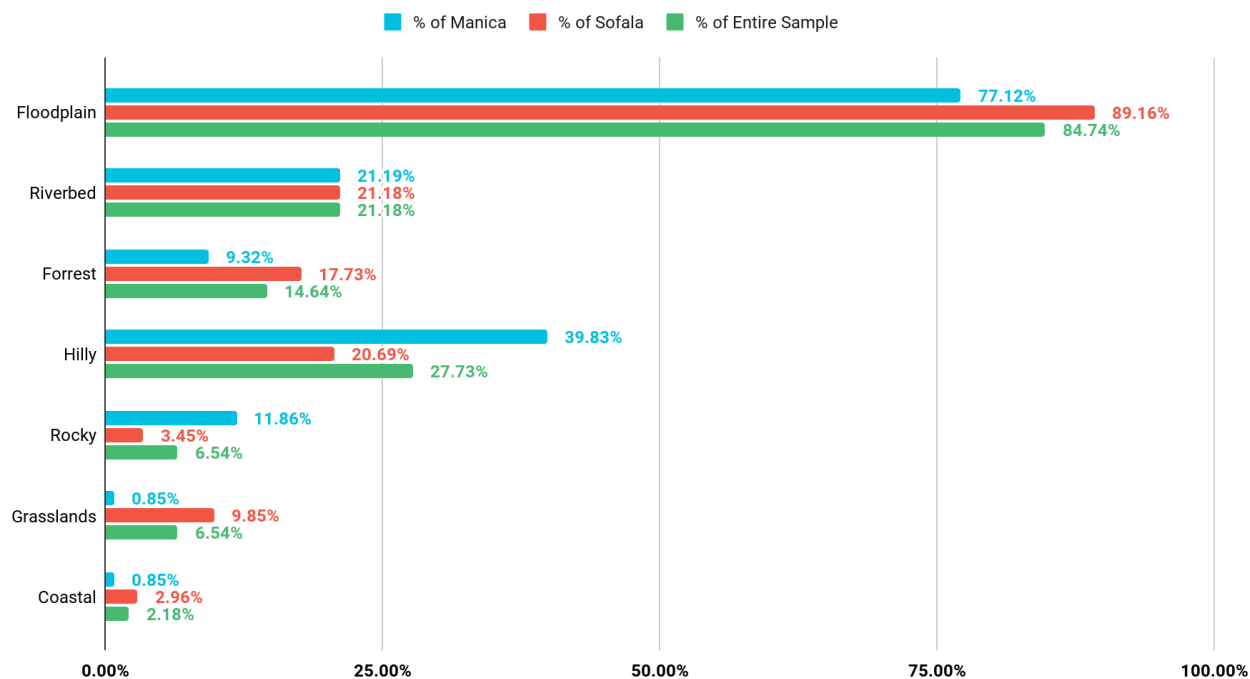
On average, smallholder farmers in the sample have access to 2.5 hectares of land for production. Close to 20% of respondents had access to less than or equal to one hectare of land.

Table 2.6: Household Land Distribution

Hectares per Household	Frequency	% of Sample
Less than or equal to 1 hectare	63	19.63%
Between 1 - 3 hectares	210	65.42%
Between 3.5 - 6 hectares	39	12.15%
More than 6 hectares	9	2.80%
Total	321	100.00%

Close to 85% of respondents characterized their land as being located in floodplains. The other common household land characteristics are Riverbed, Forrest, and Hilly.

Figure 2.3: Household Land Type by Province



Water Access

Households across the sample rely on a variety of sources to access water for drinking, irrigation, and livestock rearing. On average, households have access to 1.4 types of water sources. A majority of respondents access water through surface water sources that include rivers and lakes. Half of the respondents surveyed have access to groundwater sources through pumps and boreholes.

Table 2.7: Household Water source for irrigation, drinking, and animals distribution

Water Sources	Frequency of response	Percent of the sample
River/lake	217	67.60%
Water pump	93	28.97%
Borehole	69	21.50%
Cistern	27	8.41%
Pipe/tap	6	1.87%
Dam	2	0.62%
Other	25	7.79%
None	19	5.92%
Total	414	142.68%

2.3 Market Actor (MA) Demography

The supply side market actors surveyed are described in the tables below. The disaggregation by geography, firm size, income, and marketing area allow us to examine the MSRI score along different cross sections of the market system.

Geographical Distribution of Market Actors

Table 2.8: Market Actors by Province

Market Actor Type	Manica	Sofala	Total
Input Supplier	8	3	11
Output Market	7	2	9
Retailers	22	10	32
Total	37	15	52

Size of Market Actor Firms

Table 2.9: Firm size by Market Actor type

Market Actor Type	<11 Workers	11 - 50 Workers	> 50 Workers
Input Supplier	4	3	4
Output Market	1	2	6
Retailers	29	3	0
Total	34	8	10

Income by Market Actor

Table 2.10: Annual Revenue by Market Actor type

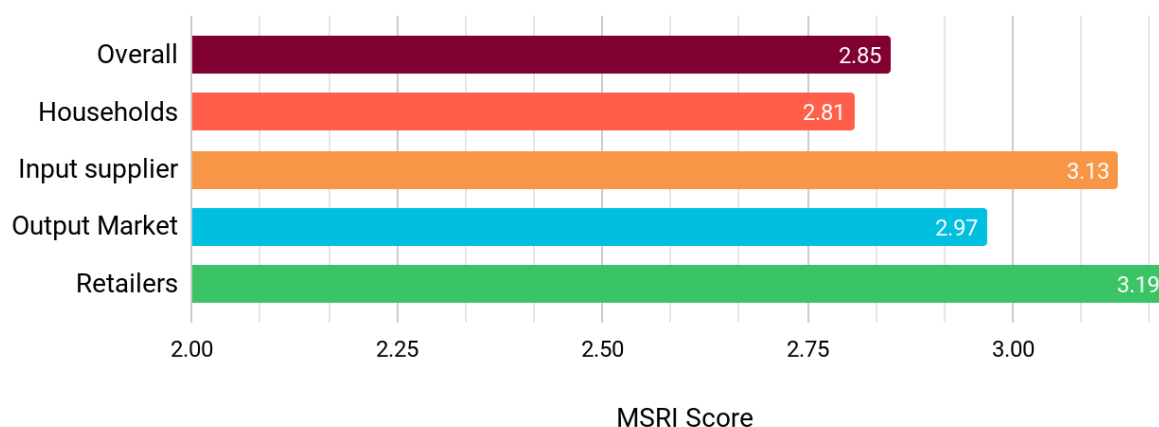
Market Actor Type	< 160,000 USD	160,000 - 800,000 USD	> 800,000 USD	Total
Input Supplier	0	0	11	11
Output Market	0	2	7	9
Retailers	25	7	0	32
Total	25	9	18	52

CHAPTER 3: MSRI RESULTS

3.1 Overall MSRI Scores- All actors

Retailers had the highest MSRI score among all actors with 3.19 out of 5, followed by input suppliers (3.13), Output Markets (2.97) and Households (2.81). The difference between MSRI scores suggests that households experience the lowest level of resilience while supply side Market Actors experience relatively higher resilience. These results will be further analyzed in the following sections.

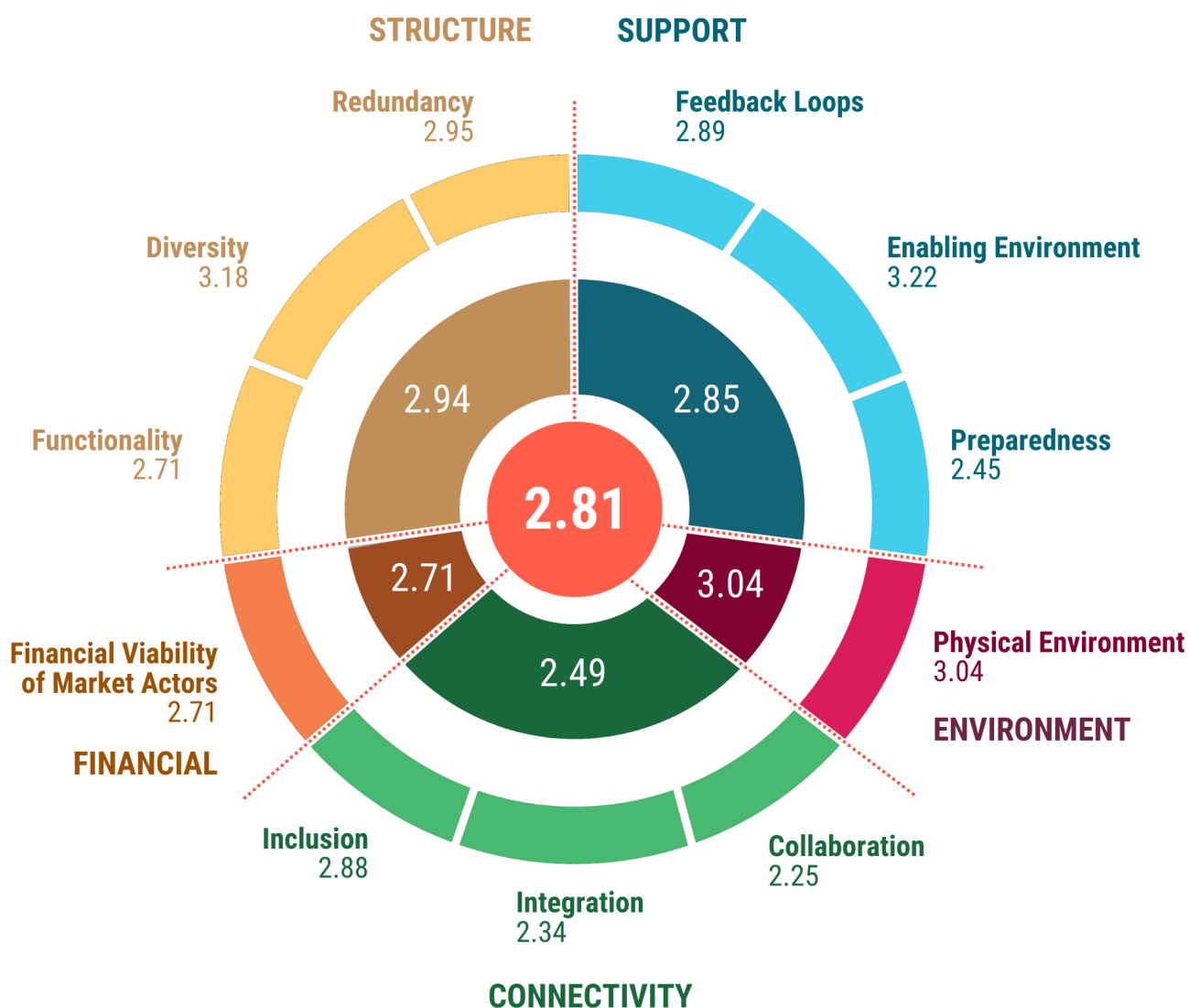
Figure 3.1 MSRI Score for All Actors



3.2 Households

The figure below shows the average determinant scores (outer band), principle scores (inner band), and overall MSRI score (center) for all households in the round 2 MSRI analysis. The highest scoring principle is Environment (3.04), followed by Structure (2.94) and Market Support (2.85). The Financial and Market Connectivity principles have the lowest averages, scoring 2.71 and 2.49 respectively. The overall MSRI household score is 2.81 out of 5, a low score illustrating that households have low levels of resilience.

Figure 3.2: Overall Household MSRI score for Round 2



Household Principle Analysis

The initial analysis of the Household MSRI results is to examine the differences in determinant, principle, and the overall MSRI scores across geographical and socioeconomic groups to identify areas of inquiry for deeper analysis and interpretation. Table 3.1 outlines the average household scores for the corresponding MSRI principle as well as the overall MSRI scores. The principle and overall MSRI scores are represented in the columns and geographic groups and subgroups are represented in the rows. The horizontal blue to yellow color gradient accentuates the comparison across principles. The blue indicates a relatively high score within that subgroup, while midpoints are represented by gray cells, and the yellow cells indicate a relatively lower score. The vertical orange to white of the overall MSRI score accentuates the comparison between geographic and socioeconomic groups with white indicating the relatively low overall MSRI score and orange representing groups with higher overall scores.

Table 3.1 Comparison of Average Household MSRI Principle and Overall Scores within Groups

		Principle 1	Principle 2	Principle 3	Principle 4	Principle 5	Total
		Structure of the Market	Connectivity of the Market	Support of the Market	Environment	Financial	MSRI
Overall Households		2.94	2.49	2.85	3.04	2.71	2.81
Manica Province	All Districts	3.11	2.52	2.95	3.18	2.85	2.92
	Gondola	3.01	2.45	2.87	3.21	2.88	2.89
	Sussundenga	3.21	2.58	3.01	3.15	2.83	2.96
Sofala Province	All Districts	2.85	2.47	2.80	2.96	2.63	2.74
	Buzi	2.97	2.40	2.70	2.98	2.63	2.74
	Dondo	2.59	2.41	2.78	2.88	2.34	2.60
	Nhamatanda	2.99	2.68	2.99	3.03	3.03	2.94
Income Range	Less than 32 USD	2.86	2.42	2.72	2.97	2.12	2.61
	32 USD to 160 USD	2.96	2.48	2.91	3.04	2.94	2.87
	More than 160 USD	3.20	2.98	2.95	3.32	3.44	3.18

Across geographies, the Manica province (2.92) scores 6.67% better than the Sofala province (2.74). On average, households earning more than 160 USD per month have the highest resiliency among all subgroups in the sample. Notably, the Dondo district has the lowest average overall score of all subgroups in the sample. Relative to other districts, Dondo scored the lowest in three of the five principles, reflecting the poorest market structure, environmental and financial conditions.

Table 3.1 also shows the consistency of principle scores, as high scoring principles and low scoring principles are consistent across geographies and socioeconomic subgroups.

Household Determinant Analysis

Table 3.2 below shows the relative differences of MSRI determinant scores (columns) for the households within each group or sub-group (row). Red cells indicate a relatively lower score and green indicates a relatively high score within that group (row). The gradient displays a relative consistency of determinant scores across geographies and the income subgroup. This data illustrates what areas could be considered when developing interventions aimed at impacting the market systems' resilience in the Beira Corridor. Further examination of determinant indicators in addition to more specific variation across groups can help inform future programming decisions.

Table 3.2 Comparison of Average Household MSRI Determinant and Overall Scores within Groups

Group		MSRI Determinants											Overall
		Redundancy	Diversity	Functionality	Inclusion	Integration	Collaboration	Feedback Loops	Enabling Environment	Preparedness	Environment	Financial	
Overall Household MSRI		2.95	3.18	2.71	2.88	2.34	2.25	2.89	3.22	2.45	3.04	2.71	2.81
Manica	All Districts	3.28	3.21	2.86	2.97	2.32	2.27	2.94	3.39	2.51	3.18	2.85	2.92
	Gondola	3.06	3.11	2.86	2.85	2.05	2.46	2.88	3.25	2.50	3.21	2.88	2.89
	Sussundenga	3.47	3.30	2.86	3.09	2.56	2.10	3.00	3.51	2.53	3.15	2.83	2.96
Sofala	All Districts	2.75	3.16	2.62	2.82	2.35	2.24	2.86	3.13	2.41	2.96	2.63	2.74
	Buzi	2.82	3.36	2.73	2.75	2.19	2.26	2.61	3.11	2.37	2.98	2.63	2.74
	Dondo	2.45	2.93	2.40	2.66	2.36	2.20	2.83	3.19	2.30	2.88	2.34	2.60
	Nhamatanda	3.06	3.15	2.76	3.17	2.59	2.27	3.31	3.07	2.61	3.03	3.03	2.94
Income Range	Less than 32 USD	2.61	3.12	2.84	2.81	2.14	2.30	2.71	3.14	2.30	2.97	2.12	2.61
	32 USD to 160 USD	3.03	3.20	2.65	2.93	2.34	2.16	2.99	3.23	2.51	3.04	2.94	2.87
	More than 160 USD	3.77	3.25	2.59	2.74	3.29	2.91	2.77	3.51	2.57	3.32	3.44	3.18

Determinants by Geography and Income

Figure 3.3 reflects the consistency of determinant scores across geographies, where low scoring determinants such as Collaboration, Integration and Preparedness have almost similar scores, while high scoring determinants, Enabling Environment and Physical Environment have larger provincial differences. The largest difference is observed in the Redundancy determinant, deserving further analysis to understand such difference. Note that the axes range between 2.0 to 3.50 for both figures 3.3 and 3.4 to best highlight variation across determinants. The determinants are still scored on the same 5.0 scale.

Figure 3.3 Average Household 2021 MSRI Determinant Scores, by Geography

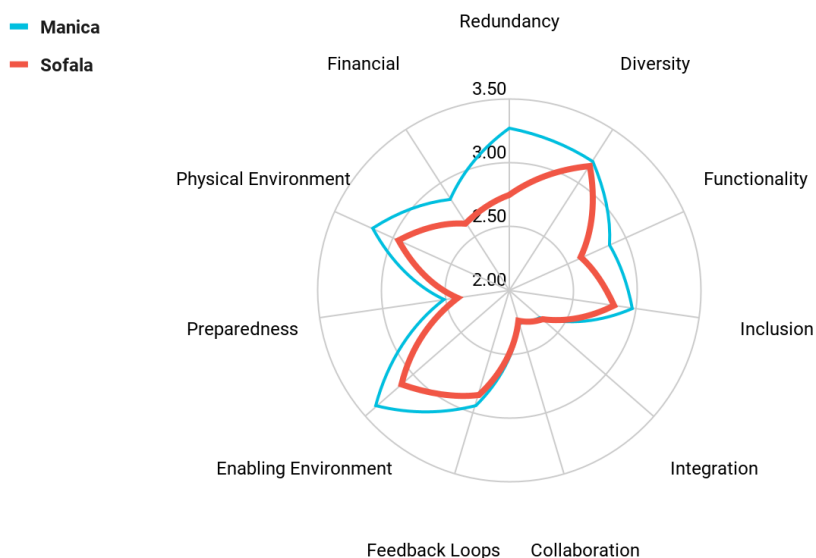
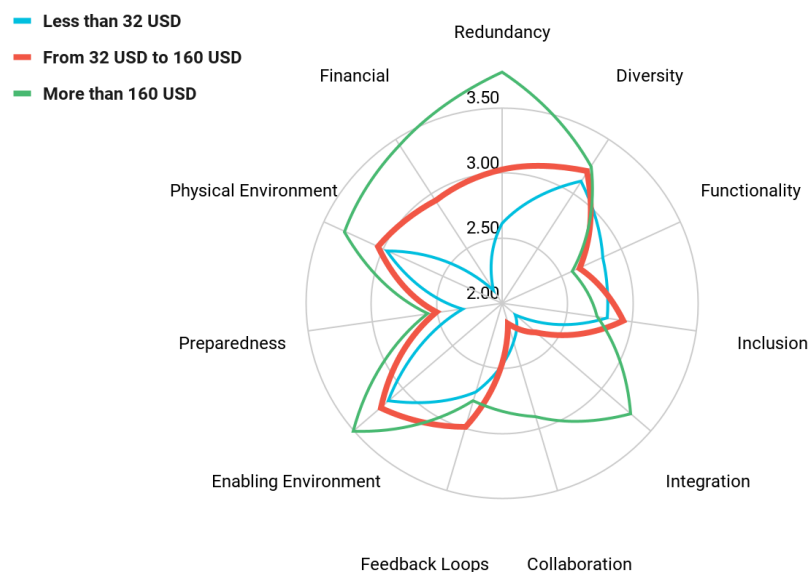


Figure 3.4. shows how income is positively correlated with overall resilience – and notably the Integration, Redundancy, and Financial determinants – in the sampled households.

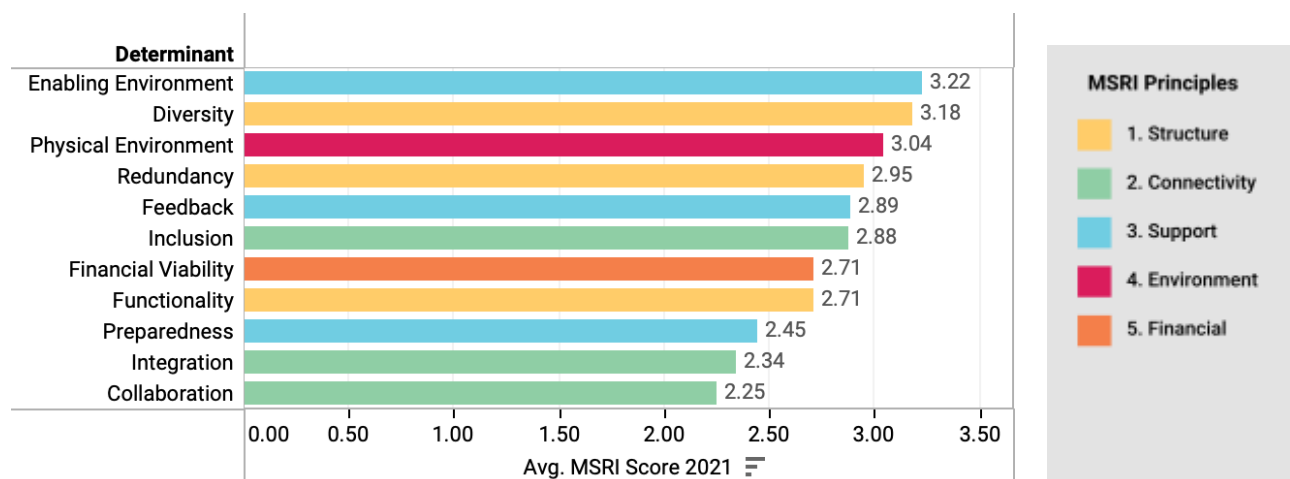
Figure 3.4 Average Household 2021 MSRI Determinant Scores, by Income



High Scoring and Low Scoring Determinants

By plotting the Household MSRI determinant scores in Figure 3.5, differences between determinants and their corresponding principles can be easily seen. The highest score represented among all MSRI determinants is the Enabling Environment with a score of 3.22. The following determinants, Diversity (3.18), Physical Environment (3.04), and Redundancy (2.95) fall within 10% of the score set by the Enabling Environment Determinant. The lowest score represented among all MSRI determinants is Collaboration with a score of 2.25. Integration (2.34), and Preparedness (2.47) fall within 10% of the low score set by the Collaboration determinant (2.25).

Figure 3.5: Average MSRI Determinant Scores for Households



High Score - Enabling Environment

The high Enabling Environment score suggests that producer households receive relatively high levels of direct support from government and non-governmental organizations. Figures 3.6 and 3.7 show that, more than 70% of respondents in every district stated that they receive support from the government and/or NGOs as well as have access to production advice through technical assistance (TA). The MSRI sampling strategy is likely a contributor to these strong Enabling Environment scores. Since households were surveyed at ITTFs, there may be selection bias that positively influences this indicator outcome.

Figure 3.6: Percent of Households Receiving Support

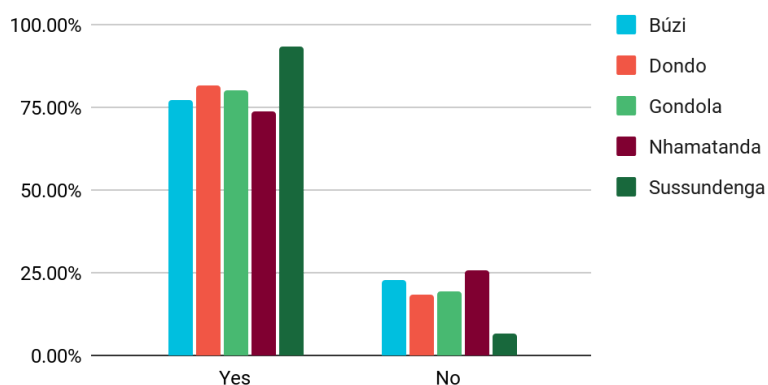
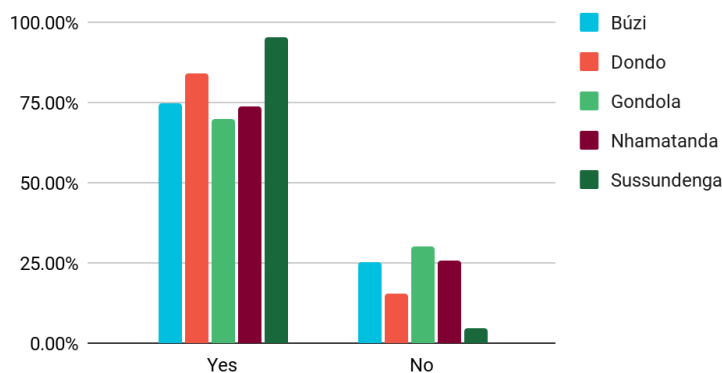


Figure 3.7: Percent of Households Receiving Technical Assistance

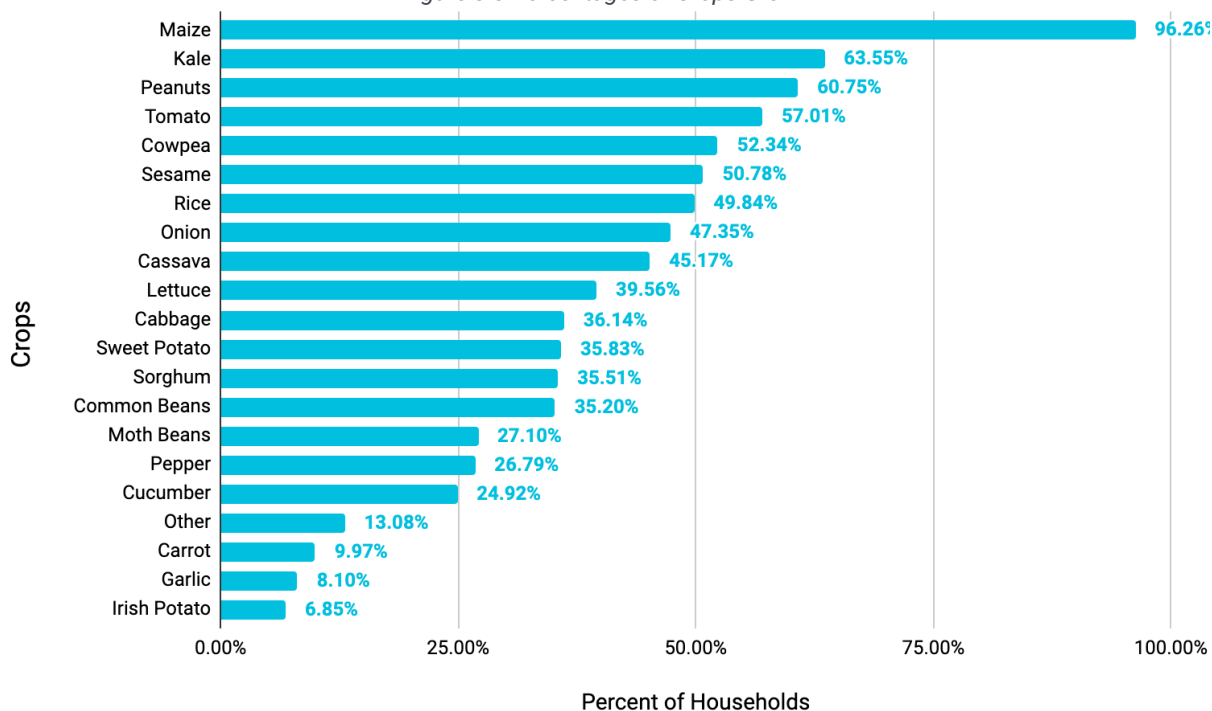


Respondents' access to enabling and facilitative infrastructure scored consistently well across geographies and subgroups. More than 50% of respondents in each district reported having access to health facilities, and more than 70% had access to a primary school. In Manica province, more than 45% of respondents had access to a granary. There is an opportunity to build on this high Enabling Environment score through increased access to resilience building activities and community groups like memberships in Farmer Field Schools, producer associations, VSLAs, and local government. 88% of sample respondents reported being members in only two or fewer resilience-building community groups.

High Score - Diversity

The Diversity determinant is the second highest scoring determinant for producer households. Diversity in the market system focuses on the variety of sources for households to generate income and support their livelihoods. The high Diversity score is driven by a relatively high variety of crops grown at the farm level as well as multiple places for farmers to purchase inputs. Respondents, on average, grow 8.2 different types of crops and on average had 1.96 different locations to access and purchase inputs that varied in price, distance, offerings and quality. Figure 3.8 shows the large diversity of crop production.

Figure 3.8 Percentages of Crops Grown



High Score - Physical Environment

The Physical Environment determinant scored higher relative to the other determinants because of the diversity of land characteristics and a relatively low rate of environmental degradation. On average, respondents in the Manica province experienced less than two (1.75) types of environmental degradation in the last five years while respondents in Sofala, on average, experienced a little more than two (2.15) types of environmental degradation in the past five years.

On the other hand, households scored relatively low across districts relating to access to water for irrigation. 57% of households in Sofala and 52% of households in Manica reported having access to only one water source (mainly through rivers and lakes and/or water pumps). MSRI asks about improved access to irrigation sources and therefore does not include rainfall as an option. While rainfed agriculture is not an inherently resilient or not resilient farming practice, its inclusion as an option could better inform our water source analysis.

Table 3.3 Count of Different Water Sources by District

Count of Different Water Sources	Sofala			Manica	
	Búzi	Dondo	Nhamatanda	Sussundenga	Gondola
No Response	9	8	0	0	2
1	41	43	31	38	25
2	29	19	18	19	26
3	4	0	1	5	3
Total	83	70	50	62	56
% of households with one water source	49.40%	61.43%	62.00%	61.29%	44.64%

High Score - Redundancy

The Redundancy Determinant score is relatively high (2.95) due to households' access to multiple sources to sell outputs and purchase inputs. Of the households surveyed, 52.02% reported having access to multiple output markets to sell their produce. 72.27% of all households reported having access to multiple agro dealers to access and purchase inputs. Of the respondents with access to multiple input dealers, 48.27% of these producer households reported having *regular* access to multiple agro dealers while 51.72% stated that they *sometimes* have access. Respondents' low participation in community resilience groups and activities also negatively impacts the Redundancy determinant score.

Low Score - Collaboration

The household Collaboration determinant is clearly the lowest score of all determinants (2.25). Across the sample, only 22.1% of respondents purchase inputs as part of a group and 23.5% of respondents sell their products as part of a group. Despite the low levels of marketing coordination, 82.3% percent of households consider themselves as part of a farmer association. This disparity could highlight the absence of last-mile aggregation.

Notably, the 2021 group purchases and sales data is a significant improvement from the 2020 household responses. This is the largest improvement of a determinant score between rounds 1 and 2 and will be further discussed in section 3.4.

Low Score - Integration

The household Integration determinant score is low (2.34) relative to other determinants due to limited sales support from last mile aggregators, lack of farmer-focused product awareness, and desire from respondents for a larger variety of supportive services. Only 16.82% of respondents stated that traders and aggregators consistently help farmers sell their products while 52.75% of respondents stated that market actors do not actively promote products and services to farmers. When households were asked what other additional services and support would be beneficial for better production, 59.55% of respondents wanted at least four additional services that would support their productivity and market access.

Low Score - Preparedness

The household Preparedness determinant score is 2.45, the third lowest score. Exposure to shocks is high, as 100% of respondents reported experiencing at least one shock to their production in the past five years. 98.42% of households experienced a climate shock while 28.1% of households experienced a public health shock (Covid or pests/disease). The breakdown indicates that 25.68% of respondents reported experiencing two different types of shocks (i.e., climate shocks as well as shocks from pests and disease) within the previous five years.

Notably, respondents adopted multiple adaptive agricultural, water management, financial, and infrastructure practices in response to shocks and stressors. However, 60.27% of respondents reported taking two to six months to recover from their most recent climate shock. At the time of the survey, 24.02% of households had still not recovered from their most recent climate shock.

3.3 Market Actors

Similar to households, MSRI results for market actors are first analyzed by examining differences in determinant, principle scores, and the overall MSRI score within groups and sub-groups to identify areas of inquiry for deeper analysis and interpretation. The figure below shows the average determinant scores (outer band), principle scores (inner band), and average overall MSRI (center) for all Market Actors in the sample.

Figure 3.8 Overall Market Actor MSRI score for Round 2



Principle Analysis

Overall MSRI scores and average principle scores for each Market Actor type, geographical group, and sub-group of market actors are shown in Table 3.5. The blue indicates a relatively high score within that group, midpoints are represented by gray cells and the yellow cells indicate a relatively lower score. The vertical orange to white of the overall MSRI score accentuates the comparison between geographic and socioeconomic groups with white indicating the relatively low overall MSRI score and orange representing groups with higher overall scores.

Table 3.5 Average Market Actor MSRI Principle and Overall Scores, by Sub-Group

		Principle 1 Structure of the Market	Principle 2 Connectivity of the Market	Principle 3 Support of the Market	Principle 5 Financial	Total MSRI
Overall	Market Actor	3.51	2.62	3.01	3.41	3.14
Market Actor type	Input supplier	3.32	2.61	3.13	3.45	3.13
	Output Market	3.46	2.44	2.67	3.30	2.97
	Retailers	3.60	2.67	3.06	3.43	3.19
Manica	All Districts	3.55	2.65	2.96	3.36	3.13
	Bárue	3.54	3.77	3.77	2.50	3.39
	Cidade de Chimoio	3.58	2.62	2.84	3.35	3.10
	Gondola	3.66	2.24	3.03	3.55	3.12
	Macate	3.64	2.96	2.62	3.50	3.18
	Manica	3.33	2.83	2.74	3.64	3.14
	Sussundenga	3.37	2.87	3.66	3.12	3.25
Sofala	All Districts	3.43	2.54	3.11	3.55	3.16
	Beira	3.32	2.38	3.12	3.60	3.10
	Gorongosa	3.17	2.97	2.34	3.38	2.96
	Nhamatanda	3.71	2.62	3.41	3.55	3.32
Firm size	Less or equal to 10 workers	3.59	2.61	3.07	3.33	3.15
	Between 11 and 50 workers	3.15	2.78	2.70	3.30	2.98
	Over 50 workers	3.50	2.54	3.00	3.78	3.21
Turnover	Less than 160,000 USD	3.52	2.66	3.17	3.31	3.16
	From 160,000 to 800,000 USD	3.73	2.30	2.47	3.58	3.02
	Over 800,000 USD	3.38	2.79	3.17	3.48	3.21
	Preferred not to answer	3.28	2.49	2.23	3.83	2.96

Across all Market Actors surveyed, resilience in Manica province (3.13) is almost equal to resilience in the Sofala province (3.16). More significant variation among Market Actors' resilience occurs depending on the Market Actor type. Of the sample, Retailers (3.19) reported the highest level of resilience. Input Suppliers (3.13) also scored relatively high while Output Market Actors (2.97) had one of the lower resilience scores of all subgroups. Importantly, the table clearly shows that the Structure and Financial principles score consistently well across all groups while the Market Connectivity and Support principles perform poorly across almost all Market Actors.

Determinant Analysis

Market Actors MSRI determinant scores are shown in Table 3.6. Across all Market Actors, Diversity (4.14) is the highest scoring determinant followed by Feedback Loops (4.06) and Financial Viability of Market Actors (3.41). The high scores suggest that Market Actors in the Beira Corridor employ business models that have the capacity, range, and intention to consistently engage with a wider variety of suppliers, clients, and competitors. The Enabling Environment (2.04) and Inclusion (2.17) determinants are the lowest scoring, suggesting that there is a lack of support from NGOs and governments while women and systemically excluded groups have less access to products and services.

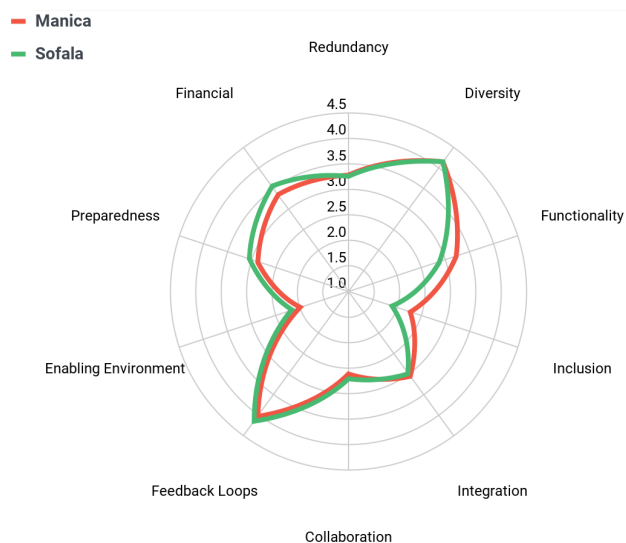
Table 3.6 Average MSRI Determinant Scores, by Market Actors

Group		MSRI Determinants										Overall
		Redundancy	Diversity	Functionality	Inclusion	Integration	Collaboration	Feedback Loops	Enabling Environment	Preparedness	Financial	MSRI
Overall	Market Actors	3.28	4.14	3.13	2.17	3.04	2.65	4.06	2.04	2.92	3.41	3.14
Market Actor type	Input Supplier	2.98	3.74	3.25	2.02	2.95	2.84	3.96	2.27	3.16	3.45	3.13
	Output Market	3.21	3.97	3.20	1.30	3.60	2.43	3.89	1.02	3.11	3.30	2.97
	Retailers	3.40	4.32	3.07	2.47	2.92	2.64	4.15	2.25	2.78	3.43	3.19
Manica	All Districts	3.28	4.14	3.23	2.27	3.07	2.62	4.03	1.99	2.87	3.36	3.13
	Bárue	2.88	4.54	3.20	4.08	2.50	4.71	4.50	3.33	3.47	2.50	3.39
	Cidade de Chimoio	3.35	4.07	3.33	2.24	2.92	2.69	4.09	1.75	2.67	3.35	3.10
	Gondola	3.23	4.01	3.73	2.02	2.50	2.21	4.01	1.83	3.24	3.55	3.12
	Macate	3.50	4.91	2.50	2.81	3.33	2.73	4.75	1.94	1.18	3.50	3.18
	Manica	3.31	3.95	2.73	2.39	3.75	2.34	3.05	1.94	3.23	3.64	3.14
	Sussundenga	2.98	4.53	2.60	2.10	4.15	2.35	4.19	3.26	3.54	3.12	3.25
Sofala	All Districts	3.27	4.14	2.88	1.91	2.99	2.71	4.14	2.17	3.04	3.55	3.16
	Beira	3.17	3.60	3.19	1.71	2.69	2.73	4.07	2.15	3.15	3.60	3.10
	Gorongosa	3.00	4.80	1.71	2.58	4.17	2.17	4.04	1.53	1.47	3.38	2.96
	Nhamatanda	3.53	4.74	2.86	1.96	3.00	2.91	4.28	2.44	3.49	3.55	3.32
Firm size	Less or equal to 10 workers	3.27	4.26	3.24	2.31	2.88	2.64	4.19	2.13	2.88	3.33	3.15
	Between 11 and 50 workers	3.15	3.75	2.56	2.46	2.61	3.28	3.87	1.51	2.72	3.30	2.98
	Over 50 workers	3.38	3.97	3.16	1.48	3.93	2.21	3.77	2.08	3.16	3.78	3.21
Turnover band	Less than 160,000 USD	3.27	4.19	3.09	2.34	2.96	2.68	4.15	2.45	2.91	3.31	3.16
	From 160,000 to 800,000 USD	3.39	4.31	3.50	2.01	2.43	2.48	3.64	0.83	2.93	3.58	3.02
	Over 800,000 USD	3.23	3.83	3.08	1.58	3.78	3.02	4.25	2.04	3.21	3.48	3.21
	Prefered not to answer	3.13	3.97	2.74	2.54	3.33	1.58	3.73	0.93	2.04	3.83	2.96

Comparing Determinants by Geography

Figure 3.8 shows the Market Actor determinant scores disaggregated by province. It is clear that there is consistency across geographies.

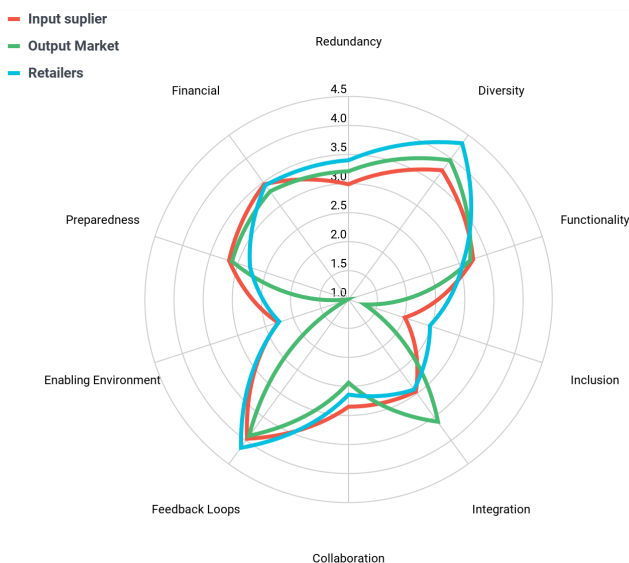
Figure 3.8 Average MSRI 2021 Market Actor Determinant Scores, by Province



Comparing Determinants by Market Actor Type

When disaggregating and comparing determinant scores by Market Actor type, we can observe that Output Markets are significantly less resilient than their supply-side counterparts. Output Markets score the lowest in 50% of the ten MSRI Market Actor determinants. Notably, Output Markets received an Enabling Environment score of 1.02 and an Inclusion score of 1.30. While all three Market Actor types scored poorly in Inclusion and Enabling Environment, Output Markets scored 54.8% and 41.9% below the average scores of the other market actors.

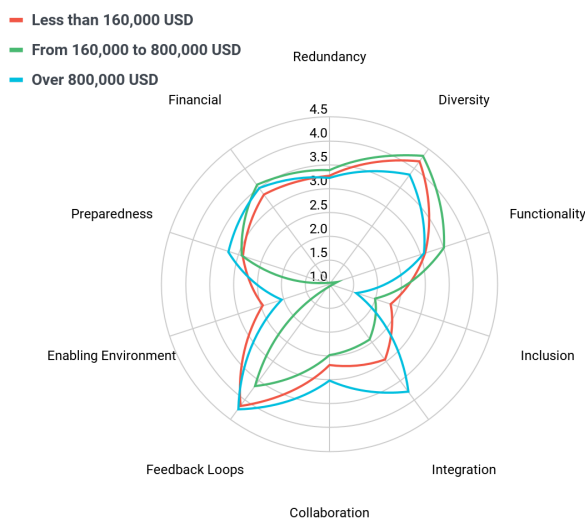
Figure 3.9 Average MSRI 2021 Market Actor Determinant Scores, by Market Actor Type



Comparing Determinants by Annual Revenue

The market actors MSRI score trends when disaggregated by annual revenue suggest a ‘missing middle’. It is clear that the group of actors earning between \$160,000 and \$800,000 USD per year are less resilient than the other income groups. This low score is driven by the significantly lower Enabling Environment and Integration scores coming from large and mid-size Retailers. Interestingly, market actors earning less than 160,000 USD (making up mostly of small-sized Retailers) scored relatively well. This subgroup only scored the lowest in two out of 10 determinants, Financial (3.31) and Preparedness (2.91) which are the most positively correlated to income and access to finance.

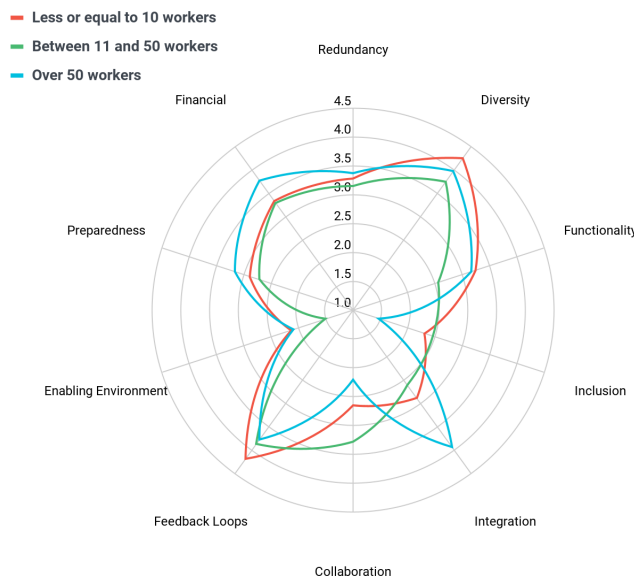
Figure 3.10 Average MSRI 2021 Market Actor Determinant Scores, by Annual Income



Comparing Determinants by Firm Size

The determinant scores when disaggregated by firm size are very similar to the trends displayed by the annual revenue disaggregation. The one significant variation is that larger firms have a lower average collaboration score.

Figure 3.11 Average MSRI 2021 Market Actor Determinant Scores, by Firm Size

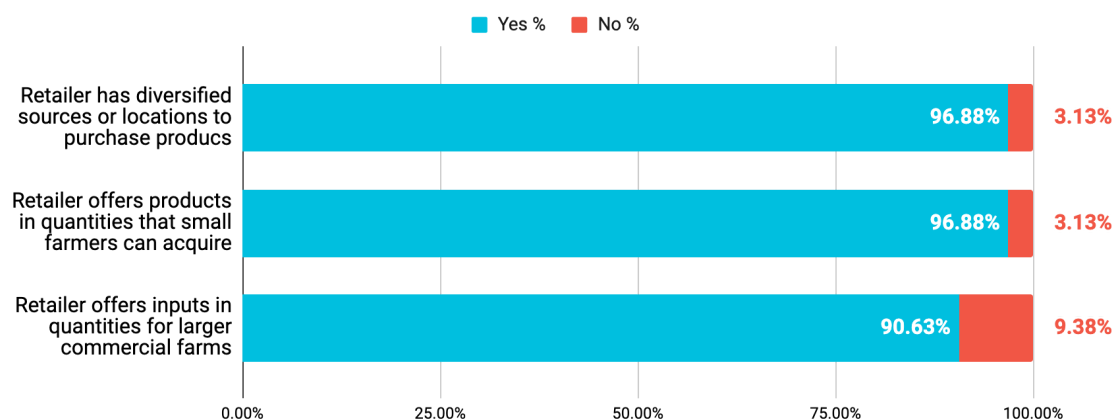


High Score - Diversity

Retailers' Diversity was the highest scoring determinant among all three Market Actor types. 96.8% of Retailers sampled have multiple locations to sell their products while 90% of them have the capacity and accessibility to sell products to both small farmers and large commercial farms. Additionally, 53.1% of retailers surveyed have contracts to supply local governments and NGOs with services.

Output Markets and Input Suppliers also scored well in diversity due to their capacity to service small and large farms, in addition to purchasing from different sources and value chains.

Figure 3.12 Retailer Diversity Indicators



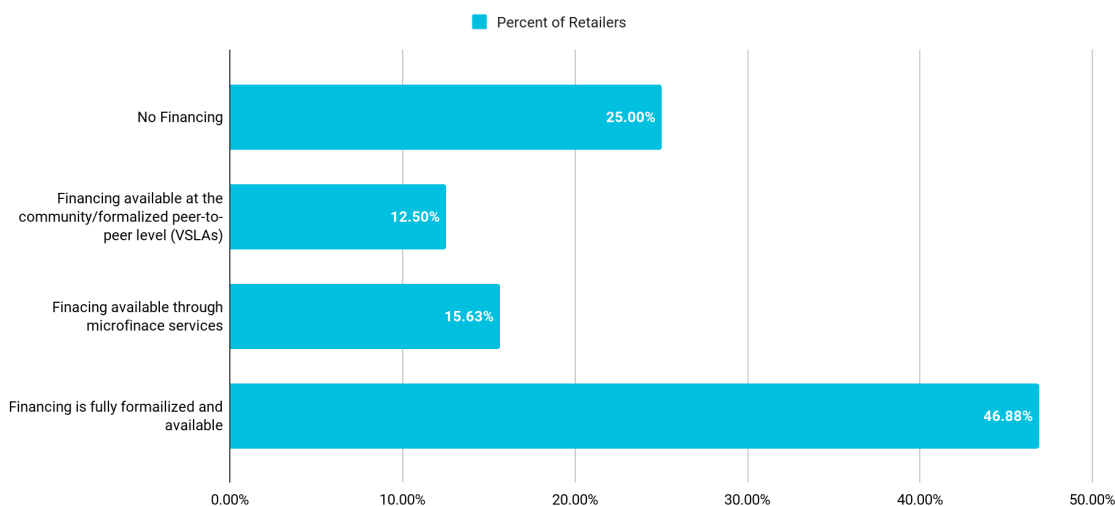
High Score - Feedback Loops

The Feedback Loops determinant is among the top highest scoring determinants of market actors. A high score in Feedback Loops suggests that the market has the ability to learn from experiences through control mechanisms and that there are feedback systems in place between buyers and sellers. Of the market actors surveyed, 72% of input suppliers and more than 90% of retailers and output markets are able to obtain product information and experiences directly from their customers. It would be beneficial and therefore recommended to further explore which mechanisms these market actors employ to learn from each other and their clients.

High Score - Financial

A large majority of market actors (94.2%) maintain accurate profits and loss statements and 57.7% of market actors have access to finance that is fully formalized and available. Access to formalized finance is primarily a characteristic of the larger input suppliers and output market actors. Retailers, on the other hand, rely on a larger variety of financial service providers. One quarter of retailers surveyed reported that they do not go to any financial service providers to access services.

Figure 3.13 Retailers Access to Financial Services



Low Score - Enabling Environment

While Enabling Environment was the highest scoring determinant for households, it is decidedly the lowest scoring determinant for market actors. These low enabling environment scores are attributable to limiting factors such as policies and regulations that do not foster business growth. Only 36.5% of market actors reported receiving support from the local government or NGOs to resume business after a shock.

Additionally, Input Suppliers, Output Market Actors, and Retailers indicated that the government has not been effective in supporting their business development (Figure 3.14) nor helping the market actors provide to farmers (Figure 3.15).

Figure 3.14 Beneficial government policies

Are there any recent laws, policies or programs that have helped you to be more effective in your business?

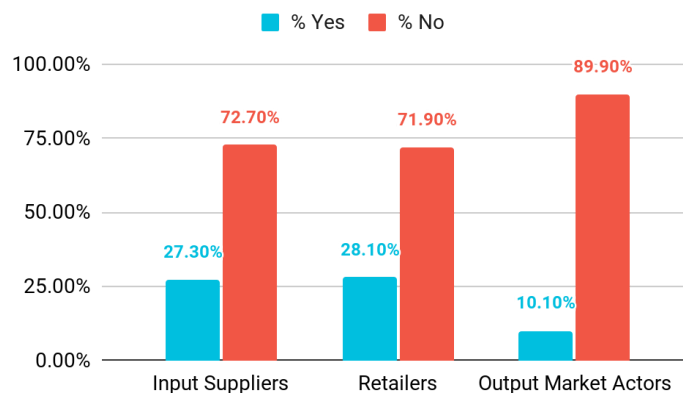
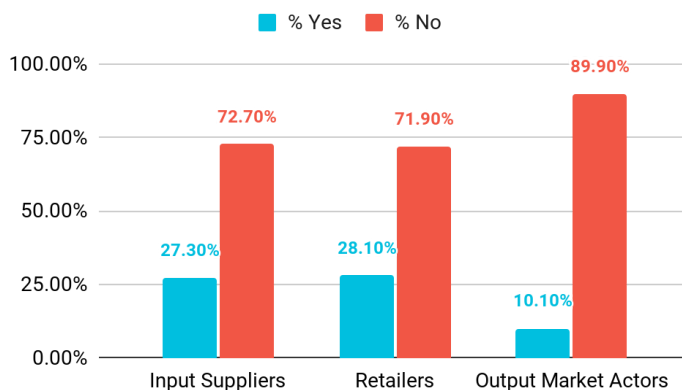


Figure 3.15 Beneficial Government Intervention

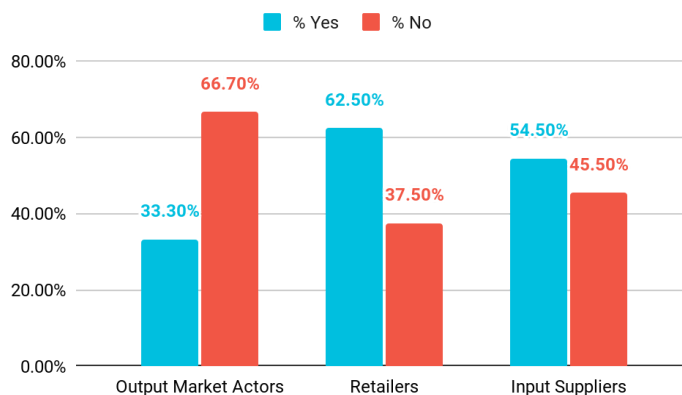
Does any government intervention exist that has helped you provide products/services to farmers?



Market actors' access to information scored relatively better than financial and policy support. More than 55.7% of market actors report receiving information from NGOs and local governments on how to improve their business practices.

Figure 3.16 Market Actors Access to Information

Do you get any information from local governments or NGOs about how you can have a more successful business?



Low Score - Inclusion

This determinant scored 2.17, showing that market actors do not actively promote the participation of women and systemically excluded groups in the market system. In Round 2, only 25% of market actors surveyed intentionally promote their products to and purchase products from women and systemically excluded groups, this is especially pronounced among the output market actors where only 11% intentionally purchase products from women and systemically excluded groups. This could in part be due to a lack of government and NGO support to encourage market actors to support women and systemically excluded groups. Only 11% of output market actors and 12.5% of retailers reported receiving government support to provide products and services to women and systemically excluded groups while no input suppliers said that they had received government support.

3.4 Comparing results from past MSRI Assessments

This section compares results from the two rounds of MSRI assessment in the Beira Corridor. With a one-year interval between the two rounds, the comparison of scores – aided by hypothesis testing – will give us an indication of the positive or negative direction households and market actors are trending. These trends will be analyzed at the micro-level to understand how individual indicators, determinants, and principles, contribute to the macro-level MSRI rating. The Round 1 and Round 2 samples are detailed in Table 3.7.

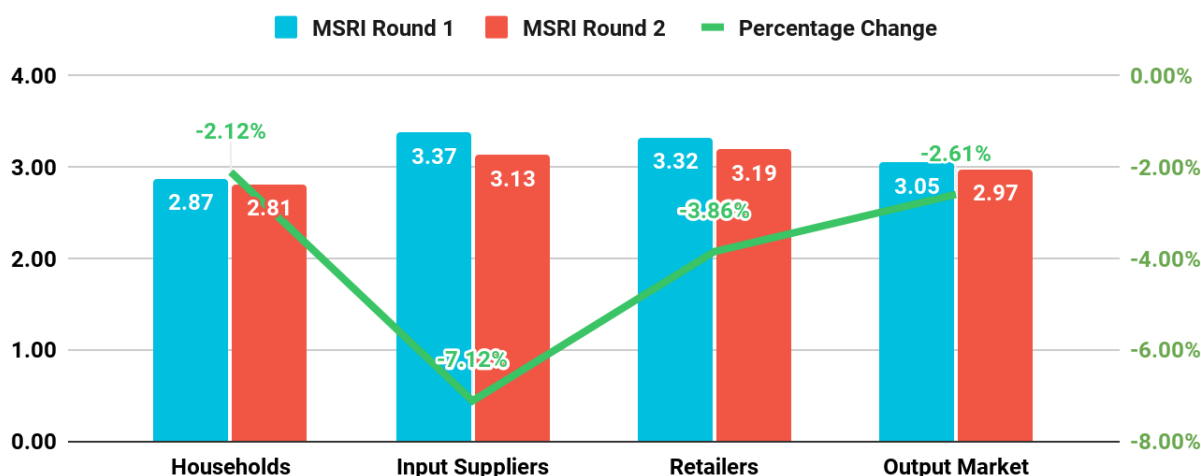
Table 3.7 Round 1 and Round 2 MSRI Samples

Market actor type	MSRI Round 1 Sample Size			MSRI Round 2 Sample Size		
	Manica	Sofala	Total	Manica	Sofala	Total
Households	141	154	295	118	203	321
Input Suppliers	7	2	9	8	3	11
Retailers	17	6	23	22	10	32
Output Market	4	1	5	7	2	9
Total	169	163	332	155	218	373

Overall MSRI Comparison

Figure 3.17 MSRI Round 1 and Round 2 Comparison

MSRI Round 1 and MSRI Round 2 Comparison

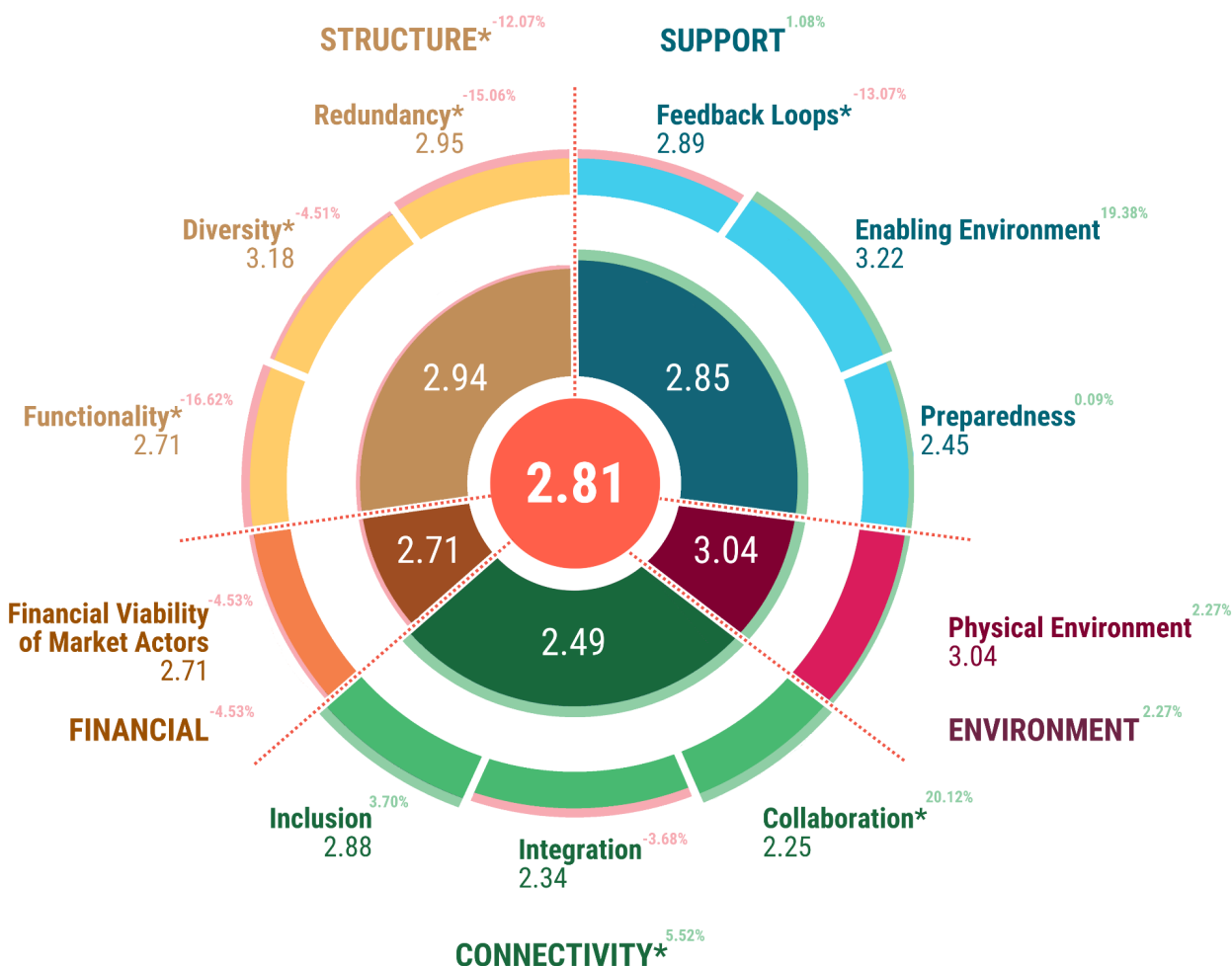


Overall, our analysis indicates that resilience remained relatively stable across all four categories of market actors in 2021. While the figure above displays a slight decrease in resilience across the board, the differences are not statistically significant. There are statistically significant differences in the disparate determinants and principles that make up the overall MSRI scores, but the aggregation of the market actor data offsets these differences. The consistency displayed above suggests that the tool is a reliable and accurate macro-level rating of resilience.

Household 2020-2021 Comparison

The figure below shows the determinant, principle, and overall MSRI score for households in 2021 as well as their respective changes in score from the prior year. The changes between MSRI Round 1 and MSRI Round 2 are represented by proportional green (positive change) and red (negative) bands layered on top of the principle and determinant segments. The percentage change is listed alongside the segment label and the asterisk indicates statistical significance.

Figure 3.18 MSRI Round 1 and Round 2 Comparison



The figure above shows that households experienced improvements in resilience in terms of Connectivity, Support, and the Physical Environment of the market system. 2021 brought decreases in Household resiliency regarding the Structure of the market system and the Financial Viability of market actors. The positive change to the Connectivity principle and the negative change to the Structure principle were statistically significant.

Household Principle Comparison

Table 3.7 below utilizes percentage change to more clearly show the Round 1 and Round 2 principle differences across geographies and subgroups. Fewer district subgroups are available for this comparison analysis because certain districts were not measured in both Round 1 and 2. The province comparison percentages listed below are an aggregation of all district-level data and compared across MRSI Round 1 and Round 2. Negative changes are represented by yellow cells while positive changes are represented in blue. The dark borders around specific cells indicate that the change is statistically significant.

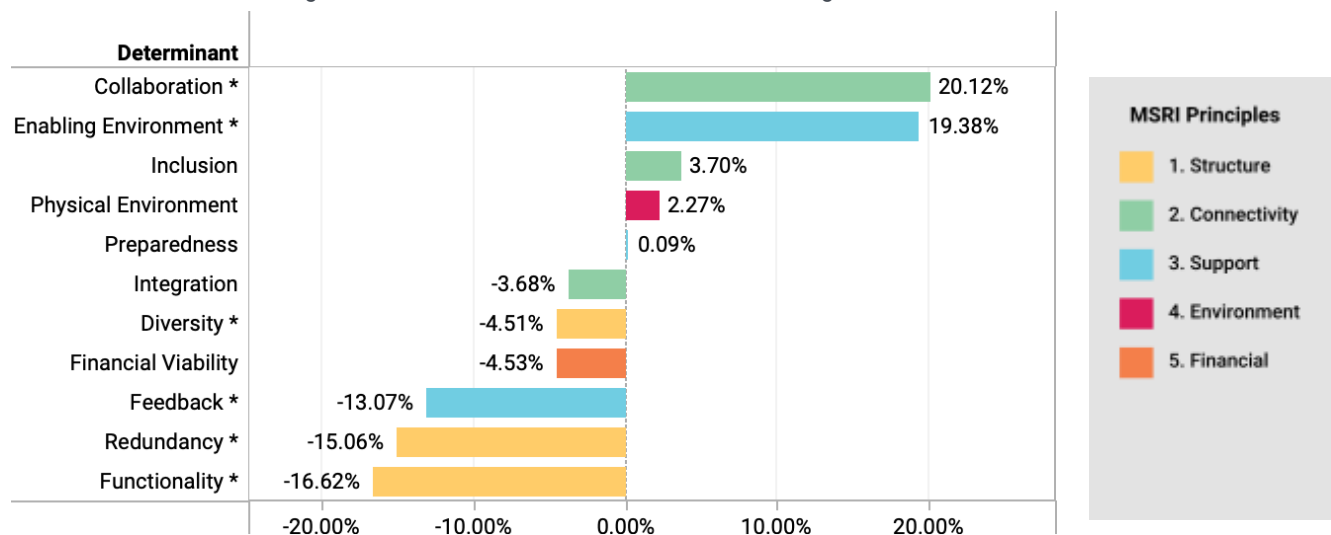
Table 3.7 Percentage Change of Average Household MSRI Principle and Overall Scores, within groups

		Principle 1 Structure of the Market	Principle 2 Connectivity of the Market	Principle 3 Support of the Market	Principle 4 Environment	Principle 5 Financial	Total MSRI
Overall Households		-12.1%	5.5%	1.1%	2.3%	-4.5%	-2.1%
Manica Province	All Districts	-8.4%	4.1%	2.8%	6.9%	-3.0%	0.1%
	Gondola	-9.3%	10.3%	3.6%	1.7%	6.5%	1.8%
	Sussundenga	-8.2%	20.0%	2.9%	7.0%	-14.5%	-0.3%
Sofala Province	All Districts	-13.8%	7.3%	0.6%	-0.4%	-4.3%	-2.8%
	Buzi	-5.6%	19.3%	-0.6%	6.7%	-10.3%	0.6%
	Dondo	-19.3%	3.9%	-0.5%	-3.4%	-10.1%	-6.5%
	Nhamatanda	-13.6%	11.3%	7.0%	-0.1%	6.8%	1.3%
Income Range	Less than 32 USD	-12.4%	9.8%	1.9%	0.6%	-0.6%	-1.0%
	32 USD to 160 USD	-13.3%	1.3%	0.0%	2.8%	-9.0%	-4.2%
	More than 160 USD	-4.8%	12.1%	-4.0%	4.5%	-15.8%	-2.8%

Household Determinant Comparison

Figure 3.19 highlights the direction and magnitude of determinant-level score changes between the two rounds of MSRI assessment. The determinant color indicates their respective MSRI principle and the asterisk indicates a statistically significant change.

Figure 3.19 Household Determinant Score Percentage Differences



Beira Corridor households have experienced significant improvements in Collaboration and Enabling Environment but a decline in Functionality, Redundancy, and Feedback. Collaboration has been the lowest scoring determinant in MSRI rounds 1 and 2. The improvements in Collaboration are attributable to a 132.6% increase in members selling products as a group as well as a 24.6% increase in group purchases of inputs. This statistic suggests intentional programming that spurred group input purchases and production sales. The improvements in Enabling Environment are attributed to a 34% increase in support from government and NGOs and a 10.8% increase in respondents receiving technical assistance.

The significant declines in Functionality and Redundancy, are jointly responsible for the significant decrease of the Structure principle. The significant change in Functionality is due to an increase in migration to pursue other income generating activities and a decrease in access to markets. Importantly, another reason for this decrease in Functionality is the introduction of new Functionality indicators focused on the use of and access to improved inputs. Therefore the variance in the Functionality score is a correction in the tool rather than a response to significant change in the market system. The decrease in Redundancy can be attributed to a 41% drop in farmers' access to multiple buyers from 87.8% to 52%. Despite this drop, the Redundancy determinant still scored high relative to other household determinants. The 13% decline in Feedback is due to a 31.6% decrease in access to market information and a 22.3% decrease in sample respondents' ability to deliver feedback on products to suppliers.

Household Determinant Comparison Disaggregations

Table 3.8 below utilizes percentage change to more clearly show the Round 1 and Round 2 determinant differences across geographies and subgroups. Fewer district subgroups are available for this comparison analysis because certain districts were not measured in both Round 1 and 2. The province comparison percentages listed below are an aggregation of all district-level data and compared across MRSI Round 1 and Round 2. Negative changes are represented by red cells while positive changes are represented in green. The dark borders around specific cells indicate that the change is statistically significant.

Table 3.8 Percentage Change of Round 1 and Round 2 Household Determinant Scores, by Subgroup

Group		MSRI Determinants Percentage Change										
		Redundancy	Diversity	Functionality	Inclusion	Integration	Collaboration	Feedback Loops	Enabling Environment	Preparedness	Environment	Financial
Overall Household MSRI		-15.1%	-4.5%	-16.6%	3.7%	-3.7%	20.1%	-13.1%	19.4%	0.1%	2.3%	-4.5%
Manica	All Districts	-7.1%	-5.4%	-13.0%	6.6%	-10.6%	20.8%	-13.0%	28.8%	-3.0%	6.9%	-3.0%
	Gondola	-13.0%	0.5%	-14.4%	1.0%	-14.3%	69.0%	-12.5%	24.4%	2.9%	1.7%	6.5%
	Sussundenga	6.8%	-6.4%	-23.1%	35.3%	-0.2%	30.8%	-18.0%	46.3%	-7.3%	7.0%	-14.5%
Sofala	All Districts	-19.4%	-3.4%	-18.4%	2.1%	3.3%	19.8%	-12.6%	13.2%	4.2%	-0.4%	-4.3%
	Buzi	-5.8%	3.5%	-14.5%	-0.9%	3.2%	98.0%	-17.1%	6.1%	15.2%	6.7%	-10.3%
	Dondo	-24.8%	-11.4%	-22.1%	-2.5%	4.2%	12.5%	-13.2%	15.9%	-2.1%	-3.4%	-10.1%
	Nhamatanda	-18.7%	-2.9%	-18.3%	13.2%	10.7%	9.2%	-0.5%	13.4%	10.3%	-0.1%	6.8%
Income Range	Less than 32 USD	-22.3%	-2.9%	-11.4%	10.3%	-8.0%	33.1%	-14.3%	22.8%	1.0%	0.6%	-0.6%
	32 USD to 160 USD	-14.3%	-6.4%	-19.3%	0.2%	-5.4%	11.5%	-12.3%	16.1%	-1.1%	2.8%	-9.0%
	More than 160 USD	5.0%	-2.2%	-18.4%	-8.8%	22.7%	27.1%	-23.2%	22.6%	-6.3%	4.5%	-15.8%

Market Actor 2020-2021 Comparison

The figure below shows the determinant, principle, and MSRI score for Market Actors in 2021 as well as their respective changes in score over the prior year.

Figure 3.20 Percentage Change of Round 1 and Round 2 MSRI Comparison

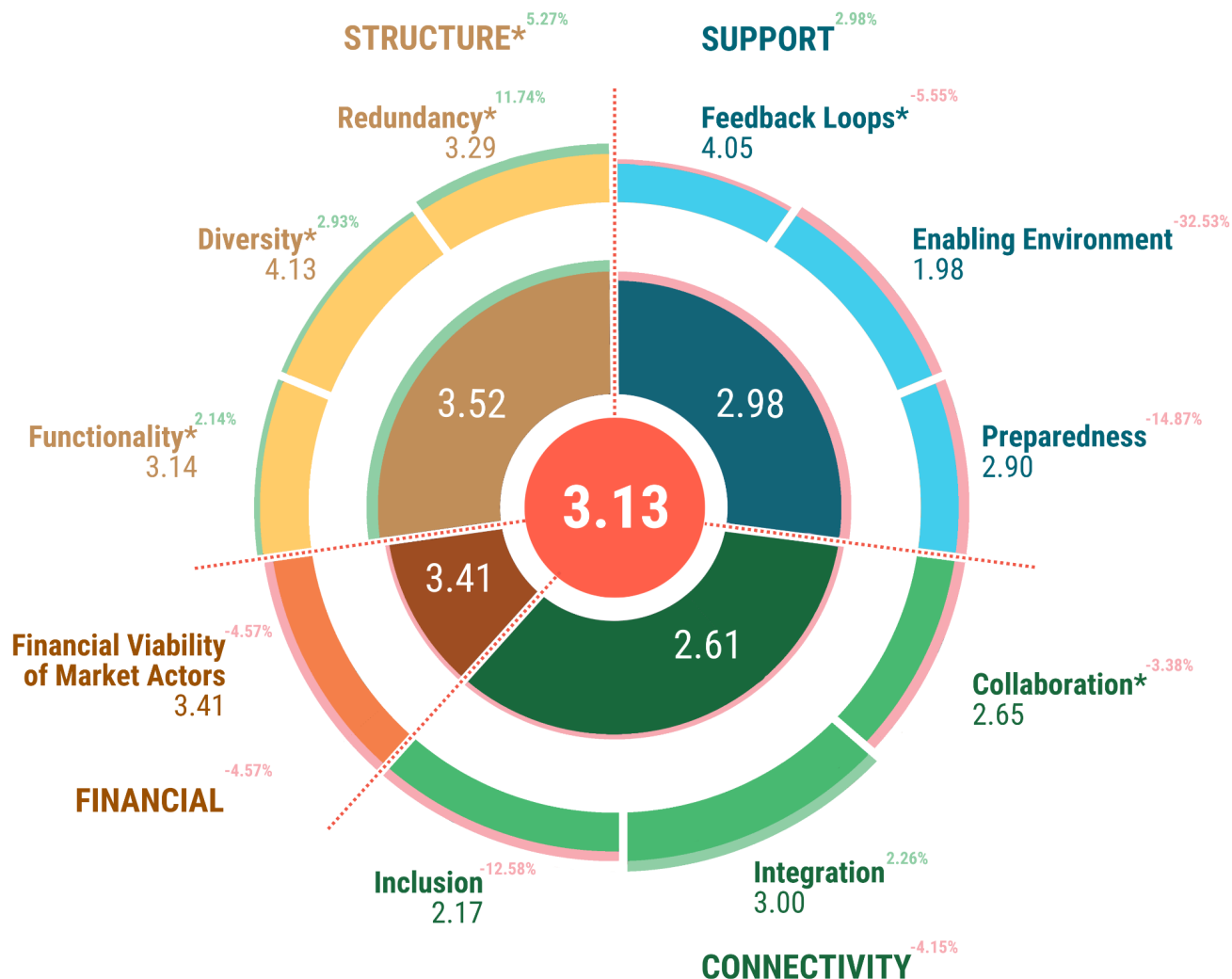


Table 3.9 below utilizes percentage change to more clearly show the Round 1 and Round 2 principle differences across geographies and subgroups. Negative changes are represented by yellow cells while positive changes are represented in blue. The dark borders around specific cells indicate that the change is statistically significant. The percentage change could not be calculated for the rows shaded orange and blue. Rows shaded blue represent subgroups with only Round 1 measurements while rows shaded orange indicate subgroups that only have Round 2 measurement data.

Table 3.9 Percentage Change of Average Market Actor MSRI principle scores, within groups

Group		Percentage Change of MSRI Determinant Score			
		P1. Structure of the Market	P2. Connectivity of the Market	P3. Support of the Market	P5. Financial
Overall	Market Actors	5.11%	-3.70%	-15.18%	-4.52%
Market Actor type	Input Supplier	-5.76%	-17.82%	-10.81%	-4.34%
	Output Market	8.68%	1.37%	-7.45%	-11.11%
	Retailers	7.64%	0.55%	-18.66%	-2.31%
Manica	All Districts	4.14%	-6.50%	-15.66%	-5.21%
	Bárue				
	Cidade de Chimoio				
	Gondola	35.61%	-20.47%	4.74%	-4.88%
	Macate	10.94%	-18.72%	-23.49%	0.00%
	Manica	-5.41%	3.84%	-24.12%	4.59%
	Sussundenga	1.75%	-7.05%	-1.54%	-19.59%
	Vanduzi				
Sofala	All Districts	7.48%	1.82%	-19.58%	-1.94%
	Beira				
	Buzi				
	Dondo				
	Gorongosa				
	Nhamatanda	29.48%	-11.76%	-16.52%	-0.93%
Firmsize	Less or equal to 10 workers	6.69%	-5.18%	-15.50%	-5.40%
	Between 11 and 50 workers	-3.68%	-3.11%	-25.18%	-10.00%
	Over 50 workers	3.37%	18.49%	4.84%	3.22%
Turnover band	Less than 160,000 USD	7.25%	-1.10%	-11.59%	-6.50%
	From 160,000 to 800,000 USD	8.63%	-27.55%	-34.84%	0.07%
	Over 800,000 USD	-3.30%	6.96%	-8.75%	-4.94%

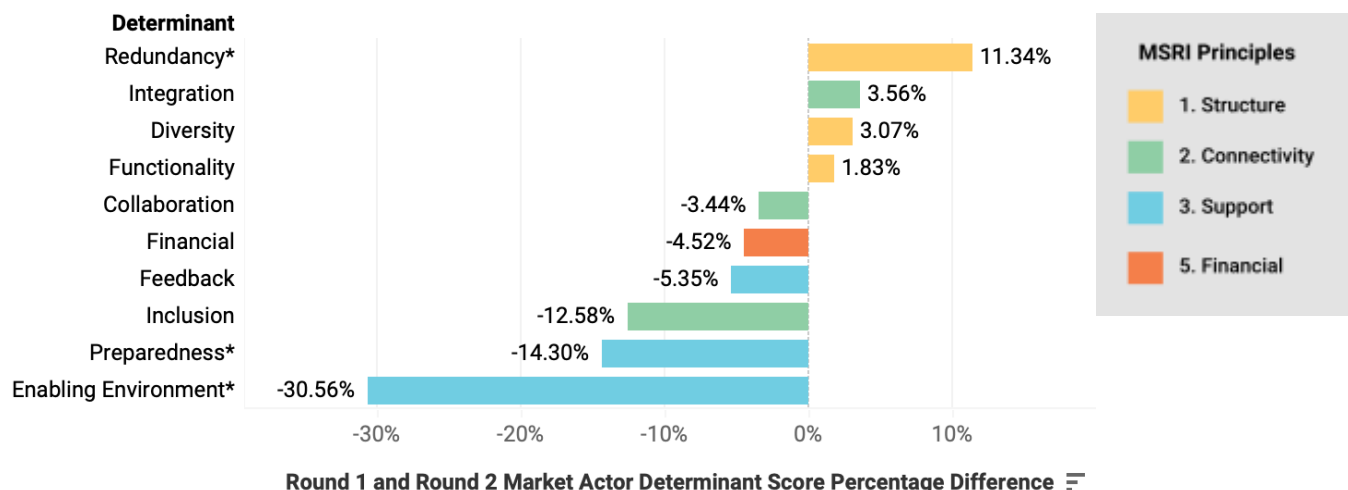
Table 3.10: Percentage Change of Round 1 and Round 2 Market Actor Determinant Scores, by Subgroup

Group		Percentage Change of MSRI Determinant Score									
		Redundancy	Diversity	Functionality	Inclusion	Integration	Collaboration	Feedback Loops	Enabling Environment	Preparedness	Financial
Overall	Market Actors	11.34%	3.07%	1.83%	-12.58%	3.56%	-3.44%	-5.35%	-30.56%	-14.30%	-4.52%
Market	Input Supplier	-1.09%	-11.96%	-2.06%	-39.49%	-18.18%	10.99%	-5.93%	-23.30%	-5.92%	-4.34%
Actor type	Output Market	-0.49%	22.82%	3.48%	41.41%	27.12%	-30.19%	9.77%	-52.99%	5.29%	-11.11%
	Retailers	17.13%	5.66%	1.23%	-1.47%	3.21%	-0.37%	-7.75%	-30.28%	-21.91%	-2.31%
Manica	All Districts	9.08%	2.84%	1.12%	-9.64%	-4.72%	-5.71%	-5.25%	-29.63%	-17.04%	-5.21%
	Bárue										
	Cidade de Chimoio										
	Gondola	42.39%	27.41%	39.53%	1.08%	-16.67%	-36.21%	20.69%	-24.57%	10.97%	-4.88%
	Macate	16.13%	43.68%	-26.53%	-6.82%	-25.00%	-21.01%	3.64%	-16.00%	-65.29%	0.00%
	Manica	6.08%	-4.87%	-16.96%	-4.31%	25.18%	-12.48%	-29.46%	-34.96%	-8.34%	4.59%
	Sussundenga	-3.38%	-0.30%	12.61%	-29.01%	-0.50%	10.70%	3.25%	-6.00%	-2.64%	-19.59%
	Vanduzi										
Sofala	All Districts	15.53%	3.92%	4.35%	-29.70%	30.42%	9.96%	-7.12%	-43.78%	-8.18%	-1.94%
	Beira										
	Buzi										
	Dondo										
	Gorongosa										
	Nhamatanda	39.02%	52.92%	-3.29%	-30.85%	-22.86%	32.70%	-4.79%	-43.83%	2.99%	-0.93%
Firmsize	Less or equal to 10 workers	12.58%	3.28%	5.71%	-15.84%	-0.12%	0.38%	-4.43%	-32.92%	-13.40%	-5.40%
	Between 11 and 50 workers	10.00%	-2.94%	-17.25%	-5.48%	-17.23%	14.58%	-9.73%	-49.03%	-23.97%	-10.00%
	Over 50 workers	0.65%	6.90%	2.06%	144.14%	42.73%	-28.00%	-0.33%	46.34%	-6.79%	3.22%
Turnover band	Less than 160,000 USD	19.06%	2.29%	2.89%	-10.31%	-0.41%	7.73%	-5.56%	-16.33%	-15.26%	-6.50%
	160,000 to 800,000 USD	3.64%	11.15%	11.01%	-32.50%	-17.47%	-31.13%	-15.27%	-78.00%	-11.30%	0.07%
	Over 800,000 USD	2.22%	-4.85%	-6.71%	-26.98%	30.22%	9.46%	0.76%	-22.69%	-9.97%	-4.94%

Determinant Analysis Comparison

Figure 3.21 highlights the direction and magnitude of the combined Market Actor determinant-level score changes between the two rounds of MSRI assessment. The determinant color indicates their respective MSRI principle. Beira Corridor Market Actors have experienced significant improvements in Redundancy but a decline in Preparedness and Enabling Environment.

Figure 3.21 Market Actor Determinant Score Percentage Differences



The statistically significant improvement to the Redundancy determinant is mainly attributable to the 17.13% improvement to Retailers' Redundancy score. On average, retailers surveyed in the second round had a significantly larger customer base than the first round responses. This is due in part to a growing customer base of some Retailers over time and also the inclusion of new Retailers into the round 2 sample that brought up the average clientele figure. Since more retailers were surveyed in round 2 compared to round 1 we believe that this adjustment to the Redundancy score more closely reflects the realities of the market system. Additionally, retailers reported increased levels of competition in local markets. In MSRI Round 1, 26% of retailers reported having more than 10 competitors of similar sizes with similar retail inventories in their market area. This percentage increased by 70% in MSRI Round 2, with 44% of retailers stating that they have more than 10 competitors.

The statistically significant decrease in Market Actor Preparedness was driven by a decrease in the preparedness of the retailers sub group. This was due to a decrease in Retailers' ability to quickly resume normal business operations after experiencing economic and public health shocks. In addition to the decreases in Retailers' reported ability to recover, a new Preparedness indicator was introduced between the first and second rounds that lowered the preparedness score and affected the weights of the other indicator scores that supported the preparedness determinant. While this slightly affected the year over year analysis, the additional indicator contributes to a more developed idea of Market Actors' capacity to plan for and mitigate risks. Analysis on overall market actor preparedness is further expanded in the following section, the Impact of Shocks and Stresses.

The most dramatic change experienced among Market Actors in round 1 and round 2 was the 30% decrease in the Enabling Environment determinant score. Market Actors across the type, income, and

geography subgroups all experienced decreases. Upon investigation of the Enabling Environment indicators, the main drivers for this decline in Enabling Environment score is the lack of government laws, interventions, and programs that support market actors' business development.

This change is most obvious among Output Market Actors where indicators relating to NGO support and government interventions decreased by half. In round 2 only 11% of Output Market Actors reported that recent laws and interventions supported business development. This is down from 40% in round 1.

3.5 Areas for further inquiry

iDE has identified three priority areas for additional inquiry based on the results presented in the above sections. These areas include: investigating the important indicators and survey questions that are driving determinant scores, further disaggregation based on survey question responses, and understanding the relative weight of questions and indicators when they are aggregated to the determinant level. These three areas of analysis will help iDE understand the relative importance of certain questions and indicators, how they interact with other indicators and determinants, and how the design and structure of the tool affects MSRI output scores.

CHAPTER 4: IMPACT OF SHOCKS AND STRESSES

The low overall resilience scores for Households and Market Actors indicate that Beira Corridor's market system is significantly vulnerable to shocks and stressors and has limited ability to respond, adapt, and recover.

4.1 Impact of Shocks and Stresses on Households

The most frequent shocks that respondents faced in the last 5 years are displayed in Table 4.1 below. Nearly all households experienced a climate shock within the last five years that affected farm production. In addition to climate shocks, 27.7% of households faced public health shocks like Covid-19, pests and disease that affected farm productivity and connectivity to markets. Of the entire household sample, every respondent reported experiencing at least one of the three types of shocks in the last five years.

Table 4.1 Frequency of shocks experienced in last 5 years by Households

Type of shocks	N	Percent
Socioeconomic (Political instability, Economic shock, Conflict)	5	1.5%
Climate (Drought, Flood, Cyclone, Earthquake, Erratic Rainfall)	316	98.4%
Public Health (Covid-19, Pests & Diseases)	89	27.7%
Total	410	127.7%

Table 4.2 shows the time required for households to recover from their most recent shock. 50% of households took between two to six months to recover from their most recent shock while nearly a quarter of respondents have yet to fully recover.

Table 4.2 Number of months needed for Household to recover from shocks

Period of month	Frequency	Percent
Has not recovered	92	22.4%
0 months	21	5.1%
1 month	50	12.2%
2-3 months	124	30.2%
4-6 months	84	20.4%
7-12 months	15	3.6%
Over 12 months	24	5.8%
Total	410	100.0%

Our analysis shows that Households face continuous and widespread vulnerability to climate shocks and stressors that affect production and business performance. However, the fact remains that preparedness

levels have not improved. iDE recommends investigating what factors could contribute to quicker recovery times. For example, iDE can run regression analysis using various questions from MSRI to determine what household characteristics and practices are correlated with faster recovery times. These regression models would inform future programming because iDE could focus efforts on underserved communities with slower recovery times. iDE could also support programs and activities that contribute more towards faster recovery and therefore stronger resilience.

4.2 Impact of Shock and Stresses on Market Actors

The most frequent shocks that market actors faced in the last five years are displayed in table 4.3 below. 88.23% of Market Actors experienced a climate shock within the last five years showing that climate change impacts the entirety of the market system. While households dealt mainly with climate shocks, COVID-19 and the larger socioeconomic environment affected Market Actor business performance and market connectivity.

Table 4.3 Frequency of shocks experienced in last 5 years by MAs

Type of Shocks	N	Percent of Market Actors Surveyed
Socioeconomic (Political instability, Economic shock, Conflict)	20	39.21%
Climate (Drought, Flood, Cyclone, Earthquake, Erratic Rainfall)	45	88.23%
Public Health (Covid-19, Animal/Plant Diseases)	44	86.27%
Total	109	

In Table 4.4 below, it can be seen that many market actors still have not recovered from socioeconomic, climate, and public health shocks.

Table 4.4 Number of months needed for MAs to recover from shocks, by type of shock

Number of months	Socioeconomic		Climate		Public Health	
	N	Percent	N	Percent	N	Percent
Has not recovered	10	47.62	10	24.39	29	65.91
0 months		0.00	5	12.20	2	4.55
1 month	2	9.52	4	9.76	2	4.55
2-3 months		0.00	2	4.88	2	4.55
4-6 months	1	4.76	8	19.51	2	4.55
7-12 months	6	28.57	9	21.95	6	13.64
Over 12 months	2	9.52	3	7.32	1	2.27
Total	21	100.0	41	100.0	44	100.0

Market actors in the Beira Corridor are largely exposed to various type of shocks, the entire Households sample reported experiencing at least one shock in the last 5 years, nearly two-thirds reported taking two

to six months to recover from their most recent climate shock, while approximately a quarter of households had not recovered from their most recent climate shock. Input Suppliers, Retailers, and Output Markets are equally exposed, 86% of their businesses being affected by a climatic shock and 88% by a public health one. Hence, better understanding resilience, is key to improve the adaptability of the market to these shocks that are more recurrent over time.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Key takeaways

- ❑ **Market Systems Resilience has slightly decreased across all Market Actors over the past year. Agricultural based actors like Household and Output Market actors have remained the least resilient.**
- ❑ **While Market Actors face widespread vulnerability to climate shocks and stressors that affect production and business performance, preparedness levels have not improved.**
- ❑ **Household Collaboration, an important metric for last-mile aggregation and services, remains very low. This highlights the need for continued engagement with the private sector.**
- ❑ **Inclusivity among Households and Market Actors remains low, highlighting a need for the Market System to more actively engage with and benefit from women and systematically excluded groups.**
- ❑ **While support from the Public and NGO sector is relatively high for households and smallholders, there is a lack of support directed at supply-side market actors. There is a limited enabling policy environment for supply-side market actors that could affect business growth and new entrants into the market system.**

5.2 Recommendations

- ❑ **For Households, prioritize incorporating strategies that support Collaboration, Integration, Preparedness, and Inclusion into current and future program activities.**
- ❑ **For Market Actors, develop strategies to support engagement with women and systemically excluded groups.**
- ❑ **Understand how iDE can support and engage with lower-scoring subgroups and geographies.**
- ❑ **Conduct regression analysis on individual survey questions to understand their impact on important dependent variables like income, MSRI, recovery time, and others.**
- ❑ **Understand and equalize the relative weights of determinant indicators to ensure consistency of results.**
- ❑ **Develop strategy on how to utilize MSRI sampling and implementation as an adaptive management tool.**

CHAPTER 6: ANNEXES

Annex 1: Analysis framework

Principle	Determinant	Description	Weight Normalized to a score out of 100
Structure	Redundancy	Surplus of market actors performing the same functions in the market system	1
	Diversity	Diversity in the market system value chains, and in the available market channels	1
	Functionality	Flow of goods and services in, out and through market spaces	1
Connectivity	Inclusion	Participation of women and other vulnerable groups in the market system	1
	Integration	Different groups' involvement in relevant processes	1
	Collaboration	Collaboration among actors of the chain	1
Support	Feedback loops	Ability to learn from experience through control mechanisms	1
	Enabling environment	Transparent market governance is in place	1
	Preparedness	Ability of the system to promptly react to disturbances	1
Environment	Physical Environment	Environmental condition of the market area	1
Financial	Financial viability of actors	Financial viability of actors in the market	1
		Access to financial services	

Annex 2: 13 agroecosystem indicators of resilience at the household used in the FAO SHARP resilience measurement tool

1. Socially self-organized

Farmers and consumers are able to organize into grassroots networks and institutions such as co-ops, farmer's markets, community sustainability associations, community gardens, and advisory networks

2. Ecologically self-regulated

Farms maintain plant cover and incorporate more perennials, provide habitat for predators and parasitoids, use ecosystem engineers, and align production with local ecological parameters

3. Appropriately connected

Collaborating with multiple suppliers, outlets, and fellow farmers; crops planted in polycultures that encourage symbiosis and mutualism

4. Functional and response diversity

Heterogeneity of features within the landscape and on the farm; diversity of inputs, outputs, income sources, markets, pest controls, etc.

5. Optimally redundant

Planting multiple varieties of crops rather than one, keeping equipment for various crops, getting nutrients from multiple sources, capturing water from multiple sources

6. Spatial and temporal heterogeneity

Patchiness on the farm and across the landscape, mosaic pattern of managed and unmanaged land, diverse cultivation practices, crop rotations

7. Exposed to disturbance

Pest management that allows a certain controlled amount of invasion followed by selection of plants that fared well and exhibit signs of resistance

8. Coupled with local natural capital

Builds (does not deplete) soil organic matter, recharges water, little need to import nutrients or export waste

9. Reflective and shared learning

Extension and advisory services for farmers; collaboration between universities, research centers, and farmers; cooperation and knowledge sharing between farmers; record keeping; baseline knowledge about the state of the agro-ecosystem

10. Globally autonomous and locally interdependent

Less reliance on commodity markets and reduced external inputs; more sales to local markets, reliance on local resources; existence of farmer co-ops, close relationships between producer and consumer, and shared resources such as equipment

11. Honors legacy

Maintenance of heirloom seeds and engagement of elders, incorporation of traditional cultivation techniques with modern knowledge

12. Builds human capital

Investment in infrastructure and institutions for the education of children and adults, support for social events in farming communities, programs for preservation of local knowledge

13. Reasonably profitable

Farmers and farm workers earn a liveable wage; agriculture sector does not rely on distortionary subsidies

Annex 3: Table 1.1. MSRI 1.0 composition, determinant, and indicators

MSRI Principle	MSRI Determinant	MSRI Description
1. Structure of the market	1.1 Redundancy (R)	Surplus of market actors performing the same functions in the market system
	1.2 Diversity (D)	Diversity in the market system value chains, and in the available market channels
	1.3 Functionality (F)	Flow of goods and services in, out and through market spaces
2. Connectivity of the market	2.1 Inclusion (Ic)	Participation of women and other vulnerable groups in the market system
	2.2 Integration (Ig)	Different groups' involvement in relevant processes
	2.3 Collaboration (C)	Collaboration among actors of the chain
3. Support of the market	3.1 Feedback loops (FL)	Ability to learn from experience through control mechanisms
	3.2 Enabling environment (EE)	Transparent market governance is in place
	3.3 Preparedness (P)	Ability of the system to promptly react to disturbances

Annex 4: iDE MSRI Informed Consent

Investigator's Statement:

iDE is an organization aimed at powering entrepreneurs to end poverty, and we are asking you to take part in a research study.

We are hoping to provide you with all of the information about the research we are conducting to help you decide whether or not you wish to participate in the study. At any point, you can say that you no longer wish to participate in the study without saying why you no longer want to participate. Your participation is completely voluntary and your choice to participate or not participate will have no impact on any future opportunity to partake in a different study. I will now describe the details of the study, after which you can indicate if you wish to continue.

Purpose:

We are looking to conduct a study with the aim to understand the resilience levels of different market actors including households. We are looking to understand your experiences in relation to shocks and stresses.

Procedures

Participation in the study involves responding to a list of questions we have prepared to achieve the purpose mentioned earlier. This interview may take between 35-45 minutes. You will not be audio taped or recorded in any way when participating in this study.

Benefits

There will be no additional monetary benefit for participating in this study. However, the learning from this study could lead to societal benefits through programming that helps address the acute vulnerabilities or recovery support resulting from various shocks.

Risk, Stress, or Discomfort

There are questions that relate to income and impacts from shocks and stresses. opting out of answering a particular question does not disqualify you from answering the other questions in the survey. You may opt out of particular questions or the entire survey at any time without providing an explanation.

Additional Information

The data will be used to inform iDE's project design and to help us learn how to improve our projects. Data will not be linked to individuals. Data will be stored for XXX. Personal information will not be disclosed without additional consent granted by the individual.

Participation

After reviewing the information, remember that participation is completely voluntary. You can choose to stop participating at any time once the study has begun with no repercussions. You may also choose to not answer any particular question but continue to participate in the study.

Do you have any questions about this study?

Do you agree to participate in the study

Contact Information

If you have any questions or concerns about the study, you may contact us at any time. My phone number is [xxx-xxx-xxxxx]. You may also contact the person overseeing this study, [Manager/Supervisor Name]. Their phone number is [xxx-xxx-xxxxx]

Redundancy Diversity Functionality Inclusion Integration Collaboration Feedback Loops Enabling Environment Preparedness Financial

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