iDE Powering entrepreneurs to end poverty.

iDE's Market Systems Resilience Index: Assessing Market Systems in Mozambique

Evaluation Report

October 2021

Sofala and Manica Provinces in Mozambique's Beira Corridor

Sweden Sverige

FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

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LATTER-DAY SAINT CHARITIES
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ACRONYMS

COVID-19	Coronavirus disease
FAO	Food and Agriculture Organization of the United Nations
HH	Household
iDE	International Development Enterprises
IGA	Income Generating Activities
IS	Input Supplier
ITTF	Input Trade and Technology Fairs
MA	Market Actors
MSRI	Market Systems Resilience Index
MSR	Market Systems Resilience
NGO	Non-Government Organisation
OM	Output Market
RE	Retailer
SHARP	Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists
USAID	United States Agency for International Development
VSLA	Village Savings and Loan Association

EXECUTIVE SUMMARY

The Market Systems Resilience Index (MSRI) measures the market's ability to react, withstand, and transform 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 2.0 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 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.

The MSRI also provides policy and programmatic recommendations for market system strengthening. Mozambique MSRI results closely resembles reality in the Beira Corridor market system, illustrating that market actors are more resilient than households; that all actors (HH, IS, RE and OM) in Manica Province have higher resilience level than those in Sofala Province, and that among market actors, input suppliers have higher resilience scores than retailers and output market actors.

HIGHLIGHTS FROM OUR FINDINGS

- **Low resilience levels in households are driven by poor market system connectivity, translating into weak market inclusion, integration and collaboration.**
- **Households scored relatively well in market redundancy and diversity, indicating households have multiple options/places to buy or sell products.**
- **Market actors are more resilient than households, and specifically, input suppliers have higher resilience scores than retailers and output market actors.**
- **Higher levels of resilience among market actors are driven by effective market feedback loops and market diversity.**
- **Mid-sized, and middle income firms have higher resilience levels compared to their smaller and larger counterparts.**

HOUSEHOLDS:

- Low resilience levels in households are driven by poor market system connectivity, translating into weak market inclusion, integration and collaboration; suggesting low participation of women and systemically excluded groups in the market system, centralized household decision-making, little involvement from different groups in relevant market processes, and weak collaboration among actors across value chains.
- On the other hand, households scored relatively well in market redundancy and diversity, indicating households have multiple options/places to buy or sell products and that income-generating activities, such as crop and livestock farming, are viable.
- Future intervention areas should aim to improve the participation of women, and systemically excluded groups, as relevant market actors and decision-makers. Future interventions should also help develop producer groups and ensure farmers participate in other steps along the value

chain. For possible scalability purposes, iDE seeks to further understand if greater availability of input/output sources for households are connected with iDE's FBA programmatic model.

MARKET ACTORS:

- Higher levels of resilience among market actors are driven by effective market feedback loops and market diversity, indicating market actors have the ability to learn from experience through control mechanisms; that there are feedback systems in place between buyers and sellers; and that there are multiple market channels in place for the sale of inputs and production.
- In contrast, market inclusion and collaboration is weak among market actors, meaning they tend to focus less on women and other systemically excluded groups as customers, and that there are incipient local service provider networks (inputs, outputs, public sector services) in place. Of note is the fact that mid-sized, and middle income firms have higher resilience levels compared to their smaller and larger counterparts, suggesting that firms with a local presence benefit more from access to information from local governments, work across value chains, adapt faster, and accommodate and better understand their client's needs.
- It is recommended that future interventions focus on addressing connectivity and social cohesion within the market system, and trying to understand which mechanisms market actors employ to learn from each other. Low market redundancy for market actors is an opportunity to reduce entry barriers and create incentives for additional input suppliers to participate in the market.

Finally, the weak enabling environment in the corridor is a common challenge among all actors. Greater policy efforts are needed to promote transparent market governance; to ensure farmers and market actors are provided with access to information from local governments; and to promote policies and laws that support producers and regulate the quality of products, particularly in the seed market. Policy should also prioritize improving infrastructure such as roads and market places, as well as reducing barriers to accessing technology by creating tariff incentives or promoting local industries.

There are no tools in common use which bring together theory-based resilience measurement for households and the market system in a way that is replicable, adaptable, and relatively easy to use by development practitioners. Practicality in time and resource requirements for data collection, and flexibility to quickly capture post-shock and long term development gains are critical requirements to incorporate into resilience measurement tools in order to provide actionable insights for practitioners.

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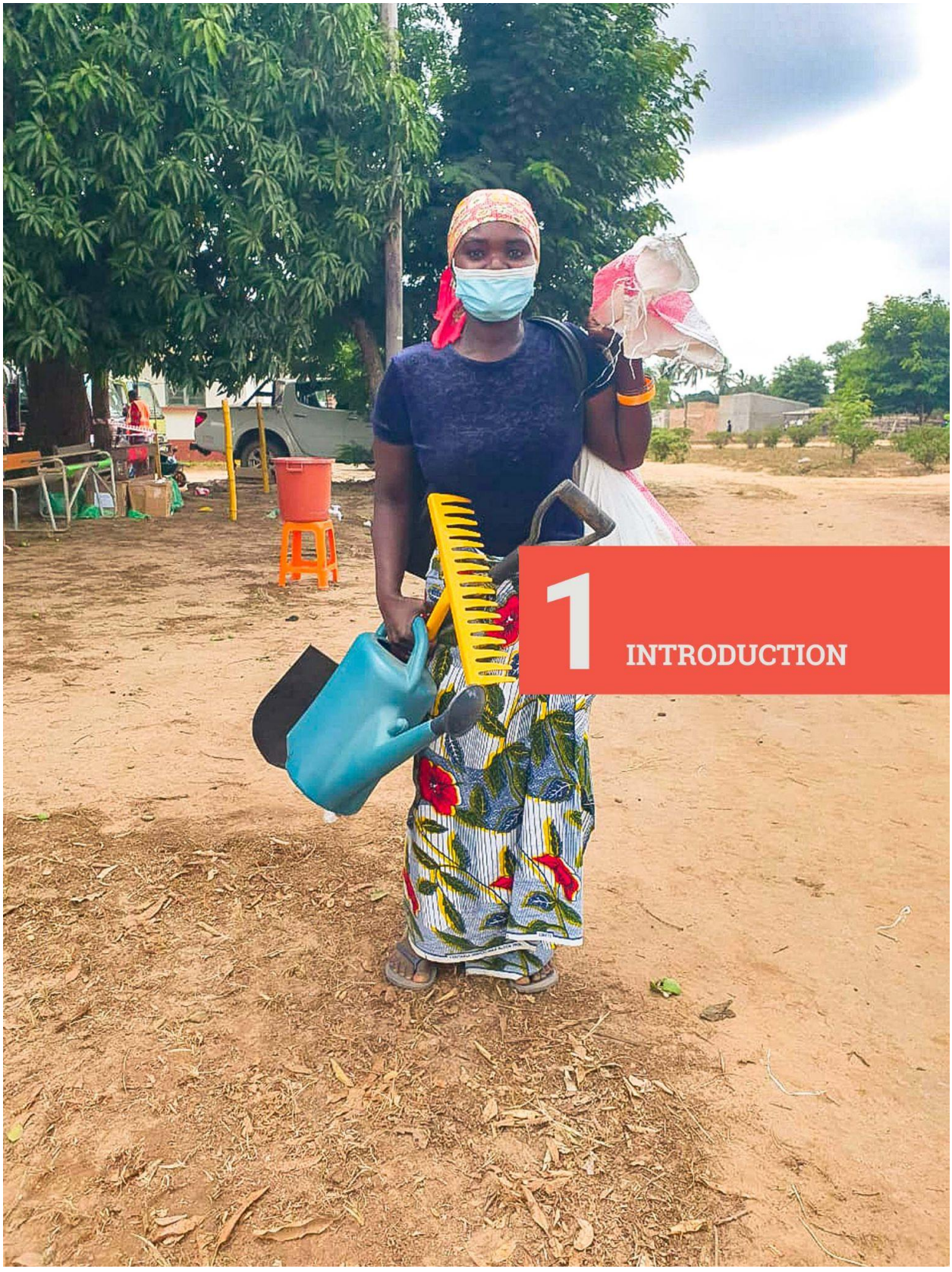


1 INTRODUCTION

PART 1

INTRODUCTION

Market Systems Resilience Index Conceptual Framework

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), in contrast to similar tools available. It was first developed by iDE in 2018 and subsequently evolved to 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[1] 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, the SHARP tool was identified as the household level resilience measurement most suitable to be integrated into the MSRI 1.0. Hence, the MSRI 2.0 attempts to build upon the experiences gained from previous resilience measurement tools and frameworks, including earlier piloted versions of MSRI. Coupled with its user-friendliness and flexibility, MSRI 2.0 is a tool poised for use with a multitude of projects. Making the deployment of MSRI data-collection instruments more efficient, and linking market systems resilience to household resilience, improves the tool for project managers as well as other sector partners. This work provides the entire international development sector with an opportunity to learn from an innovative measurement tool, which improves adaptive management and guides systems change.

The below table shows how iDE has attempted to integrate the MSRI and SHARP tools, by mapping the 13 agroecosystem indicators[2] (SHARP) across the nine determinants of MSRI 1.0, resulting in the second version of MSRI. iDE has reviewed and updated the determinants for MSRI 2.0 which now includes two additional determinants related to environment (natural) and financial considerations (shaded grey) based on piloting in Mozambique.

[1] See Annex X Table 1.1. MSRI 1.0 composition, determinant, and indicators

[2] 13 agroecosystem indicators of resilience at the household used in the FAO SHARP can be found in Annex X

Table 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[3]	
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 market system 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 excluded groups in the market system	9. Reflective and shared learning	11. Honours legacy
	2.2 Integration (Ig)	Different groups' involvement in relevant processes	11. Honours legacy	3: Appropriately connected
	2.3 Collaboration (C)	Collaboration among actors of the chain	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	
	5.2 Ability to access financial services (FA)	Level of access to financial services	10. Globally autonomous and locally interdependent	

Developing Instruments & Scores based on MSRI 2.0 Conceptual Framework

A brief market assessment was conducted to determine the most important market actors in the Beira Corridor, shedding light on four main actors on the demand side: households; supply side: retailers, input suppliers and output market actors. Converting the combined conceptual framework into data collection instruments has required iDE to develop scoring rubrics specific to Mozambique at household, input supplier, retailer and market-actor levels. Four sets of questionnaires were designed for each different type of actor.

[3]Framework from Cabell and Oelofse, 2012

Objectives of the MSRI

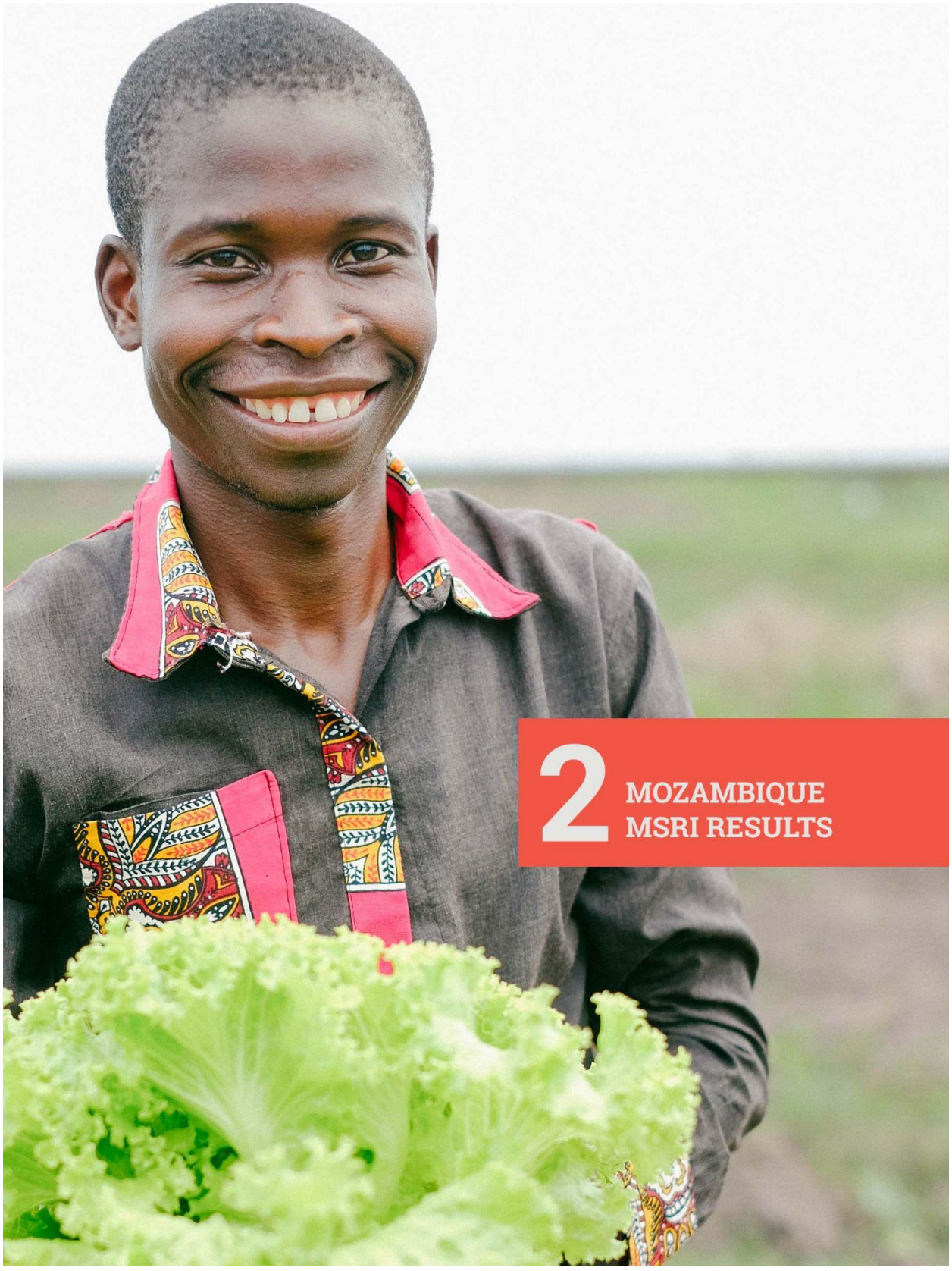
The primary objective of MSRI is to examine how robust market systems can affect resilience at both the systems and household levels and to provide more detailed information regarding future programme scale-up and expansion.

MSRI can provide comprehensive evidence to project managers to inform future decisions related to project implementation, while also providing the project team and donors with evidence related to the impacts 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. In doing so, 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 Mozambique is to examine how market system factors affect resilience at both systems-level and household-level in the Beira Corridor, and to provide more detailed information regarding future program and policy improvement.

For this round of MSRI implementation in Mozambique 2020/2021, the key objectives were to:

1. Establish a market system level resilience metric in the Beira Corridor
2. Analyze market system resilience and the potential for strengthening distribution networks necessary to provide inputs to farmers in rural markets
3. Adapt and implement MSRI as a quantitative resilience assessment tool
4. Understand the impact of climatic shocks and other stressors on market system resilience along with regular climatic disasters faced by the project; and
5. Identify the scope of improvement of interventions to increase resilience of households and market actors



2 MOZAMBIQUE MSRI RESULTS

PART 2

MOZAMBIQUE MSRI RESULTS

Sample Overview

A total of 295 households (HHs), 38 market actors (MA) of which 10 input suppliers (IS), 23 retailers (RE) and 5 output market actors (OM) were interviewed for this resilience market system analysis. Our market actor sample was distributed between two provinces, Manica with a total of 169 market actors and Sofala with 164 market actors.

Table 2. Market actor sample based on types

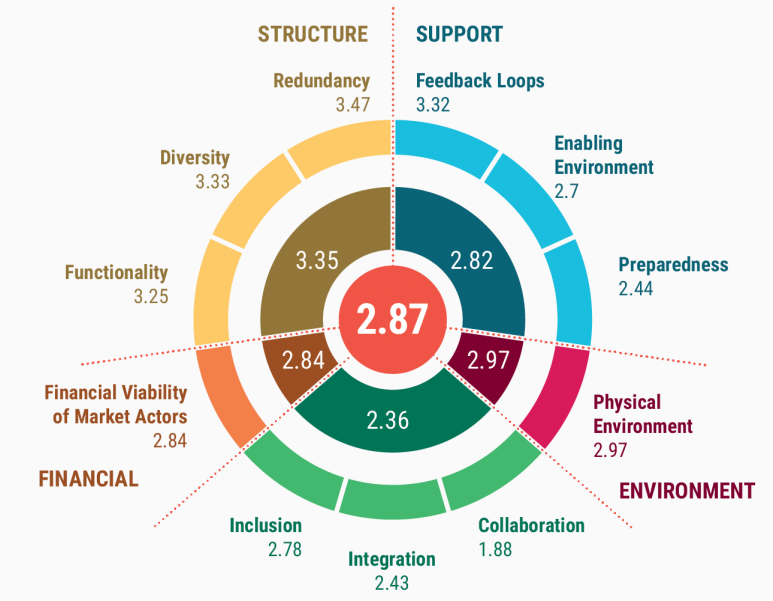
Market actor type	Manica	Sofala	Total
Households	141	154	295
Input Supplier	7	3	10
Retailer	17	6	23
Output Market Actor	4	1	5
Total	**169**	**164**	**333**

Overall MSRI Scores for All Actors

Input suppliers had the highest MSRI score among all actors with 3.45 over 5, followed by retailers (3.32), output market actors (3.05) and households (2.84). The difference between MSRI scores suggest a certain level of homogeneity in resilience levels between actors in the Beira Corridor. These results will be further analyzed in the following sections.

FIGURE 1. MSRI SCORE FOR ALL ACTORS

Demand Side: Households



According to the MSRI resilience classification, the overall household score is 2.87 over 5. This relatively low score illustrates that households in the Beira Corridor have *rarely present* determinants that contribute to market system resilience.

Table 3 below outlines the average household scores for MSRI Principle and overall MSRI scores, both represented in the columns and different groups and sub-groups represented in the rows. The blue indicates a relatively high score within that group, midpoints are represented by grey cells and the yellow cells indicate a relatively lower score. For the household sample, the highest scoring MRSI Principle is Structure of the Market, followed by Environment Principle. Households in Manica province (2.92) on average are more resilient than those in Sofala province, and households with higher income (3.27) are significantly more resilient than their lower income counterparts.

Table 3. Comparison of Average Household MSRI Principle and Overall Scores within groups

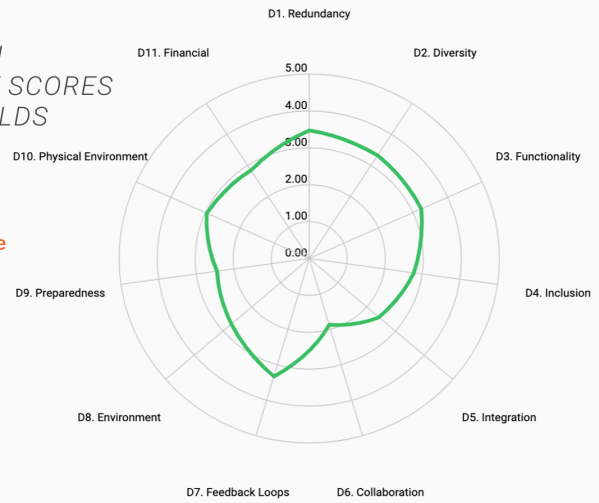
GROUP	STRATA	AVERAGE MSRI PRINCIPLE SCORES					AVERAGE TOTAL MSRI SCORE
		P1. Structure of the Market	P2. Connectivity of the Market	P3. Support of the Market	P4. Environment	P5. Financial	MSRI
Overall	Households	3.35	2.36	2.82	2.97	2.84	2.87
Province	Manica	3.40	2.42	2.87	2.97	2.94	2.92
	Sofala	3.30	2.30	2.78	2.97	2.75	2.82
Monthly Income Range	Less than 32 USD	3.26	2.20	2.67	2.95	2.13	2.64
	From 32 USD to 160 USD	3.41	2.45	2.91	2.96	3.23	2.99
	More than 160 USD	3.36	2.66	3.07	3.18	4.09	3.27

Note: Monthly income converted to USD using exchange rate of 1 USD to 62.5 MT

Determinant Analysis of Household Scores

By plotting the Household MSRI 11 determinant scores in Figure 2, differences between determinants can be easily seen. Redundancy scores the highest for both provinces, for lower and middle income households and this is the case across most districts in the sample. Redundancy for households in this context can be associated with multiple sources to buy agricultural inputs and/or sell output, different income generating activities, multiple crops and types of livestock.

FIGURE 2. AVERAGE MSRI DETERMINANT SCORES FOR HOUSEHOLDS



Redundancy scores the highest for both provinces, most districts in the sample and for lower and middle income households.

The Collaboration determinant had the lowest score in almost all groups including lower, middle and higher household income levels

The Collaboration determinant had the lowest score in almost all groups including lower, middle and higher household income levels, with the only exception being the district of Manica. Collaboration can be related with heads of households being part different associations or part of groups either for selling output or buying inputs. Other high scoring determinants include Diversity (3.33), Feedback Loops (3.32), and Functionality (3.25). Conversely, other low scoring determinants include Integration (2.43), Preparedness (2.44), Environment (2.70) and Inclusion (2.78).

FIGURE 3. AVERAGE HOUSEHOLD MSRI DETERMINANT SCORES, BY PROVINCE

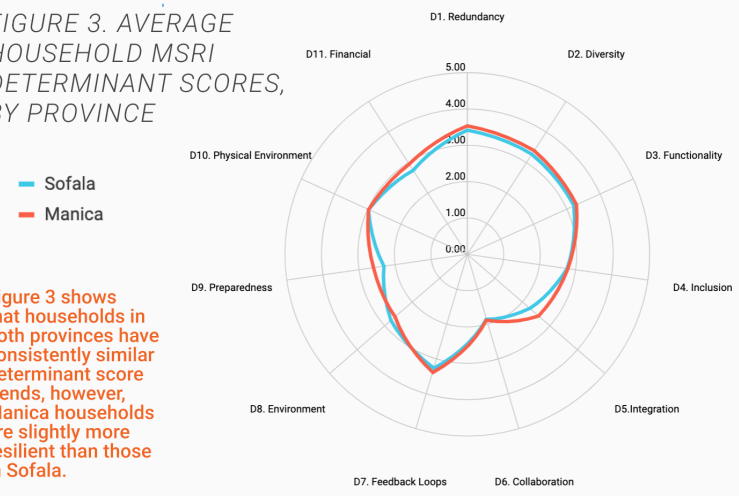


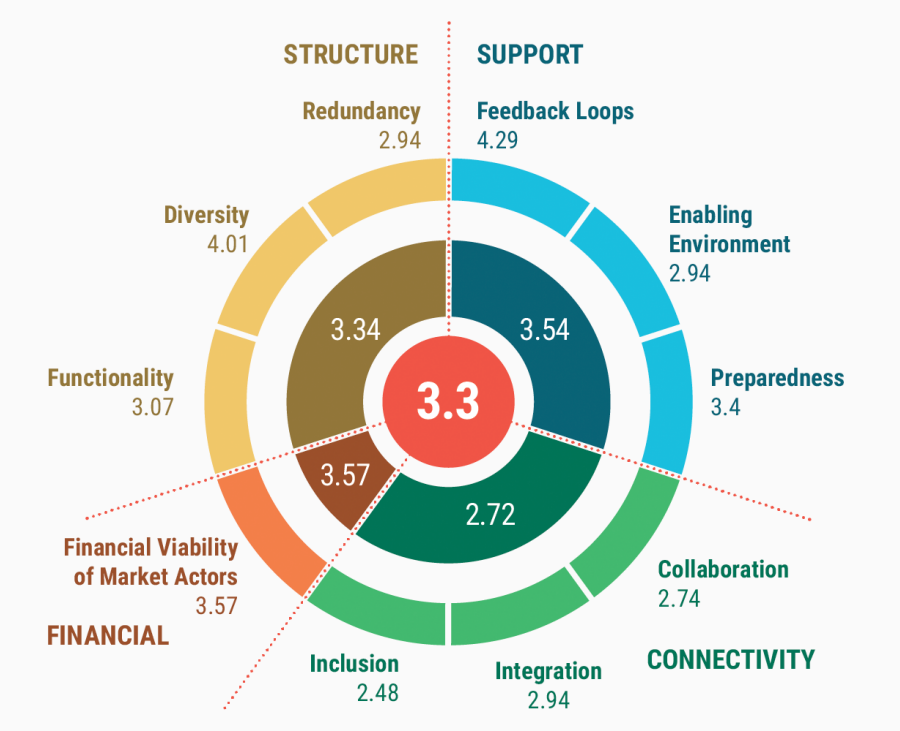
Figure 3 shows that households in both provinces have consistently similar determinant score trends, however, Manica households are slightly more resilient than those in Sofala.

Figure 3 shows that households in both provinces have consistently similar determinant score trends, however, Manica households are slightly more resilient than those in Sofala. Sofala has two of the lowest resilient districts in the sample and Manica district has the highest average scores for most determinants. Manica scores particularly higher in Integration and Preparedness determinants. These results are good reality proxies as Manica, in comparison to Sofala, is less isolated and counts with better infrastructure, climatic and soil conditions.

Household income is positively related to resilience in the sampled households. On average changing from lower to medium income range increases HH resilience by 0.34 and changing from lower to higher income range increases HH resilience by 0.93 which represents more than 50% of their initial resilience.

Low levels of collaboration hinder resilience scores within all groups. This result highlights the potential for farmer support improvement, increasing collaboration by forming producers groups for different needs is a cost-effective intervention area to explore, for example: groups to aggregate product and lower transport cost to access an output market. **Connectivity of the Market principle, composed by Inclusion, Integration and Collaboration determinants, is the principle contributing less to household resilience, having its three determinants with the lowest scores. This suggests a low participation of women and systemically excluded groups in the market system, centralized household decision making, little involvement from different groups in relevant market processes and weak evidence of collaboration among actors across value chains.** Again, future intervention areas should aim to improve women and systemically excluded groups participation as relevant market actors and decision makers. The second important result is the role of the Redundancy, Diversity, Feedback Loops and Functionality determinants in households resilience, as these determinants consistently score high within most groups. However, there is plenty of room for programmatic improvement in those areas, as none of the scores, despite being the highest, are above 70% (score over 5).

Supply Side: Market Actors

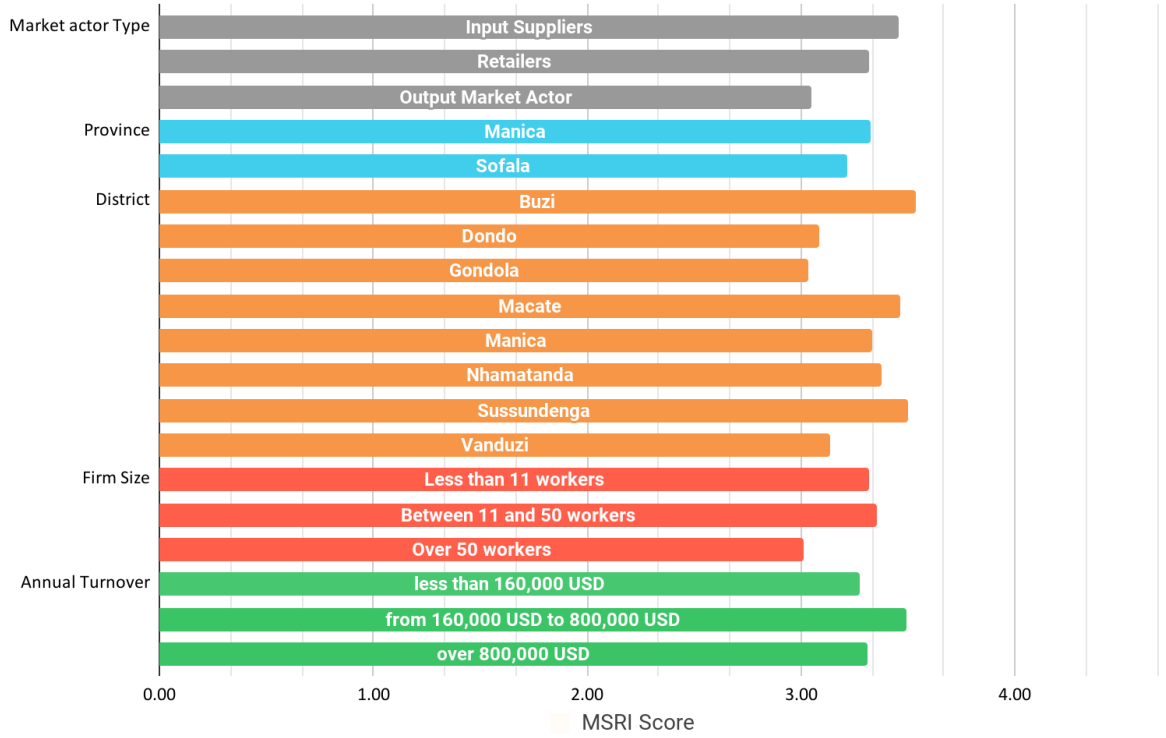


The MSRI market actors overall score is 3.30, relatively higher than the HH score, however low and indicating that key determinants contributing to market system resilience are from rarely to sometime present in the supply side market of the Beira Corridor.

When disaggregated by type of actor, input suppliers have the highest score being 3.45, followed by retailers with 3.32 and output market actors with 3.05. The MSRI scores for each sub-group of the supply side are shown in Figure 4.

We see that the Manica resilience score is higher than its counterpart. Mid-sized firms on average have higher levels of resilience compared to their counterparts and firms earning middle range income on average are also more resilient than their counterparts.

Figure 4 MSRI Scores, by Sub-Group



Within Group & Across Determinant/Principle Comparison

Overall MSRI scores and average principle scores for each sub-group of market actors are shown in Table 4. Differently from HH, for the supply side of the market, there are only four principles and ten determinants. The blue indicates a relatively high score within that group, midpoints are represented by grey cells and the yellow cells indicate a relatively lower score. Financial has the highest principle score, followed by Support of the Market, while Connectivity of the Market has the lowest score.

Table 4. Average Market Actor MSRI Principle and Overall Scores, by Sub-Group

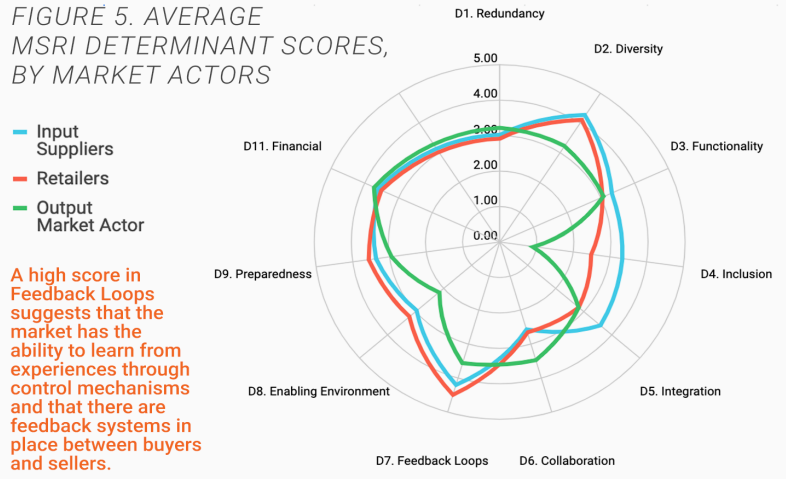
		AVERAGE MSRI PRINCIPLE SCORES				AVERAGE TOTAL MSRI SCORE
GROUP	STRATA	P1. Structure of the Market	P2. Connectivity of the Market	P3. Support of the Market	P4. Financial	MSRI
Overall	Market Actors	3.34	2.72	3.54	3.57	3.30
Province	Manica	3.41	2.84	3.51	3.54	3.32
	Sofala	3.19	2.49	3.87	3.63	3.21
Firm Size	Less than 11 workers	3.36	2.75	3.63	3.52	3.32
	Between 11 and 50 workers	3.27	2.87	3.61	3.67	3.36
	Over 50 workers	3.39	2.14	2.87	3.66	3.01
Annual Turnover	Less than 160,000 USD	3.28	2.69	3.59	3.54	3.27
	From 160,000 USD to 800,000 USD	3.43	3.17	3.79	3.58	3.49
	Over 800,000 USD	3.50	2.61	3.47	3.66	3.31
Market Actors Types	Input Suppliers	3.53	3.17	3.51	3.61	3.45
	Retailers	3.34	2.66	3.76	3.51	3.32
	Output Market Actor	3.18	2.41	2.89	3.71	3.05

Note: Monthly income converted to USD using exchange rate of 1 USD to 62.5 MT

Determinant Analysis of Market Actors Scores

Market actors MSRI determinant scores are shown in Figure 5. Feedback loops is the highest scoring determinant, followed by Diversity determinant. 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, it is recommended to further understand which mechanisms

FIGURE 5. AVERAGE MSRI DETERMINANT SCORES, BY MARKET ACTORS



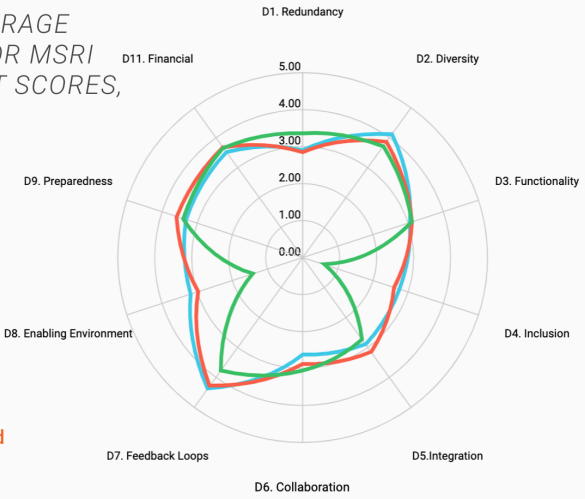
these market actors employ to learn from each other and their clients. Inclusion and Collaboration determinants scored the lowest across nearly all sub groups. A few other notable findings include: 1) Very low Inclusion scores for Output market actors and 2) Very low inclusion scores for Large firms.

Relative to other market actor types, output market actors have lower scores for almost all determinants, with the exception of Collaboration. Both input suppliers and retailers follow similar determinant score patterns, with differences in the Integration and Collaboration determinant. Integration and Inclusion are the only two determinants where input suppliers have significantly higher scores. Moving forward, it is recommended that interventions focus on addressing market connectivity and social cohesion of the market system, as those are the determinants that across actors scored deficiently.

Firm Size

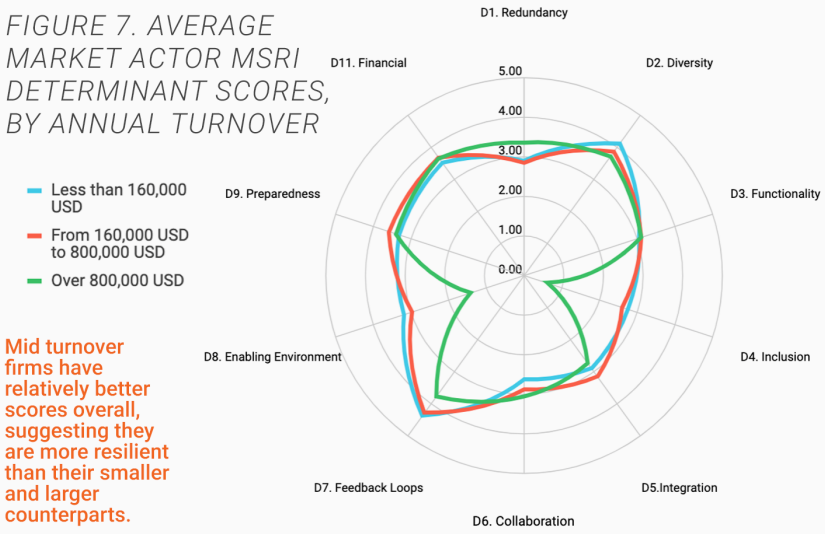
When disaggregating by firm size, we can observe that the three different firm sizes follow similar score trends, with the exception of Inclusion (0.60) and Enabling Environment (1.42), where firms with over 50 workers score significantly less, suggesting that large firms do not particularly reach to systemically excluded groups and that policies, information and government tend not to facilitate their operations. Mid-sized firms have the highest average scores for most determinants, being the highest scored in Financial (3.67), Preparedness (3.58) and Integration (3.15).

FIGURE 6. AVERAGE MARKET ACTOR MSRI DETERMINANT SCORES, BY FIRM SIZE



Large firms scored lower on Inclusion and Enabling Environment, suggesting they do not reach vulnerable groups and that policies, information and government tend not to facilitate their operations.

FIGURE 7. AVERAGE MARKET ACTOR MSRI DETERMINANT SCORES, BY ANNUAL TURNOVER



Mid turnover firms have relatively better scores overall, suggesting they are more resilient than their smaller and larger counterparts.

Firms' Annual Turnover

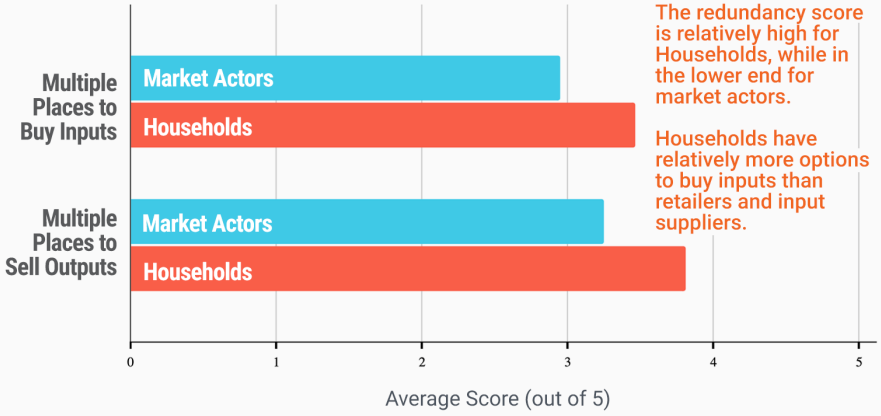
The market actors MSRI score trends when disaggregated by annual turnover, suggest that lower and higher annual turnover firms have similar scoring through all determinants, although lower annual turnover tends to score slightly lower. Mid turnover firms have relatively better scores throughout all determinants, with significantly higher results in Collaboration (3.60) and Enabling environment (3.77). This suggests mid turnover firms are more resilient than their smaller and larger counterparts, because they benefit more from access to information from

local governments or NGOs and they collaborate more within actors of various value chains and from being part of local service provider networks and/or interacting with networks of producers.

Mozambican Context

In this section, iDE identifies priority areas for additional inquiry based on the results presented in the above sections. iDE explores which performance indicators and survey questions in particular are driving some of the results that we see for households and market actors.

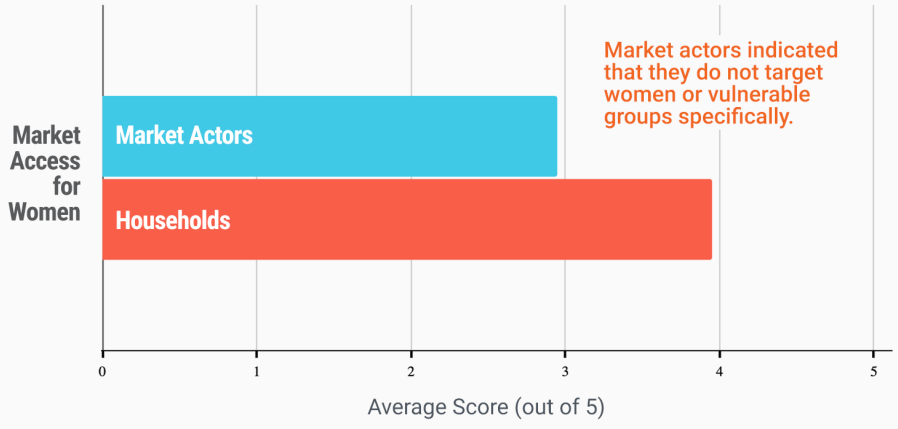
FIGURE 8. PERFORMANCE INDICATOR SCORES OF REDUNDANCY DETERMINANT BY HOUSEHOLD AND MARKET ACTOR



Redundancy

The redundancy score is relatively high for Households, while in the lower end for market actors. In both cases, multiple places or sources were identified to buy and sell input or outputs, leading to higher determinant scores. However, households scored slightly higher than market actors in both performance indicators, which means households have more options/places to buy or sell products compared to the number of suppliers that market actors have access to. This suggests that households have relatively more options (local) to buy inputs than retailers and input suppliers, which in the Mozambican case is close to reality as the agricultural input market is thin and inputs suppliers (and input products) are few in number, yet local retailers (agro dealers) constitute a thicker distribution network. More than a programmatic way forward, this insight provides a policy or market level recommendation, to attract and incentivize the entry to the market of more input suppliers. It would be interesting to further understand if such greater availability of input sources for households is related with the project's Farm Business Advisors.

FIGURE 9. PERFORMANCE INDICATOR SCORES OF INCLUSION DETERMINANT BY HOUSEHOLD AND MARKET ACTOR



Inclusion

Women's access to market opportunities is a pertinent question in the Mozambican context. One of the performance indicators making up the Inclusion determinant is Market Access for Women. We find relatively low scores for Market

Actors and moderate scores for Households. Figure 9 shows that market actors tend to focus less on female customers, while from the HH side, women tend to go to the market regularly. During discussions with market actors, the market actors said they do not target women or systemically excluded groups specifically.

Enabling Environment

Households scored relatively low in the Enabling Environment determinant compared to market actors. Inquiring further, we see that access to information to increase agricultural activity and to basic infrastructure is low, as well as productive group membership. Having received support from government or NGOs is the highest score indicator, which goes in line with the household sample being part of the iDE Input Technology and Trade Fairs (ITTFs) in Manica and Sofala. Overall, across performance indicators there is room for group support, access to information and infrastructure improvements.

FIGURE 10. PERFORMANCE INDICATORS' SCORES OF ENABLING ENVIRONMENT DETERMINANT OF HOUSEHOLDS

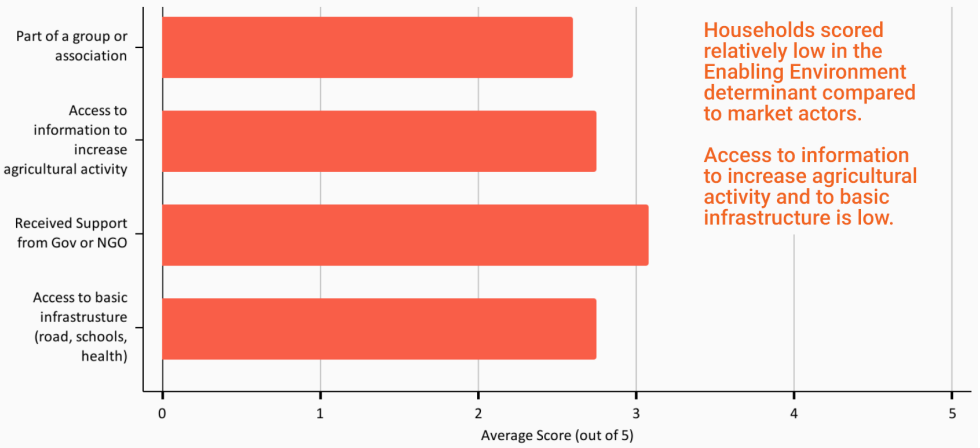
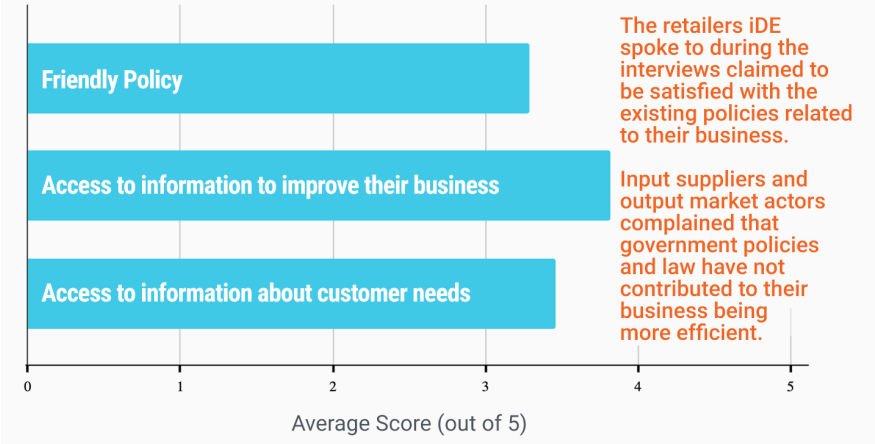


FIGURE 11. INDICATORS' SCORES OF ENABLING ENVIRONMENT DETERMINANT OF MARKET ACTORS



There is a slightly higher overall score for Enabling Environment for market actors (2.94) . Figure 11, shows that market actors have standard access to information to improve their business and about their customer needs, while Friendly policy score is relatively lower. The retailers iDE spoke to during the interviews claimed to be satisfied with the existing policies related to their business, while input suppliers and output market actors (that tend to be larger) complained that government policies and law have not contributed to their business being more efficient.

Preparedness

Preparedness is a crucial determinant in the context of the Beira Corridor, due to its likelihood of being affected by climatic shocks. Access to early warning systems scored remarkably lower for HH respondents than market actors, this constitutes an aspect where efforts should be channeled, as one of the most important aspects of resilience is the ability to prepare in order to cope with the shocks and stresses. Climate related knowledge (such as adaptation measures for households), however, scored higher for HH actors than market actors.

FIGURE 12. INDICATORS' SCORES OF PREPAREDNESS DETERMINANT OF HOUSEHOLDS

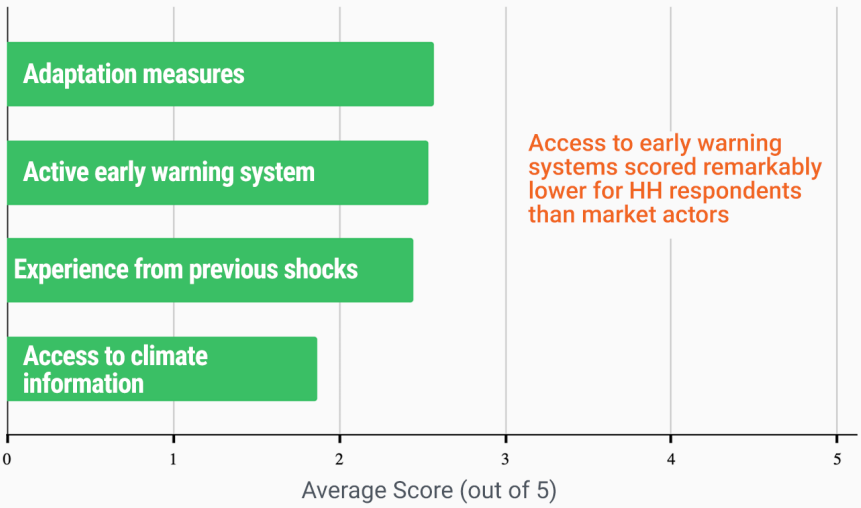
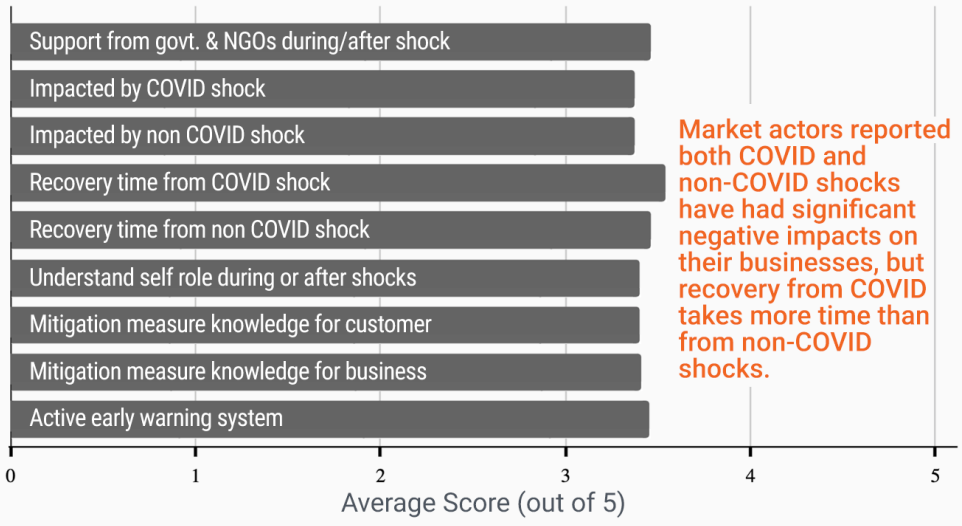


FIGURE 13. INDICATORS' SCORES OF PREPAREDNESS DETERMINANT FOR MARKET ACTORS



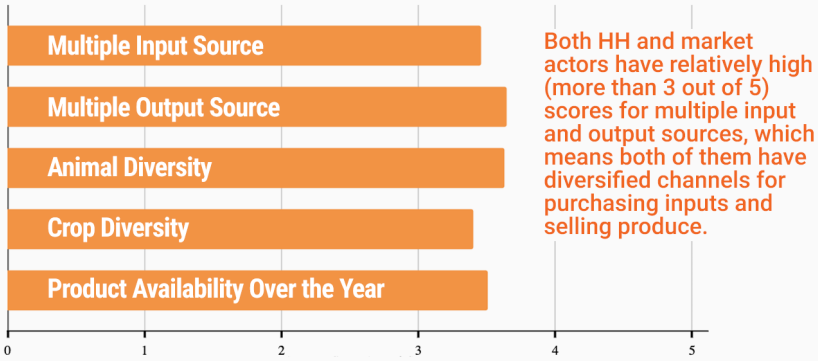
Market actors reported both COVID and non-COVID shocks have had significant negative impacts on their businesses, but recovery from COVID takes more time than from non-COVID shocks. Market actors played a role in climate-related information dissemination, as almost all of them were notified before any climate related shocks and they understand they have a role to help the community during, or immediately after, a shock. Market actors have equal knowledge on mitigation and adaptation measures for their customers and for their businesses. If there is a mutual understanding that market actors have a role to play in alleviating negative impacts from shocks and stresses, and market actors have greater access to

early warning systems, then this could be leveraged to increase absorptive and adaptive coping strategies for households and individuals.

Diversity

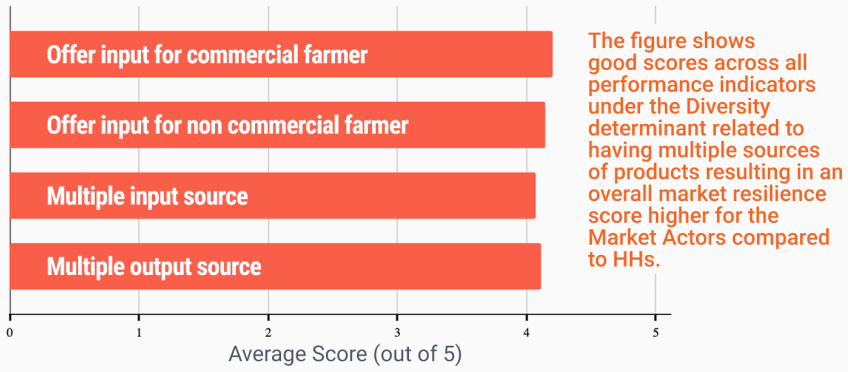
Diversity in the value chain is important for market resilience because it allows producers with different risk profiles to produce at full capacity. Both HH and market actors have relatively high (more than 3 out of 5) scores for multiple input and output sources, which means both of them have diversified channels for purchasing inputs and selling produce. However, in the case of HH, crop and animal diversity scores are lower, resulting in lower overall market resilience score, relative to market actors.

FIGURE 14. INDICATORS' SCORES OF DIVERSITY DETERMINANT OF HOUSEHOLDS



The figure 15 shows good scores across all performance indicators under the Diversity determinant related to having multiple sources of products resulting in an overall market resilience score higher for the Market Actors compared to HHs. It shows most of the market actors offer input for non commercial farmers (score 4.16 out of 5) with around the same score for market actors offering inputs for commercial farmers (score 4.2 out of 5). It should be noted that market actors consider non-commercial farmers equally to commercial farmers in terms of offering their inputs, despite the latter having higher purchasing capacity.

FIGURE 15. INDICATORS' SCORES OF DIVERSITY DETERMINANT OF MARKET ACTORS



3 IMPACT OF SHOCKS & STRESSES

PART 3

IMPACT OF SHOCKS AND STRESSES

The overall resilience score related to shocks and stresses is 2.45 out of 5 for HHs, shown by their exposure to shocks and their ability to adapt in response to them is relatively poor. For market actors, the scenario is different as their resilience score related to shock is 4.2, a high score indicating an outstanding capacity of market actors to face, adapt & recover from stress.

In fact, this score is higher than all market actor determinant scores, with the exception of feedback loop (4.29). A deeper look into this will be explored below.

Impact of Shocks and Stresses on Households

The most frequent shocks that the Mozambique sample faced in the last 5 years can be found in Table 5 below. The most frequent type of shock (91.5%) is related to climate stresses such as droughts, floods, cyclones, earthquakes and erratic rainfall. These shocks directly affected HHs' main income generating activities such as crop production, making firewood, and their livestock.

Table 5. Frequency of shocks experienced in last 5 years (Households)

Type of shocks	N	Percent (%)
Socioeconomic (Political instability, Economic shock, Conflict)	3	1.0
Climate (Drought, Flood, Cyclone, Earthquake, Erratic Rainfall)	270	91.5
Covid-19	7	2.4
Pests & Diseases	82	27.8
Total	**295**	**100.0**

All households reported being affected by shocks in the last five years, 35.9% of respondents were unable to access the market for purchasing inputs and 44.6% were not able to access the market for selling produce. Table 6 shows the time required to recover from a shock. Almost a fifth of the respondents stated not having recovered from the last shock and two-thirds of them reported that recovery took over two months.

Table 6. Number of months needed to recover from shocks

Period of month	Frequency	Percent (%)
Has not recovered	64	21.7
0 months	8	2.7
1 month	61	20.7
2-3 months	97	32.9

4-6 months	73	24.7
7-12 months	29	9.8
Over 12 months	30	10.2
Total	**295**	**100.0%**

For market actors, 93.1% stated to have been significantly impacted by shocks in the last five years and most of the shocks are related to floods and/or prolonged rain etc. Surprisingly, and speaking to the redundancy and preparedness determinants, 68.42% market actors said they were able to obtain the necessary stock and services to their customers after the last shocks. Weather and climate-related phenomena, such as floods and droughts are common in these areas, and it stands to reason that market actors take the necessary preparation to mitigate some of the effects of such shocks.

Adaptation of Climate Resilient Livelihood Strategies

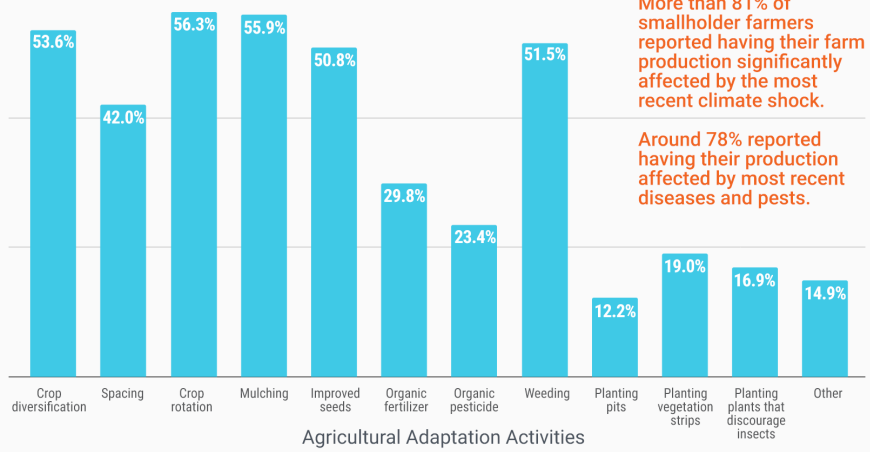
Households and Market Actors currently use a series of strategies and adaptations to mitigate the effects of shocks and stresses. Notably, 85.45% of the respondents reported having access to an early warning system that provides information about upcoming climatic disasters. Close to 50% of the climate related information received is related to floods or extreme events forecasts and whether to expect rain. Other types of climate information household and market actors have access to, is related to droughts (18%), seasonal weather forecasts (15.79%), pest and disease outbreaks (15.08%) and hail (2.02%).

Nearly 90% of market actors reported having an early warning system active in their operation area that smallholders can access. Furthermore, 63.16% of Market Actors delivered messages on the upcoming shocks to their customers over phone, social media, friends etc, showing that for a significant proportion of market actors enabling the market to promptly react to disturbances is a priority. This was confirmed in the interviews as local retailers explained that as part of their business strategy, they broadcast in the radio announcing appropriate time for planting and climatic forecast.

Household Coping to Shocks and Adaptation Activities

More than 81% of smallholder farmers reported having their farm production significantly affected by the most recent climate shock and around 78% reported having their production affected by most recent diseases and pests. iDE promotes a number of climate resilient practices among the farmers in its Farmer Field Schools. In figure 16, it can be seen that the main agricultural

FIGURE 16. PERCENTAGE OF HOUSEHOLD CLIMATE RESILIENT TECHNIQUES



techniques adopted by households to minimize the effects of shocks are crop rotation, mulching, crop diversification, weeding and use of improved seed, with over 50% of HHs applying such techniques. In response to shocks or stresses, smallholder farmers also adopted other resilience strategies related to different training and infrastructure improvement. The use of food preservation strategies was by far the most popular adaptation activity, with over 78% adoption rate, followed by masonry training with 10.5%. While training on basic medicine (0.55%) and carpentry (1.93%) were the least popular adaptation activities. Over half of HH respondents have used savings as an adaptation to face shocks, followed by financial support from family or friends to a savings group.

Impact of Shock and Stresses on Market Actors

The most frequent shocks that market actors faced in the last five years are public health related, in particular COVID-related, almost all market actors (97.4%) reported to have been affected by COVID-19, followed by climate related shocks with 76.3% and socio economics stresser with 21.1%.

Table 7. Frequency of shocks experienced in last 5 years (Market Actors)

Type of shocks	N	Percent (%)
Socioeconomic (Political instability, Economic shock, Conflict)	8	21.1
Climate (Drought, Flood, Cyclone, Earthquake, Erratic Rainfall)	29	76.3
Public Health (COVID-19, Pests & Diseases)	37	97.4
Total	**38**	**100.0**

In the table below, it can be seen that from the 37 market actors that were affected by COVID-19, nearly a third reported their business having not recovered yet to pre COVID levels, while over a fifth reported to have recovered in less than a month.

From the 29 market actors that reported being affected by socio economic shocks, more than half reported to have recovered in less than three months, while from the eight actors that were affected by climate shocks, recovery appears to be more difficult as 37.5% reported to have not recovered yet.

Table 8. Number of months needed to recover from shocks, by type of shock

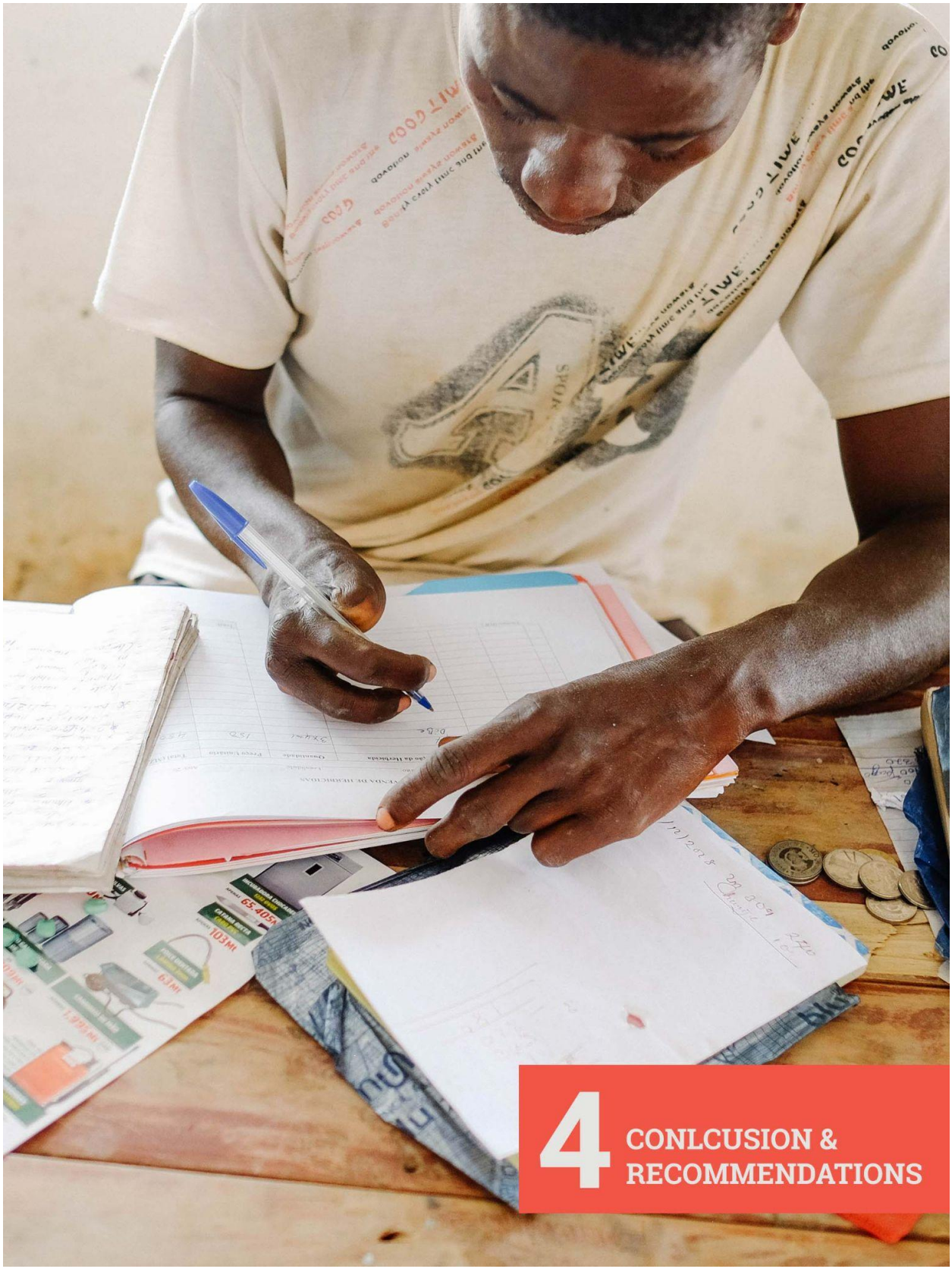
Number of months	Socioeconomic		Climate		Public Health	
	N	Percent	N	Percent	N	Percent
Has not recovered	2	6.9	3	37.5	12	32.4
0 month	6	20.7	0	0	8	21.6
1 months	4	13.8	1	12.5	8	21.6
2-3 months	10	34.5	1	12.5	7	18.9
4-6 months	5	17.2	2	25.0	2	5.4
7-12 months	0	0	1	12.5	0	0
Over 12 months	2	6.9	0	0	0	0
Total	**29**	**100.0**	**8**	**100.0**	**37**	**100.0**

Market Actor's Business Mitigation

Most of the market actors noticed that flood/prolonged rain is the main risk for their business, as it affects farmers' production. The market actors were asked what their role was in helping their customers to mitigate shocks. Table 9 shows that advance and technical information to the customers are the main mitigation activity offered to the customers before the shocks. While financial support/credit sales is the least popular type of support.

Table 9. Market actors support for the customer on shocks mitigation

Type of support	N	Percent (%)
Advance information	37	97.37%
Sell tolerant variety	16	42.11%
Technical information	17	44.74%
Financial support/credit sales	2	5.26%
Linkage with buyer/GO/NGO	6	15.79%
Other	5	13.16%
Total	**38**	**100.00%**



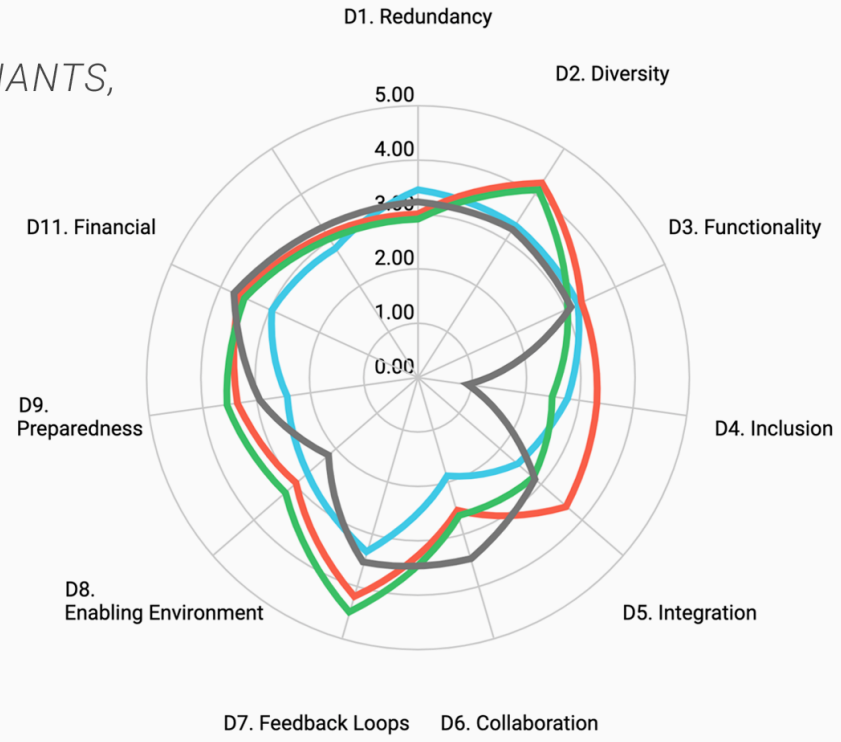
4 CONLCUSION & RECOMMENDATIONS

PART 4

CONCLUSION AND RECOMMENDATIONS

The MSRI assessment has provided a number of insights related to resilience in the market system in the Beira Corridor. Such results across principles, determinants and actors can guide project and policy implementation in order to move towards a resilient market system that is able to withstand, react and transform in the face of shocks and stressors so that the system is more sustainable, scalable, inclusive and autonomous.

FIGURE 17. MSRI DETERMINANTS, ALL ACTORS



Households and market actors follow different resilience structures because market actors' scores are considerably higher compared to household resilience scores and the score in each determinant varies as well.

The market system analysis suggests that households and market actors such as input suppliers, retailers and output market actors follow different resilience structures, not only because market actors' scores are considerably higher compared to household resilience scores, but because the score in each determinant varies as well. The figure above demonstrates input suppliers and retailers, which are part of the same type of business differing predominantly in size and reach, have similar determinant scores, with the exception of retailers scoring less in Integration and Inclusion determinants. For output market actors, which have a different type of business: agriculture output commercialization (nationally and internationally), the strongest determinant is Financial and Collaboration. This is in line with the size and

volume (large) of their business; and with the fact there are not many output actors in the market and they interact more frequently among each other.

HOUSEHOLDS: Households, on the other hand, aside from scoring less than market actors in almost all determinants, scored higher Redundancy, showing how families in the sampled district have multiple ways to purchase inputs and to sell their products. Nonetheless they scored the lowest in Collaboration, indicating they do not work together in groups to benefit from lower transport cost, or better negotiation power when selling output or buying inputs.

While a greater part of household resilience originates from the activities they engage in to increase their market linkages (sources and clients), household resilience was found to benefit the least from connectivity of the market, meaning that households are less engaged in activities related to Collaboration, Inclusion and Integration.

> *Moving forward, recommendations to increase household resilience through engagement and cooperation include the creation (or enhancement) of producers networks, a segmented understanding of farmer preferences and enabling digital tools to share knowledge among farmers. For Integration and Inclusion, interventions that focus on increasing the involvement of input and output linkage actors reaching the last mile and augmenting the involvement of women and other systemically excluded groups in the market.*

MARKET ACTORS: Market actors' resilience benefits greatly from their efforts to create and maintain a good information network and Feedback Loops to ensure their clients are satisfied with their products while creating diversity in the market system and channels, by availing multiple products or technologies with different risk profiles. Redundancy, understood as a surplus of market actors performing the same function in the market system is low.

> *Policy and projects can focus on enabling conditions so that the Beira Corridor counts multiple market actors providing inputs and output services, increasing honest competition and benefiting farmers. This can be done by reducing barriers to entry, brokering flexible repayments and financing, and access to business training. Collaboration is an area for great improvement. Interventions can focus on increasing cooperation among actors of different value chains, by layering agro-dealer services, investing in social cohesion networks and aligning incentives to work together in disseminating information about their products and services. Lastly, market Integration among actors, which was also low, can be improved by increasing the involvement and capacity of input and output actors to participate in the market, by improving last-mile distribution.*

Creating a market environment that enables household and market actors to thrive is crucial. Policy interventions are greatly needed to ensure a transparent market governance is in place. This can be achieved by ensuring farmers and market actors have access to information from local governments, and by promoting policies and laws that support producers and regulate quality of products, particularly in the

seed market. Policy should prioritize improving infrastructure such as roads, market places, as well as reduce barriers to technology, by creating tariff incentives or promoting local industries.

The MRSI analysis also helped identify specific opportunities and disparities related to characteristics such as location, size and income. Households and market actors in Manica Province were found to be more resilient than those in Sofala Province. While higher income households were found to be more resilient, mid-income and mid-size market actors scored the highest level of resilience when compared to both low and higher income market actors.

Mid-sized market actors scored better in being Inclusive, promoting an enabling environment and feedback loops. This is an important finding, strongly suggesting that mid-size businesses (pequena e media empresa) should be promoted by government and projects, as they tend to make better use of their staff, have greater flexibility to adapt, are closer to their clients and seem to understand and react better to their needs.

SHOCKS AND STRESSES: Another key element that contributes to the resilience of households and market actors is the frequency of shocks and stresses experienced, as well as the strategies both groups apply to mitigate these shocks. For households, climate shocks were by far the most frequent shock in the last five years, while COVID and socioeconomic shocks were the least frequent. Furthermore, close to one fifth of households reported they had not recovered from the shocks they experienced.

Finally, it is important to note how different types of shocks affect households and market actors, while 91% of households reported to have been affected by climate shocks, 97% of market actors reported being affected by COVID. Their distinct recovery times also illustrate the difference in their ability to adapt to shocks. This finding strongly suggests that farmer-directed interventions need to be tailored to increase resilience to climate change, while market actor interventions need to focus on equipping businesses to withstand economic crises and demand shortages.

PART 5

ANNEXES

Annex 1: Analysis framework

Principle	Determinant (Det)	Description	Weight Normalised to a score out of 100
Structure of the market	Redundancy (R)	Surplus of market actors performing the same functions in the market system	1
	Diversity (D)	Diversity in the market system value chains, and in the available market channels	1
	Functionality (F)	Flow of goods and services in, out and through market spaces	1
Connectivity of the market	Inclusion (Ic)	Participation of women and other systemically excluded groups in the market system	1
	Integration (Ig)	Different groups' involvement in relevant processes	1
	Collaboration (C)	Collaboration among actors of the chain	1
Support of the market	Feedback loops (FL)	Ability to learn from experience through control mechanisms	1
	Enabling environment (EE)	Transparent market governance is in place	1
	Preparedness (P)	Ability of the system to promptly react to disturbances	1
Environment	Physical Environment (PE)	Environmental condition of the market area	1
Financial	Financial viability of actors (FV)	Financial viability of actors in the market	1

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 centres, 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. Honours 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 systemically excluded 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

At iDE Mozambique, our primary focus has always been to create income opportunities for smallholder farmers. We aim to make a lasting impact by connecting clients to markets that deliver innovative and affordable agricultural products and services in order for them to prosper through abundant, nutritious harvests.

About iDE

iDE is a global development organization that advances market-based approaches in agriculture; access to finance; and water, sanitation, and hygiene (WASH) to create income and livelihood opportunities for economically and socially disadvantaged households. Since our founding in 1982, iDE has made a difference for more than 35 million people by developing inclusive market ecosystems that allow more people to participate in the economy, exercise choice through economic freedom, and achieve their aspirations. With offices in 12 countries around the world and employing over 1,200 people, 96% of whom are local, iDE creates real change that gives people the power to prosper on their own terms.

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