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Introducing and operationalizing the Market System Resilience Index (MSRI)

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A B S T R A C T

Market system development approaches have increasingly been applied—both in combination and separate from more traditional non market-based approaches—to strengthen the resilience of poor households. While existing literature has focused extensively on methods to measure resilience at the household level, little research has so far focused on developing methodologies to track the market level resilience, an essential aspect for the success of those system-wide approaches.

This paper introduces the Market System Resilience Index (MSRI) to enable the tracking of resilience of the wider market system, specifically in a rural context. The methodology proposes a unique, user-friendly, and functional composite index, based on previous literature and iDE's experience in market system strengthening, composed of nine determinants. The determinants are broken down into three categories that review the structure, connectivity, and support of the market.

The index is piloted under the Suchana project, in the North-West of Bangladesh, an area particularly prone to climate risks. Preliminary findings show changes in the overall market system resilience from the Baseline to the Phase-1 in the project working areas. The data are visualized through color-coded diagrams where changes in specific determinants can be assessed and may offer support in further adapting project interventions.

1.Introduction

1.1.*Market System Resilience*

Pro-poor market system development aims to strengthen weak markets and encourage the long-term participation of poor smallholders and micro-entrepreneurs.

There has been growing recognition that market-based approaches help promote household resilience through increased income, improved food security and nutritional status, promotion of both farm and off-farm activities promoting differentiation, and increased employment opportunities. However, for the benefits of a stable and inclusive market system to be sustainable in the longer term, the market system itself needs to be able to withstand, react, and transform in the face of shocks and stresses [1].

While evidence on what contributes to increasing the resilience of market system is still limited, literature has recently been growing, with contributions from practitioners studying value chain, supply chain, and market system resilience characteristics. Key principles identified contributing towards a resilience market system include: maintaining the diversity and redundancy of system components, promotion of linkages

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and communication among system components, enabling learning and feedback loops, market governance and transparency of the enabling environment [2][3].

The methodology proposed here aims to introduce a functional composite index filling the gap in the available methodologies to measure the resilience of the market system. While the index is introduced in the context of a specific project (i.e., Suchana), the methodology allows for its application and contextualization to various circumstances.

1.2. *Suchana*

Suchana: Ending the Cycle of Undernutrition in Bangladesh (2015-2022), is a multi-sectoral nutrition program which aims to reduce undernutrition leading to stunting in children under two years of age. The project is supporting 250,000 very poor households with women of reproductive age (15-45 years) in the Sylhet and Moulvibazar districts of Bangladesh (see Figure 1). The program adopts an integrated approach to interventions that are nutrition specific (those that address the immediate determinants of nutrition) and nutrition sensitive (those that address the underlying causes of undernutrition) and aims to develop a sustainable and replicable model that can be scaled. Within the nutrition sensitive pathway, Suchana is supporting food security and strengthened livelihood systems. Within the nutrition specific pathway, Suchana is supporting wider health and governance systems. Suchana is funded by the UK Department for International Development (DFID) and the European Union (EU) and is implemented by a consortium of eight partners, including Save the Children, iDE, WorldFish, Helen Keller International, and implementing agencies Center for Natural Resources Studies (CNRS), RDRS (Formerly the Bangladesh field program of the Geneva-based Lutheran World Federation/Department for World Service), and Friends in Village Development Bangladesh (FIVDB). The consortium is led by Save the Children International and iDE is providing technical advisory services related to strengthening market linkages and capacity building of the consortium partners on market-based approaches.

Suchana is using a geographic phased approach and interventions last a total of three years in each union. There are a total of five phases (including a learning phase) which are staggered geographically. The project is currently in Phase-2 and the MSRI has been calculated for Phase-1 areas.

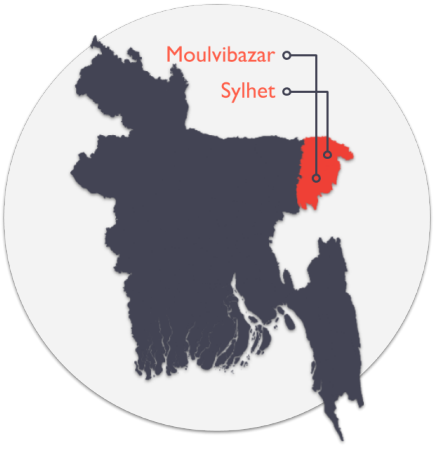

Figure 1: Suchana project districts in Bangladesh.

1.2.1. Market systems development in Suchana

Focusing on Suchana's first pathway to nutrition, through nutrition sensitive interventions, the project is supporting two intertwined market systems: the food security system and the livelihood system. For the purposes of this project, these systems include five distinct sectors: 1) horticulture, 2) poultry, 3) small livestock, 4) aquaculture, and 5) off-farm livelihood options (such as trading, weaving, and shop keeping). This systemic approach leads to greater sustainability of project activities and greater resilience in income generation for better livelihoods. Traditional approaches would directly provide required services, but would

not seek the long-term resilience of interventions.

Within this approach the team seeks to identify why the existing market is not providing solutions to problems. The current market system is exclusionary for the very poor, women, and the most disadvantaged. Products and services do not reach poor households, market actors have little incentive to sell to the poor, and low production of vegetables, fish, or eggs limits the traders who want to purchase products from poor households. For example, seed packets are large and expensive for small homestead production and traders are not willing to travel to remote areas to only collect a handful of tomatoes. iDE is working to break down these barriers through 1) aggregating and clustering households for better purchasing and selling power; 2) supporting local market actors (i.e., retailers, traders, vaccinators, etc.) to see the poor as potential customers or suppliers; and 3) supporting lead firms and government bodies to create incentives for staff to directly work with the poor.

The market systems approach seeks to find a 'tipping point' of the market by engaging with a viable percentage of the sector to reach scale. Suchana's strategy to work with all poor households in the Sylhet and Moulvibazar districts (250,000 households) leads to a tipping point of 35% of all households involved in income generating activities (IGAs) and 14% of the entire population of the total poor population (35,000 households).

1.2.2. **Climate resilience under Suchana**

The northeast region of Bangladesh, Sylhet, is characterized by its unique ecological context; rural areas are generally low lying and remain underwater for a prolonged period during the monsoon. Additionally, some of the Suchana project area falls in wetland ecosystems called *haors* or in *hilly* areas prone to landslides.

Therefore, many of the intended livelihood outcomes are contingent on the ability to mitigate the impact of climate-related shocks, particularly the recurrent impact of both prolonged rainfall and flash flooding. This necessity is highlighted in Output 1.2 of the Suchana logical framework which is: *'Shocks are better absorbed and mainstreaming resilience in to program activities.'*

In 2017, the majority of Suchana working areas have experienced unusually heavy rainfall, repeated flash floods, and prolonged floods. The prolonged flooding and excessive rainfall have resulted in delayed activities under Suchana. To address these problems, Suchana has introduced explicitly climate-resilient activities related to cropping, poultry, horticulture and fisheries to ensure project outcomes are met in the face of climate hazards [4].

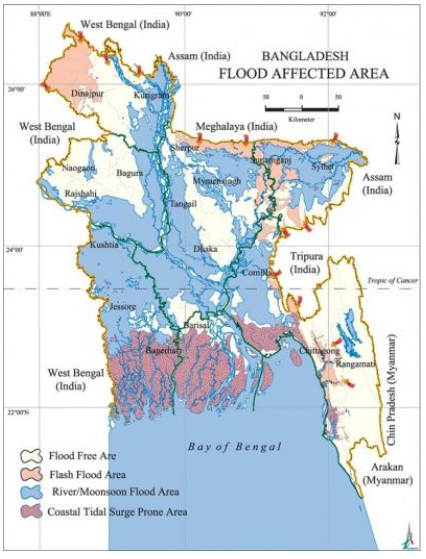

Figure 2: Flash Flood & River/Monsoon Flood in 2017. (Source: Mohammad Mohiuddin)

1.3.***Systemic Change Tracker (SCT)***

One of the most difficult components of iDE's engagement within the Suchana project is measuring, monitoring, and analyzing systemic change in the Suchana market systems: food security and livelihoods. Additionally, with the extent of stakeholders in the program, finding simple and robust measurement systems is critical. Based on these requirements, the team has developed and piloted a tool called the Systemic Change Tracker (SCT). The SCT contains two layers: the goal layer and the market actor outcome layer. The overall goal layer highlights five main markers of a functioning market system: 1) sustainability, 2) scale, 3) inclusion, 4) autonomy, and 5) resilience. While the definitions are not aligned with the MSRI, significant overlap does exist. In the second layer, the SCT combines aspects of Donor Committee for Enterprise Development (DCED)'s results chains [5] with a graduation model approach to create outcome level goals for market actors across three levels of engagement: 1) development/market trigger, 2) transformation/market uptake, and 3) graduation/enterprise performance. Market actors are also tracked against their results, attitude, capacity, and effort [6]. These methods leverage components of behavior change and market systems monitoring to create a rounded framework. Essentially, the indicators map a 'perfect' market system as defined by the project for the purposes of creating a more functional system for the poor leading to better nutritional outcomes.

Scoring is completed annually with the monitoring, evaluation, and learning (MEAL) team and led by the Suchana Market Systems Working Group (MSWG). In a similar fashion to FAO's food security classification system [7], the team uses a consensus method by conducting a scoring workshop to propose sub-indicator scores using existing project data. The scoring process relies on the expanse of data that exists within the Suchana monitoring program. Data from progress monitoring, the semi-annual survey, annual market actor survey, deep dive rapid market assessments, and case studies are all utilized to propose scores of each determinant for each of the five project sectors. These sub-indicators are then averaged into eight overarching indicators per sector. Next, this initial scoring (including evidence and recommendations) is shared with the wider consortium for feedback and review. The consensus scoring process takes up to one month to complete after the initial workshop and recommendations filter down to the project over the subsequent year of implementation.

For data visualization purposes, the project leverages color scores to show the functionality of the market system and the extent of 'graduated' market actors. For the market actors there are five color levels: 1) green - graduation, 2) light green - transforming, 3) yellow - developing, 4) orange – exploring, and 5) red - emergent. These were selected to align with the existing terminology used for household graduation. For the market system, there are also five colors: 1) green - mature, 2) light green - advanced, 3) yellow - intermediate, 4) orange – initial, and 5) red - nascent. The first round of analysis for the horticulture sector can be seen in Figure 3. Since this first round of analysis operates as a project system baseline, the market system is visibly quite weak and there is plenty of room for market system interventions.

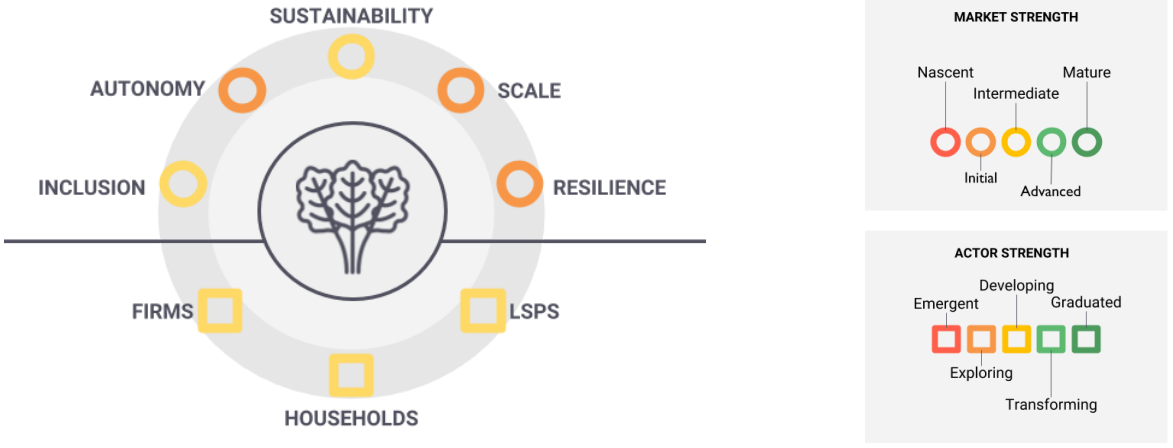

Figure 3. SCT Scoring for Suchana, Horticulture Sector, (2017) Baseline

2.Methodology

Leveraging the existing SCT system within the Suchana project, the team has embarked on a mechanism to measure system-wide resilience: the Market System Resilience Index (MSRI). It is noted that the two monitoring mechanisms are monitoring different elements. The SCT monitors the overall strength of the market system in reaching poor and disadvantaged in the Sylhet region; the MSRI monitors the resilience of the markets to economic and climatic shocks. While being launched under the Suchana project, the MSRI aims to offer a methodology that can easily be transferred and applied under different contexts and projects.

While resilience is understood to be a dynamic process, which changes over time and where interactions across scales and components of the system contribute non-linearly to the final outcomes, the proposed framework for the MSRI attempts to depict the dynamics of the market system in a way that could easily be operationalized in the field. The final MSRI score is therefore used as a proxy measurement of the current level of resilience of the market.

Through a literature review and outcome measurement exercise, nine market system resilience determinants were identified. The determinants are each then broken down into three categories that review the structure, connectivity, and support of the market. Therefore, the structure of the market includes: 1) redundancy, 2) diversity, and 3) functionality; connectivity of the market includes: 4) inclusion, 5) integration, and 6) collaboration; and support of the market includes: 7) feedback loops, 8) enabling environment, and 9) preparedness. The determinants are described in Table 1. Each determinant is measured using a number of context-specific indicators. In the context of Suchana, the determinants of *functionality* and *preparedness* both have higher weighting because of their importance to the project, however this can be adjusted based on an agreed upon definition of resilience.

Following the process used in the SCT, the team will use a similar workshop-based consensus methodology to evaluate the indicators leading to a final determinant score, as average of all the determinant indicator scores. Each indicator is scored on a scale from 1 to 5 as per Table 2.

The final MSRI score will be out of 100 through a summation of the nine weighted determinants following the formula (1) and (2).

Principle	**Determinant (Det)**	**Description**	**Weight (w)**
Structure of the market	Redundancy (R)	Surplus of market actors performing the same functions in the market system	10/100
	Diversity (D)	Diversity in the market system value chains, and in the available market channels	10/100
	Functionality (F)[1]	Flow of goods and services in, out and through market spaces	15/100
Connectivity of the market	Inclusion (Ic)	Participation of women and other vulnerable groups in the market system	10/100
	Integration (Ig)	Different groups' involvement in relevant processes	10/100
	Collaboration (C)	Collaboration among actors of the chain	10/100

[1] Determinants of critical importance to the Suchana project are in bold, and have been given an higher weight

Support of the market	Feedback loops (FL)	Ability to learn from experience through control mechanisms	10/100
	Enabling environment (EE)	Transparent market governance is in place	10/100
	Preparedness (P)	Ability of the system to promptly react to disturbances	15/100

Table 1: MSRI composition, determinant, indicators and weights.

Using a consensus-based methodology, each individual determinant is scored following the classification presented in Table 2. Selected indicators, relevant to the context, are used to assess the nine determinants characterizing market resilience.

Resilience Contributing Score	**Description**
5	Market shows these elements frequently
4	Market shows these elements often
3	Market shows these elements sometimes
2	Market shows these elements rarely
1	Market shows these elements never

Table 2: Classification of Resilience Score contribution assessed at the determinant level.

The resulting MSRI is a composite index computed as the weighted average of the nine individual determinants as:

$$MSRI = (R * w_R)/5 + (D * w_D)/5 + (F * w_F)/5 + (Ic * w_{Ic})/5 + (Ig * w_{Ig})/5 + (C * w_C)/5 + (FL * w_{FL})/5 + (EE * w_{EE})/5 + (P * w_P)/5 \quad (1)$$

or

$$MSRI = SUM[(Det * w_{Det})/5] \quad (2)$$

$w_{R,\ldots,P}$ is the weight assigned to each determinant, respectively, in centesimal. Det is the determinant score from 1 to 5 as per the Table 2.

The final index follows the resilience classification shown in Table 3, where the total score falls under five categories: red zone (very weak), orange zone (weak), yellow zone (medium), light green zone (strong), or green (very strong).

MSRI classification	**MSRI Score**	**Description**
Very Strong	85-100	Very strong market resilience measured through the weighted contribution of the nine determinants
Strong	69-84	Strong market resilience measured through the weighted contribution of the nine determinants
Medium	53-68	Medium market resilience measured through the weighted contribution of the nine determinants
Weak	37-52	Weak market resilience measured through the weighted contribution of the nine determinants
Very Weak	20-36	Very weak market resilience measured through the weighted contribution of the nine determinants

Table 3: MSRI Resilience Classification

3.Application of the MSRI and considerations

The MSRI has been piloted using a comparative analysis between the baseline and Phase-1 representing the first full year of project implementation in the project areas for the horticulture sector. The same array of data sources from the Suchana project collected to this point were leveraged to track the MSRI.

Dashboarded results of the piloted use can be found in Figure 4 and details of the computation are found in Annex A. In order to aid the visualization of the score, the rounded percentage values for each determinant and principle have been added to the dashboard.

As can be seen through the changes in overall color from red-orange-yellow to orange-yellow-green, changes in the market system have taken place from the baseline to the Phase-1 working areas. Of particular interest are the significant improvements in integration and diversity, each by two contributing resilience scores, which align with direct project interventions.

Figure 4. MSRI for Suchana, Horticulture Sector, Baseline (2017) and Phase-1 (2018) Comparison.

During the first round of piloting the MSRI, the Suchana team explored the challenges and opportunities related to a consensus methodology for scoring determinants. As the team reviewed existing evidence from case studies, annual surveys, field observations, and project monitoring analysis, it became clear that drawing consensus on each indicator from one to five was not difficult as the data was fairly clear to score. However, the team provided significant notes related to the specific definitions of words, explanations of concepts, and justifications of the scoring. The team felt that this would clarify and support the next round of scoring associated with Phase-2 of the project. It was noted that more indicators could potentially be included in this list and the team spent significant time reviewing and selecting the unique indicators that

were the most relevant to track the nine determinants of resilience. It is possible that the indicators and their relevant definitions will be further refined during the next scoring cycle.

When scoring multi-sectors at the same time, it is important to note that some determinants may remain identical for a specific geography or a specific intervention levels (macro, meso, or micro). It is also critical to determine the scope of the market that is to be measured and which actors fall within the measured market and which fall outside. This will be particularly helpful in the contextualization of the index.

While a final MSRI score is useful to track overall change at the system-level resilience, the individual determinants and principle scores were more valuable to the team in its efforts to improve the project outcomes. The scores also led to interesting discussions about the efficacy of individual project activities and targeted interventions on market development and systems strengthening. These discussions will hopefully lead to more strategic interventions for the next phase.

The strong visual changes in the dashboard help to translate complex ideas into a more approachable model and can spark discussions among the project team on the reasons for changes in some indicators versus those that did not change. The team anticipates printing the dashboards and displaying them within the project office as a visual reminder not only of the recommendations and learnings from the exercise, but also as a reminder of the importance of system resilience in the Suchana project.

4.Conclusion

Based on the first application of the MSRI for the Suchana project in Bangladesh, the authors believe that there are significant opportunities for further applications, not only in tracking the changes in resilience within a single market, but also to compare markets, sectors, and geographic zones. Understanding that resilience is dynamic, there is caution attached to 'measuring a market,' however this index offers means to explore changes, ranges, and structures that impact market resilience. The analysis should never end with a final index score, but as an adaptive management and self-monitoring tool to build resilient interventions.

The index can easily be adapted to other contexts by adjusting the indicators that lead to a specific determinant and the weights that are given to each determinant.

Additionally, it can be seen from this first pilot round that there are significant linkages between household resilience and market system resilience. If market system development interventions are designed with the objective to increase household resilience, and a logical connection between the two is clearly delineated, a relationship between market system resilience and household resilience may be expected. The authors theorize that market-systems level interventions could replace some of the direct household level interventions to increase household resilience with the intent of reaching scale. This hypothesis could be further explored in future research. The authors expect to pilot a household level resilience measurement instrument to test for any correlation between the two scales of interest and guide further programming efforts.

Acknowledgements

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Annex A. MSRI Suchana Scoring - Baseline and Phase-1, Horticulture

Scoring of Determinants

Determinant	Indicator/Performance Statements	Baseline				Phase-1			
		Score	Average Score	Weighted Score	Weighted Score (%)	Score	Average Score	Weighted Score	Weighted Score (%)
Redundancy (R) Weight =10	Multiple market actors providing inputs services	4	3	6	60	4	3.5	7	70
	Multiple market actors providing output services	2				3			
Diversity (D) Weight =10	Multiple market channels for sale of inputs	2	2.25	4.5	45	4	3.75	7.5	75
	Climate sensitive products and services have functional supply chain	2				3			
	Multiple market channels for sale of production	2				4			
	Multiple products/technologies with different risk profiles utilized by producers	3				4			
Functionality (F) Weight =15	Continuous availability of input products and services to producers	3	2.33	7	46	4	3.33	10	66
	Continuous production and sale of outputs	2				3			
	Continuous availability of market information	2				3			
Inclusion (Ic) Weight =10	Women and vulnerable people have access to market	2	2	4	40	3	3	6	60
	Market actor reach to the vulnerable *(Suchana has six components to vulnerability)*	2				3			

Integration (Ig) Weight =10	Involvement of input linkage actors *(activity of)*	3	2.5	5	50	4	3.5	7	70
	Involvement of output linkage actors *(activity of)*	2				3			
Collaboration (C) Weight =10	Producer networks	2	1.5	3	30	3	2.5	5	50
	Local service provider networks *(inputs, outputs, public sector services)*	1				2			
Feedback loops (FL) Weight =10	Information-gathering processes in place *(public, private, CBOs, market committees)*	2	2.25	4.5	45	3	2.5	5	50
	Research institutes are engaged in climate resilience technology development	4				4			
	Experience sharing within actor groups	2				2			
	Experience sharing between actors groups	1				1			
Enabling environment (EE) Weight =10	Producers and market actors have access to information from local government or market committee	3	2.33	4.66	46	3	2.33	4.66	46
	Local government or market committee contributes to the needs of the community	2				2			
	Policies and laws support producers	2				2			
Preparedness (P) Weight =15	Business groups are able to resume and continue businesses post shocks *(climate and economic)*	2	1.6	4.8	32	3	2.6	7.8	52
	Market actors are able to resume and continue businesses post shocks *(public and private)*	3				4			
	Warning systems are in place to enable the monitoring of some slow and fast variables	1				2			
	Producers and market actors have strong understand of climate risks and mitigations	1				2			
	Supporting institutions have plans to ensure timely response aftershocks *(local government, public, private, CBOs, financial etc.)*	1				2			
MSRI = Sum of weighted scores		**Baseline** **43.46** Rounded to 44				**Phase-1** **59.96** Rounded to 60			