Piloting the Dietary Diversity Module of the Minimum Nutrition Dataset for Agriculture (MNDA)

Nathaniel Cordova, Christian DiRado-Owens, Kathryn Merckel, Andrew Pike, and Amrita Rao

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Amrita Rao conducting a household interview in Dokur, Andhra Pradesh
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“The Tata-Cornell Agriculture and Nutrition Initiative (TCi) is a long-term research initiative focusing on the design and evaluation of innovative interventions linking agriculture, food systems, human nutrition, and poverty in India.”

Source: [http://tci.cals.cornell.edu](http://tci.cals.cornell.edu)
Module #1: Anthropometry/Clinical Nutrition Indicators

Module #2: Biochemical Markers

Module #3: Dietary Diversity Scoring and Food Access

Module #4: Intra-household Food Allocation Metrics

Module #5: Early Childhood Care in First 1,000 Days
Research Purpose
To design and validate a survey instrument capable of capturing the most essential dietary information at both the individual and household levels, and which can be easily integrated into existing agricultural surveys.
Linking Agriculture to Nutrition
What Can Dietary Diversity Tell Us About Nutritional Status?
Methods
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Target Village Profiles:

Aurepalle, Andhra Pradesh

Dokur, Andhra Pradesh

Kanzara, Maharashtra

Kinkhed, Maharashtra


Designing Survey Instruments

• purpose to capture individual and household dietary information

• to do this, we targeted women ages 18-45 responsible for household cooking

• used 3-day recall period

• foods consumed in small quantities were not included

• disaggregated mixed dishes

• linked food items reported in HH surveys to source from which food items/dishes were accessed.
Instructions and Respondent Criteria

Minimum Nutrition Dataset for Agriculture (MNDA): Dietary Diversity Module
Tata-Cornell Agriculture for Nutrition Initiative (TC) / ICRISAT

INSTRUCTIONS
Ensure that:
1. You are speaking with a woman between 18-45
2. You are speaking with the woman responsible for the household cooking
3. That you've properly identified the correct respondent for the record link (compare and validate with the appropriate Village HH Master List)
4. Orally confirm name.

VILLAGE NAME

INFORMATION

VLS HOUSEHOLD NUMBER:

VLS INDIVIDUAL NUMBER:

DATE OF INTERVIEW

DAY: 2
MONTH: 01
YEAR: 2014

IS THIS WOMAN:

- [ ] Pregnant? (check if yes)
- [ ] Breastfeeding? (check if yes)

Respondent Name

Start Time

End Time

Date

Pre-mem ID

Village Name

Age

Pregnant and/or Breastfeeding Checkboxes

Start Time

End Time

Date

Pre-mem ID

Village Name

Age

Pregnant and/or Breastfeeding Checkboxes
### Day (1 of 3)

#### Market Day, Special Day, Fasting Day

- **Checkboxes**
  - Visited Market
  - Special day (actual, religious, etc., do not check or mark day)
  - Respondent was fasting on this day

#### Additional HH Foods Prompt

#### Respondent’s Consumption Outside HH (Prompt)

#### Time of Day

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Prompt</th>
<th>Upon Rising (4-9am)</th>
<th>Mid Morning (9am-12pm)</th>
<th>Afternoon (12pm-4pm)</th>
<th>Late Afternoon Through Evening (4pm-8pm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Food (write in)</td>
<td>Food (write in)</td>
<td>Food (write in)</td>
<td>Food (write in)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Source*</td>
<td>Source*</td>
<td>Source*</td>
<td>Source*</td>
</tr>
</tbody>
</table>

#### Food Source Code Guide

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Public Distribution System (PDS)</td>
</tr>
<tr>
<td>2</td>
<td>Local Vendors and Shops</td>
</tr>
<tr>
<td>3</td>
<td>Own farm/Foraged</td>
</tr>
<tr>
<td>4</td>
<td>Market</td>
</tr>
<tr>
<td>5</td>
<td>Prepared food</td>
</tr>
<tr>
<td>6</td>
<td>Other (cooked food)</td>
</tr>
</tbody>
</table>

#### Foods Reported

#### Children’s Consumption Outside HH (Prompt)
Focus Group Discussions

- to validate food groups for scoring
- to become familiar with local dishes to inform probing in HH surveys
- to cross-check findings of common foods consumed in HH surveys
- to validate our designation of women ages 18-45 as the HH proxy
- to test other assumptions regarding meal times, cooking responsibilities, consumption norms, food sources, foods on special days, etc.
Focus Group Discussion Questions:

For the villages of: Aarepalle, Dokur, Kanzara, Kinkhed

Food Groups Reference List:

1. Currently, how many meals a day do you eat in your household? At what times do you eat them?
2. Generally, how often do you cook?
3. In your household, what are common dishes or foods that you eat throughout the day?
4. Mixed Dishes:
   * Record mixed dishes or food items composed of more than one food groups/ingredients.
   * Dishes/items recorded will inform probing for ingredients or food groups in dietary diversity survey.
5. What kinds of oils/fats do you cook with?
6. Generally, who cooks in your household? Are cooking responsibilities shared? Who decides what to cook?
7. Does everyone in your house eat the same foods?
   a). In your household, is anyone given preference for foods or the first meal?
   b). Do you eat together as a family?
8. In your household, do you eat outside of your home? How often? What kinds of food?
   * Men?
   * Women?
   * Children?
9. From what sources do you buy or access your food?
10. In your village, do you eat different foods on special days or during festivals, weddings, etc.?
11. Do people fast in your household/village? What do you eat while fasting?
12. Do you eat different foods if you’re pregnant or breastfeeding?
13. Do you cook special foods for children under five?

Questions

• set of thirteen essential questions
• two focus groups held per village
• one mixed-group consisting of both men and women, one all-women’s group
• targeted eight to ten community participants for each focus group discussion
• held in neutral spaces, accommodating all castes, classes, and sex
• roles broken up into moderator/investigator, translator, and enumerator
• time taken for each = 1 to 1.5 hours
Getting to Know our Field Investigators

Tejashri and Aruna: Kinkhed, MH

Rupali and Vaijanteemala: Kanzara, MH

Shree, Palavi, and Mounika: Aurepalle, AP

Vidya and Swathi: Dokur, AP
Conducting Dietary Diversity Surveys

- HH surveys held in respondent’s home
- timing based on work and availability; most respondents available during the early morning and at night
- village investigators translated food items/dishes reported for interns to record
- daily interviews resulted in endless amounts of chai

### Snapshot Statistics

<table>
<thead>
<tr>
<th>Time Spent in the Field (June 30th - July 12th)</th>
<th>2 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total # of HH Surveys Conducted</td>
<td>142</td>
</tr>
<tr>
<td>Avg. Time for HH Surveys</td>
<td>27 minutes</td>
</tr>
<tr>
<td>Total # of FGDs Conducted</td>
<td>9</td>
</tr>
<tr>
<td>Total # of Informal Market Surveys</td>
<td>3</td>
</tr>
</tbody>
</table>
Informal Market Surveys

- visited local weekly markets in proximity to each village to make qualitative observations

- in doing so, we were able to note differences in food items/food groups consumed versus those available in the market across villages
Creating Dietary Diversity Scores

• data was input using Excel Version 14

• we established a list of all food ingredients encountered in the surveys, including food items with local names

• each ingredient assigned a food group based on FAO recommendations

• number of food items consumed by each respondent totaled, then given a dietary diversity score for both 24 hr and three day recall

• WDDS score ranges from zero to nine

• HDDS score ranges from zero to twelve
• food items within food group totaled to create a variety score, and a food group score was calculated based on whether a food item within the food group was consumed

• calculated scores both for women’s consumption and for household consumption

<table>
<thead>
<tr>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. woman’s consumption of food item (yes or no)</td>
</tr>
<tr>
<td>2. woman’s source of access to food item (1-6)</td>
</tr>
<tr>
<td>3. woman’s 24 hr recall (yes or no)</td>
</tr>
<tr>
<td>4. household’s consumption of food item (yes or no)</td>
</tr>
<tr>
<td>5. household’s source of access to food item (1-6)</td>
</tr>
<tr>
<td>6. household’s 24 hr recall (yes or no)</td>
</tr>
</tbody>
</table>
Tests and Hypotheses

(1) Tool Validation:
• $H_0$: The MNDA collects similar information as the intensive Village Level Survey (VLS) nutrition module
• MNDA 24hrs vs. VLS 2014

(2) Recall Period Validation:
• $H_0$: The MNDA 3 Day recall collects the same information as the MNDA 24hr recall.
• MNDA 24hrs vs. MNDA 3 Day

(3) Recall Period + Tool Validation
• $H_0$: The MNDA 3 Day recall collects the same information as the VLS 2014
• MNDA 3 Day vs. VLS 2014
VLS 2014 as our baseline

Why?
• Most recent and complete VLS dataset

Collected using intensive 24hr recall for each HH individual
• Took into account portion size, all ingredients

Scores calculated using FAO guidelines for dietary diversity
• WDDS for micronutrients
• HDDS averaged individual scores

Individual scores input as matched pairs
• Observations missing VLS 2014 scores were dropped (n=3)
**WDDS Descriptive statistics and distribution**

<table>
<thead>
<tr>
<th></th>
<th>VLS 2014</th>
<th>MNDA 24hrs</th>
<th>MNDA 3 Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± S.D.</td>
<td>5.26 ± 0.83</td>
<td>4.36 ± 1.05</td>
<td>5.36 ± 1.11</td>
</tr>
<tr>
<td>Variance</td>
<td>0.686</td>
<td>1.097</td>
<td>1.239</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.281</td>
<td>0.432**</td>
<td>0.094</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.668</td>
<td>3.838*</td>
<td>2.761</td>
</tr>
</tbody>
</table>

*sktest indicates significant difference from normality at the level p<.10

**significant at p<.05
***significant at p<.01

**MNDA 24hrs WDDS**

- n=135
- \( \mu = 4.36 \pm 1.05 \)

**VLS 2014 WDDS**

- n=135
- \( \mu = 5.26 \pm 0.83 \)

**MNDA 3 Day WDDS**

- n=135
- \( \mu = 5.36 \pm 1.11 \)
HDDS Descriptive statistics and distribution

<table>
<thead>
<tr>
<th></th>
<th>VLS 2014</th>
<th>MNDA 24hrs</th>
<th>MNDA 3 Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± S.D.</td>
<td>8.03 ± 1.00</td>
<td>8.04 ± 1.05</td>
<td>9.30 ± 1.04</td>
</tr>
<tr>
<td>Variance</td>
<td>1.007</td>
<td>1.112</td>
<td>1.089</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.81***</td>
<td>-0.908***</td>
<td>-0.688***</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>3.316</td>
<td>4.694***</td>
<td>6.781***</td>
</tr>
</tbody>
</table>

*sktest indicates significant difference from normality at the level p<.10

**significant at p<.05

***significant at p<.01

VLS 2014 HDDS

n=135
μ=8.03±1.00

MNDA 24hrs HDDS

n=135
μ=8.04±1.05

MNDA 3 Day HDDS

n=135
μ=9.30±1.04
Data limitations

Seasonality of Data

- MNDA data was collected in July 2014
- VLS 2014 data was collected in February-April 2014

HDDS scores are calculated differently

- MNDA - the woman’s raw score is found then additional food consumed by the HH is added, and then HDDS is calculated

- VLS - a raw score is calculated for each individual, then foods are grouped calculate the IDDS (same formula as HDDS), and then the combined IDDS are averaged to calculate a HDDS
Results
(1) Tool Validation (MNDA 24hrs vs VLS 2014) - WDDS

Paired T-test MNDA WDDS 24hrs and VLS WDDS 2014

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNDA 24hrs</td>
<td>135</td>
<td>4.356</td>
<td>0.0907</td>
<td>1.054</td>
<td>4.176 - 4.535</td>
</tr>
<tr>
<td>VLS 2014</td>
<td>135</td>
<td>5.269</td>
<td>0.0721</td>
<td>0.837</td>
<td>5.117 - 5.402</td>
</tr>
<tr>
<td>Difference</td>
<td>0</td>
<td>-0.904</td>
<td>0.122</td>
<td>1.419</td>
<td>-1.145 - -0.662</td>
</tr>
</tbody>
</table>

\[
\text{mean(diff) = mean(WDDS}_{1}\text{DP}_{24}\text{hrs- INS_WDDS}_{2014})
\]
\[
\text{Ho: mean(diff) = 0}
\]
\[
\text{Degrees of freedom=134}
\]
\[
t = -7.4006
\]
\[
\text{Ha: mean(diff) < 0}
\]
\[
\text{Pr(T < t) = 0.0000}
\]
\[
\text{Ha: mean(diff) != 0}
\]
\[
\text{Pr(|T| > |t|) = 0.0000}
\]
\[
\text{Ha: mean(diff) > 0}
\]
\[
\text{Pr(T > t) = 1.0000}
\]

- The means are significantly different (p<0.0000)

- We reject “Ho: The MNDA 24hrs WDDS collects similar information as the VLS 2014 WDDS.”

- The MNDA 24hrs WDDS and the VLS WDDS 2014 are not collecting the same information
(1) Tool Validation (MNDA 24hrs vs VLS 2014) - HDDS

**Tool Validation for HDDS**

**Paired T-test MNDA HDDS 24hrs and VLS HDDS 2014**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNDA 24hrs</td>
<td>135</td>
<td>8.044</td>
<td>0.089</td>
<td>1.036</td>
<td>7.868 - 8.221</td>
</tr>
<tr>
<td>VLS 2014</td>
<td>135</td>
<td>8.019</td>
<td>0.087</td>
<td>1.011</td>
<td>7.847 - 8.191</td>
</tr>
<tr>
<td>Difference</td>
<td>135</td>
<td>0.0252</td>
<td>0.114</td>
<td>1.326</td>
<td>-0.201 - 0.251</td>
</tr>
</tbody>
</table>

**mean(diff) = mean(HDDS_1DP_24hrs- INS_HDDS_2014)**

Ho: mean(diff) = 0

Ha: mean(diff) < 0  
Ha: mean(diff) ≠ 0  
Ha: mean(diff) > 0

Pr(T < t) = 0.5871  
Pr(|T| > |t|) = 0.8258  
Pr(T > t) = 0.4129

Degrees of freedom=134

- The means are not significantly different (p=.8258)

- We fail to reject “Ho: The MNDA 24hrs HDDS collects similar information as the VLS 2014 HDDS.”

- The MNDA 24hrs HDDS and the VLS HDDS 2014 are collecting the same information
Recall Period Validation (MNDA 24hrs vs MNDA 3day) - WDDS

**Paired T-test MNDA WDDS 24hrs and MNDA WDDS 3 Day**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNDA 24hrs</td>
<td>135</td>
<td>4.356</td>
<td>0.091</td>
<td>1.054</td>
<td>[4.176, 4.535]</td>
</tr>
<tr>
<td>MNDA 3 Day</td>
<td>135</td>
<td>5.356</td>
<td>0.095</td>
<td>1.109</td>
<td>[5.167, 5.544]</td>
</tr>
<tr>
<td>Difference</td>
<td>0</td>
<td>-1</td>
<td>0.088</td>
<td>1.0221</td>
<td>[-1.174, -0.826]</td>
</tr>
</tbody>
</table>

mean(diff) = mean(WDDS_1DP_24hrs- WDDS_total_3day)

Ho: mean(diff) = 0  
Ha: mean(diff) < 0  
Pr(T < t) = 0.0000  

Ha: mean(diff) != 0  
Pr(|T| > |t|) = 0.000  

Ha: mean(diff) > 0  
Pr(T > t) = 1.0000

- The means are significantly different (p<0.0000)

- We reject “Ho: The MNDA 3 Day WDDS collects the same information as the MNDA 24hr WDDS.”

- The MNDA 24hrs WDDS and the MNDA 3 Day WDDS are not collecting the same information.
(2) Recall Period Validation (MNDA 24hrs vs MNDA 3day) - HDDS

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNDA 24hrs</td>
<td>135</td>
<td>8.044</td>
<td>0.089</td>
<td>1.036</td>
<td>7.868 - 8.220</td>
</tr>
<tr>
<td>MNDA 3 Day</td>
<td>135</td>
<td>9.311</td>
<td>0.090</td>
<td>1.040</td>
<td>9.134 - 9.488</td>
</tr>
<tr>
<td>Difference</td>
<td>0</td>
<td>-1.267</td>
<td>0.086</td>
<td>1.009</td>
<td>-1.438 - 1.094</td>
</tr>
</tbody>
</table>

mean(diff) = mean(HDDS_1DP_24hrs - HDDS_total_3days)  
Ho: mean(diff) = 0  
Ha: mean(diff) < 0  
Ha: mean(diff) != 0  
Ha: mean(diff) > 0  
Pr(T < t) = 0.0000  
Pr(|T| > |t|) = 0.0000  
Pr(T > t) = 1.0000  

Degrees of freedom = 134  
t = -14.5873

- The means are significantly different (p<0.0000)
- We reject “Ho: The MNDA 3 Day HDDS collects the same information as the MNDA 24hr HDDS.”
- The MNDA 24hrs HDDS and the MNDA 3 Day HDDS are not collecting the same information.
(3) Recall Period + Tool Validation (MNDA 3 day vs VLS 2014) - WDDS

**Paired T-test MNDA WDDS 3 Day and VLS WDDS 2014**

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=</th>
<th>Mean</th>
<th>Std. Err.</th>
<th>Std. Dev.</th>
<th>[95% Conf. Interval]</th>
</tr>
</thead>
<tbody>
<tr>
<td>MNDA 3 Day</td>
<td>135</td>
<td>5.356</td>
<td>0.095</td>
<td>1.109</td>
<td>5.167 - 5.544</td>
</tr>
<tr>
<td>VLS 2014</td>
<td>135</td>
<td>5.259</td>
<td>0.072</td>
<td>0.837</td>
<td>5.117 - 5.402</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td>0.096</td>
<td>0.119</td>
<td>1.387</td>
<td>-0.140 - 0.332</td>
</tr>
</tbody>
</table>

\[
\text{mean(diff)} = \text{mean(WDDS_total_3day - INS_WDDS_2014)}
\]

- \( t = 0.8067 \)
- Degrees of freedom = 134

- Ho: \( \text{mean(diff)} = 0 \)
- Ha: \( \text{mean(diff)} < 0 \)
- \( Pr(T < t) = 0.7894 \)

- Ha: \( \text{mean(diff)} \neq 0 \)
- \( Pr(|T| > |t|) = 0.4212 \)

- Ha: \( \text{mean(diff)} > 0 \)
- \( Pr(T > t) = 0.2106 \)

- The means are not significantly different (\( p = .4212 \))

- We fail to reject “Ho: The MNDA 3 Day WDDS collects the same information as the VLS 2014 WDDS.”

- The MNDA 3 Day WDDS and the VLS 2014 WDDS are collecting the same information.
(3) Recall Period + Tool Validation (MNDA 3day vs VLS 2014) - HDDS

The means are significantly different (p<0.0000)

- We reject “Ho: The MNDA 3 Day HDDS collects the same information as the VLS 2014 HDDS.”

- The MNDA 3 Day HDDS and the VLS 2014 HDDS are not collecting the same information.
Conclusion (1 of 3)

(1) Tool Validation:
- $H_0$: The MNDA collects similar information as the intensive Village Level Survey (VLS) nutrition module
  - The MNDA 24hrs WDDS and the VLS WDDS 2014 are not collecting the same information
  - The MNDA 24hrs HDDS and the VLS HDDS 2014 are collecting the same information
- There are a wide variety of effects that could be causing this difference in the HDDS
- One of the most likely is the differing ways the HDDS is calculated
- The VLS method is more a measure of general consumption diversity, while MNDA measures total diversity of household access
- Because of the differing ways the HDDS scores have been calculated, it may not be valid to compare the MNDA HDDS with the VLS HDDS.
Conclusion (2 of 3)

• (2) Recall Period Validation:
  • $H_0$: The MNDA 3 Day recall collects the same information as the MNDA 24hr recall.
    • The MNDA 24hrs WDDS and the MNDA 3 Day WDDS are not collecting the same information.
    • The MNDA 24hrs HDDS and the MNDA 3 Day HDDS are not collecting the same information.
  – This tells us that for both WDDS and HDDS, the difference in a 24hr and 3 Day recall is not inconsequential
  – The two different recall periods yield different results
  – Further research will be needed to determine the implications and opportunities of choosing a 3 Day versus a 24hrs recall period
Conclusion (3 of 3)

• (3) Recall Period + Tool Validation
  • \( H_0 \): The MNDA 3 Day recall collects the same information as the VLS 2014
    • The MNDA 3 Day WDDS and the VLS 2014 WDDS are collecting the same information.
    • The MNDA 3 Day HDDS and the VLS 2014 HDDS are not collecting the same information.
      – This tells us that a 3 day recall for WDDS using our method is necessary to yield information similar to that obtained by the 24hr recall of the intensive VLS survey
      – Deeper exploration is needed to understand how recall period and intensity of the survey affect resulting scores.
Limitations
Recall Accuracy

- three days worth of food difficult to recall
- responses from other family members present at interview may skew respondent’s recall as a proxy
- over-reporting possible in incidences where respondents do not wish to disclose accurate dietary info.
- food items with no English translation required accurate recording and grouping
- all foods obtained from sources outside of the primary five grouped into a sixth category: other; no distinctions between sources within this category
Out-migration

• out-migration is something to consider when using a single proxy to measure household level dietary diversity

• two women reported returning to the village the previous day after an extended period of time working in Hyderabad for supplementary income

• these two women met all of the selection requirements, but logically could not be a true proxy for the household
• fasting on special days, Ramadan, etc. led to large disparities in individual vs. household consumption; difficult to capture in survey because of limited space in design

• foods consumed in small quantities not consistently included, but if consumed frequently enough could prove important to household dietary diversity scoring
Seasonality and Timing
Generalizability
(1). We feel that our survey design and general methodology can be adapted and applied to many different populations. The use of the FGD’s will help contextualize the responses and the surveys can be used by investigators with or without a background in nutrition.

(2). The MNDA shows promise but further research into our results is necessary to examine the efficacy of the tool in measuring dietary diversity.
Further Areas of Interest
Overview

• Initial market survey purpose
  • Contextualize local food supply
  • Does product availability in market reflect individual/household diet diversity?
• Proposed methods
Limitations of Original Market Methodology

- survey thought to be too capacity-intensive at large retail markets
- data collected regarding available products would not elucidate complex relationships between markets and diets in the region
Informal Market Visits

• visited three total markets total:
  • two in Andhra Pradesh (Deverkadra & Amangal)
  • one in Maharashtra (Murtijapur)
• data collection and revised methods
Market Observations

- all markets were retail in nature, with evidence of wholesale and assembly activity
- mix of direct-to-consumer vendors and retail traders
- limited physical infrastructure
- role of markets in supporting dietary diversity in study villages
Market Level Assessment and the MNDA

- market data collection instrument in original form did not provide significant information to justify expending capacity to implement it

- future marketing research recommendations
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Respectfully,
The TCi Intern Team
WE ARE TEAM ICRISAT!