OPERATIONAL RESEARCH ON AGRICULTURE-NUTRITION LINKAGES IN SIERRA LEONE: FINDINGS AND RECOMMENDATIONS FOR IMPROVING NUTRITIONAL IMPACTS

By

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The REACH partnership collaborated with:

- Sierra Leone Agricultural Research Institute,
- Njala University,
- Ministry of Agriculture Forestry and Food Security
- Ministry of Health and Sanitation
- Wageningen University and Research Centre

The overall objective of the research was to identify food/agriculture based interventions that contribute to improved nutrition and have potential for scaling up.
The research consisted of 3 components:

• A desk review of knowledge on the linkages between small holder value chain and nutrition programming.

• A broad mapping of the potential key stakeholders and their roles and linkages in small holder value chains in Sierra Leone.

• An in-depth study of small holder farmers focusing on nutritional impacts of rice and vegetables value chain development and entry points for improvement.
Components of the REACH smallholder value chain model linking supply and demand for nutritious foods at household level

**Supply**
- Production
- Food for own consumption
- Processing and fortification
- Local procurement for food assistance programs
- Commercialization and marketing

**Demand**
- Preparation and consumption of nutritious foods
- Intra-household allocation of food
- Purchase of nutritious foods
- Income generation
- Improved nutritional status

**Impact to smallholders**
- Direct pathway relating improved nutrition to subsistence-oriented production for the household’s own consumption
- Indirect pathway relating improved nutrition to income generated from the sale of agricultural products
- Indirect pathway relating improved nutrition to income generated from local procurement of nutritious foods produced by smallholder farmers that are to be distributed through food assistance programmes
• Key informant interviews involving public and private sector organizations working on agriculture and nutrition projects

• Focus group discussions at community level involving small holder producers, processors, marketers, consumers in 4 districts for the broad mapping and 2 districts that are very important for rice and vegetable production for the indepth study
Potential pathways linking different components of agricultural value chain interventions to improved nutrition

1) Production-related pathway

Production

- Increased food availability for home consumption through production
- Increased availability of diversified foods through crop diversification

Nutrition intake and status

2) Processing-related pathway

Processing/packaging

- Increased income through improved added value
- Increased food availability for home consumption through improved shelf-life
- Improved nutritional value of produce

Nutrition intake and status

3) Marketing-related pathway

Marketing

- Increased income from the sale of agricultural commodities

Nutrition intake and status
### Findings

#### A: Challenges Related to Production Aspect

<table>
<thead>
<tr>
<th>Rice Value Chain</th>
<th>Vegetable Value chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Limited access to inputs, credit, storage, hired labour, extension service</td>
<td>- Continuous cropping and burning of vegetation leading to soil nutrient depletion</td>
</tr>
<tr>
<td>- Poor soil fertility</td>
<td>- Poor irrigation systems for dry season cultivation</td>
</tr>
<tr>
<td>- Suspect quality of fertilizers and pesticides</td>
<td>- Most inputs e.g. fertilizers are sold in quantities that farmers cannot afford</td>
</tr>
<tr>
<td>- High illiteracy levels</td>
<td>- Improved seeds are expensive and supply is not timely</td>
</tr>
<tr>
<td></td>
<td>- Problems in accessing hired labour due to high costs and that farming is not attractive to youths</td>
</tr>
</tbody>
</table>
## Findings

### B: Challenges Related To Processing/packaging Aspect

<table>
<thead>
<tr>
<th>Rice Value Chain</th>
<th>Vegetable Value Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Rudimentary parboiling methods</td>
<td>- Processing equipment is not available within the country</td>
</tr>
<tr>
<td>- Inadequate drying floors increasing the chances of contamination</td>
<td>- Lack of cool rooms</td>
</tr>
<tr>
<td>- Wastage due to Inadequate milling, attack by storage pests</td>
<td>- Lack of funds to procure packaging materials (bags, boxes, baskets)</td>
</tr>
<tr>
<td>- Inadequate storage facilities, limited milling machines</td>
<td></td>
</tr>
<tr>
<td>- Inadequate knowledge on operating milling machines</td>
<td></td>
</tr>
</tbody>
</table>
### C: Challenges Related To Marketing Aspect of Rice Value Chain:

<table>
<thead>
<tr>
<th>Rice Value Chain</th>
<th>Vegetable Value Chain</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Half of the income from rice sale is used on purchase of starchy foods</td>
<td>• Lack of transport</td>
</tr>
<tr>
<td>• Poor road network</td>
<td>• Poor road network, some villages may be cut off due to flooded roads</td>
</tr>
<tr>
<td>• Distress sale of rice</td>
<td>• Lack of storage facilities</td>
</tr>
<tr>
<td>• Increasing prices of food that is not produced by the household itself.</td>
<td>• Poor prices for farmers; prices dictated by wholesalers and traders, vegetables have to be sold very soon after harvest</td>
</tr>
<tr>
<td>• Smuggling of Rice Across Border to Guinea</td>
<td>• High spoilage since there are no cooling facilities and most of vegetables are sold in Freetown, several kilometers away</td>
</tr>
</tbody>
</table>
Actual pathways linking rice value chain development interventions to nutrition in the context of Sierra Leone

- Less than 50% is kept for home-consumption (most of the produce is sold)
- Household sizes have increased and smallholders are constrained by labour and finances to expand cultivation

Rice value chain development

Due to short duration varieties farmers are able to cultivate two crops a season

Due to parboiling

Improved production and added-value (milling) has yielded in higher income

Increased food availability for own consumption

Increased availability of diversified foods

Increased nutritional value of produce

Improved nutritional value of produce

Increased income

Poor diets remain largely unchanged

The additional crops cultivated comprise mainly starchy staples

Nutrition intake and status

Increase in micronutrients

- Additional income is used for purchasing rice rather than high nutritional value products
  - Not all income is used for food purchase
  - Increased food prices have resulted in reduced food access from income

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Actual pathways linking small-scale commercial vegetable production to nutrition in the context of Sierra Leone

- Only a small proportion is kept for home-consumption (most of the produce is sold)
- Only few smallholders are processing vegetables to improve shelf-life

Small-scale commercial vegetable production

- Improved production has yielded in higher income

Smallholders are stimulated to grow different crops

Increased availability of diversified foods

- Increased food availability for own consumption

Increased nutritional value of produce

- Only few vegetables are consumed due to lack of knowledge on how to prepare newly introduced vegetables

Improved income

Nutrition intake and status

- Only a small proportion is consumed (partly due to short shelf-life)
- Adding vegetables to the dietary pattern improves the nutrition intake, however poor food preparation leads to losses of important micronutrients

Only few smallholders are processing vegetables to improve shelf-life

- Additional income is used for purchasing rice, palm oil and condiments rather than high nutritional value products.
- Increased food prices have resulted in reduced food access from income

Most smallholders are not (yet) involved in processing of vegetables

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Findings

D: Challenges related to coordination

- Efforts of organizations involved in agriculture/nutrition are not evenly distributed around the country
- Interventions of some organizations are overlapping

However,

- Government and NGO’s are making efforts to organize farmers to improve productivity
CONCLUSION

• Initiatives along the value chain have contributed to improved production and income

• They have not translated into improved nutrition uptake and status.

• This is probably due to the fact that nutritional considerations are not an integral part of these interventions and also because it takes time to change behavior.
Application of research findings and recommendations (Sierra Leone context and similar situations)

1. Nutrition Education to enhance consumption of nutritious foods by
   - integrating nutrition interventions with extension messages
   - Providing nutrition education through community facilities
   - Scaling up the establishment of school gardens

2. Improving food diversity
   - Promote multiple-cropping including short duration varieties and vegetables
   - Promote integrated farming
   - Promote small livestock production and fishing
   - Promoting back yard gardens

3. Improving nutritional value of the staple food
   - Use fertiliser for micronutrient (Zn) enriched rice
   - Cross breed rice for higher micronutrient content
   - Investigate timing of rice harvest for higher protein content
Application of research findings and recommendations
( Sierra Leone context and similar situations)

4. Improving storage, processing and packaging capacity
   – Promote improved parboiling of rice and investigate feasibility of fortification with Zn and Fe during parboiling
   – Introduce new technologies of rice and vegetable processing and packaging
   – Increase access to storage and drying facilities and appropriate processing and packaging equipment (e.g. through ABCs/FBOs.)
   – Support agro-industries development (infant/small scale)

5. Improving market access
   – Scale up purchase for progress to more districts
   – Add value to produce through processing
   – Upscale feeder roads intervention linking production to market/ABCs
6. Gender sensitive programming
   – Promote the level of control of resources accrued from agricultural production by women
   – Ensure women’s access to credit /loans scheme to support farming activities esp. vegetable gardening.
   – Strengthen the participation of women in extension services and facilitate inputs to women involved in backyard gardening
   – Train women on nutritional content, value and preparation of the food they grow
   – Promote social support services and mechanization to reduce the labour demand on women
Application of research findings and recommendations (Sierra Leone context and similar situations)

7. Regulatory frameworks and legislation
   – Bureau of standards to ensure quality control on all imported pesticides and fertilizers.
   – Reduce taxes on agricultural inputs to reduce cost of production and make nutritious food affordable.
   – Adopt approaches that can empower farmers to reduce dependency on donors.
   – Enact legislation to ensure there are no restrictive procedures for borrowing - collateral which women can not comply with.
   – Ensure that on-going land policy reform provides for access and ownership of land by women.

8. Supportive measures and policy implications
   – Strengthen extension services
   – Strengthen research services
   – Improve access to credit /loans
   – Improve coordination among all key stakeholders
   – Improve information management
END OF PRESENTATION
THANK YOU