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and Innovations in Nutrition Globally

# Linking Agriculture and Nutrition: Value Chain Analysis-Based Tools for Enhancing the Nutritional Impacts of Agricultural Interventions

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# Background

- USAID has long made investments in enhancing agricultural productivity
- Limited evidence of direct and appreciable impacts on nutrition
- Feed the Future has given impetus for better integration of agriculture and nutrition:
  - Value chain thinking can help to realize the potential nutritional impacts of agriculture
  - Key focus on role of the private sector

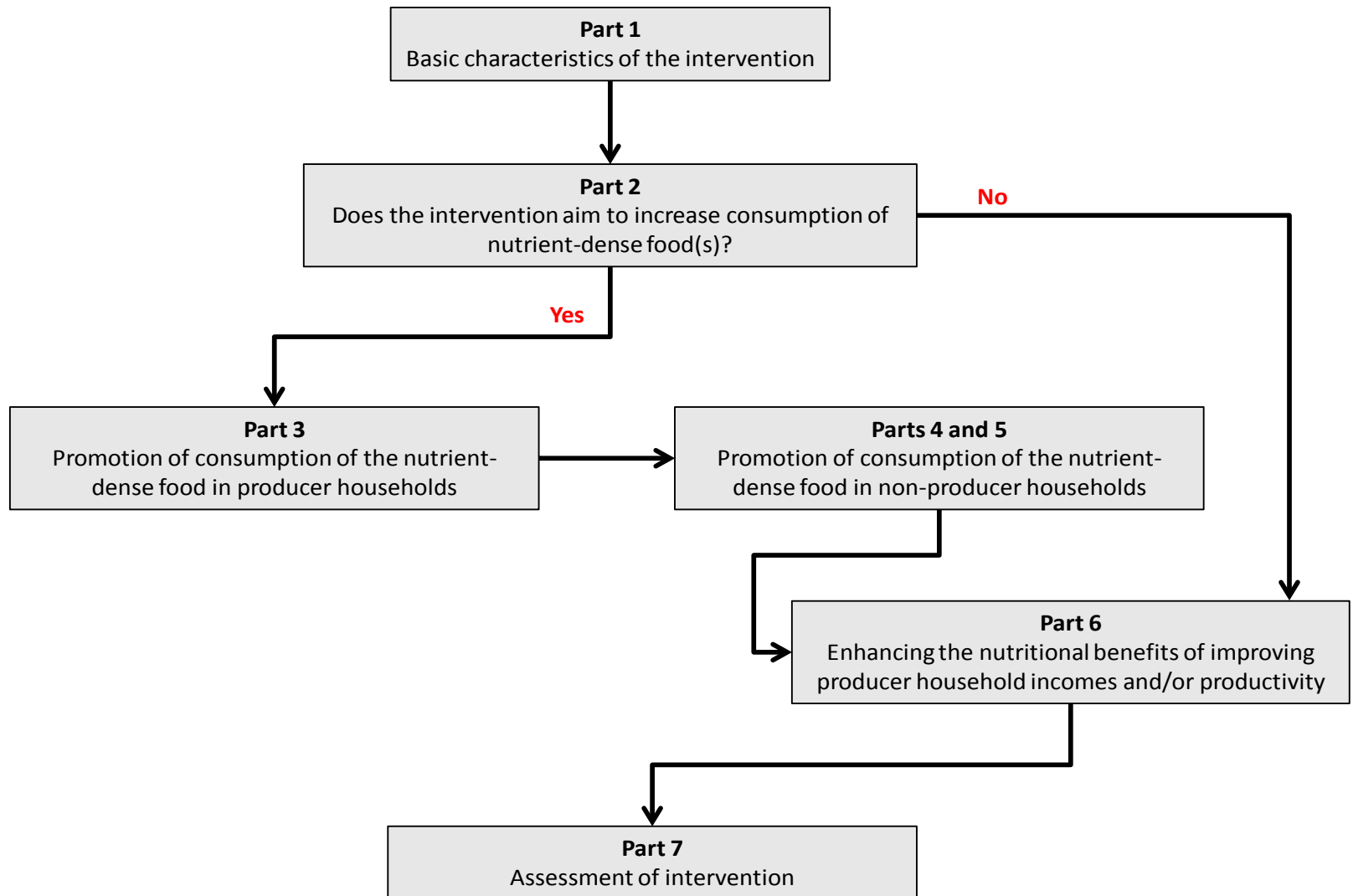
# Nutritious Agriculture by Design: A Tool for Program Planning

- Applications:
  - Prompt redesign of existing agriculture projects for nutritional impact
  - Enhance specifications for new projects
- Users:
  - Project/program designers and implementers
  - USAID and other donors

# Routes from Agriculture to Nutrition

	<b>Income Route</b>	<b>Consumption Route</b>
<b>Consumption of Nutrient-Dense Food by Target Producer Households</b>	Expenditure by farm households on nutrient-dense foods	Own-consumption of the focal nutrient-dense food by producer households
<b>Consumption of Nutrient-Dense Food by Other Households</b>		Consumption of the focal nutrient-dense food by non-producer households

# Structure of the Tool



# Key Questions Addressed by the Tool

1. What are the basic characteristics of the intervention?
2. Does the project aim to increase production or consumption of nutrient-dense foods? If so, who will consume these foods?
3. What is the production *and* consumption of the target food by producer households? Will on-farm consumption of the commodity have an impact on nutrition. Is it a pathway to support? Which populations within the household could benefit?
4. Is there a potential to improve nutrition through increased income and/or productivity?
5. What is the impact on the nutrition of individuals not directly assisted by the project?
6. Summarizes the key findings and action points

Part 1

## What are the basic characteristics of the intervention?

### 1.1 Brief description of the intervention

*This first part of the Rapid Assessment Tool clarifies the basic goals and objectives of the intervention and highlights briefly the interactions with nutrition, poor farmers and business.*

1.1 Provide a brief description of the intervention. What are its core activities, objectives and goals?

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# Kenya Dairy Sector Competitiveness Program (KDSCP)

- One of first applications of tool
- Will use throughout to illustrate the application of the tool
- USAID-funded program aimed at commercialisation of small-scale dairy production in Kenya
- Focus on:
  - Increased productivity
  - Market linkages
  - Chilling capacity
  - Market promotion

Start

## Nutritious Agriculture by Design: A tool for program planning

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Part 1

### What are the basic characteristics of the intervention?

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Part 2

### Does the intervention aim to increase production or consumption of nutrient-dense foods? If so, who will consume these foods?

*Projects focused on agriculture differ from those focused on nutrition in their starting points and intermediate objectives. Agriculture projects typically focus on the beginning of the value chain, farm production and inputs to farm production. Health/nutrition interventions typically prioritise the end of the value chain, focusing on consumption of food (and absorption of specific nutrients) and particular populations that face nutrient deficiencies beyond energy intake.*

*Part 2 begins to close this gap by identifying whether the intervention aims to increase the availability of nutrient-dense foods, either by increasing the supply of foods that are nutrient-dense or by increasing the nutritional value of foods currently produced (for example, introducing bio-fortified varieties). To some extent, the definition of nutrient-dense is subjective. However, it is taken here to refer to foods that have appreciable levels of high quality protein and/or that are rich in micronutrients.*

2.1 Does the intervention aim to promote increased availability of a nutrient-dense food?

Yes  No

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# KDSCP: Findings from Part 2

- Predominant focus on target producer households
- Some efforts to target non-producer households - but motivated by the market potential of these groups
- Nutrition not a factor in determining the target groups of the intervention
- No attention given to lifecycle groups

## Part 3

## Production and Consumption of target food by target producer households

*Promoting on-farm production and consumption of nutrient-dense food is one widely-used route to addressing undernourishment. Section 3 examines this route. What evidence is there that the food targeted by the intervention will successfully address the nutritional needs of individuals in the households that produce it? Note that producer households here are taken to include not only farm households that are the direct target of the intervention, but also the households of labour employed by target producers.*

### 3.1 Will on-farm consumption address problems of undernourishment?

3.1.1 For which individuals in the target producer households will the intervention increase consumption of the target food?

- Women in general
- Pregnant or lactating women
- Infants ages 6-23 months
- Children
- Men
- Persons with HIV/AIDS or other health issues

Other (*specify below*)

# KDSCP:

## Findings from Part 3

- Efforts had been made to promote milk consumption by producer households – mainly through awareness-raising
- Efforts to boost milk consumption secondary to boosting milk production as a means to increased income
- Recognised that efforts to commercialise milk production could actually lead to a decline in own-consumption of milk
- Impacts of the intervention were largely unknown – no baseline and indicators of milk consumption, diet quality or nutritional status

Part 4

## Impact of the intervention on nutrition of individuals not directly assisted by the intervention

*Interventions may aim to increase the consumption of the target food by individuals in households that are not directly assisted by the intervention, and that access the target food other than through their engagement in its production. The issue of acceptability arises, as it does with consumption in target producer households. However, there are additional issues, such as how food produced on farms reaches consumers. Part 4 of the tool examines whether the links from farm production through to consumption are well thought through and how the intervention ensures that they work. Part 5 repeats this module for interventions that target more than one group of consumers.*

### 4.1 (Pt. 1) Is there a nutritional impact on individuals that are not directly assisted by the intervention?

4.1.1 Does the intervention specifically aim to increase consumption of the target food by individuals outside of producer households directly assisted by the intervention?

Yes  No

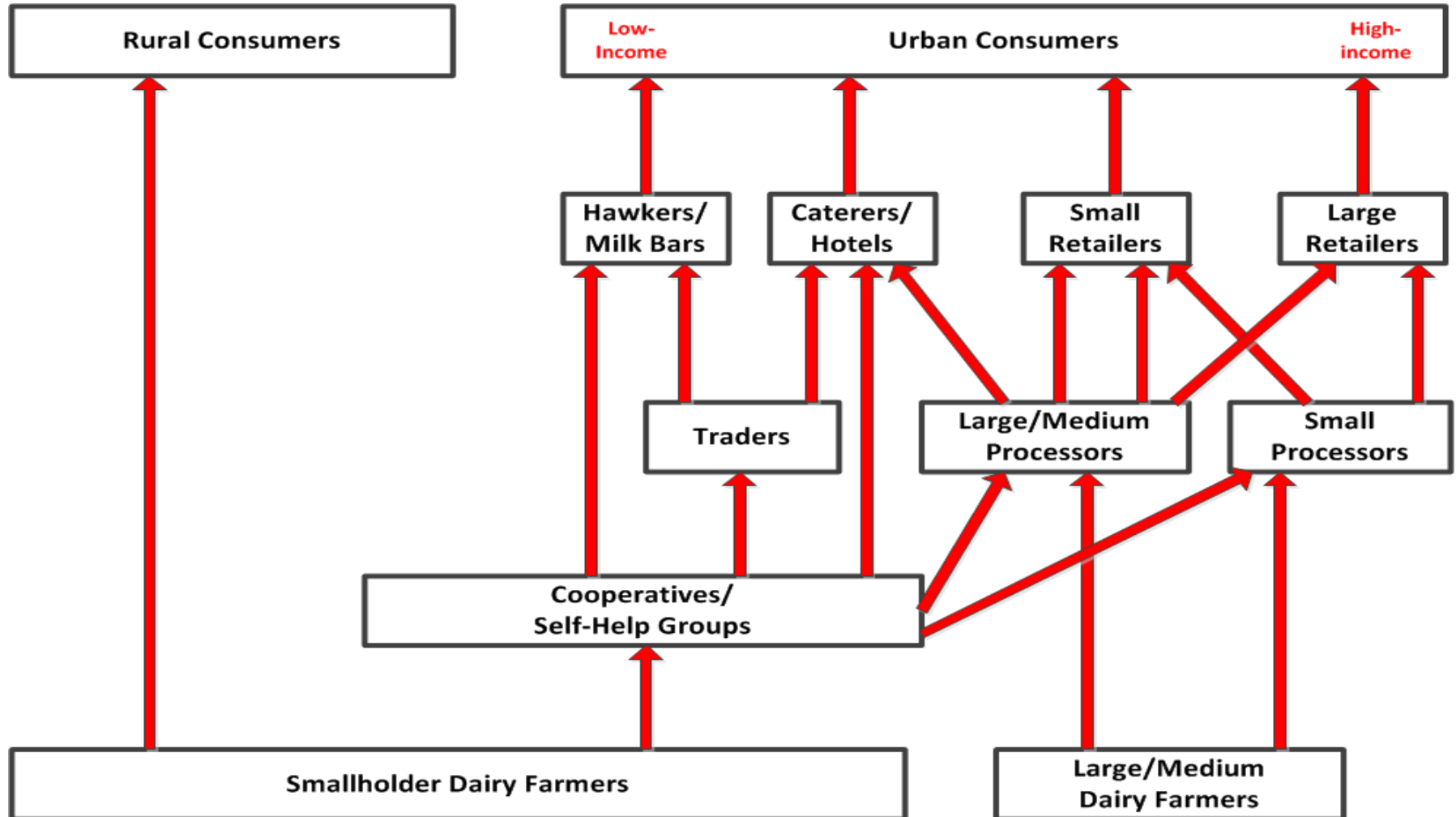
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# KDSCP:

## Findings from Parts 4 and 5

- Efforts had been made to increase milk and dairy product consumption by:
  - Poor consumers in general
  - Schoolchildren
  - Women with HIV/AIDS
- These groups targeted as:
  - Significant market potential
  - Ease of access
- Attention given to enhancing the functioning of the value chain for milk beyond the farm gate

# KDSCP Value Chain Mapping





# KDSCP:

## Findings from Parts 4 and 5

- Efforts made to facilitate access of the poor to milk:
  - Low-cost and smaller packaging
  - Milk dispensers
  - Rejuvenation of school milk program
- However largely at the ‘proof of concept’ or small-scale level
- Need for wide-scale efforts to promote milk and dairy production consumption – beyond the scale of the program

Part 6

## Nutritional impacts through increased income and/or productivity

*So far, the tool has focused on how increases in consumption of the target food can affect nutrition, both in target producer households and within consumers more generally. Many agricultural interventions primarily aim to increase incomes and/or productivity of producers, with a particular focus on inclusion of poor and vulnerable farmers. Increased income may translate into improved dietary diversity through purchases and consumption of nutrient-dense foods in general. This part of the assessment examines routes to nutritional impacts in individuals in producer households that are directly assisted by the intervention.*

*Note that producer households here are taken to include not only farm households that are the direct target of the intervention, but also the households of labour employed by target producers.*

6.1 Does the intervention directly target poor producer households?

Yes  No

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# KDSCP: Findings from Parts 6

- Impact of program on farm household incomes well-established
- Assumption that increased incomes will lead to increased purchases of nutrient-dense foods
- Some efforts to promote consumption of nutrient-dense foods but at very limited scale:
  - Behaviour change communication
  - Kitchen gardens
  - Small animal production
- No baseline or efforts to monitor diet quality or nutritional status

# KDSCP:

## More General Findings

- Tool very good at getting those involved with agricultural interventions to start thinking about nutrition and to challenge their assumptions
- Are often ‘low hanging fruit’ low-cost and easily implemented changes that might enhance nutritional impacts and/or enable these to be monitored
- More profound changes to promote nutrition in agricultural interventions are more problematic:
  - Requires the reallocation of resources
  - May be trade-off between boosting farm incomes and nutritional impacts
  - Requires the donor to require that nutritional impacts are achieved and monitored

# **Nutritious Agriculture by Design: A Tool for Private Sector Engagement**

- Identify specific market opportunities for locally producing and distributing nutrient-dense foods to people with nutritional deficiencies
- Identify value chain challenges that need to be overcome in order to make these opportunities feasible

## Two Stage Process

- Initial assessment of feasibility
- Definition of detailed business plans

# Structure of the Tool

- **Part 1** – Defining products and routes to potential nutritional outcomes
- **Part 2**- Assessment of value chain challenges:
  - Agricultural inputs
  - Production
  - Post-harvest handling
  - Processing
  - Distribution and marketing
  - Consumption
- **Part 3**- Business case
- **Part 4** – Overall assessment

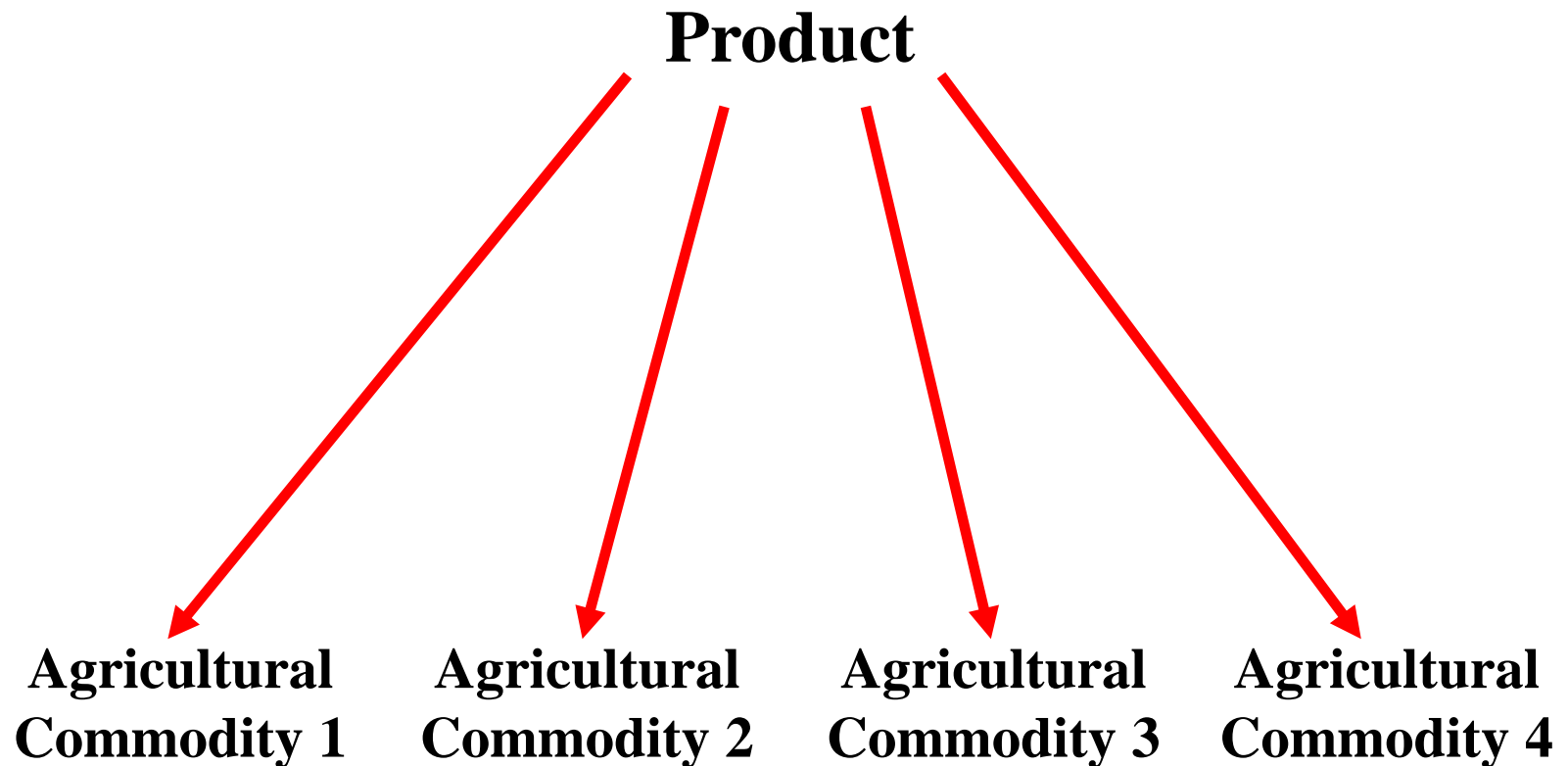
## Part 1:

# Defining Products and Routes to Potential Nutritional Outcomes

- Definition of focal products
- Identifying links to target consumers and potential contributions to nutrient intake
- Compilation of available evidence on affordability, reach and acceptability



# The Starting Point



**Product:** Fresh and boiled tubers, Golden bread, Juice, Juice blends with corn, fruit, Biscuits, OFSP flour

**Focal Commodities:** OFSP

- High in beta carotene
- Significant potential for value chain development
- Long-term investment in development of agricultural production
- Synergies with development of export markets?
- On-farm consumption

**Nutrition Product:** Cashew butter, cashew snack bars, Lipid-based nutrient supplements (LNS)  
**Local Commodities:** Cashew Nuts

- Good source of protein and fatty acids
- Efforts to scale-up domestic production
- Predominantly an export crop
- Scope for broken kernels to enter local value chains?
- On-farm consumption

**Focal Product:** Dried mango, Mango bars, Mango juice

**Definition of Focal Commodities:** Mango

- Good source of vitamin A and essential minerals
- Much of focus on development of an export sector
- Domestic market mainly supplied through informal market channels
- Scope for routing of export rejects to local markets?
- On-farm consumption

# Target Consumers: Orange-Fleshed Sweet Potato

Target Group	Product	Nutritional Benefits
Undernourished 1000 day groups/children	Porridges	Vitamin A (Other nutrients)
Poor rural consumers/households	Fresh/Boiled tubers Juice/Juice blends Biscuits Porridges	Vitamin A (Other nutrients)
Poor urban consumers/households	Fresh/Boiled tubers Juice/Juice blend Golden Bread Biscuits Porridges	Vitamin A (Other nutrients)

# Routes to Potential Nutritional Outcomes: Golden Bread

- OFSP puree preserves nutrient content
- Golden Bread consists of blend of OFSP puree and wheat flour
- Golden Bread already offered in some bakeries/food fairs in Maputo
- Some distribution of Golden Bread in distribution schemes
- Evidence of consumer acceptability
- Affordability an issue – higher price than regular bread:
  - Need to create value in the eyes of the consumer
- Distribution a key issue especially in targeting individual consumers
- Scope for product differentiation/development?

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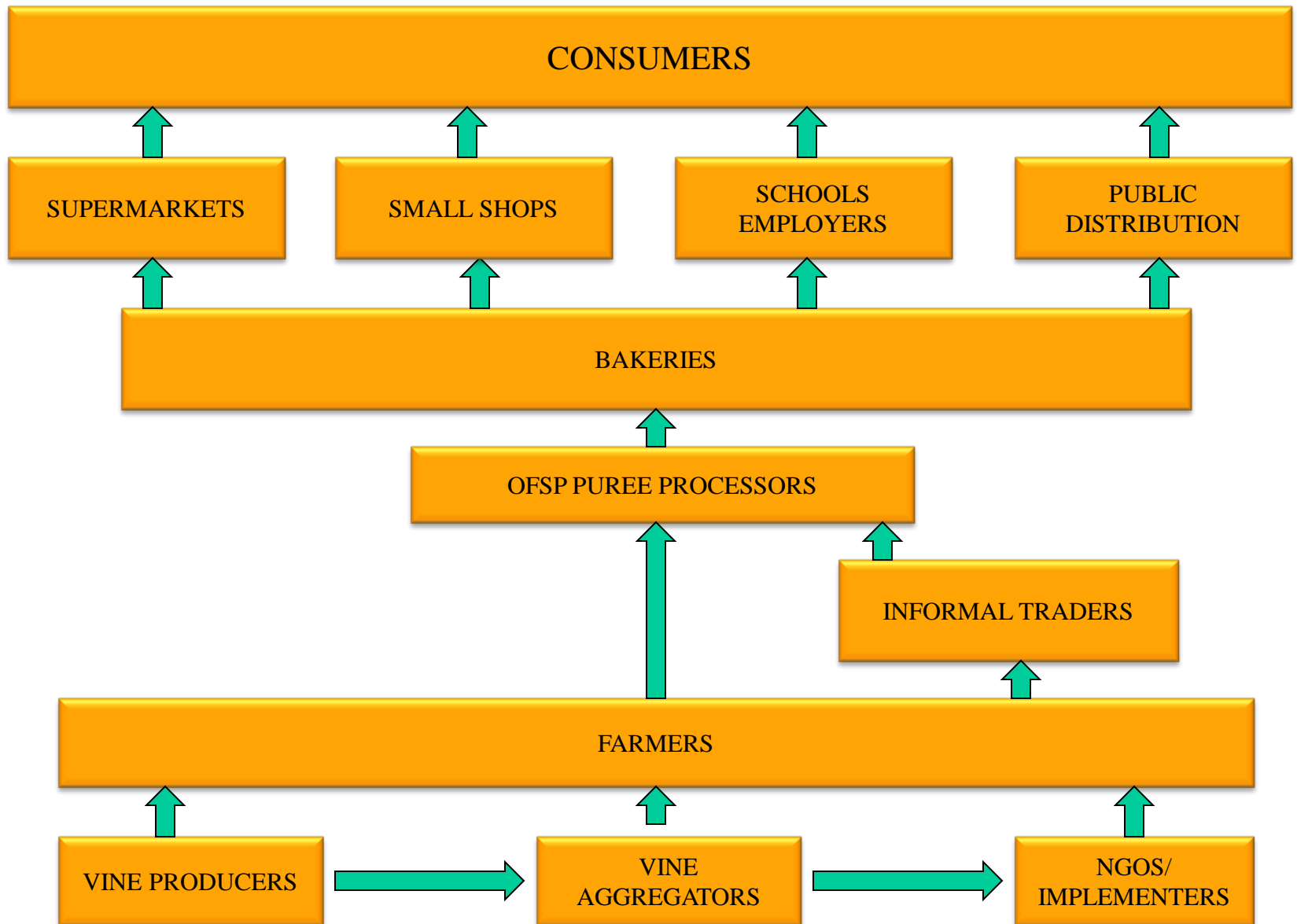
## Part 2:

# Assessment of Value Chain Challenges

- Mapping of value chains
- Assessment of challenges:
  - Agricultural inputs
  - Production
  - Post-harvest handling
  - Processing
  - Distribution and marketing
  - Consumption



# Value Chain Mapping: Golden Bread



# Golden Bread: Agricultural Inputs

- Significant investment in breeding of appropriate varieties:
  - Drought tolerance
  - Agronomic suitability
  - Consumer acceptability
- Need to shift to commercial system to supply vines....
- ....still largely pre-commercial and needs to be scaled-up
- Many complimentary inputs are imported:
  - High price
  - Unreliable supply
- Access to improved inputs a major constraint for many producers

# Golden Bread: Agricultural Production

- Supply of OFSP remains limited though expanding– need to scale-up production
  - Farmer training
  - Integrate producers into value chains
- Need to promote farmer adoption:
  - Strong incentives
  - Defray risks
- Strong support program for OFSP....
- ....but limited in scope
- Risk of varietal deterioration over time
- Wheat mainly imported – price issues

# Golden Bread: Post-Harvest Handling

- Need to integrate producers into traders and markets for tubers
- Lack of on-farm storage....
- ....sell at lower prices on spot markets
- No apparent transportation problems – easy to transport
- Need for better and more integrated storage facilities that are nutrient-sensitive (light and heat for Pro vitamin A)

# Golden Bread: Processing

- Production of OFSP puree a new operation
- Alternatives:
  - Bakeries
  - New actors – pulp processors
- Some bakeries already involved at an experimental level
- Small number of local processing firms
- Need for enhanced/more appropriate mashing technology
- Need to adapt established processing methods to be more nutrient-sensitive
- Need to disseminate concept and techniques on wider scale to bakery sector

# Golden Bread: Distribution and Marketing

- Currently most distribution through health programs, development agencies, etc.
- Limited private sector involvement to date....
- ....at least without donor support
- Market still experimental - concept not proven
- Bakery sector well-developed and innovative
- Retail sector well-developed in urban areas....
- ....and signs of development of bakery sector in rural areas
- Uncertainty as to scale of consumer demand
- Scope for marketing at household and individual consumer levels

# Golden Bread: Consumption

- Sufficient evidence of consumer acceptability:
  - Sensory trials
  - Test markets
- Price remains a considerable potential impediment, especially for the poor
- How will use differ to regular bread – true substitutes?
- Will consumption and demand be driven by nutrition?
- Need for strong promotion and marketing investment
- Concerns about potential impact on on-farm consumption of OFSP

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# Part 3:

## Business Case

### Golden Bread

- More nutritious substitute for standard bread
- Production and fundamental consumer acceptability challenges with OFSP addressed
- Need to upscale production and integrate into value chains...
- ....might exports be an important facilitator of this process?
- Currently at 'proof of concept' phase
- Evidence of consumer acceptability and demand...
- ....but not at the substantive market level
- Need for comprehensive and rigorous market-based consumer studies

# Business Case Golden Bread

- Some evidence of business interest in commercialisation....
- ...but with donor support
- Routes to commercialisation:
  - Gradual adoption by small-scale bakers
  - Wholesale adoption by bakery sector/large-scale bakers
- Key role of OFSP puree:
  - New intermediaries within value chain
  - Technological innovations

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- **Part 4** – Overall assessment

# Part 4:

## Overall Assessment

Condition	Golden Bread
Degree to which product meets a nutritional need in a relevant population group	Enhanced nutritional value Evidence of nutritional impact unclear
Degree to which nutrition of producer households might be enhanced through consumption of the focal agricultural commodity	High Potential to enhance nutrient intake of producer households
Closeness of product to being ready for testing and marketing	Product ready, for commercialization
Level of prior experience in successful production and/or consumption of the product	Experience on pilot scale only

# Overall Assessment

Condition	Golden Bread
Degree to which serious obstacles identified along value chain	<p>Need for effective value chain linkages for supply of OFSP puree</p> <p>Need to expand significantly to commercial scale</p> <p>Aggregation by traders unproven</p> <p>Consumer demand unproven</p>
Level of existing or planned private investment	High degree of readiness with donor support

# Actions Required: Golden Bread

Stage of Value Chain	Private Sector Action	Public Sector Action
Agricultural inputs	Upgrade vine and other input supply networks	Establish market linkages
Production	Establish/up-scale commercial farms and establishing out-grower schemes	Facilitate smallholder linkages Support to smallholder upgrading
Post-harvest handling	Upgrade storage facilities	Access to credit
<b>Processing</b>	<b>Establish substantive puree manufacturing capacity</b> <b>Adapt baked goods manufacture</b>	<b>Training</b> <b>Information dissemination</b> <b>Demonstration plants</b> <b>Access to credit/grants</b>
Distribution and marketing	Establish distribution networks through retailers, schools/workplaces and public distribution	Information dissemination Demonstration sites Legislative action
Consumption	Product promotion	Support for promotional campaigns Market testing