

ANALYZING POSTHARVEST KNOWLEDGE SYSTEM IN TRINIDAD AND TOBAGO: CASE OF PUMPKINS

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<i>Commodity food group</i>	<i>Commodity</i>	<i>Current consumption (tonnes)</i>	<i>Current production (tonnes)</i>	<i>Projected outputs</i>		<i>Quantity exported/yr. (tonnes)</i>
				<i>2012-2013</i>	<i>2013-2014</i>	
<i>Staples</i>	Rice	33,636	2,273	3,000	5,000	nil
	Cassava	4,500	5,454	11,817	15,453	nil
<i>Vegetables</i>	Hot pepper	423	710	1,100	1,500	360
	Pumpkin	485	1,790	1,840	1,890	1,287
	Okra	921	940	960	980	4
	Dasheen leaf	328	340	360	380	ND
<i>Fruits</i>	Citrus	32,271	1,537	1,614	1,695	nil
	Pineapple	462	462	700	700	nil
<i>Pulses</i>	Pigeon peas	802	130	140	150	nil
	Bodie	928	970	1,010	1,050	nil



Quality requirements

- a. Green skin with yellow, orange or white striations,**
- b. Free from blemishes, surface discolouration, moulds and diseases,**
- c. No chemical residue,**
- d. No bird or insect damage,**
- e. Subjected to curing treatment prior to refrigerated storage.**



Postharvest problems of pumpkins

- **High degree of cross pollination and variations in fruit maturation,**
- **More than 90 % of growers and marketers do not engage in curing fruits following harvest,**
- **Excessive use of poultry manure,**
- **Transporting fruits from field to farmer's holding over poorly developed and sometime inaccessible, uneven and bouncy road surfaces,**
- **Pre-harvest soil borne pathogens.**

Harvest pumpkins

Maturity indices: stem corking, loss of surface sheen or gloss, die-back of tendrils

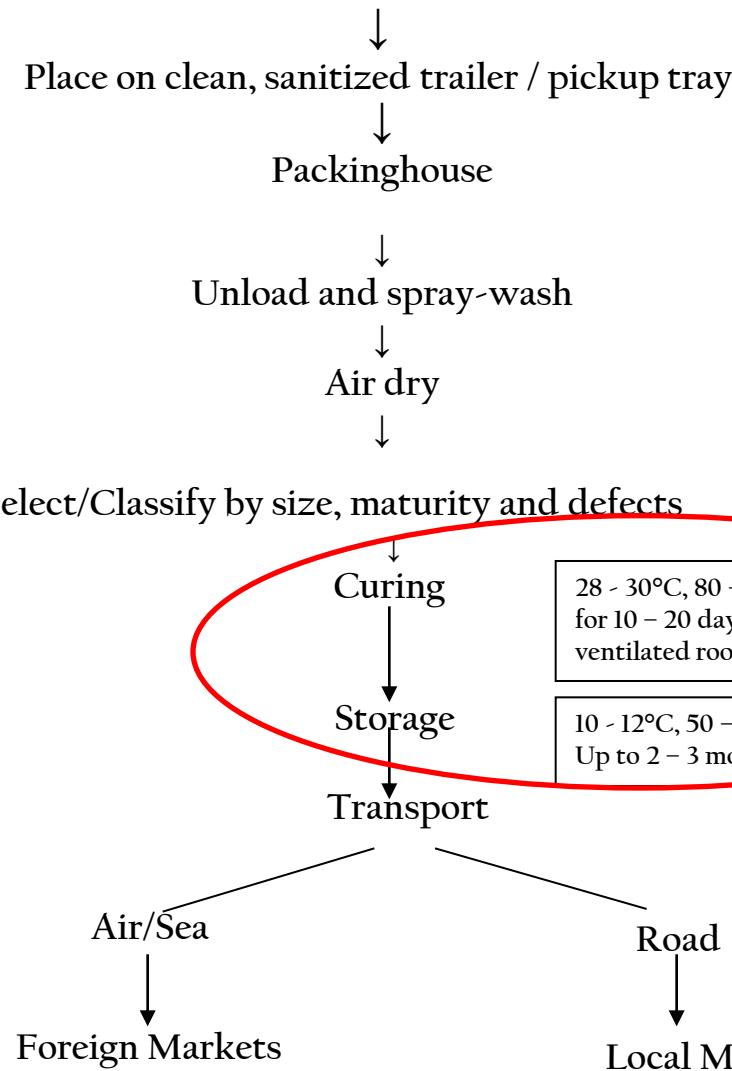
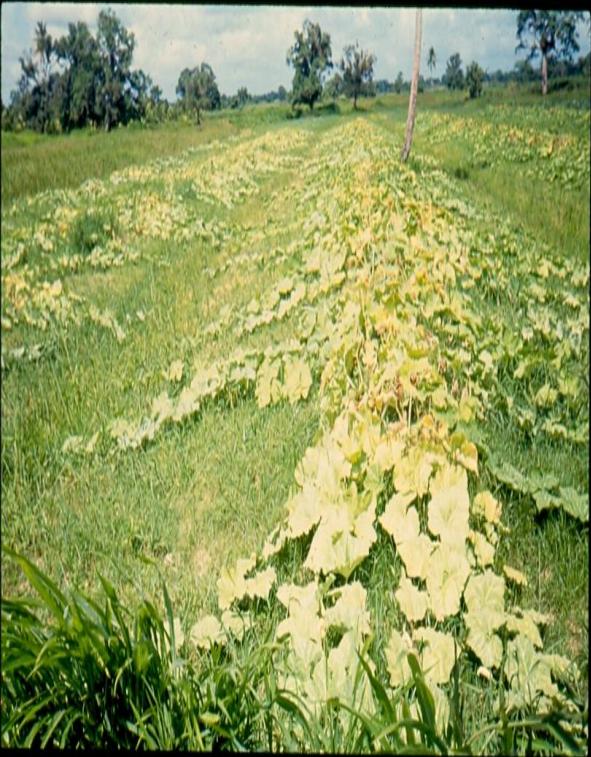


Table 1. Postharvest losses of pumpkins at various market outlets at critical stages in the handling system

Handling system steps	Roadside DS		Farmer's DS		Wholesale DS		Mobile DS		Supermarket DS		Export DS	
	WS	WS	DS	WS	DS	WS	WS	DS	WS	DS	WS	DS
Harvesting	4.4	8.6	2.6	3.6	1.1	3.3	3.3	6.7	4.7	6.8	7.0	9.2
Transportation	2.2	7.2	1.2	2.0	0.5	3.1	2.6	3.9	3.9	4.3	4.9	4.9
No Curing	6.0	8.9	4.5	6.6	3.6	6.9	5.6	8.4	7.8	9.9	12.9	16.8
Sorting/Grading	2.2	2.5	1.0	1.4	0.3	1.2	1.6	3.3	2.9	4.0	4.6	5.5
Packaging	2.0	2.3	1.3	2.4	1.0	1.3	0.8	2.9	2.5	2.9	3.0	4.7
Storage/Display	1.8	1.3	1.4	2.1	1.3	1.5	1.2	2.7	0.5	2.0	3.5	3.3
Total losses	18.6	30.8	12.0	18.1	7.8	17.3	15.1	27.9	22.3	29.9	35.9	44.4













<i>Nature of damage at farmer's markets</i>	<i>Type of damage or causal agent</i>	<i>% Pumpkin damage</i>	
		<i>Dry season</i>	<i>Wet Season</i>
Physical	Cracks	3.1	4.0
	Scars	0.0	2.0
	Punctures	1.0	1.0
	Abrasions	1.2	1.5
	Compression	0.0	0.0
Physiological	Heat stress	1.0	0.0
	Chilling injury	0.0	0.0
	Internal breakdown	3.9	6.3
	Immature fruits	0.5	1.0
Pathological and Entomological	Fungus	0.0	0.5
	Bacteria	0.0	0.0
	Virus	0.0	0.0
	Insect	1.3	2.8
TOTAL LOSSES		12.0	18.1



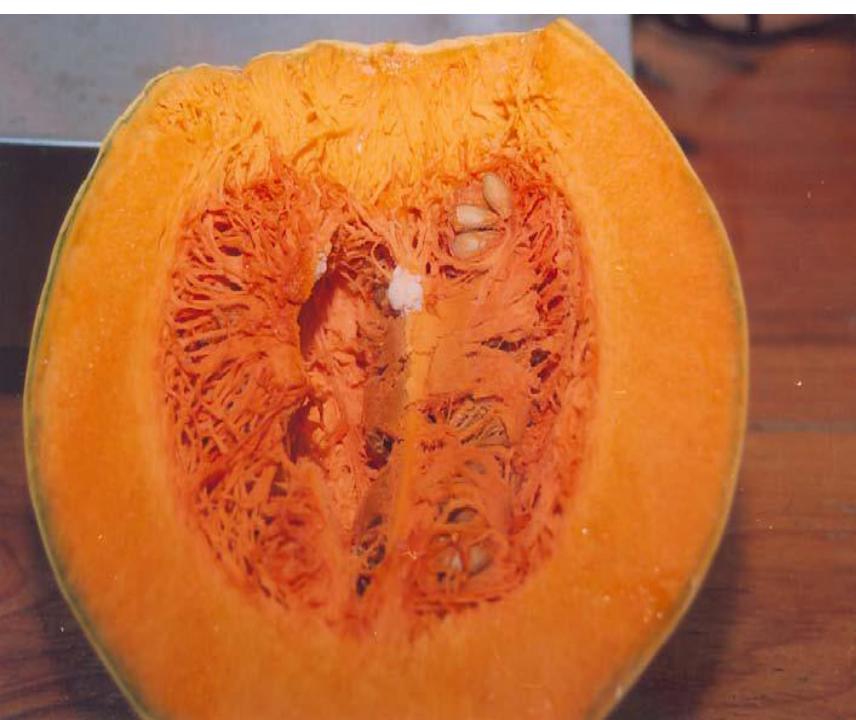








Table 2 : Quality parameters of pumpkin cultivars before, during and after curing.

Quality parameters	cv. Bodies Globe			cv. Future NP 999			cv. Crapaud Back		
	Day 0	Day 9	Day 18	Day 0	Day 9	Day 18	Day 0	Day 9	Day 18
Fresh weight loss(%)	0.0a	12.6b	34.5c	0.0a	13.8b	32.9c	0.0a	13.5b	34.1b
Skin firmness (g/force)	2793a	2865b	3096c	3085a	3230b	3203b	2886a	2900ab	3027b
Flesh firmness (g/force)	607.5a	801.1b	1121.6c	697.3a	920.2b	1440.5c	631.4a	823.3b	1123.8c

FUTURE NP 999

CRAPAUD BACK

BODLES GLOBE

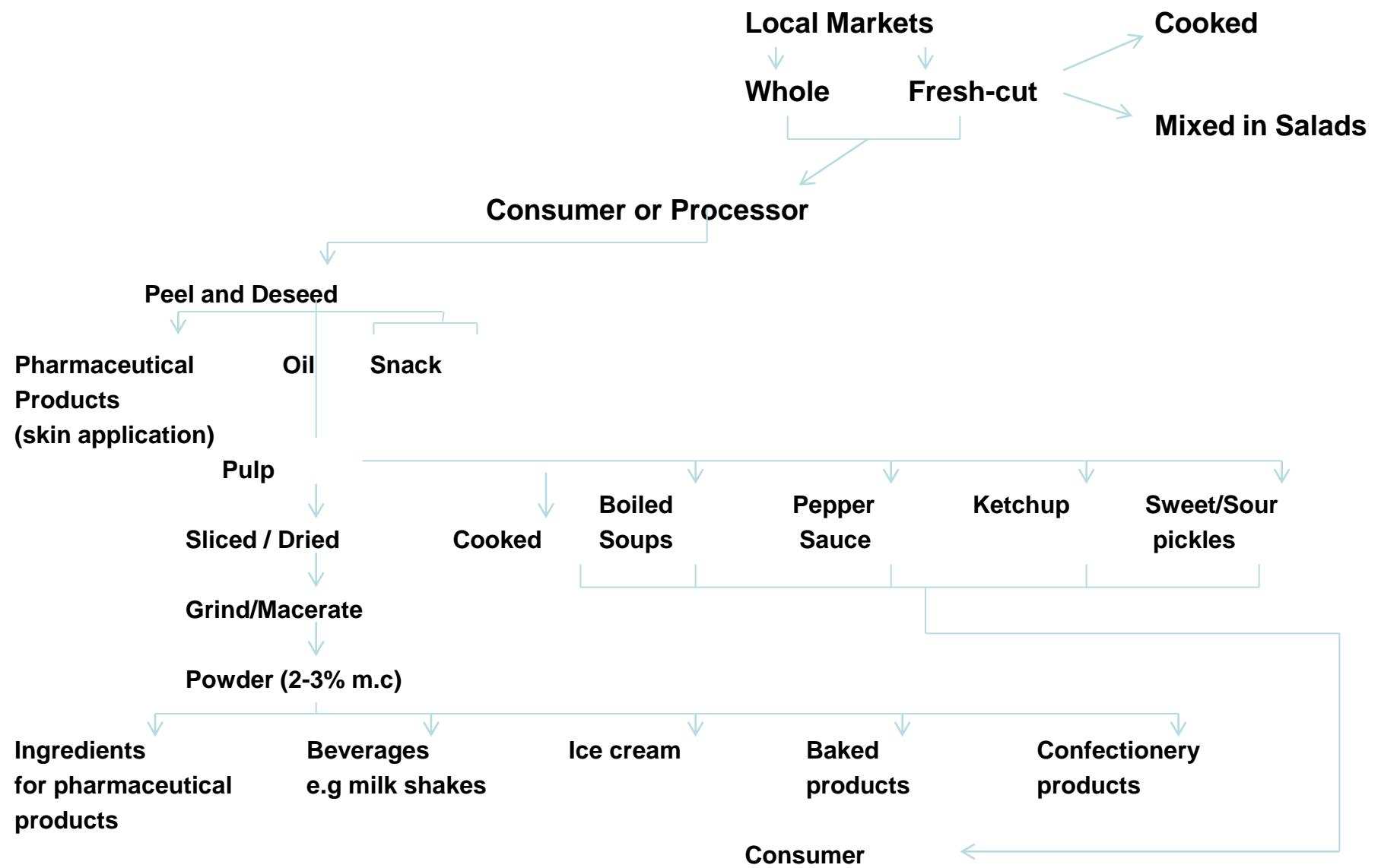


Fig. 1 Value-added products from pumpkin.

S. Sammy

Garden Fresh Callaloo Pack

#10 Pasea extension, Tunapuna

S. Sammy

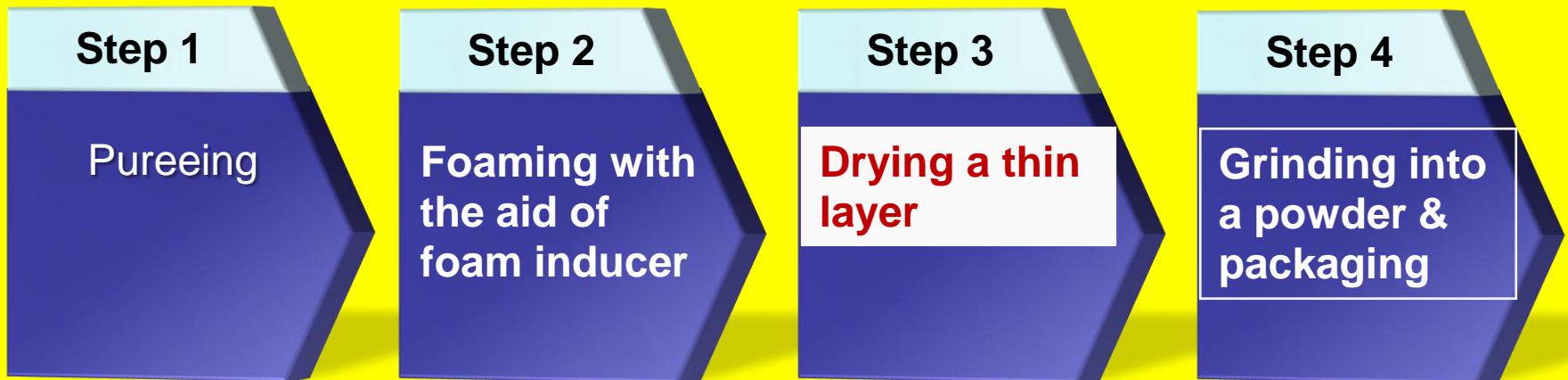
Garden Fresh Callaloo Pack

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Garden Fresh Callaloo Pack

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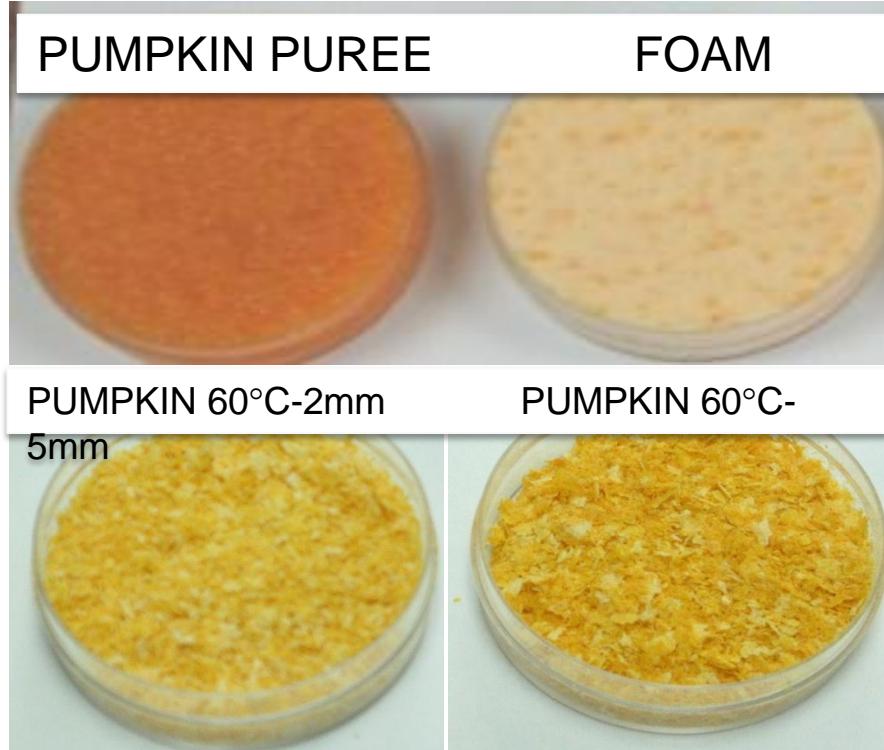
Foam-mat drying process



- Foam-mat drying is a process whereby liquid foods are whipped into stable foams with the aid of a foaming agent and dried by exposing a thin layer to hot air at atmospheric pressure
- The **process yields** porous products which can be rapidly and easily reconstituted having the flavour, colour, and nutrient value similar to the original material (**Harrynanan and Sankat, 2013**).

Results.....

Pumpkin L*a*b* Colour



- ✓ Foaming the purees caused an increase in volume accompanied by a decrease in redness or a^* and an increase in L^* or lightness colour values through the FMD process.
- ✓ The best retention of pumpkin colour for FMD powders was determined from the 0.005 m thick foam layer at 60°C (**Harrynanan and Sankat, 2013**)

Table 5. Sources and access of postharvest information and innovations among pumpkins producers.

Access to innovations	Respondents (%) in Farmer's market^z
Extension Officer	2.9
Overseas training	1.5
Company training	0.0
Radio/TV media	0.0
Press	3.5
Agricultural associations	5.0
Garden shop	70.5
Trial and error	100.0
Research institutes	16.5
Courses at Farmer's Training Centre	12.7
Fellow producers and traders	66.0

^zPercentages sum to more than 100% due to multiple answers given by respondents.

Pre-harvest activities

Postharvest activities

Public
sector
extension

Public –private
Partnerships

Private
sector
extension

General
extension by
MOAs

Subject
Matter
Specialists
State and
Private

Consultants
Extension

*Pro-Active Farmer
Associations*

*Improved
infrastructure*

Supportive policies

Push

Pull

Consumers

<i>Countries</i>	<i>Forms of Extension systems</i>
New Zealand	Complete commercialization/privatization of public extension
Germany	Many models in different states: Completely privatised, semi-privatised, subsidised farmers' associations; voucher system.
Netherlands	Increasing cost recovery from users.
Ireland	Increasing cost recovery from users.
USA	Subsidized extension through higher education institutions. Current privatization models vary from a complete withdrawal of state interventions to a commercialization and cost-recovery approach.
Turkey	Cost sharing of advisors.
Chile	Sub-contracting and voucher system.
Costa Rica	Voucher system targeted at small-farmers to contract private extension.
Denmark	Extension services rendered by farmers' organizations; 90% cost recovery.
Ecuador	Sharecropping between farmers and extension staff for a profit.
Ethiopia	Privatised service centres
Kenya	Extension associated with extension agencies

Availability of data and analytical procedures that are necessary to guide policy makers to engage in strategic interventions to improve the postharvest handling system for pumpkins should include:

- Postharvest technology must be formally included in all Min. of Agriculture.
- Establish regular postharvest in-service training courses to upgrade technical skills and capacities of extension staff.
- Develop and implement specialized postproduction workshops for SMS.
- Introduce a Postharvest Technology Advisory Board (PTAB) to guide relevant commodity specific research for more efficient information flows as well as to coordinate interventions at all levels.