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Market Intelligence Insights for Groundnut Breeding and Seed Systems in Tanzania

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Citation

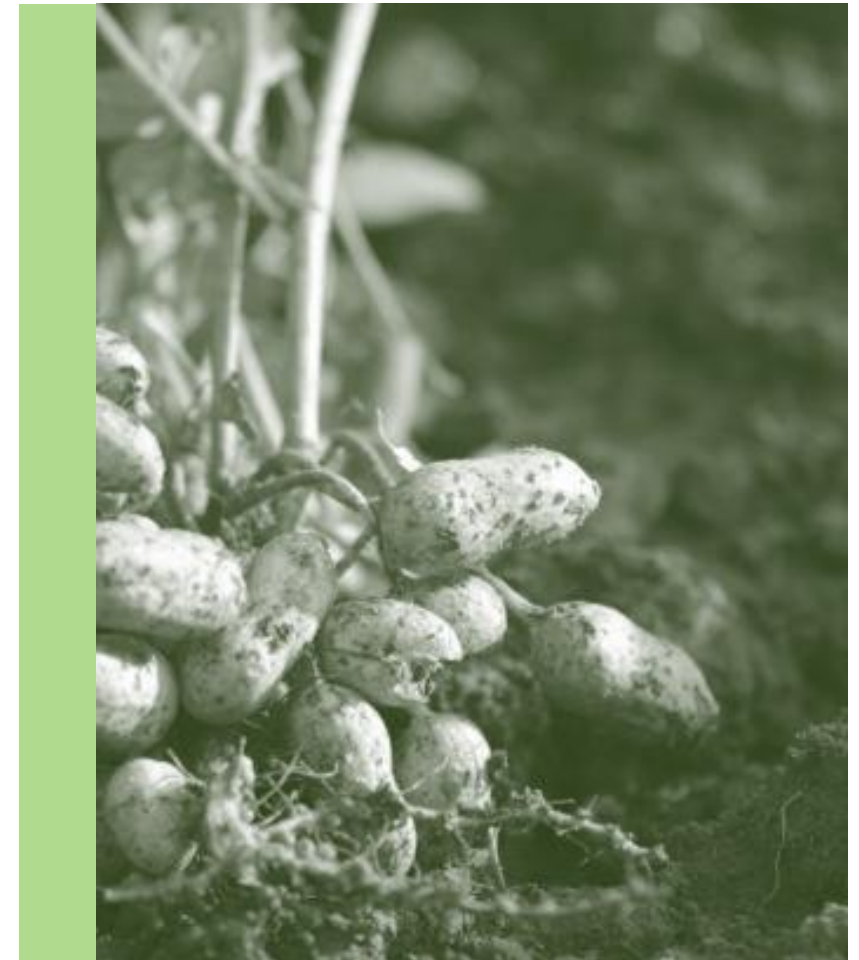
Rutsaert P; Masimane J; Mawia H; Kitoto V; de Sousa K; Van Etten J; Daudi H; Ochieng; J; Rubyogo JC; Ojiewo C. (2023) Market Intelligence Insights for Groundnut Breeding and Seed Systems in Tanzania. CIMMYT. Nairobi, Kenya. 51 p.

Market intelligence for informing crop breeding and seed system decisions



CGIAR Market Intelligence Initiative

- The CGIAR Initiative on Market Intelligence provides data, information and insights to inform decisions that will prioritize and align investment in breeding pipelines and seed systems. These investments aim to maximize contributions to the five CGIAR Impact Areas: poverty reduction, food and nutrition security, gender and youth inclusion, climate adaptation and environmental protection.
- Over the past decades, varieties derived from CGIAR germplasm have helped provide food for hundreds of millions living in harsh and vulnerable environments. However, the capacity to deliver increased benefits from crop breeding will depend on effective strategies to address the stubbornly slow rate of uptake of improved varieties. Meeting the challenge will require, among other inputs, deeper insights on the evolving preferences and requirements of farmers, processors and consumers. In short, breeding will need to be led more by demand.
- Key to the success of demand-led breeding will be the availability of reliable and timely intelligence on the current and future preferences and requirements of farmers, processors and consumers. Although 'market intelligence' has existed in various forms in CGIAR's social science research agenda, an opportunity exists for increased relevance based on shared approaches and tools and new partnerships, both within CGIAR and between CGIAR and its partners.



Market intelligence: Respond to main research questions of breeding and seed system teams

How	Product design team meeting (PDT)
When and where	<ul style="list-style-type: none"> Naliendele Tanzania, November 2022
Methodology	<ul style="list-style-type: none"> PDTs provide guidance to the plant breeder on current market needs and trends PDTs should consist of members that represent the entire crop value chain
Stakeholders	<ul style="list-style-type: none"> NARS: breeders, physiologists, social scientists, nutritionists, extension Seed producers (companies, out growers), agro-dealers, farmers Processors, traders and wholesalers
Goal	<ul style="list-style-type: none"> Identify market segments Estimate size/importance market segments Design TPP per market segment
Role of market intelligence	<ul style="list-style-type: none"> Guide market segment discussion Provide feedback to stakeholders Support TPP development Pick up key research questions to answer

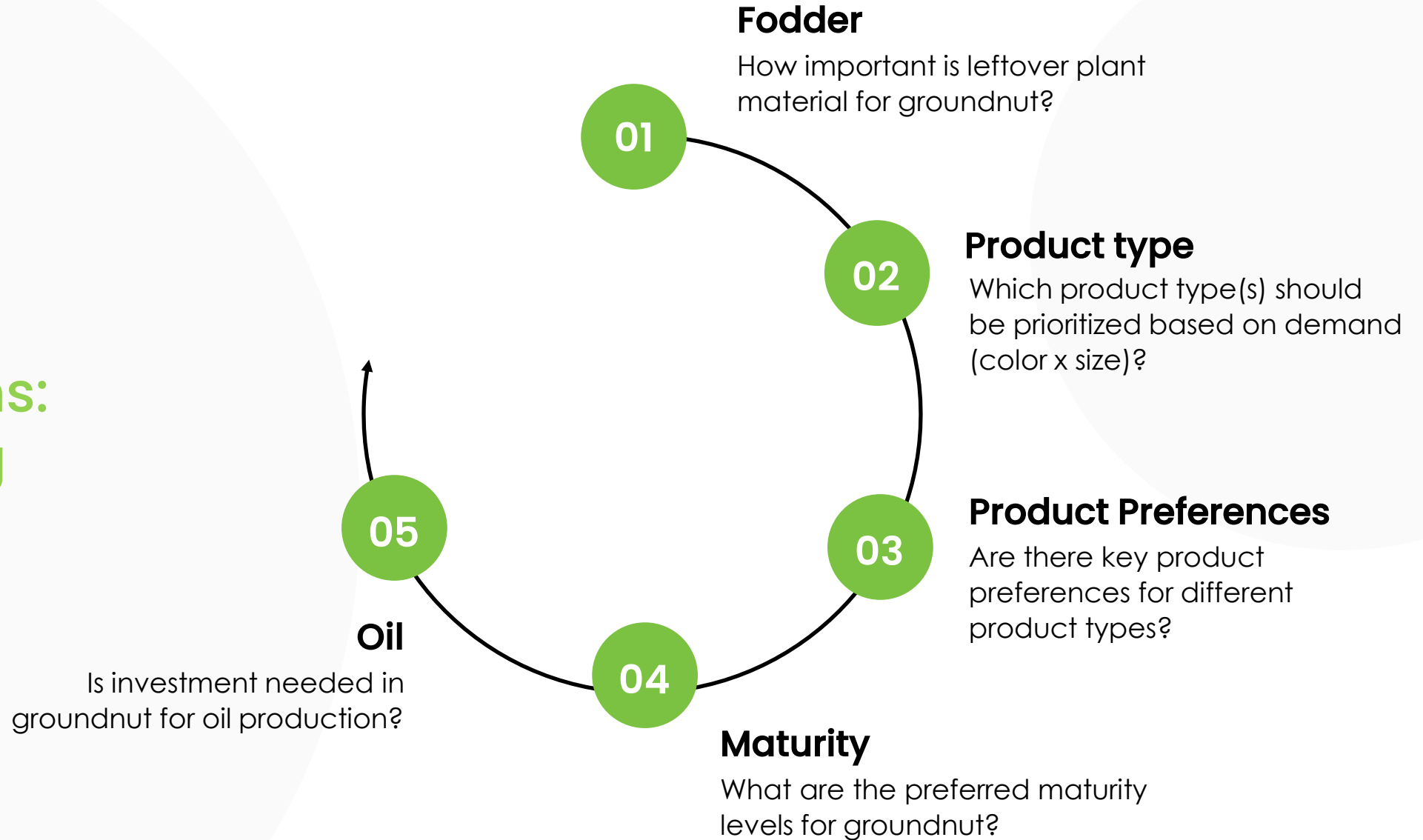


EXECUTIVE SUMMARY

*Research questions coming
out of PDT meeting*

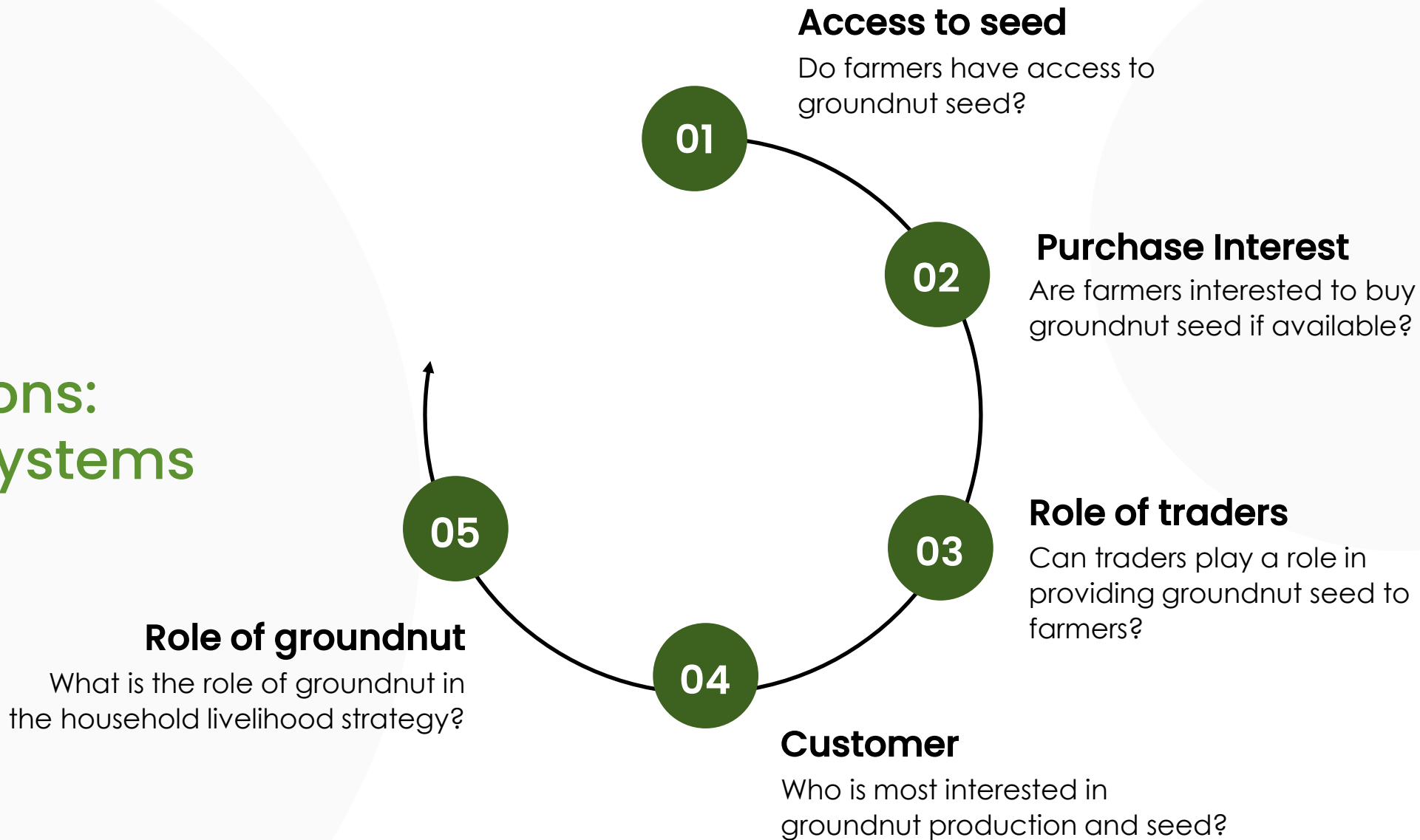


Questions: Breeding





Questions: Seed Systems



KEY BREEDING INSIGHTS

PRODUCT PREFERENCES

Drivers for large groundnuts (size being key) are different than for small/medium groundnuts (oil content, confectionary). This was confirmed in on-farm testing.

MATURITY: EARLY IS MOST PREFERRED

There is a dominant preference for early maturing groundnut varieties in arid and semi-arid areas of Tanzania

OIL: FOR PEANUT BUTTER

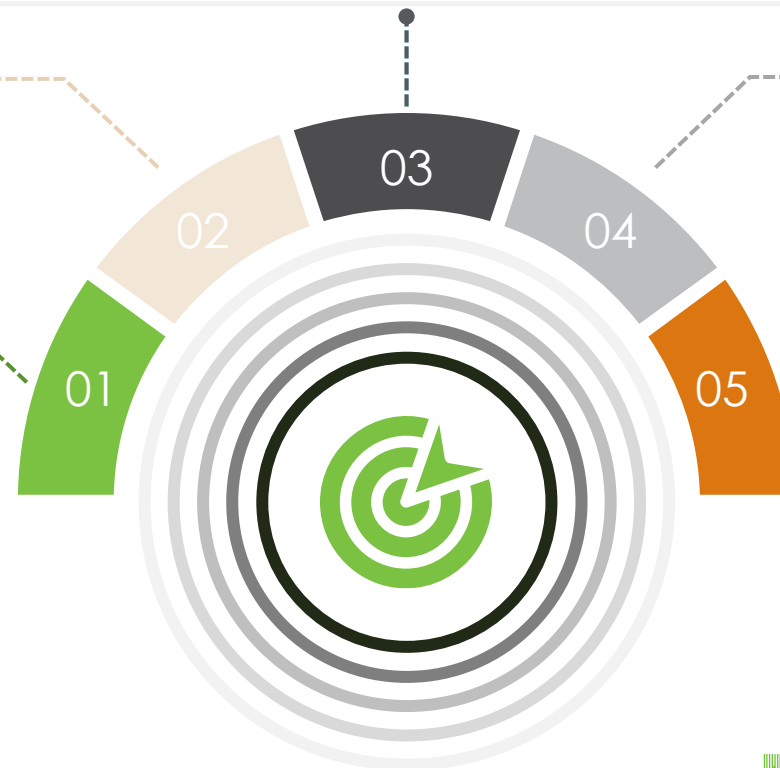
- No current demand for specialized groundnut suited for oil production
- Oil content is important for peanut butter and this is only mentioned for small/medium size groundnuts

PRODUCT TYPE: GROUP SMALL & MID

There is a distinction between small/mid vs large. Color is driven strongly by regional preferences. Overall tan had a higher market share than red. Large size (red and tan) dominant in highland areas

FODDER: NOT FOR BREEDING

Over 70% use the crop residue for mulching, not fodder.



KEY SEED SYSTEMS INSIGHTS

ROLE OF TRADERS: *IMPORTANT*

Almost half of the traders confirmed that their customers use the grain purchased as seed for planting. 24% of traders prepare the grain to sell it as seed.

PURCHASE INTEREST: *HIGH*

9 out of 10 farmers are interested in buying groundnut seed if available and half of them would buy every season.

ACCESS TO SEED: *LOW*

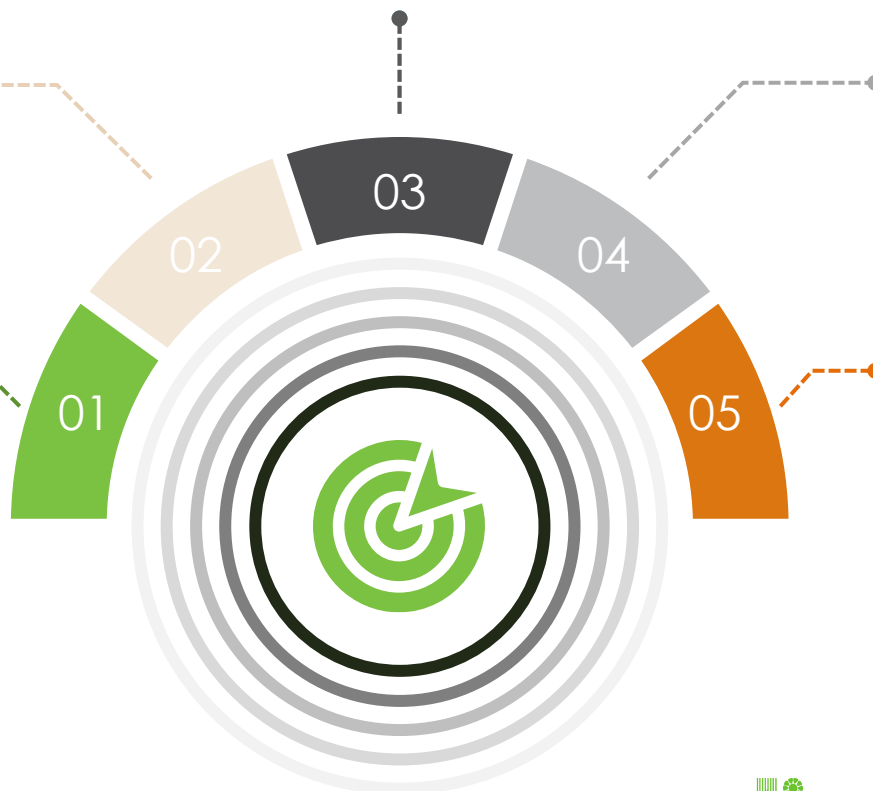
Farmers depend on the informal sector (neighbors 61% and local markets 31%) or recycle own seed (15%).

CUSTOMER: *WOMEN*

Women work on most farm activities in groundnut farming such as weeding, harvesting and storage; and have more knowledge on seed.

ROLE OF GROUNDNUT: *INCOME + FOOD*

Groundnut is a key source for income (women consider groundnut their ATM) as well as a food crop used for snacking, peanut butter and sauces.



SUMMARY – 3 KEY SEGMENTS



> 45%

Small-medium tan groundnut

> 20%

Large tan groundnut

< 20%

Large red groundnut

- **Main use:**
 - Peanut butter and cooking
- **Production:**
 - Low seed access
 - Area – Lake and central zone (Dodoma)
 - Early maturity
- **TPP Priorities:**
 - Oil content requirements for peanut butter
 - No prioritization of fodder

- **Main use:**
 - Snacking, confectionary use and cooking
- **Production:**
 - Low seed access
 - Area – Southern highlands (Songwe)
 - Intermediate maturity
- **TPP Priorities:**
 - Large size essential
 - Taste prioritization
 - No prioritization of oil content
 - No prioritization of fodder

DATA SOURCES



Study 1: Trader survey

Analysis	Quantitative
Instrument	<ul style="list-style-type: none"> • Structured Questionnaire
Methodology	<ul style="list-style-type: none"> • Face to Face Interviews
Sampled respondents	<ul style="list-style-type: none"> • Large off takers (n=87) • Small/marketplace traders (n=213) • Total sample (N=300)
Location	<ul style="list-style-type: none"> • 12 regions in Tanzania: : Mwanza, Mbeya, Dodoma, Mtwara, Tabora, Katavi, Singida, Shinyanga, Dar es Salaam, Kigoma, Songwe, Simiyu
Languages	<ul style="list-style-type: none"> • Swahili
Data collection dates	<ul style="list-style-type: none"> • 17th May and 9th June 2023
Objective	<ul style="list-style-type: none"> • Understand the interests, drivers, constraints, and opportunities traders to adopt improved groundnuts varieties in Tanzania
Survey owners	<ul style="list-style-type: none"> • TARI, CIMMYT, Alliance-PABRA, TOSCI



Study 2: Stakeholder interviews



Analysis	Qualitative
Instrument	<ul style="list-style-type: none"> • Discussion Guide
Methodology & Sample	<ul style="list-style-type: none"> • 20 key informant interviews with traders, groundnut seed producers, processors and government officials • 5 focus group discussions with men • 5 focus group discussions with women • Each FGD had 8-10 participants
Location	<ul style="list-style-type: none"> • Dodoma region (Bahi and Kongwa districts) • Shinyanga region (Ushetu and Kahama MC districts)
Languages	<ul style="list-style-type: none"> • Swahili
Data collection dates	<ul style="list-style-type: none"> • October/November 2022
Objective	<ul style="list-style-type: none"> • To map groundnut production activities; stakeholder engagement in groundnut farming, trading, marketing and consumption • To identify the constraints and opportunities for groundnut production in Tanzania
Survey owners	<ul style="list-style-type: none"> • CIMMYT



NB: Data sources have been input at the bottom of each slide in this report

Study 3: Farmer survey

Analysis	Quantitative
Instrument	<ul style="list-style-type: none"> • Structured Questionnaire
Methodology	<ul style="list-style-type: none"> • Face to Face Interviews
Sampled respondents	<ul style="list-style-type: none"> • Sample size of 1100 groundnut farmers • (Men 551; Women 549)
Location	<ul style="list-style-type: none"> • Dodoma region (Chamwino and Kongwa districts) • Shinyanga region (Msalala and Ushetu districts)
Languages	<ul style="list-style-type: none"> • Swahili
Data collection dates	<ul style="list-style-type: none"> • June 2023
Objective	<ul style="list-style-type: none"> • To guide the next generation product profiles for improved groundnut seed • Giving insights in product expectations that speak most to the needs of farmers through concept testing • To establish factors that influence farmers classifications and choice of groundnut varieties.
Survey owners	<ul style="list-style-type: none"> • CIMMYT



NB: Data sources have been input at the bottom of each slide in this report

Study 4: On-farm testing with tricot



Analysis	Quantitative
Instrument	<ul style="list-style-type: none"> • Structured Questionnaire
Methodology	<ul style="list-style-type: none"> • Face to Face Interviews
Sampled respondents	<ul style="list-style-type: none"> • Sample size of 1203 groundnut farmers • (Men 549; Women 654)
Location	<ul style="list-style-type: none"> • Countrywide
Languages	<ul style="list-style-type: none"> • English and Swahili
Data collection dates	<ul style="list-style-type: none"> • 2021 – 2023
Objective	<ul style="list-style-type: none"> • To test the performance of pre-released varieties on-farm • Scale a sentinel large N on-farm trial to register farmers' feedback on the performance of crop varieties
Survey owners	<ul style="list-style-type: none"> • TARI, Alliance Bioversity-CIAT, CIMMYT



RESEARCH FINDINGS



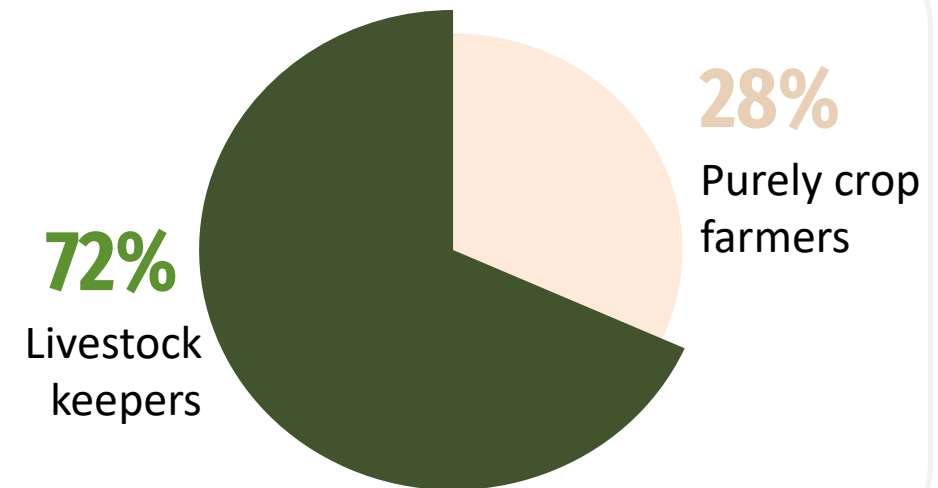
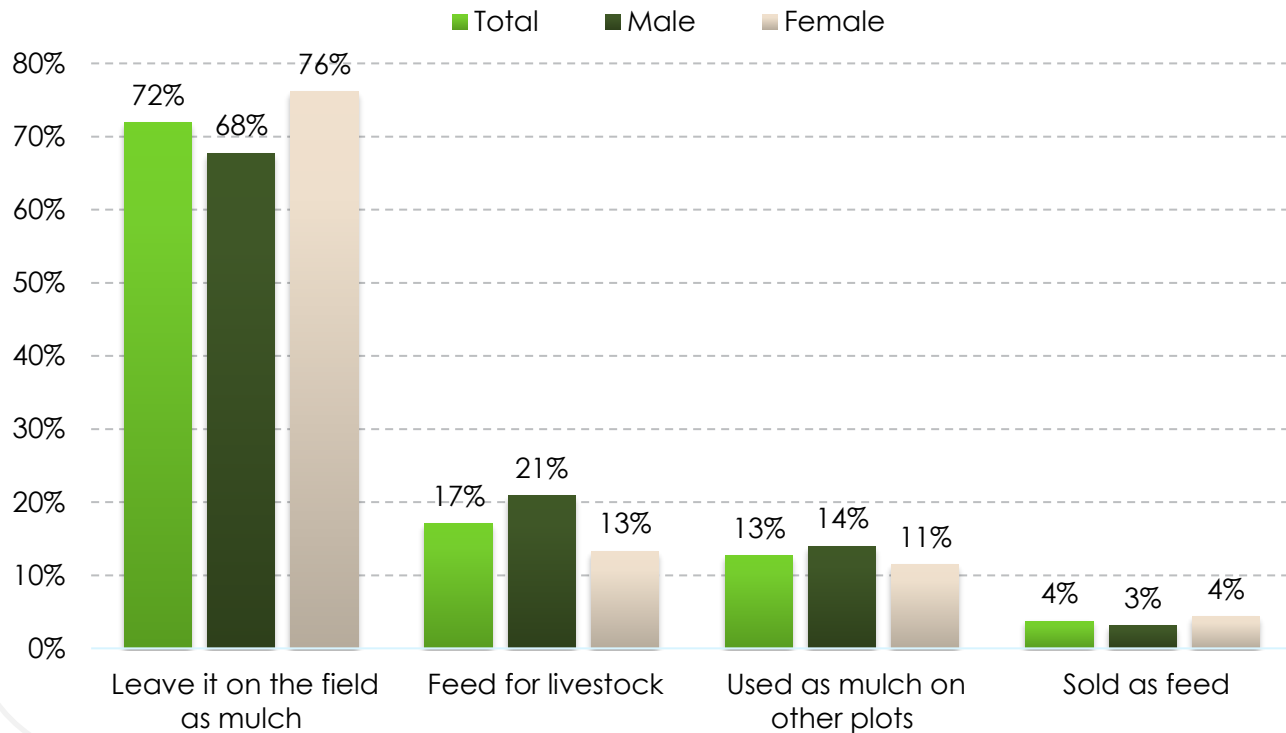
FODDER

Fodder



Breeding groundnuts for fodder is futile; since crop residue mulching is the ubiquitous practice. This implies that groundnut farmers would prioritize other crops for fodder. Albeit uncommon, using for livestock feed is higher for males compared to females.

What do you do with leftover plant material for groundnut?



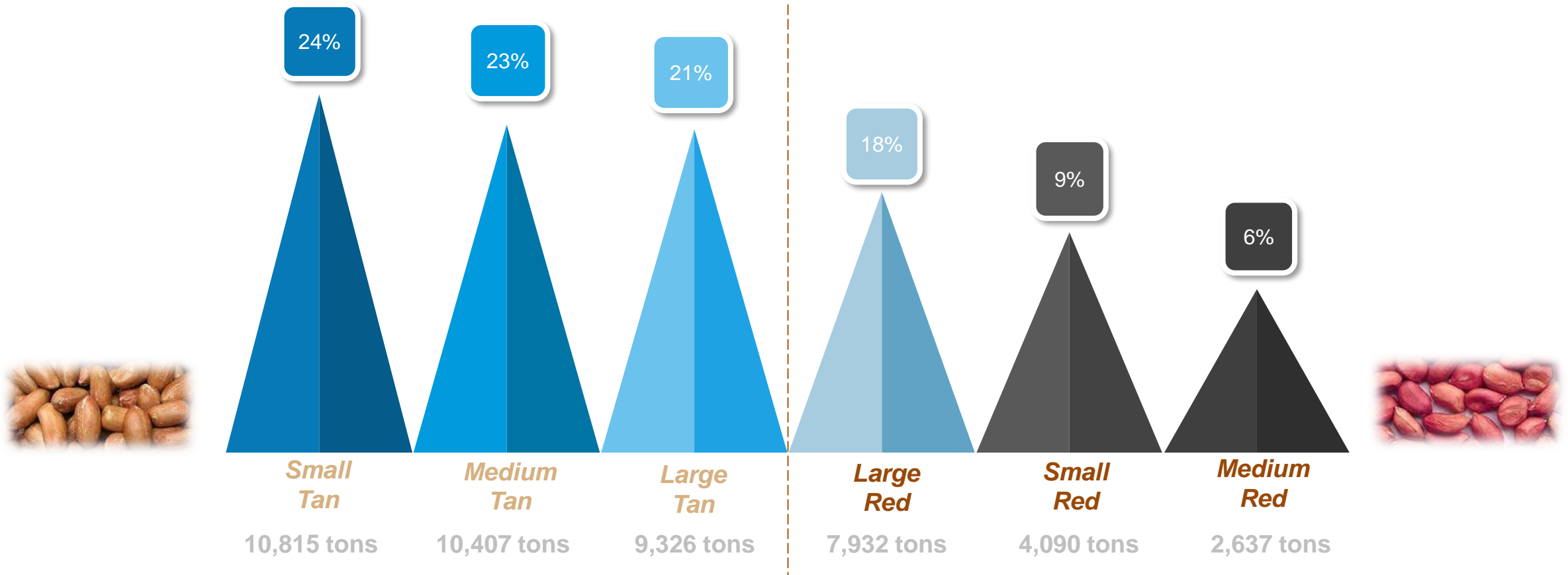
Source: Quantitative Study
Base: N=1100 (M: n=551. F: n=549)

PRODUCT
TYPE

Volume per Product Type



There was higher production for the **tan groundnuts** across all 3 sizes. Small tan and medium tan product types had the highest sales volumes and in almost equal proportions. However this differs for the red groundnuts where the large red was substantially the most sold product type.



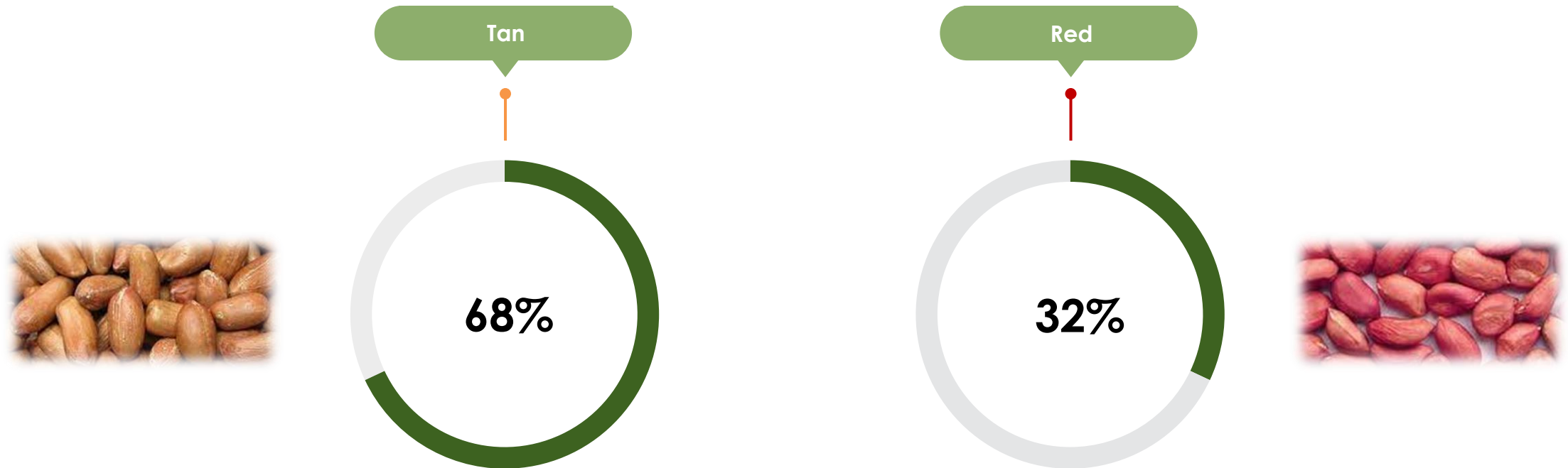
- Base: N = 300 Traders: 213 Informal, 87 Off takers.
- Source: Accelerate Report

Total = 45,207 tons

Color: Red vs Tan



Overall, more tan groundnuts are traded in Tanzania compared to red groundnuts.



small 24%, mid 23%, large 21%

Tan varieties are mainly produced in Dodoma, Songwe, and Dar es Salaam

large 18%, small 9%, mid 6%

Red is produced in more regions despite having the lower volume; Songwe, Mwanza, Dodoma, Dar, Katavi

- Base: N = 300 Traders: 213 Informal, 87 Off takers.
- Source: Accelerate Report

Size: Big/ Medium/ Small



Size of groundnut was mainly related with production region. Large groundnuts were mainly found in the Southern highlands (Songwe), small and medium were prevalent in central Tanzania (Dodoma).



LARGE

Large Tan: 9326 tons. 21% share.
Large Red: 7932 tons. 18% share.
Mainly produced in Songwe.



SMALL

Medium Tan: 10815 tons. 24% share.
Medium Red: 4090 tons. 9% share.
Mainly produced in Dodoma (tan) and Mwanza (red).

38%



Medium

Medium Tan: 10407 tons. 23% share.
Medium Red: 2637 tons. 6% share.
Mainly produced in Dodoma.

33%

29%

- Base: N = 300 Traders: 213 Informal, 87 Off takers.
- Source: Accelerate Report

Product Type vs Region



There is a very strong relation between region and groundnut product categories. Small tan, medium tan, and medium red are mainly produced in Dodoma. Large tan and large red are mainly produced in Songwe. Small red is mainly produced in Mwanza. Outside these three regions, there is potential to produce the product types which are being produced in significantly lower proportions.

Small Tan



	n	Tons
Total sales	85	10,815
Dodoma	19	9,160
Tabora	9	626
Singida	12	414
Mwanza	12	291
Katavi	8	177
Shinyanga	16	75
Dar es Salaam	4	66
Mbeya	4	5
Mtwara	1	1

Medium Tan



	n	Tons
Total sales	192	10,407
Dodoma	12	4,876
Dar es Salaam	11	1,967
Mwanza	29	943
Katavi	16	678
Tabora	20	556
Mtwara	32	548
Mbeya	42	397
Songwe	4	351
Shinyanga	5	45
Singida	7	25
Kigoma	13	21
Simiyu	1	1

Large Tan



	n	Tons
Total sales	47	9,326
Songwe	18	8,736
Mbeya	14	404
Dar es Salaam	4	92
Kigoma	1	60
Mtwara	3	28
Tabora	1	2
Shinyanga	1	2
Mwanza	1	1
Katavi	2	1
Simiyu	1	1
Singida	1	0

Large Red



	n	Tons
Total sales	122	7,932
Songwe	12	3,969
Dar es Salaam	14	1,500
Katavi	25	1,269
Mbeya	32	491
Tabora	4	212
Kigoma	9	196
Singida	7	194
Mtwara	15	66
Mwanza	1	15
Shinyanga	2	14
Dodoma	1	8

Small Red



	n	Tons
Total sales	23	4,090
Mwanza	1	2,500
Tabora	4	654
Singida	9	592
Dodoma	4	325
Shinyanga	3	12
Kigoma	1	6
Katavi	1	0

Medium Red



	n	Tons
Total sales	50	2,637
Dodoma	6	1,447
Tabora	12	599
Katavi	8	484
Singida	7	38
Mwanza	6	21
Dar es Salaam	3	21
Mbeya	4	17
Kigoma	1	5
Shinyanga	2	4
Mtwara	1	2

- Base: N = 300 Traders: 213 Informal, 87 Off takers.
- Source: Accelerate Report

Volumes per Region



Majority (64%) of the total groundnut sales volumes were from two regions; Dodoma (35%) and Songwe (29%). There is room to increase production and sales in all other regions as they produce low volumes across all varieties.

Volumes (tons) groundnut sold			
	n	Vol.	%
Dodoma	42	15,814	35%
Songwe	34	13,055	29%
Mwanza	50	3,771	8%
Dar es Salaam	36	3,646	8%
Tabora	50	2,650	6%
Katavi	60	2,608	6%
Mbeya	96	1,314	3%
Singida	43	1,263	3%
Mtwara	52	646	1%
Kigoma	25	287	1%
Shinyanga	29	152	0%
Simiyu	2	1	0%
Total	519	45,207	100%



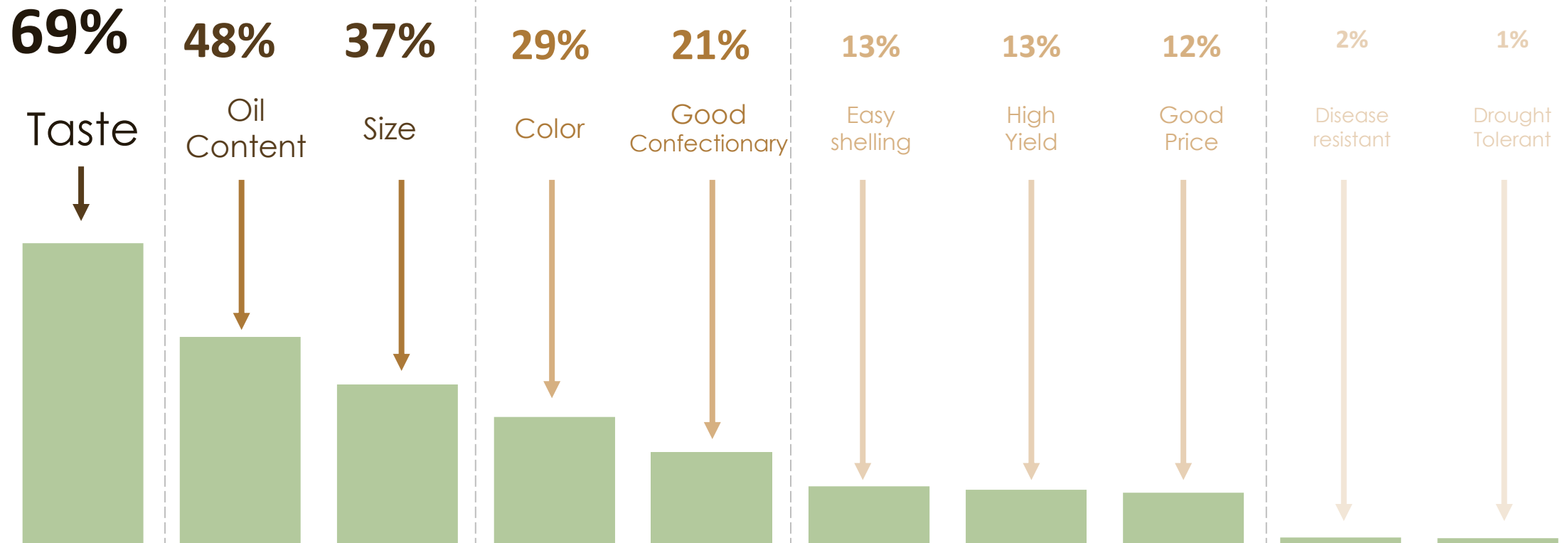
- Base: N = 300 Traders: 213 Informal, 87 Off takers.
- Source: Accelerate Report

PRODUCT PREFERENCES

Product Preferences Drivers



Taste should be a prioritized as an essential trait since it dominantly drives preference with no close rival; it should therefore be avoided as a breeding trade off. Oil content follows as confirmed by almost half the respondents. Size and color were other key groundnut characteristics.









- Source: Accelerate Report
- Base: N = 300 Traders: 213 Informal, 87 Off takers.

Preferences per Product Type



Drivers for large groundnuts (size being key) were different than for small/medium groundnuts (oil content, confectionary, easy shelling)

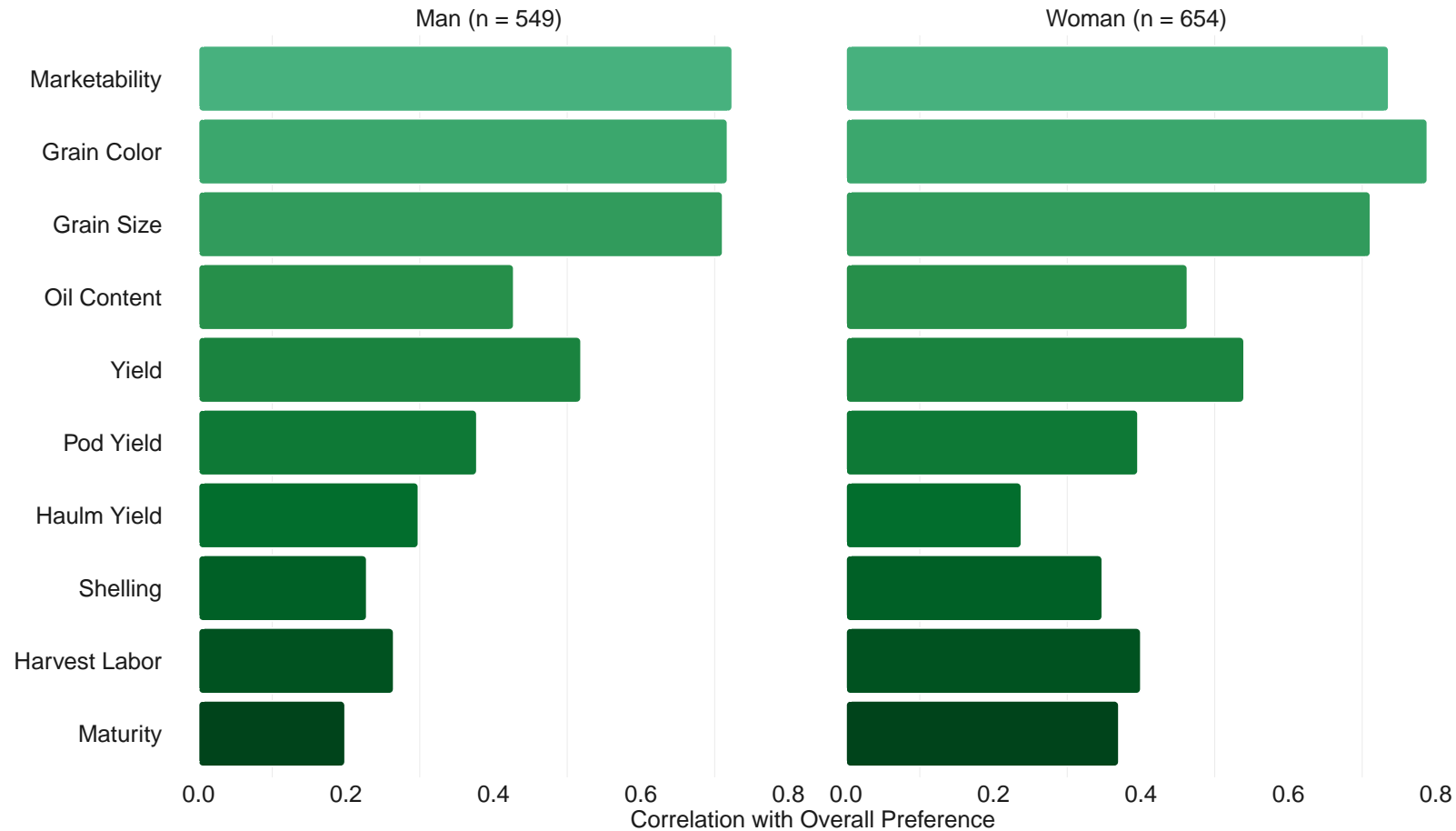
	 Small tan	 Medium tan	 Large tan	 Large red	 Small red	 Medium red
Taste	71%	71%	57%	71%	61%	72%
Oil content	78%	57%	23%	25%	52%	40%
Size	21%	25%	55%	63%	22%	36%
Colour	20%	33%	32%	27%	17%	38%
Good confectionary	15%	20%	26%	18%	39%	32%
Easy shelling	26%	18%	9%	3%	17%	2%
High yield	5%	15%	19%	14%	0%	14%
Good price	8%	12%	17%	16%	13%	2%
Disease resistant	0%	2%	6%	1%	0%	2%
Drought tolerant	2%	0%	2%	2%	4%	2%
Others*	6%	11%	13%	2%	9%	4%

- Source: Accelerate Report
- Base: N = 300 Traders: 213 Informal, 87 Off takers.

On-farm testing results (AVISA / 1000FARMS)



On-farm testing results are in line with farmer stated preferences. Overall preference correlates (Kendall correlation) with market traits for both men and women including marketability, color and size.

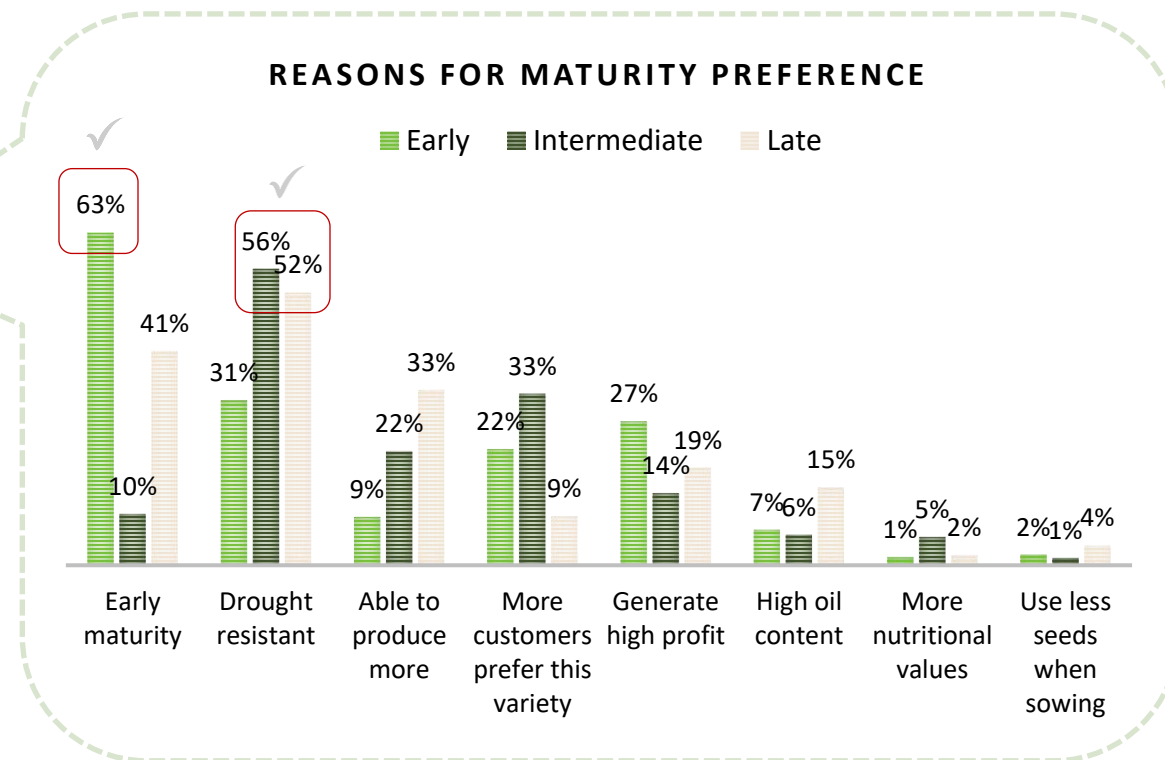
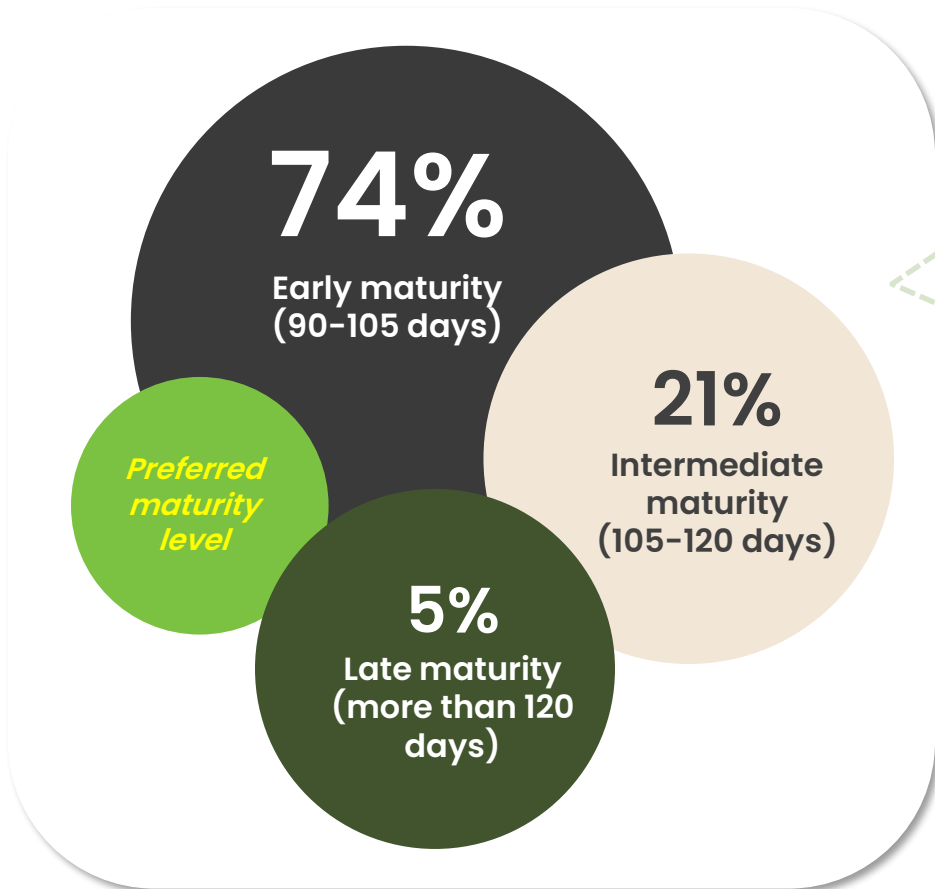


- Source: Happy Daudi, Kauê de Sousa, et al. (2023)
- Base: N = 1203 farmers.

Maturity



There is a predominant preference for early maturing groundnut varieties in Dodoma and Shinyanga as these are arid and semi-arid production environments. Late maturity (and larger groundnut size) might be more demanded in highland areas.

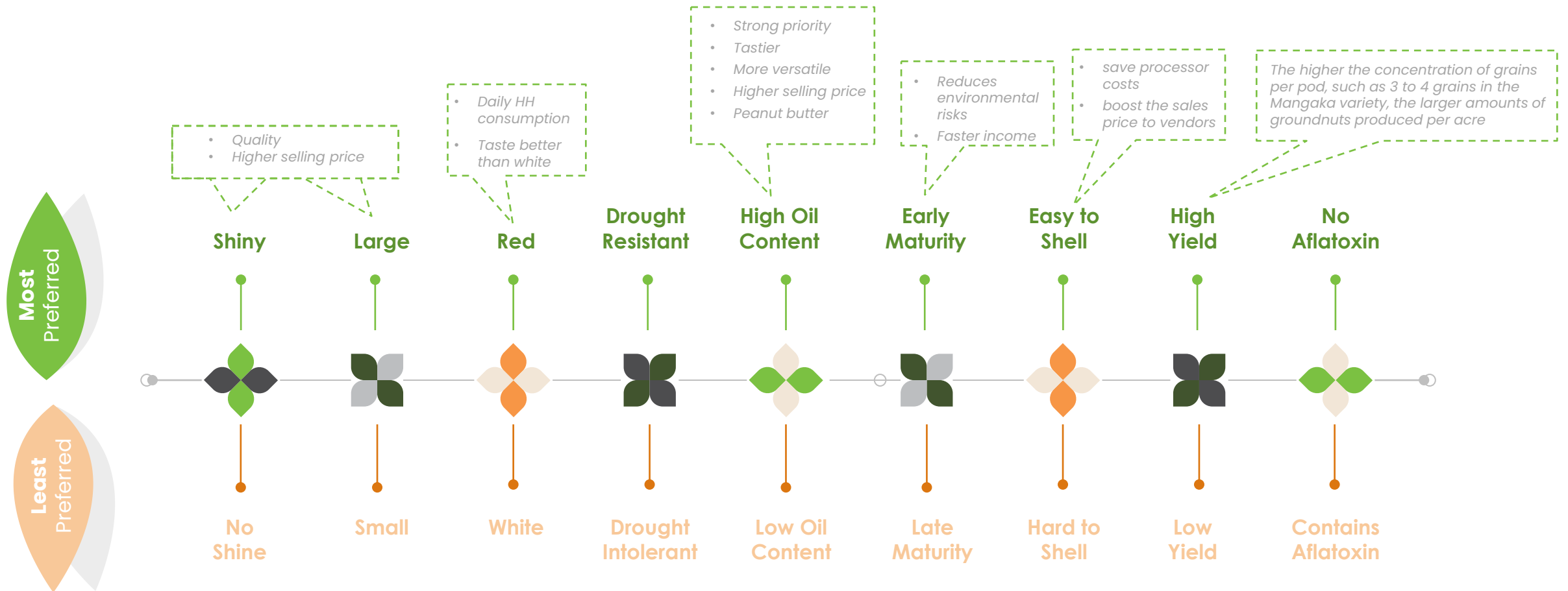


Source: Quantitative Study
Base: N=1100 (M: n=551. F: n=549)

Key traits for farmers



Shine level of groundnuts was important due to quality associations that fetch farmers higher prices. **Farmers prefer large size** groundnuts but **peanut butter producers prefer small size** since are easier to break down into peanut butter and have more oil content. **Drought resistance, early maturity and aflatoxin resistance can be combined** in the category of reducing climate risk for groundnut farmers; less field exposure time and harvest loss. High yield seeds were the second most popular trait discussed and are seen as a priority to maximize the per plant / per acre financial benefit. Agronomic elements such as **intercropping, planting on flat or sloped land, did not generate many points of discussion.**



SEED SYSTEMS

Gender Role



Women are responsible for groundnut farming.

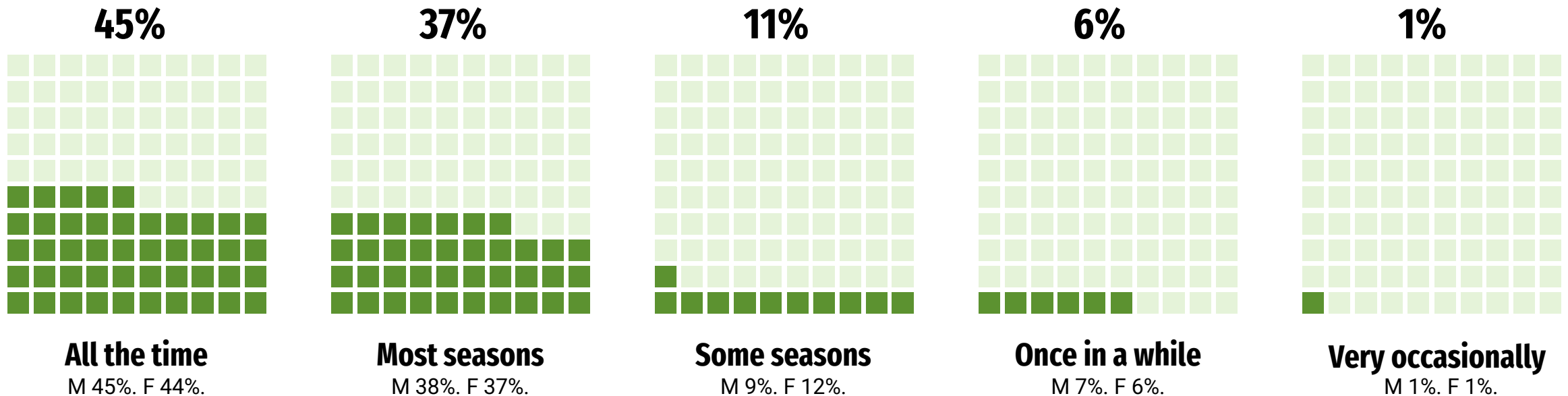


Recycled Seed Frequency



All farmers confirmed to have recycled seed and the highest proportion (81%) do it frequently. This verifies both low uptake of improved varieties and prevalent subsistence farming. Increased adoption can be achieved through awareness and trial usage strategies. Alternatively commercialization through seed credit programs can be implemented where ready markets exist for the creditors.

Frequency of using recycled groundnut seeds

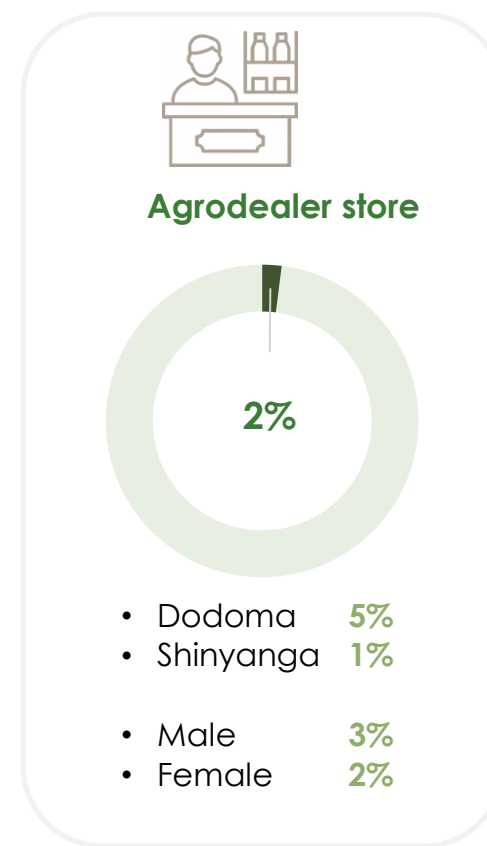
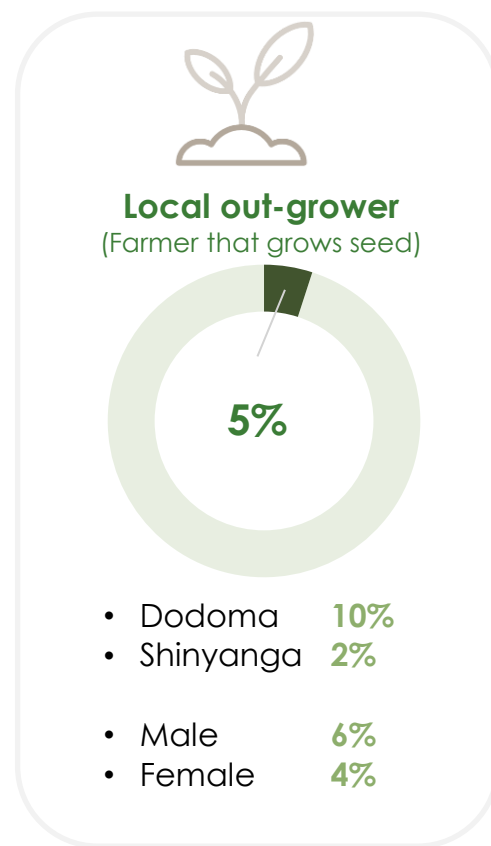
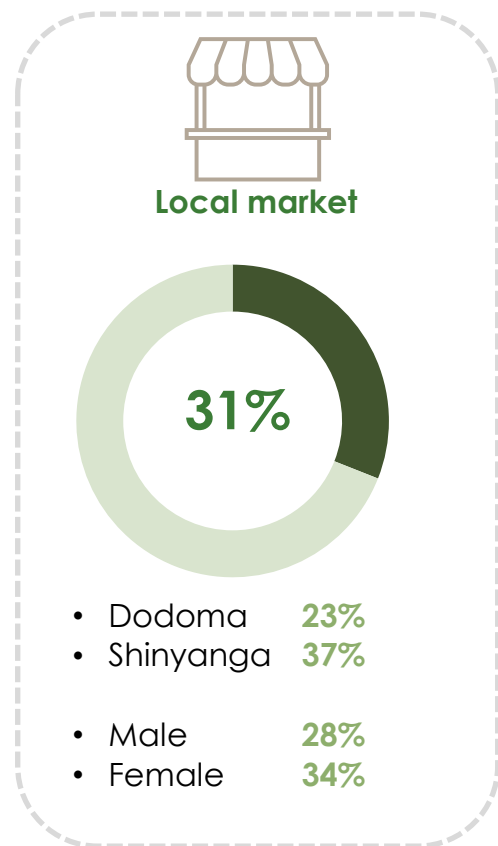
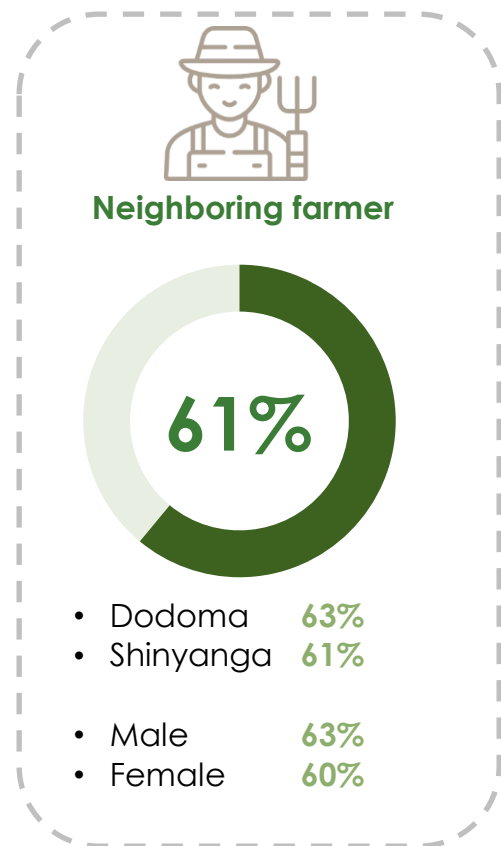


Place of purchase



Majority of farmers access or purchase groundnut seed from neighboring farmers and this practice is common across men and women. About a third purchase seed from the local market and this practice was skewed to Shinyanga and female farmers. *Both practices confirm reuse of grain as seed amongst 92% of the farmers.* Purchasing from local out-growers and agro-dealer stores is uncommon.

Where do you access/purchase groundnut seed? (n=485) (%)



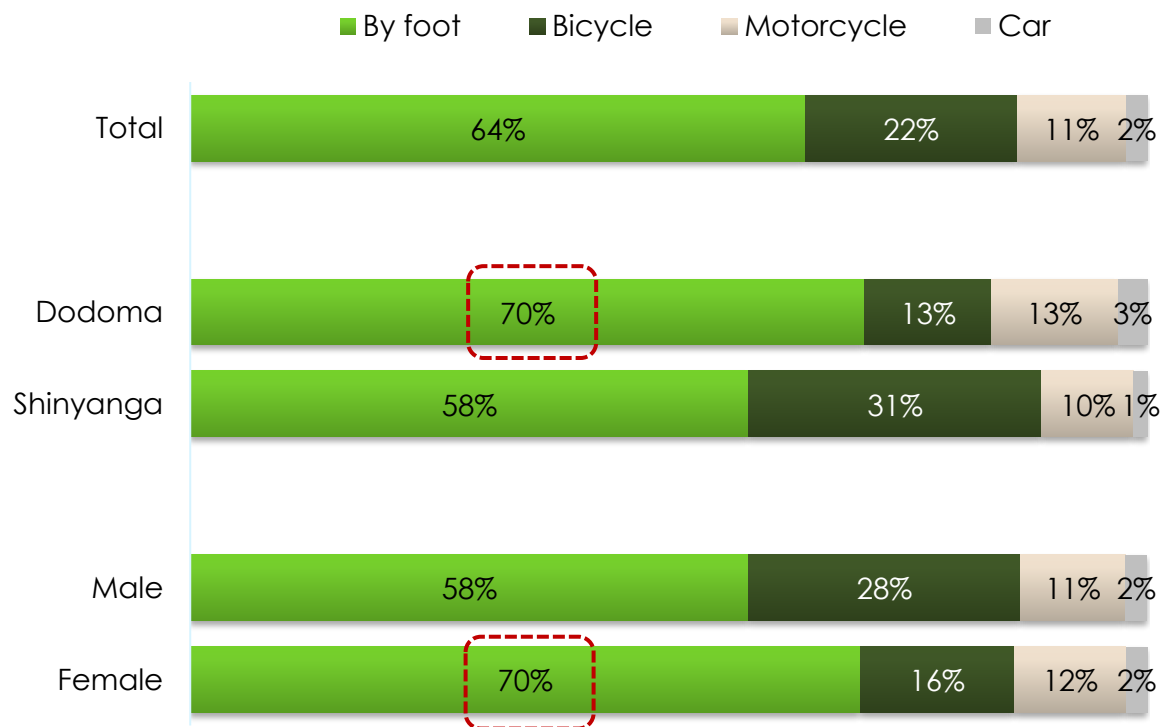
Source: Quantitative Study
Base: N=485

Duration & Mode of Transport

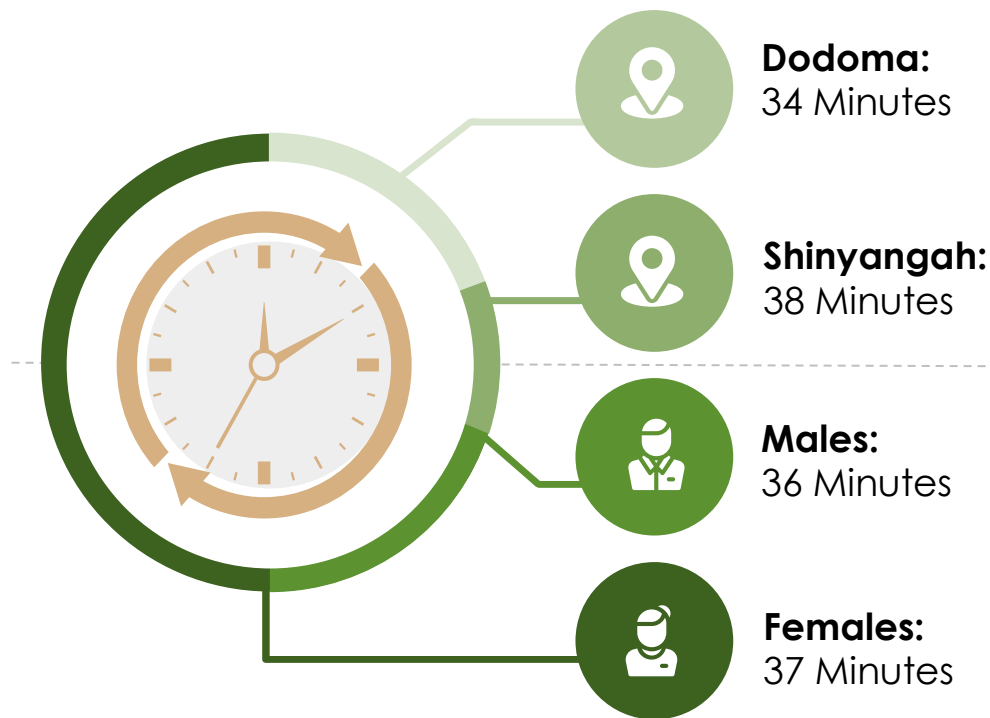


Farmers essentially walk to purchase/ access seed; at their neighboring farmers and local markets as earlier established. The average 36 minutes travel implies long proximities. About a third of Shinyanga and male farmers use a bicycle, *implying much longer proximities for the former or higher transport accessibility for the latter*. Using a motorcycle is rare and trivial proportions would use a car.

Mode of transport to access seed (%)



Minutes travelled to access seed:
Average = 36 Minutes



Source: Quantitative Study
Base: N=485

Purchase Interest



Although only 7% of farmers bought seed with agro-dealers and out-growers, there was a high interest among farmers to buy groundnut seed if it would be available in their area with over 4 out of 10 farmers interested to buy seed every season. Purchase interest was relatively higher among male farmers and in Shinyanga compared to Dodoma.

If groundnut seed would be available in your area, would you be interested?



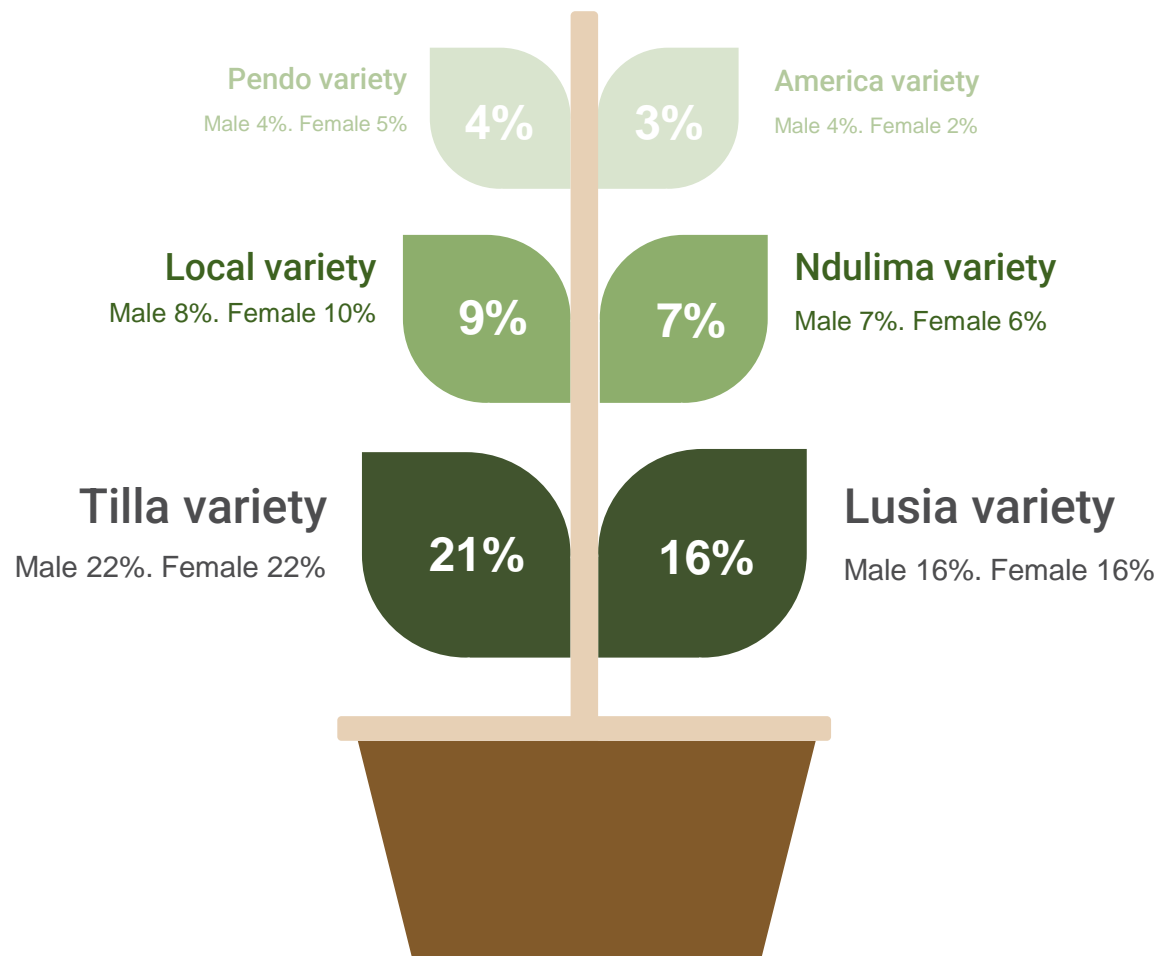
Source: Quantitative Study
Base: N=485

VARIETIES & TRAITS

Varieties grown main season



The groundnut varieties grown are quite fragmented as almost thirty varieties were mentioned; and more than twenty of them are each grown by less than 1% of farmers. The highest proportions confirmed to be growing Tilla and Lusía making them the most adopted varieties, followed by Ndulima, Pendo, and America varieties.



- .. other varieties mentioned <1% ..
- | | |
|--------------------------|----------------------------------|
| <i>Red color (27%)</i> | <i>Bara seed</i> |
| <i>White color (19%)</i> | <i>Groundnuts with two seeds</i> |
| <i>Mandulima (2%)</i> | <i>Johali</i> |
| <i>Mangaka</i> | <i>Kidaki</i> |
| <i>Daki</i> | <i>Kongo</i> |
| <i>Jazaa</i> | <i>Madila</i> |
| <i>Manyema</i> | <i>Mambo sasa(Kigoma)</i> |
| <i>Ulanda</i> | <i>Mayowe</i> |
| <i>Yakisikuma</i> | <i>Mbunga</i> |
| <i>Combat</i> | <i>Nyasa</i> |
| <i>Mnanje</i> | <i>Nachingwea</i> |

INPUTS

Farming/ harvesting



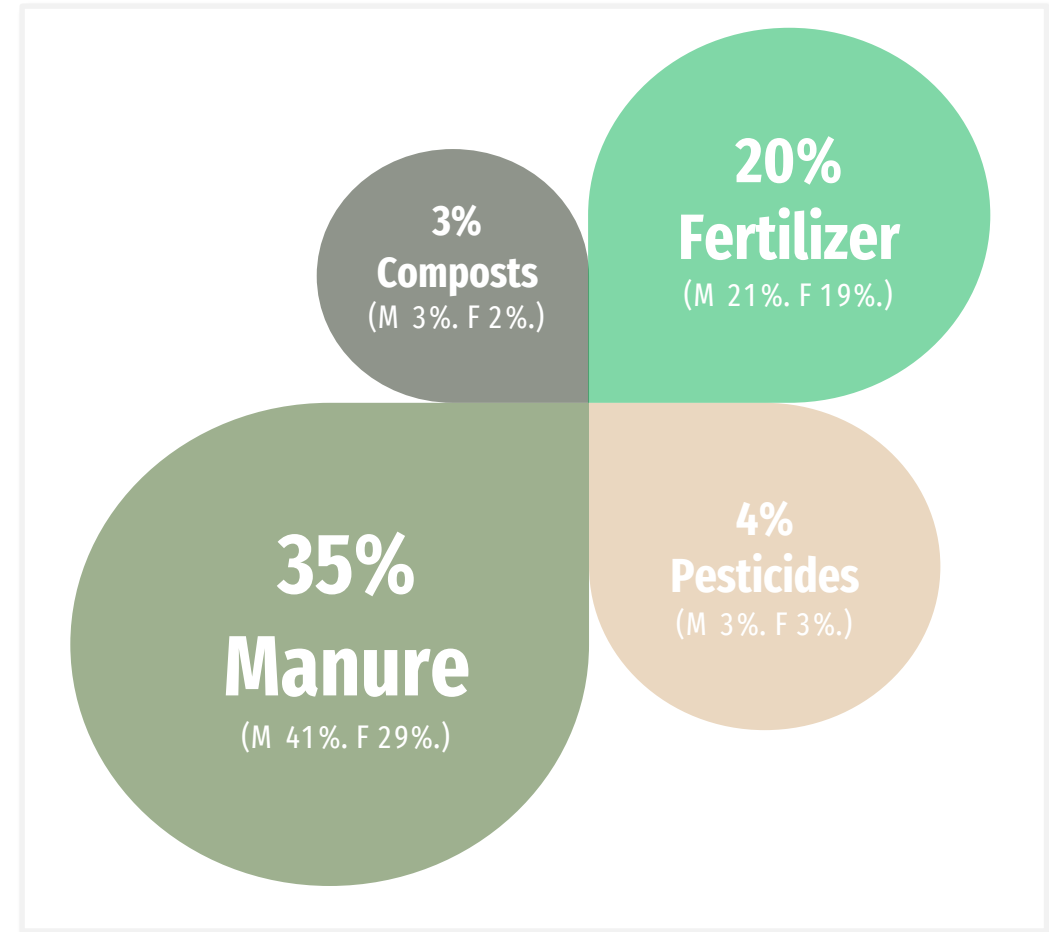
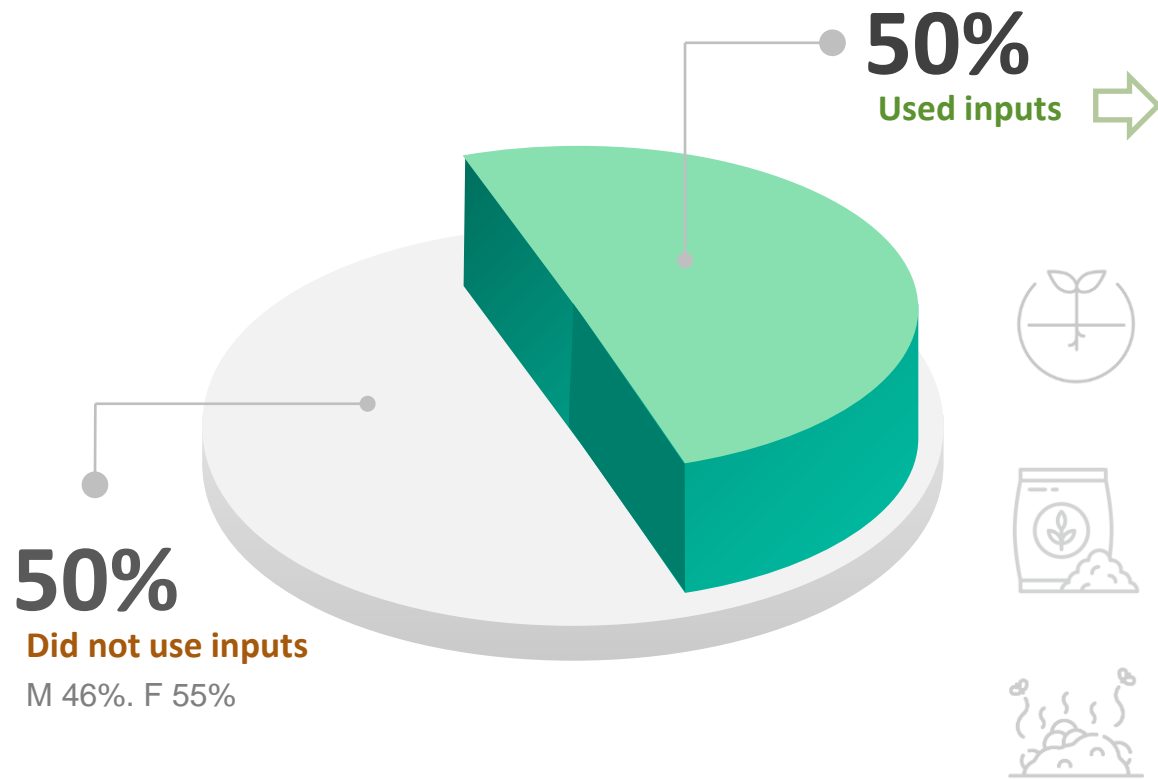
Testing of new varieties should be done under low-input systems since groundnuts are less associated with requiring inputs



Crop inputs during past 12 months



Half the farmers do not use any inputs after planting and this is more prominent for female farmers. Less input varieties would therefore be suitable to sustain drought resistance, high yield, disease and pest resistance. Amongst those who use inputs, manure and fertilizer and the most applied. Use of pesticides and composts is unconventional in groundnut farming.

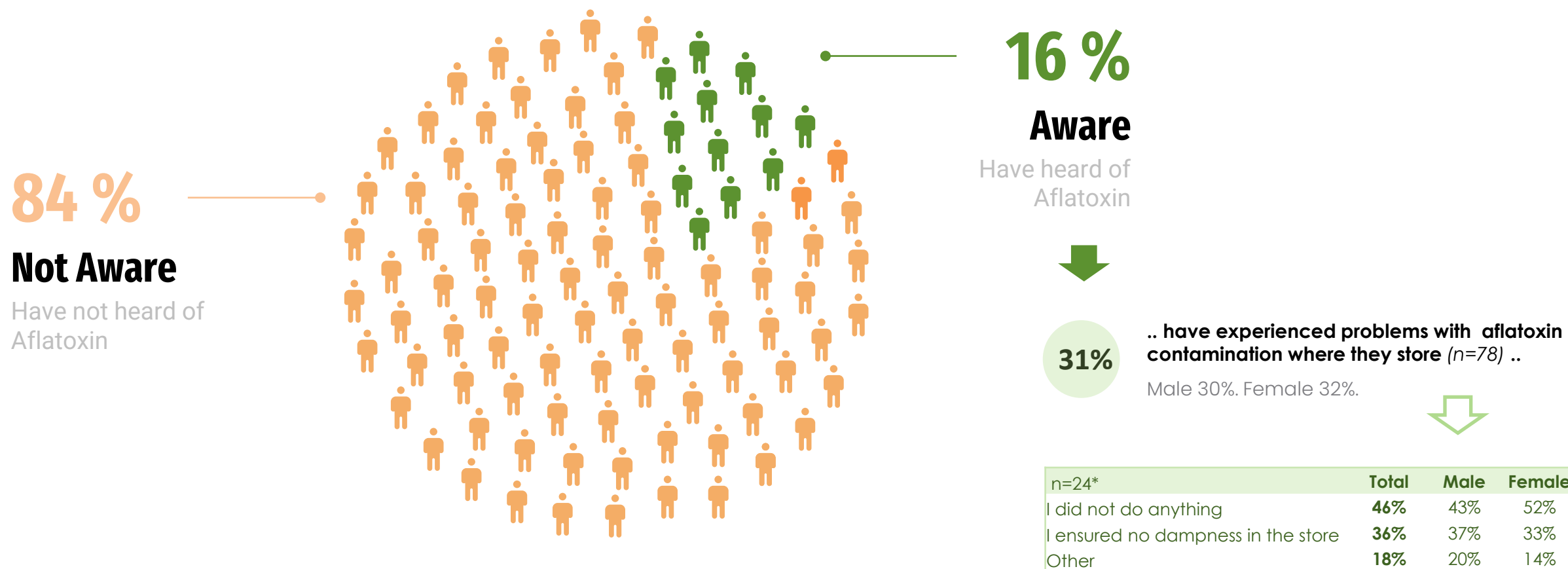


AFLATOXIN

Aflatoxins



Groundnut farmers are not aware of Aflatoxin yet the crop is the most affected after maize. To promote adoption of aflatoxin resistant inputs or varieties, widespread communication of it must be achieved since awareness inevitably precedes adoption. Amongst the few who are aware, a third of them have experienced problems with contamination during storage; the highest proportion did not do anything about it.

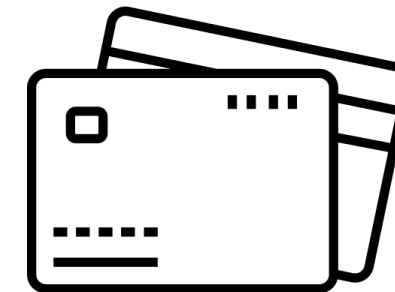
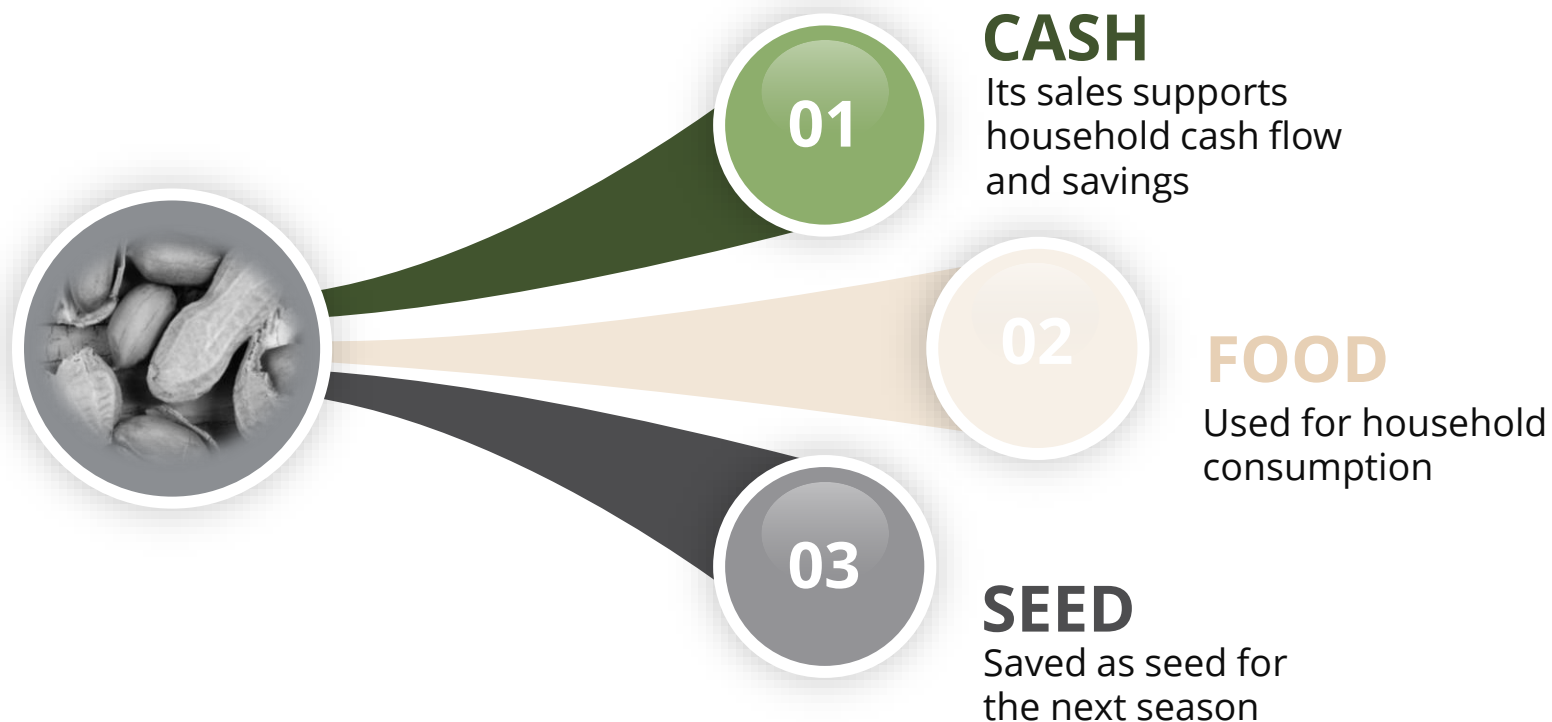


GROUNDNUT USE

Grain Use (1/2)



Farmers grow groundnut for three main reasons: sales, household consumption, and seed generation. Although the balance of the three uses varies between farmers, it appears the majority grow it for cash purposes first, household consumption second and seeds third.



“...qualitative survey findings in Dodoma, particularly from women, indicate that groundnuts are **like an ATM card for quick cash withdraws...**”

“...women farmers reported that they **sold groundnut throughout the year** and this provided money for their needs, thus ATM ...”

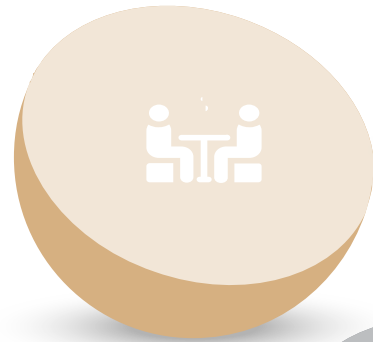
Grain use (2/2)



Majority (56%) of the produce is sold and at different stages; after harvest, later in season, used for payments in kind. Only about a third is used for home consumption. This confirms that groundnuts are more of a cash crop despite the prevalent recycling of seeds and low use of inputs. Farmers therefore need improved varieties that would help them maximize commercial gains from the crop.

Consumed: 29%

Male 27%. Female 31%.



Sold directly after harvest 29%

Male 30%. Female 27%.

Sold later in season: 23%

Male 24%. Female 21%.



Kept for next season: 15%

Male 15%. Female 15%.



Used for payment in kind 4%

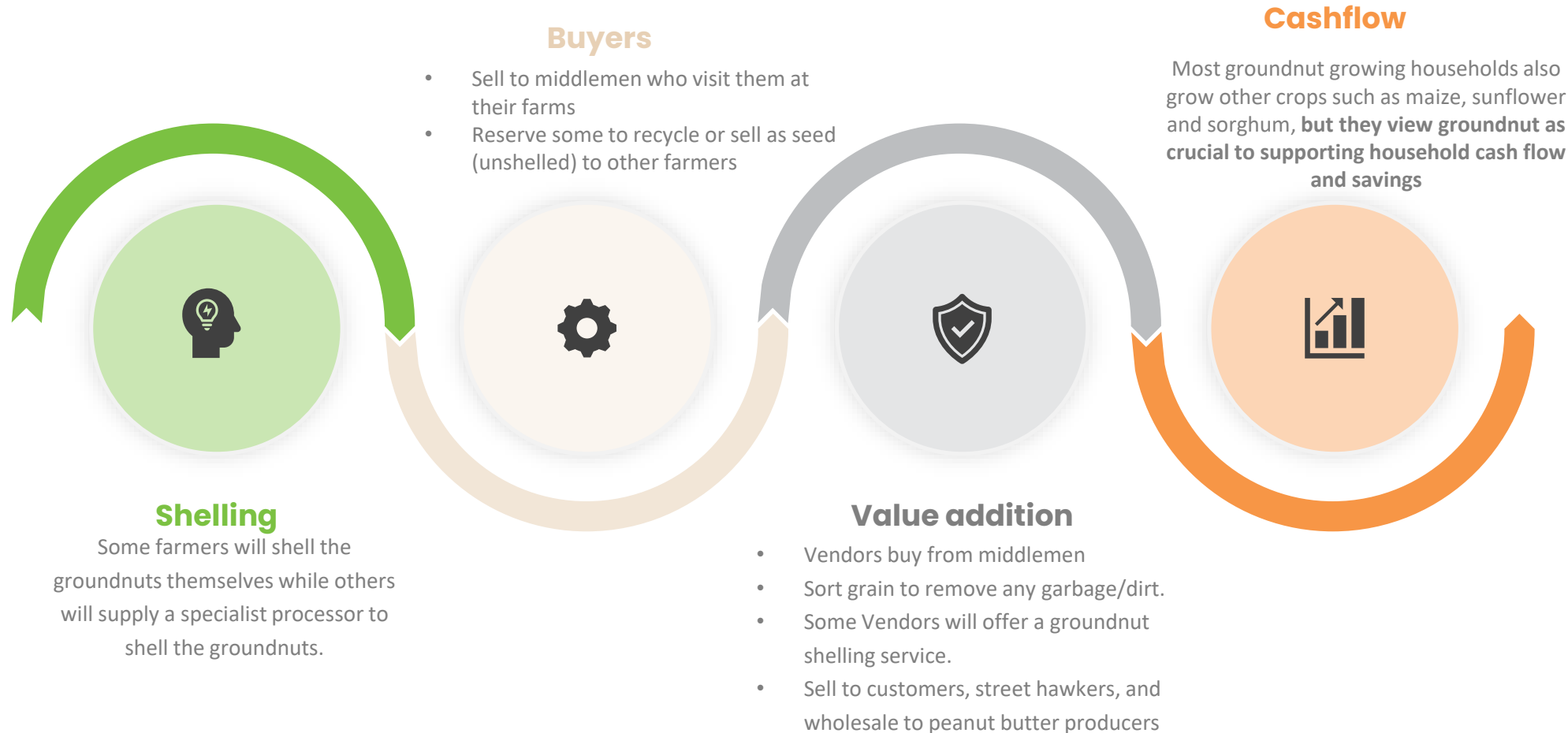
Male 3%. Female 4%.



Sales process



Farmers are responsible for shelling the groundnuts before selling to middlemen who sell to vendors. The end customer are the roadside buyers, hawkers, and processors. As earlier informed, groundnuts are crucial to the farmer households cashflow.



Home consumption



There is a high demand for groundnuts locally in Dodoma and Shinyanga as they are a popular nutritious daily food

01

Ways of consumption

Groundnut growing households typically consume groundnuts daily as either a snack, an accompaniment to dishes, boiled or as a sauce.



02

Peanut butter opportunity

Increased demand for peanut butter is cited by groundnut processors as one of the key business opportunities to exploit.



03

Cooking oil substitute

While government officials also acknowledge that due to the increased price of standard vegetable or sunflower cooking oil, groundnuts provide a flavor some, affordable cooking oil alternative.



Funding sources and partners

01

MARKET INTELLIGENCE INITIATIVE

- The CGIAR Initiative on Market Intelligence brings together strategic info on future crops, market segments and trait priorities aligned to the needs and preferences of farmers, agri-business and consumers.
- Funding: CGIAR donors

02

ACCELERATE

- Accelerate aims to develop a scalable model for accelerating the adoption of improved, climate-resilient varieties of beans, sorghum, groundnut, and other open-pollinated crops by small-scale producers in Africa
- Funding: BMGF

03

AVISA

- Accelerated Varietal Improvement and Seed Systems in Africa (AVISA) project, aims to improve the livelihoods of small-scale producers and consumers of sorghum, millet, groundnut, cowpea and bean.
- Funding: BMGF

04

1000FARMS

- 1000FARMS aims to implement an Africa-wide digital on-farm variety testing network to provide the critical performance data and farmer feedback required for optimized breeding and placement decisions for new climate-adapted and farmer-preferred crop varieties.
- Funding: BMGF





Thank you for
your interest!

