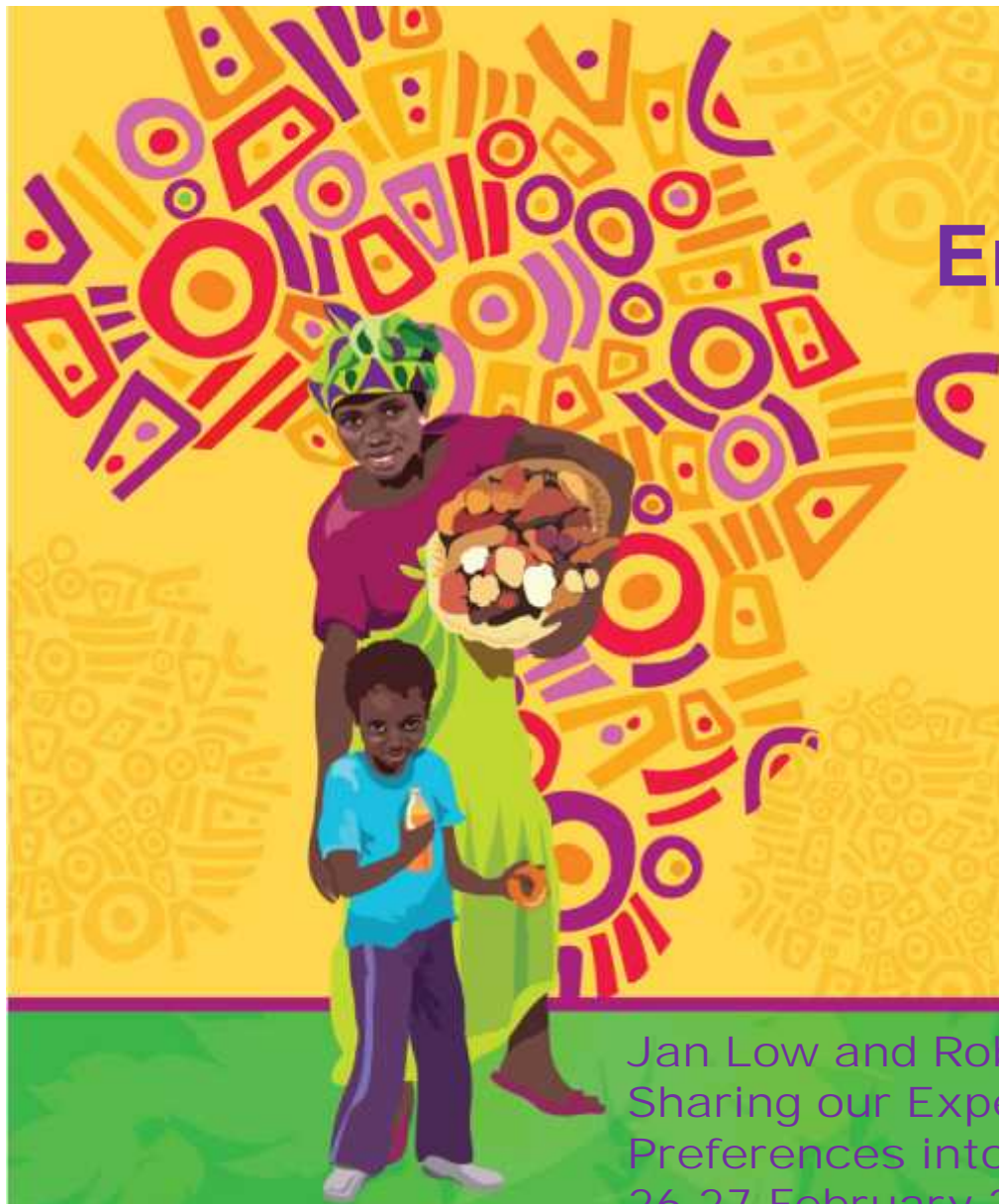


Beyond Yield: End User Preferences



Jan Low and Robert Mwangi
Sharing our Experience at the Integrating End User
Preferences into RTB Breeding Workshop held
26-27 February 2015

Who Are We Breeding For?



Groups:

- 1- E &C: Ethiopia, Rwanda, Kenya
- 2- Southern Africa
- 3- West Africa
- 4- E & C: Uganda, Tanzania, Burundi

- What is your key target group?
- What traits meet their needs?
- How do you assess the preferences of the target group?
- At what stage in the breeding cycle do you assess preferences?
- In your program, which variety best meets current preferences of this key target group?
- How widely has this variety been adopted?

Traits



Traits	TOTAL	East & Central						Southern					West Africa			USA
		KE	TZ	UG	ET	RW	BU	MZ	MA	ZM	SA	MAD	GH	NI	BF	
Yield (roots)	17	2	2	2	1	1		1	1		1		4	1		1
Early maturing	5	1	1									1	1		1	
Virus resistance	6	1		1	1								2		1	
Biotic stresses	5		2	1							1		1			
Fusarium resistance	2										1					1
Soil rot resistance	1															1
Root Knot Nematode resistance	1															1
Weevil resistance	4				1				1		1		1			
Alternaria resistance	1										1					
Abiotic stresses	1												1			
Drought tolerance	5		1						1		1		1		1	
Beta-carotene content (nutrition)	15	2	2	2		1	1	1	1	1			3	1		
Mineral content (nutrition)	3						1	1					1			
Good taste	3			1								1		1		
High dry matter	15	2	1		1	1	1	1	1	1	1	1	3	1		

Traits

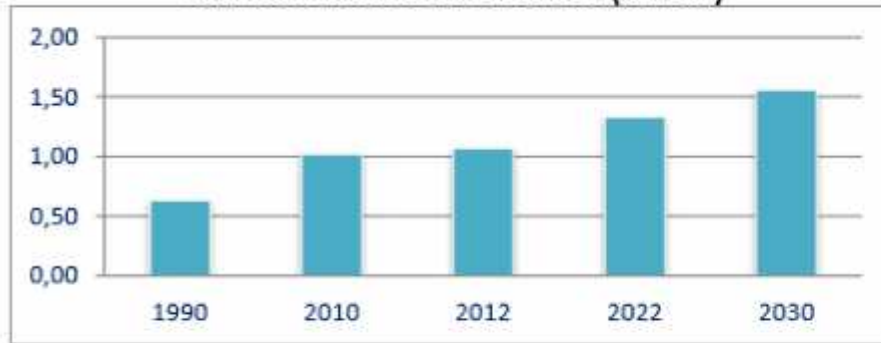


Traits	TOTAL	East & Central						Southern					West Africa			USA
		KE	TZ	UG	ET	RW	BU	MZ	MA	ZM	SA	MAD	GH	NI	BF	
<i>Starch quality</i>	3							1					1	1		
<i>Non-sweet</i>	2												2			
<i>Sweetness</i>	2									1	1					
<i>Good cooking qualities</i>	1	1														
<i>Processing quality</i>	1															1
<i>Storage ability/long-shelf life</i>	2	1													1	
<i>Root shape</i>	4	1									1			1		1
<i>Root size</i>	2													1		1
<i>High quality seed</i>	1													1		
<i>Thick vines/vine vigor</i>	2												2			
<i>Leaf quality (eating)</i>	1									1						
<i>High foliage yield/Dual purpose</i>	2					1						1				

The World is Changing



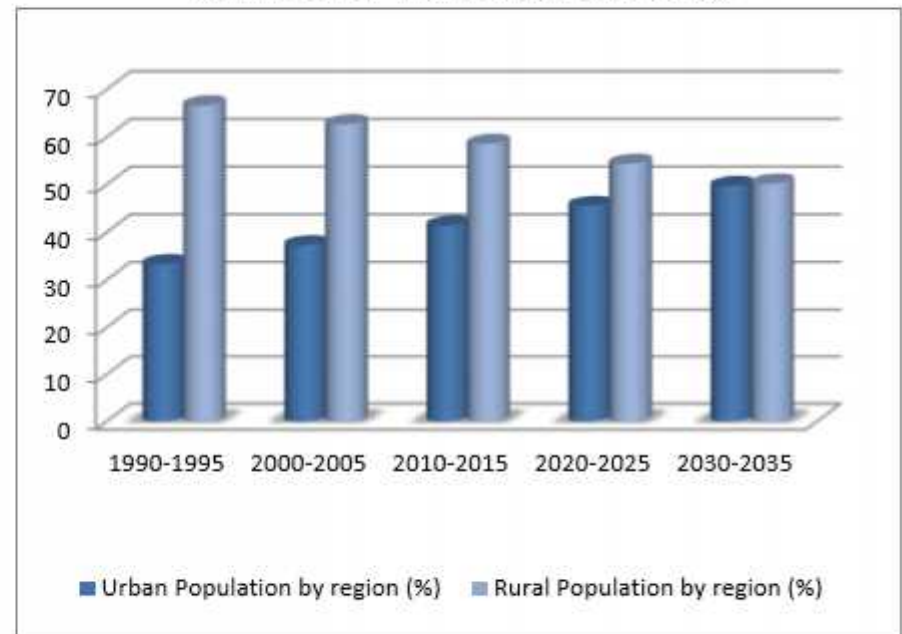
GRAPH 1 : AFRICA TOTAL POPULATION (BILLIONS)



Source: AfDB based on UN Population Division data.

1.6 billion in Africa by 2030
19% of World's Population

GRAPH 8: AFRICA- URBAN-RURAL POPULATION (%)



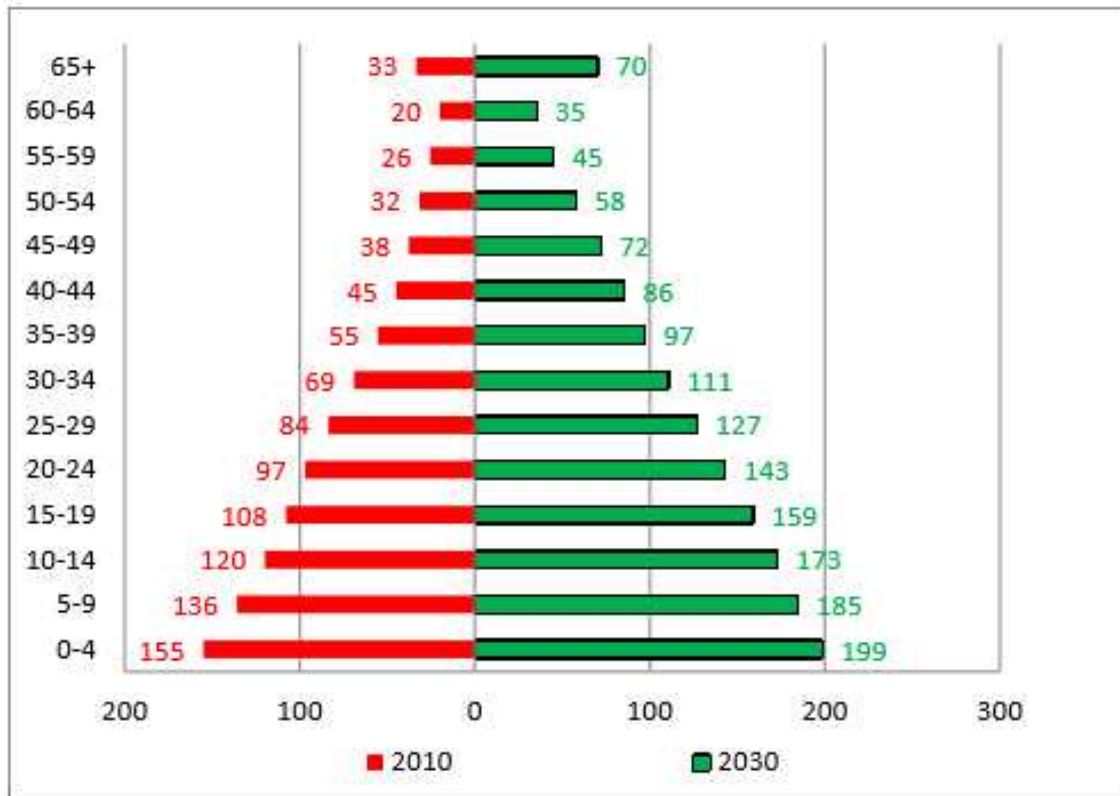
Source: AfDB based on UN Population Division data.

Urbanization rate highest in world
By 2035, more urban than rural residents

The Demographic Balance is Shifting



GRAPH 7: AFRICA POPULATION BY AGE GROUP 2010 AND 2030



Source: AfDB based on UN Population Division data.

By 2030:

More young people relative
working age groups

Also, more elderly surviving

How can we understand how to breed better now and for the future?



- Examples from several projects (NextGen Cassava) & the private sector (Nestle's & HZPC Holland)
- Mix of food scientists, socio-economists & breeders: Quality Traits
- Varietal adoption decisions are the product of the interaction between:
 - 1) the characteristics (traits) of the variety (V),
 - 2) the characteristics of end users (U), and
 - 3) the characteristics of the socioeconomic environment (E).
- Are there engendered traits we are failing to understand?
- Private sector develops typologies by classifying individuals into types of users (segments)

Key Points from Nestle



- Consumer-centric approach. The end user is a key player.
- Understand why consumers behave how they do (focus groups, individual interviews, ethnographic research)
- Trained assessors to monitor sensory attributes discover commonalities in consumer preference drivers to shape nationally- or regionally-accepted products
- Sensory attributes don't vary much for traditional foods from village to town, but it becomes more about prioritizing sensory against services, e.g. convenience
- Note, however, that only 50% of the ideas make it...

Key Points from HZPC



- There is not one perfect potato: there are many perfect potatoes, depending on the clusters and many other factors.
- Heavily invested in high-throughput texture analysis
- 350 flavor components make or break the quality of the potato
- Sugar is the most important piece for processing trait profiling
- Most quality traits have medium to high heritability and are multi/polygenic in nature
- Developing SNP markers for potatoes: about 20-25 SNP markers may explain 80% of variance

Where are we with Sweetpotato?



- BMGF commissioned study: Root, Tuber, and Banana Textural Traits--- literature review
- Paucity of literature on sensory traits in SSA
 - Missed Ray & Tomlins 2010 book:
Sweet Potato: Post-harvest Aspects in Food, Feed, & Industry
- G X E interactions can affect textural traits, making breeding more challenging
- Tomlin's work found starch, taste & sweetness were most dominant sensory attributes for consumers. Stickiness also key.
- Starch digestibility & pasting qualities vary widely by variety
- Sugar composition changes on cooking, more maltose..

Note From Marketing, Processing & Utilization Community of Practice



- Need to start considering more nutritional attributes affecting processing & include in catalogue with traits
 - Fried foods
 - Starch content
 - Reducing sugar content
 - Amino acid – Asparagine (browning)
 - Moisture content (already reporting)
 - Puree
 - Sugar content after cooking
 - Amylase activity
 - Fiber—stringiness
 - Flour
 - Ability to retain beta-carotene after heating
 - Starch as a thickening component; Dry matter content
- Need to breed more for shape (oblong) and form (no bumps) and size (200-300 grams)
- How to better capture odor? Seems to be an issue especially with OFSP.



Developing Consumer Profiles



- What are 3 distinct market segments in your sub-region/country for which distinct sweetpotato varieties are needed?
Now & in the future...
- What are the key traits for each of these segments?
- Which of these traits could be determined using Near-infrared spectrometry (NIRS) technology or another fast throughput method?
- How should we approach confirming these consumer profiles and estimate the future size of the different market segments?