



Improving farm-based seed production and storage



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Tsvetelina Stoilova
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Arusha, Tanzania



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- founded in **1971**, in Africa since **1992**
- our **research and development** is **nonprofit**
- our research outputs are **global public goods**
- **prosperity for the poor, health for all**

Women and youth
Income
Nutrition

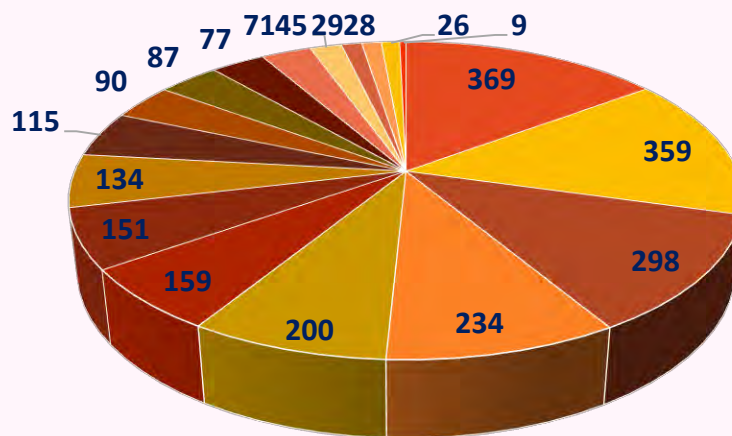


theme germplasm



the world's largest vegetable collection (>60,000 accessions)
439 species from 156 countries

Germplasm collection at WorldVeg, ESA

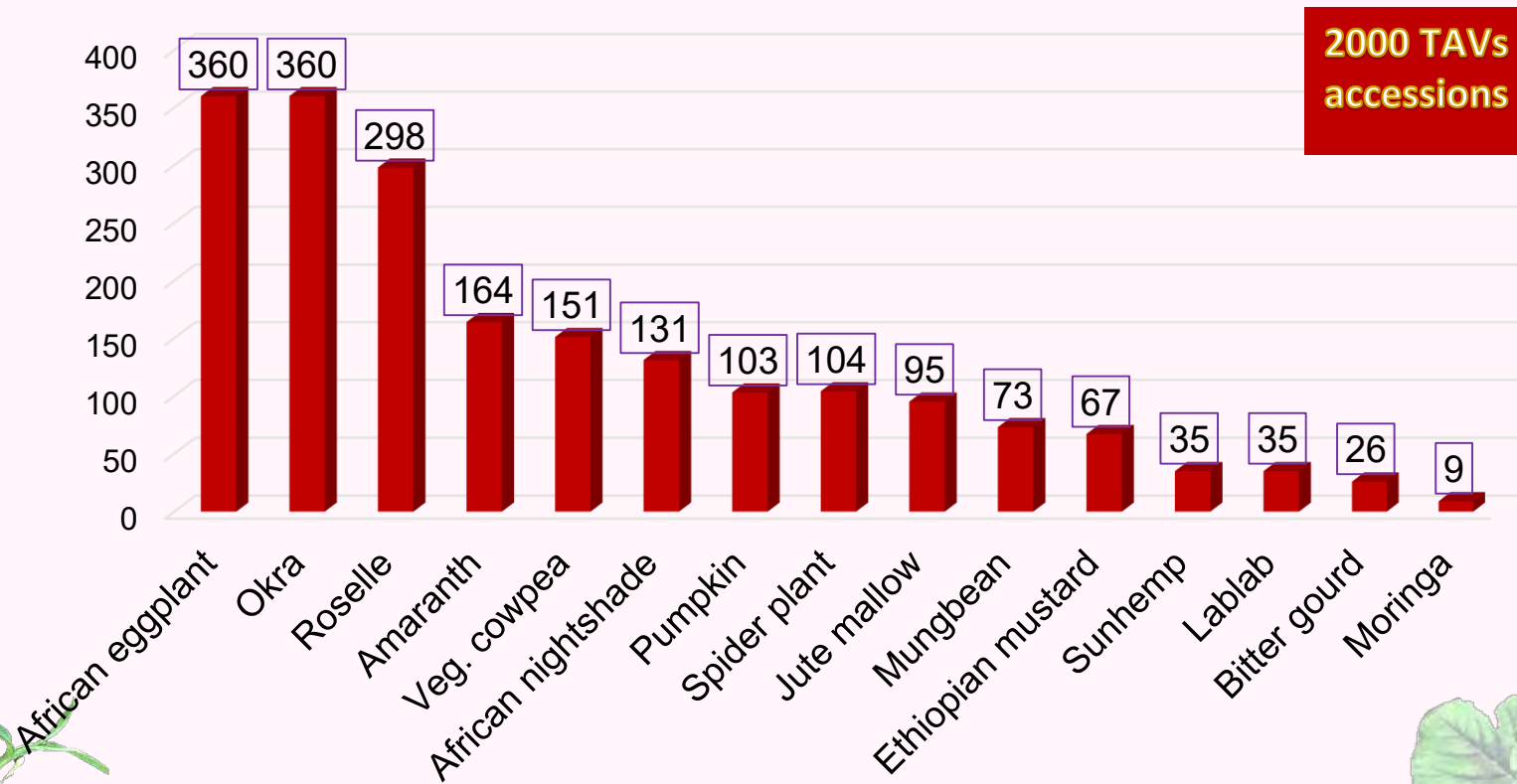


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|----------------|--------------------|------------|-----------------|
| ■ Okra | ■ African eggplant | ■ Roselle | ■ Tomato |
| ■ Pepper | ■ Amaranth | ■ Cowpea | ■ A. nightshade |
| ■ Spider plant | ■ Jute mallow | ■ Mungbean | ■ Pumpkin |
| ■ Eth. Mustard | ■ Lablab | ■ Sunhemp | ■ Veg. soybean |
| ■ Bitter gourd | ■ Moringa | | |



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Collection of TAVs at Eastern and Southern Africa



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Traditional treasures: diet diversity



Spider plant

African
eggplant



Nightshade

Cowpea



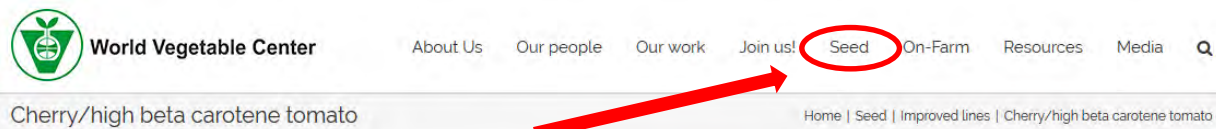
Amaranth



Ethiopian kale



Order seed: avrdc.org



AVTO0102

High beta carotene globe shaped fruit for fresh market. Early maturing, good heat tolerance, suited to hot-wet conditions.



AVTO1174

Indeterminate line with Ty-1/Ty-3 TYLCD and TMV resistance. Small fruit size with oblong shape and orange color.



AVTO1349

Indeterminate line with Ty-1/Ty-3 TYLCD and TMV resistance. Small fruit size with oblong fruit shape and red color.



AVTO1350

Indeterminate line with Ty-1/Ty-3 TYLCD and TMV resistance. Small fruit size with oblong fruit shape and red color.

COMPARE PERFORMANCE

- Table of Characteristics

MORE INFORMATION ON EACH LINE

- AVTO0102 (CLN2366B)
- AVTO1174 (CLN3284A)
- AVTO1349 (CLN3284J)
- AVTO1350 (CLN3284G-1)

DATA SHEETS IN EXCEL

- Test location & crop management
- Plant characteristics & reactions to biotic stresses
- Yield & yield components

ALL CROPS

Best widely adapted selections for commercial release:

- Chili pepper
- Sweet pepper

For breeding purposes or commercial release with further local testing:

- Fresh market tomato
- Processing/dual purpose tomato
- Cherry tomato and high beta carotene tomato
- Vegetable soybean
- Grain soybean
- Leafy brassicas
- Chinese cabbage
- Shallot
- Bitter melon
- Onion
- Cucumber
- Winter squash/pumpkin
- Rootstock

International nurseries for local testing:

- Chili pepper
- Sweet pepper



Where does the seed go?



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Seed security



- **Seed security** is defined as ready access by farmers and farming communities to adequate quantity of quality seeds adapted to their agro-ecological conditions at planting time under normal and abnormal weather conditions.
- **Formal** seed system
- **Semi-formal** seed system
- **Informal** seed system



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Seed of traditional African vegetables

Seed quality attributes

- ❖ Physical qualities
- ❖ Physiological qualities – viability and vigor
- ❖ Genetics – cultivars, improved varieties, landraces
- ❖ **Influence of seed quality to crop production**

Where to start?

Seeds



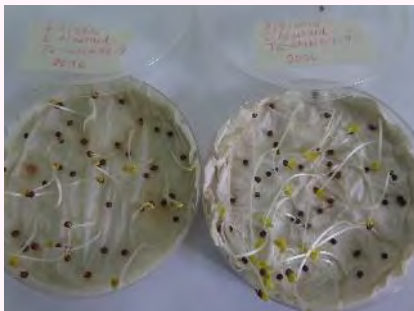
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Seed attributes

1. Physical quality



2. Physiological quality



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Factors affecting seed quality during seed production



1. Vegetative growing (climate, cultural practices, isolation distance, seed maturity, pest and diseases)





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Improved agricultural practices



GAP are collection of specific methods:

- Nursery management, fertilization, IPM, crop management.
 - This requires knowing, understanding, planning, measuring, monitoring and record keeping at each step.
 - The main challenges with TAVs include: low yields, food safety, food and nutrition insecurity, short shelf life and environmental degradation.
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Nursery management

1. Production of seedlings in trays



2. Traditional practices in beds



Nursery management
in Babati

Nursery in Uganda



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Field-tested technologies benefit small-scale farmers

Grafting: *Helps farmers overcome flooding and soil-borne diseases*



Simple rain shelters:
Protect high-value crops



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Improved varieties together with Good Agricultural Practices



Vegetables grown under stress conditions



Good Agricultural Practices



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Agricultural practices for good seed production




- ✓ Pest and disease control - IPM
- ✓ Practice crop rotation
- ✓ Sanitation (remove infested leaves and plants)
- ✓ Use botanical and other natural pesticides
- ✓ Extension officers support vegetable and seed production




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❖ Breeding and selection for desired characteristics



- Breeding program is focused on developing germplasm of OPV based on yield, yield components and fruit/leaf characteristics.
- Resistance to pest and diseases
- Breeding for nutrition



Madiira 1



Madiira 2



Nduruma



Rungwe



DB3



Improved lines – Released varieties in Tanzania



>4,000 accessions and breeding lines
dispatched annually worldwide

>500 OPVs directly commercialized

Crop	Lines	Na
Ethiopian mustard	ST3, MLEM1	Ar
African nightshade	SS49, BG16	Ole
African eggplant	DB3	
Amaranth	Ex Zim and AM38	Ma



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Isolation distance

1. Isolation distance according to the crop



Isolation through different
time planting



Avoid insect pollination
during flowering



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Harvesting crops for seed production



Harvesting for fruits and seeds



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Factors affecting seed quality during processing and storage



1. Initial seed quality
2. Water/ moisture content of seed before entry into storage
3. Conditions surrounding the seeds during storage (temperature, %RH)





Seed extracting



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Storage seeds



Seed repository



Seed moisture content 5-7%



Seed storage in different packaging materials



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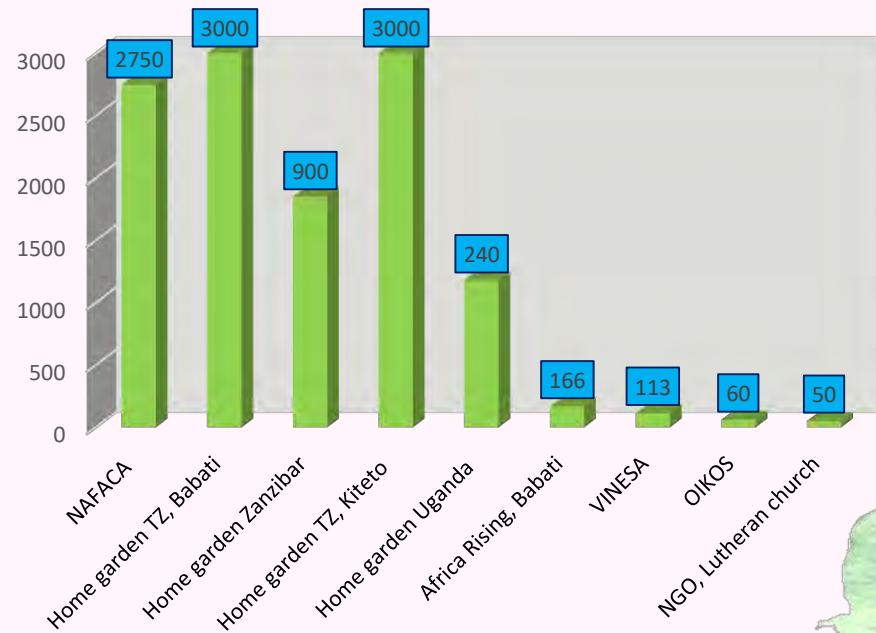
Distribution of seed kits - 2016



Baraa primary school, Arusha



10,279 seed kits distributed in 2016



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Seed Kits distribution in Ukerewe District/ Ukara Division – Helen Keller International



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Training of Trainers (ToT)

- Crop management
- Improved agricultural practices
- Plant protection, IPM, bio-pesticides
- **Seed production and storage**
- Postharvest management, food safety
- Value chain training



1005 trainers
(2012-2014)



**3,389 trainers and farmers
trained at ESA from 1994 to 2014**



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Improved cultivars and local varieties



Local 'Nakati' is wide
used in Uganda



Improved amaranth
cultivars and maintain
the local one



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How to produce your own seeds



- The seeds must be **healthy** and they must possess all the **desirable properties** that farmers need as **high yield** and **resistance to diseases**.
- Own seed production needs **knowledge** and **proper experience** to be conversant with various aspect of seed production



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Farmers' own seed production



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Farmers learn how to produce and save their seeds for the next season



Cowpea seeds produced by farmers

African nightshade left for seed production



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Success story



Good start from one seed kit



James sells his production

Mr. Juma James, village Madokani A, (Sengerema district) grows big area of soybean after receiving one Seed Kit from AVRDC's project.



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How to use traditional vegetables ?



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