Root and Tuber Crops (Cassava, sweet-potato, yam, taro) are important staples in many tropical countries. Emerging abiotic and biotic changes are now endangering their agrobiodiversity, thus threatening food security. The high distribution costs for planting materials and limited resources from local research institutes are constraining access to improved cultivars by farmers. This study aims at assessing the potential of: 1. True seeds production for on-farm plant breeding. 2. Progenies distribution under the form of true seeds and their on-farm use for wide distribution of genetic diversity.

**Materials and Methods**

- **Sites**: participative experiments in six villages located in three islands of Vanuatu, involving 4-5 farmers in each island.

**Experimental design and measurements:**

- **On-farm**:
  - Poly-cross trials for sweet potato seed production (3 cultivars) - Nb of fruits per plant (Monthly)
  - Taro seeds and seedlings raising (1 progeny) - Germination rate and kinetic, seedlings survival rate and vigour in nursery and in the field.

- **On-station**:
  - Cassava male sterility (20 cultivars) -> % of male sterile cultivars
  - Poly-cross trial for sweet potato seed production (20 cvs + 18 hybrids) -> Flowering dynamics, Nb of fruit per individual (weekly), Nb capsules / Nb of flowers, Nb of seeds per capsule, % of viable seeds
  - Evaluation of yam (130 hybrids) and taro progenies - % of eligible hybrids based on tuber quality (no oxidation/ no acidity)

On-farm and on-station experiments are complementary. The first ones provide information on farmers ability to raise early-stage seminal materials for plant breeding. The second ones provide reliable data regarding reproductive biology. A complementary analysis of farms constraints and characteristics enable us to analyse experiments successes and failures. It is of great use for development oriented recommendations.

**Results and discussion**

1. **Diversity of farms characteristics and constraints**

   Differences are mostly based on: main crop, importance of cash crops, intensity of land use. Farms practicing a less intensive land use and oriented on subsistence, appear more inclined to conduct plant breeding activities.

2. **Efficiency of on-farm seed production**

   Percentage of landraces flowering for each root crop species on the basis of interviews done in 10 islands

**Cassava (Manihot esculenta)**

- 55 landraces
- No flower
- No data
- Flower

**Greater yam (Dioscorea alata)**

- 166 landraces
- No flower
- Data
- Flower

**Taro (Colocasia esculenta)**

- 311 landraces
- Data
- No flower
- Flower

**Sweet potato (Ipomoea batatas)**

- 55 landraces
- No flower
- Data

2. **Efficiency of on-farm seed production**

   - High sexual multiplication rate, but many landraces do not flower.
   - Yam: Landraces are mainly male (dioecious), impeding fructification. Anthracnose often destroy plants before fruits are fully formed.

3. **On-farm use efficiency of true seeds**

   Reasonable germination rates in very simple seed-beds for yam (45 %) and taro (over hundred seeds per infructescence) but not for sweet potato.

4. **Socio-cultural issues**

   - Farmers knowledge on each species sexual reproduction reflects its complexity.
   - For them, the creation of new varieties is a way to get notoriety.

**Conclusions**

On-farm seed production has potential for taro and sweet potato if productive genotypes are used. Production of true yam seeds is less adapted to farm conditions. On-farm seedlings raising and progenies evaluation is feasible, but more work has to be done to identify good crosses and recommend them to farmers. However, farmers are not used to manipulate seeding materials in early growth stages. This study highlighted the need for reliable intermediaries which would conduct the early stages of seed production and nursery management. This work could be done in primary schools.