

Opportunities and challenges for hybrid potatoes in East Africa

Workshop organized by VIB-International Plant Biotechnology Outreach¹⁾ and Project group POTAREI²⁾ - June 13-14, 2019, Ghent, Belgium

Potatoes are increasingly considered an important staple crop in Africa because of their high nutritional value and limited water use, as compared to e.g. cereals. However, whereas in Northern regions yields of 40 t/ha are possible, East African yields often remain far below 10t/ha. African farmers mostly rely on traditional low productivity varieties which are adapted to East African climate conditions and with which farmers have experience. Since potatoes are normally propagated through tubers, the crop is vulnerable for stacking diseases, which results in degeneration and loss of harvest. Indeed, African farmers are facing significant troubles with tuber borne diseases like bacterial wilt, viruses, and late blight.

As an alternative to conventional breeding and tuber propagation *true potato seed systems* are currently being developed in the Netherlands. For example, the Dutch start-up company Solynta has recently established a diploid hybrid potato system which promises faster development of new potato varieties that can potentially be propagated by seed. This approach may not only lead to more effectively dealing with diseases, it also promises significantly lower transport costs of tubers, and an enhanced and accelerated capacity to breed new hybrid potato varieties adapted to local conditions that may contribute to food security aims in Africa.

It is expected that several hybrid seed multiplication and cropping strategies are theoretically possible, varying from sowing true potato seeds directly by farmers to using tubers that are produced by special firms with true potato seeds as starting material. These different strategies raise a series of questions whether these hybrid varieties of true potato seed might fit in current systems and conditions of agriculture in Africa: questions may rise about the organization of breeding and the provision and cost of seed, about breeder's rights and seed certification, about appropriate practices of propagation and cultivation, about market needs and conditions, about the role and needs of different groups and collectives of farmers, including smallholders, and about the role of public and private parties.

Workshop aims

The major aim of the workshop is to assess the opportunities and challenges for hybrid potato breeding and cultivation in East Africa from a perspective of 'responsible innovation'. Responsible innovation in this context seeks to benefit productivity, sustainability, diversity and equity in systems of agriculture, while taking into account the needs and interests of a variety of stakeholders.

¹⁾ International Plant Biotechnology Outreach (IPBO) is part of the Flemish Institute for Biotechnology (VIB) and aims to train people from less developed regions and emerging economies in order to access the latest technological developments and the design of effective biosafety and regulatory mechanisms.

²⁾ POTAREI is a Dutch NWO-funded Responsible Innovation project that aims to assess the agronomical and societal possibilities, conditions and impacts of hybrid potato breeding. Partners in this project are Wageningen University, the University of Groningen, the Rathenau Institute (The Hague) and the potato breeding firm Solynta (Wageningen).

Conceptual approach and topics to be discussed

Below we shortly discuss our conceptual approach and the topics of the workshop that follow from it, given the problem description in the introduction above.

Four worlds of innovation

With respect to the case of hybrid potato breeding we distinguish four worlds, arranged in a constellation as depicted in Fig. 1:

- The local world of potato cultivation in Africa
- The international context of (large) companies and NGOs
- The world of research
- The world of policy and regulation

These worlds should be seen as ideal-typical characterizations and are not strictly separated because mutual dependencies and shared, but also conflicting interests, values, and worldviews. Indeed, the worlds of companies, NGOs, research, policy and regulation are often more or less entangled and involved in *technological innovation*, whether it is positive or negative sense. We have depicted innovation as a shell around the local world of potato cultivation. That does not mean that there is no innovation in the local world. On the contrary, it is a challenge to find out how technological and local innovation can be aligned. It is our conviction that we should search, from the perspective of responsible innovation, for a balance of interests and values across the different worlds. For each of these worlds, we can identify more specific or practical issues that will be discussed during the workshop.

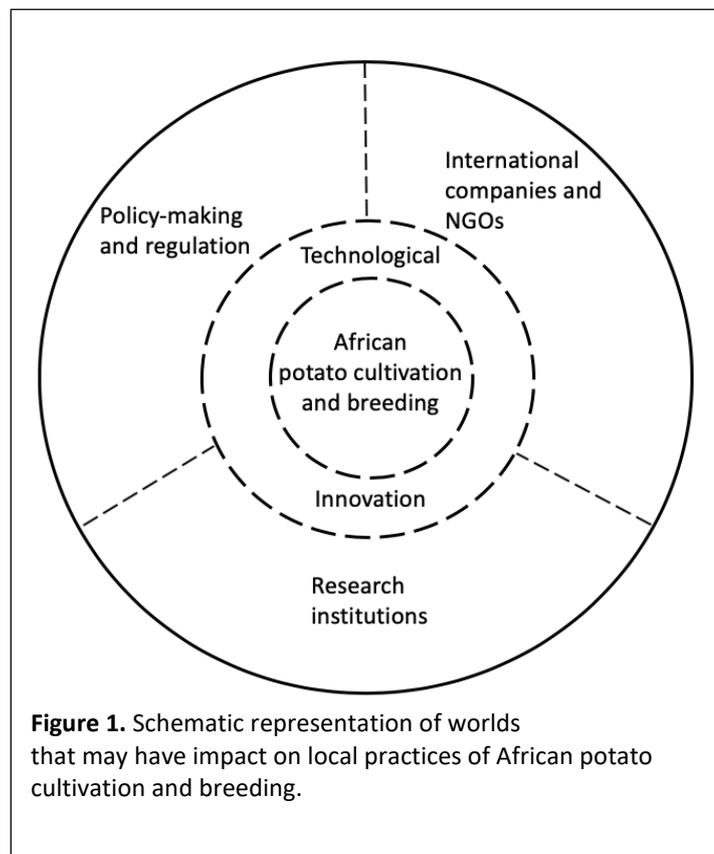


Figure 1. Schematic representation of worlds that may have impact on local practices of African potato cultivation and breeding.

The local world of potato cultivation

This world consists of practices of potato cultivation, potato breeding and the production and exchange of seed tubers, involving farmers, traders, seed producers and breeders, and actors responsible for regulation and certification. Local NGOs (as farmer's groups) may also be considered as belonging to this world. Special topics are:

- Role of different groups of farmers, especially small-holders;
- Significance of potatoes as subsistence and cash crop;
- Productivity of local varieties in relation climatological circumstances and agronomical conditions;
- Impact of diseases and pests;
- Use of sources as seed potatoes, fertilizers, and pesticides;

- Systems of (informal) seed production, exchange, certification and variety development.

The international world of companies and NGOs

This world consists of companies, often operating at a global scale with regard to cultivation, consumption, trade and regulation of agricultural products, including biotech companies, seed companies and producers of pesticides, fertilizers, and machineries. Also NGOs are important players in this international context, supporting farmers with seed development and agricultural innovation programs. Special topics are:

- Current and alternative business models for true potato seed breeding;
- Economic parameters (expected sales, etc.);
- The role of patents and other forms of seed protection;
- Corporate responsibility: transparency, sustainability and integrity;
- R&D strategies
- Role of NGOs in breeding, innovation and agricultural development strategies
- Models of collaboration and participation with farmers, including participatory breeding.

The world of research

This world consists research institutes, universities, knowledge intermediaries (boundary organizations) and partly also R&D group industries. This topic addresses existing knowledge infrastructures and innovation programs with respect to potatoes, pivotal aims of research, role of public and private parties (including NGOs), and relationships with farmer organizations. Special topics are:

- Role and impact of public and commercial breeding research;
- Aims and results of breeding results so far;
- Breeding technologies, biotechnology and access to genetic resources;
- Public and private and national and international collaboration;
- Protection of knowledge and access to innovation for farmer (organizations).

The world of regulation and policy-making

This world consists of governmental institutes and institutions dealing with potatoes as staple food and cash crops, policy-making and strategies of innovation, breeding, seed and variety certification, intellectual property and market regulation. Special topics are:

- Role of potatoes in national food production now and in the future;
- Governmental policies with respect to knowledge production and innovation of potatoes;
- Role of agricultural extension services in knowledge sharing and distribution;
- Role of the government in tuning formal and informal seed systems;
- Role of the government in the potato value chain.

Workshop programme

June 13	Activity	Invited speakers
10:00 – 10:30	Welcome / coffee	
10:30 – 10:50	Workshop aims – hybrid true potato seeds (HTPS) as a focus	Dirk Stemerding & Sjaak Swart (POTAREI)
10:50 – 11:25	Potatoes: A global perspective	Robert Graveland (HZPC)
11:25 – 12:00	African farmers' perspectives on potato cultivation & breeding	Moses Nyongeasa (KALRO, Kenya)
12:00 – 13:00	Plenary discussion: what do you see as the most challenging issues in African potato farming?	Chair: Sjaak Swart
13:00 – 14:00	Lunch	
14:00 – 14:35	Potato breeding research & innovation in Africa	Denis Griffin (Teagasc, Ireland)
14:35 – 15:10	Potato regulation and certification in Africa	Jean Claude Nshimiyanar, CIP, Uganda)
15:10 – 15:40	Plenary discussion	Chair: Dirk Stemerding
15:40 – 16:00	Tea / coffee	
16:00 – 16:30	Corporate involvement in African potato value chains	Anton Haverkort (WUR)
16:30 – 17:00	The role of NGOs	Bram de Jonge (Oxfam)
17:00 – 17:30	Plenary discussion	Sjaak Swart (Chair)
17:30 – 18:30	Posters and drinks	
19:00 – 21:00	Dinner	
June 14		
09:00 – 09:15	Welcome / coffee	
09:15 – 09:45	Wrapping up: prospects, bottlenecks and challenges from the perspective of responsible innovation	Koen Beumer (POTAREI)
09:45 – 10:20	Possible potato growing systems of HTPS	Luuk van Dijk (POTAREI)
10:20 – 10:55	African experiences with HTPS so far	Gertjan Becx & Olivia Kacheo (Solynta)
10:55 – 11:25	Tea / coffee	
11:25 – 12:00	Why innovation may fail?	Conny Almekinders (POTAREI)
12:00 – 13:00	Plenary discussion: relevant questions on African HTPS	Chair: Dirk Stemerding
13:00 – 14:00	Lunch	
14:00 – 14:35	Towards a systems' perspective on African HTPS: relevant issues for group discussions	Paul Struik (POTAREI)
14:35 – 15:15	Group discussions: conditions and requirements for African HTPS	
15:15 – 15:30	Tea / coffee	
15:30 – 16:30	Plenary presentations of group discussions & conclusions	Dirk Stemerding & Sjaak Swart (Moderators)
16:30 – 17:30	Drinks	
19:00 – 21:00	Dinner	