



International Union for the Protection of New Varieties of Plants

Seminar on the role of plant breeding and plant variety protection in enabling agriculture to mitigate and adapt to climate change:

## **Report on: Thematic SESSION 5: the Role of plant variety protection in the development of new varieties to mitigate and adapt to climate change**

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# Thematic SESSION 5: Topics

- **The role of PBR in plant breeding efforts to address climate change mitigation and adaptation. Example of Canada, including public sector breeding**

Mr. Anthony Parker, Commissioner, Plant Breeders' Rights Office, Canadian Food Inspection Agency (CFIA), Canada

- **Plant Breeding and Plant Variety Protection: a catalyst for developing climate smart crop varieties in Sub-Saharan Africa**

Mr. Hans Adu-Dapaah, Expert, Crops Research Institute, Council for Scientific and Industrial Research Institute (CSIR), Ghana

- **Plant breeding and PVP system for adapting Japan's unique climate condition and consumers' preferences**

Mr. Teruhisa Miyamoto, Deputy Director of Plant Variety Office, Intellectual Property Division, Export and International Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries (MAFF)

- **The role of plant variety protection in promoting development of crop varieties that adapt to, and mitigate, climate change. Example of Kenya**

Mr. Simon Mucheru Maina, Head, Seed Certification and Plant Variety Protection, Kenya Plant Health Inspectorate Service (KEPHIS)

- **Impact of the Community Plant Variety Rights system on the European Union economy and the environment**

Mr. Francesco Mattina, President, Community Plant Variety Office (CPVO) and Mr. Nathan Wajsman, Chief Economist of the European Intellectual Property Office (EUIPO)



# Thematic SESSION 5: Canada

## Impact of Climate Change:

- Annual temperature increase, flooding, droughts, extreme weather events
- Northward expansion of warmer weather crops, such as corn and soybean, displacing cereals and canola
- Water/heat stress to plants and may have a negative impact on yields, new pests and diseases.

## Public Research

- Example: Digital Imaging Technology and Plant Phenotyping of Wheat Varieties
- Digital imagery reveals differences in plant canopy temperatures between varieties.
- Differences identified between varieties in respiration rates and plant dehydration.
- Historic drought tolerant varieties can be used as breeding material for introgression into modern high performing varieties

# Thematic SESSION 5: Canada

## Linking to UPOV-based PBR

- All wheat varieties released by AAFC are PBR protected. Art 14. of UPOV secures the investments made by taxpayers and farmers. Royalties from sales and licensing are re-invested back into breeding and research, creating a self-sustaining funding environment.
- Art 15 (1) (ii) “researcher’s exemption” supports ongoing research, and scientific publication, dissemination of knowledge about the qualities/attributes of specific varieties.
- Art 15 (1) (iii) “breeder’s exemption” ensures that all PBR protected varieties are available for breeding purposes. Breeder’s have information on varieties that are drought tolerant, and can access those varieties to introgress into their breeding program.
- Art 19, the breeder’s right is finite. Unprotected varieties are “public domain”, AAFC varieties deposited in ITPGRFA – MLS system.

# Thematic SESSION 5: Sub-Saharan Africa

## Challenges to Agricultural Production in Africa:

- Rapid declining soil fertility (especially nitrogen)
- Increased complexity of pests and diseases
- Postharvest losses and short shelf- life of produce
- Inherent low yields of crops
- Lack of labor
- Ecological concerns
- Illegal mining activities destroying agricultural lands and water bodies and distorting ecologies,
- loss of biological diversity, land constraints

## Achieving Food & Nutrition Security in 2050

- Crop production will have to double/triple by 2050, using limited resources (land, water, nitrogen etc.)
- Need to increase productivity per unit area (intensification)
- Smart breeding has a role to play to achieve food and nutrition security.
- CSIR-CRI developed high-yielding drought tolerant maize variety

# Thematic SESSION 5: Sub-Saharan Africa

## Plant Variety Protection:

- Well implemented PVP may be a catalyst for sustainable development of CSCV, since it will attract investors.
- The benefits of PVP cuts across several sectors of the economies of Sub-Saharan African countries and will promote national development.
- The PVP has an enormous potential to improve productivity, the seed system, protect genetic diversity, and empower farmers to access new markets and attract private sector investments in plant breeding.
- The formation of African Plant Breeders Association in 2019 with branches in most African countries is a positive development for PVP implementation in SSA.

# Thematic SESSION 5: Japan

## Impact of Climate Change on Agricultural Products:

- Average temperature has risen by 1.26 degrees Celsius per 100 years in Japan: agricultural production regions are expected to change with emerging high-temperature injury.
- Rice-immature starch formation in grain due to high temperatures
- Apple-poor or delayed coloring of fruit due to high temperature
- Deterioration of fruit quality reported in other fruits (grapes, peaches, etc.)

## New Plant Varieties - Key to Adapt to Climate Change

- Rice-High temperature tolerant variety with few immature grains
- Grapes -New varieties with good coloration even at high temperatures
- Apple-New varieties with good coloration even at high temperatures
- Impatiens-Growing well in wide range conditions, even at high temperature

# Thematic SESSION 5: Japan

- **Innovation to Facilitate Breeding of New Varieties to Adapt to Climate Change:**
  - “Smart breeding system” in combination with AI and new breeding technologies will enable more efficient and faster breeding by big data on phenotype-genotype information
- **Importance of Securing PVP Protection Aboard:**
  - Japan PVP Act Amendment to protect Japan Export Market
- **Importance of Cooperation:**
  - Efficient application
  - Enhance DUS cooperation



# Thematic SESSION 5: Kenya

## Climate Change Impact

- Extended dry periods and rainfall outside the normal seasons
- Emergence of new pests and diseases such as maize Lethal Necrosis (MLN), Fall Army Worm (FAW) among others
- It is very important for breeders to develop varieties that are resilient to harsh agro-ecological conditions

## Development of Smart Varieties

- Development of drought tolerant varieties of maize, sweet potato, cassava, sorghum, pigeon peas, amaranth, rangeland grasses among others
- Efforts to release pest and disease tolerant varieties to counter emerging pests as a result of climate change
- Sixteen (16) varieties tolerant to Maize Lethal Necrosis Disease (MLND) released,
- Varieties of Fall Army Worm (FAW) tolerant maize are under evaluation

# Thematic SESSION 5: Kenya

## Plant Variety Protection in Kenya:

- Acceded to UPOV 1978 in May 1999, UPOV 1991 in May 2016
- Kenya grants PBRs for all plant genera and species
- Breeders having assurance on return of investment following development of new varieties.
- Enhanced capacity for testing of new varieties through cooperation with UPOV and UPOV members.
- Collaboration and co operation between the breeders and the testing authority on variety testing.

# Thematic SESSION 5: EU/CPVO

## The EU's impact study shows key economic contribution:

- EU-protected plant variety innovations sufficient to feed an additional **57 million** people with arable crops, **38 million** with fruit crops, and **28 million** for vegetable crops.
- EU PVR-protected crops generated additional value of 13 billion EUR to EU GDP
- Additional production resulted in higher employment rates in the EU agriculture, and better remunerated

In the absence of the CPVR system, in 2020 the production in the EU would be:

- ✓ 6.4% lower for agricultural crops;
- ✓ 2.6% lower for fruits;
- ✓ 4.7% lower for vegetables;
- ✓ 15.1% lower for ornamentals.

# Thematic **SESSION 5: EU/CPVO**

## **EU-Community Plant Variety Right (CPVR) system**

- Not only makes an economic contribution to the EU economy, but also contributes to the fulfilment of the EU's environmental objectives by reducing annual greenhouse gas emissions and water use in agriculture and horticulture
- Contributes to the UN's Sustainable Development Goals, by reducing the environment impact and resource use in agriculture and horticulture, increasing farm incomes, and keeping prices lower for consumers

# Conclusions:

- To address climate change mitigation and adaptation requires collective action, including; farmers, breeders (public and private), and policy makers.
- Effective PVP provides incentive for breeders to invest in innovation and development of new varieties of plants that can adapt to or mitigate the impact of climate change.
- UPOV-based PBR provides a framework that ensures the balance between incentives and rewards, and restrictions on the breeder's right by way of "exemptions," that ensure access to knowledge and the use of protected varieties for breeding purposes.
- UPOV membership provides for enhanced cooperation among members

**Thank you!**