**1**
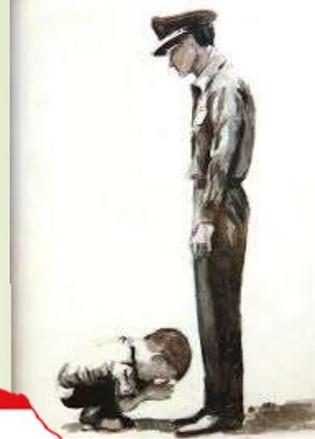
# Biosafety Regulation
# and
# GMOs detection and Identification
# In Thailand

**Dr. Piyarat Thammakijjawat**
**GM plant and microbe detection group,**
**Biotechnology Research and Development Office,**
**Department of Agriculture, MOAC**

**Asia-Pacific Science-Policy Dialogue on the Detection and Identification of Living Modified Organisms**
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# Topics of Presentation

I.  The status of Agricultural Biotechnology
II. Regulation and Legislation
III. GMO approval /disapproval and Monitoring
IV. GMOs : Analytical Capacities

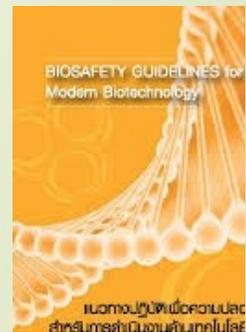# The status of Agricultural Biotechnology in Thailand

- **Do not permit to grow GM crops commercially in the country (under Plant Quarantine Act.)**

- **Importation of GM seeds only allow for research purpose under Plant Quarantine Act. regulate by Department of Agriculture.**

- **GM soybean and corn grains are permitted to be imported for foods feeds and industrial purpose.**

- **The FDA notified a labelling regulation for food containing ingredients derived from GM soy and corn. (Threshold 5%)**

# Regulation and Legislation

1. **Existing biosafety related laws**

   • **Plant Quarantine Act** B.E. 2507 (1964) amend ed **B.E. 2542 (1999); B.E. 2551 (2008)** : to prohibit 33 species 51 genus and 1 family to be imported into the Kingdom except for R&D.

   • **Plant Variety Protection** B.E. 2542 (1999) : to register and assess for potential risk of **living modified plants**.

   • **Food Act** B.E. 2522 (1979) : to **label food** containing ingredients (e.g. soybean & corn starch) derived from GMOs.

2. **Biosafety Guidelines :** Guidelines for R&D, Food biosafety guidelines, guidelines for contained use of GM microorganisms at pilot and industrial scale

# GMO approval and Monitoring

**GM events approval only for Food safety (Voluntary)**

FDA; MOPH
: Ministerial Notification on prohibited maize (StarLink)
: Food Safety Assessment is process under FDA-NSTDA MOU
 25 projects have been approved of gm soy and corn including
        6 single events of GM soybean
        13 single events and 6 stacked events of GM corn

More than 10 projects is in the process of risk assessment.

# Cultivation approval: No GM crops have been approved.

**MOAC**
**:Environmental safety assessment :**
        **only greenhouse, no field trial since 2007**

**:Feed safety assessment (no policy)**

**Environmental monitoring: Dept. of Agriculture**
**Importation monitoring for raw material and**
**surveillance detection in farmer field such as papaya rice**
**cotton soybean and corn.**
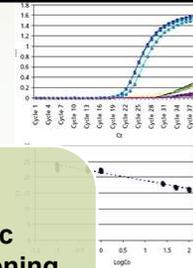
# GMOs : Analytical Capacities

**Conventional PCR based**



- Taxon specific
- Element specific
- 35S, NOS screening
- Matrix approach

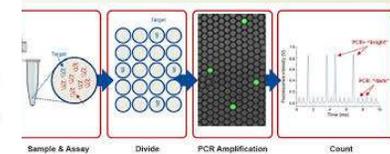**GMOs DETECTION METHODS**

**Real-time PCR based**



- Taxon specific
- Element specific
- 35S, NOS Screening
- Construct specific
- Qualitative
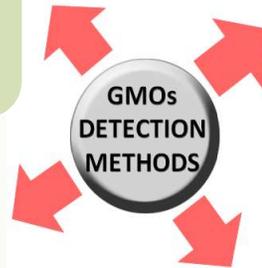- Quantitative

**Protein based**



- Antibiotic resistance protein detection
- GM genetic marker detection
- GM protein detection

**Digital PCR**



- qualitative, quantitative construct and event

# GMOs : Analytical Capacities

**Matrix approach: for testing raw material, seed, processed food**

Screening : 35S-promoter, NOS-terminator, npt II, CTP2-cp4-EPSPS, bar, PAT

**Event specific for:**

Soybean : RRs, A2704, A5547, DP305043, DP356023, MON89788, 68416

Maize : 59122,Bt11, Bt176, Event3272, GA21, MIR162, MIR604,MON810, MON88017, MON89034, MON863, NK603, Starlink, T25, TC1507, DAS-402789

Potato : EH92-527-127

Papaya : 55-1, unknown events PRSV-SC

Rice : Bt63, LLrice62, LL601

Wheat, sugar beet, rapeseed, cotton


Soybean    Corn    Cotton

# GMOs Analysis Laboratories

## Regulatory Lab

○ **Biotechnology R&D Office (DOA)**

○ **Bureau of Quality and Safety of Food (DMSC)**

## Service Lab

○ **DNA Technology Lab (Kasetsart University)**

## Private Lab

○ **CLT, ALS, OMIC, SGS, Intertek**

# Capacities development: Laboratories

 Increasing ISO17025 accreditation of GM events specific  detection.

Increasing testing methods for other types: matrix approach

 Apply new technology i.e. ddPCR, Strip test

 Encourage private lab: Bangkok & regional center

# Sawasdee ka