

Part II. Challenges and efforts towards social implementation  
(including regulatory considerations)

15:40-16:40 2. Communication strategy and consumer outreach by Ministry of Agriculture, Forestry and Fisheries

Mr. Hiroaki Yamada, Director, Research Policy Planning Division, Biotechnology Safety Office, Agriculture, Forestry and Fisheries Research Council Secretariat, Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan

## Communication strategy and consumer outreach by Ministry of Agriculture, Forestry and Fisheries (MAFF)

Mr. Hiroaki Yamada, Director, Research Policy Planning Division, Biotechnology Safety Office, Agriculture, Forestry and Fisheries Research Council Secretariat, Ministry of Agriculture, Forestry and Fisheries (MAFF), Japan

### Abstract

As promoting research and development (R&D) utilizing biotechnology and practical application / commercialization of its results, it is important to encourage communication with the public from the early stage of R&D about what kind of benefits are expected and what kind of risk there is.

MAFF provides consumers with research outcomes which may bring benefits to them along with objective information on their risk at the symposium, seminar, science café, etc., as well as disseminating information on research outcomes through the mass media.

It is important to ensure compliance with laws and regulations to gain the public trust. In addition to the appropriate safety assessment on genetically modified crops, MAFF provide guidance for appropriate management to research institutes conducting R&D of genetic modification technology and checks their compliance with the laws and the regulations.

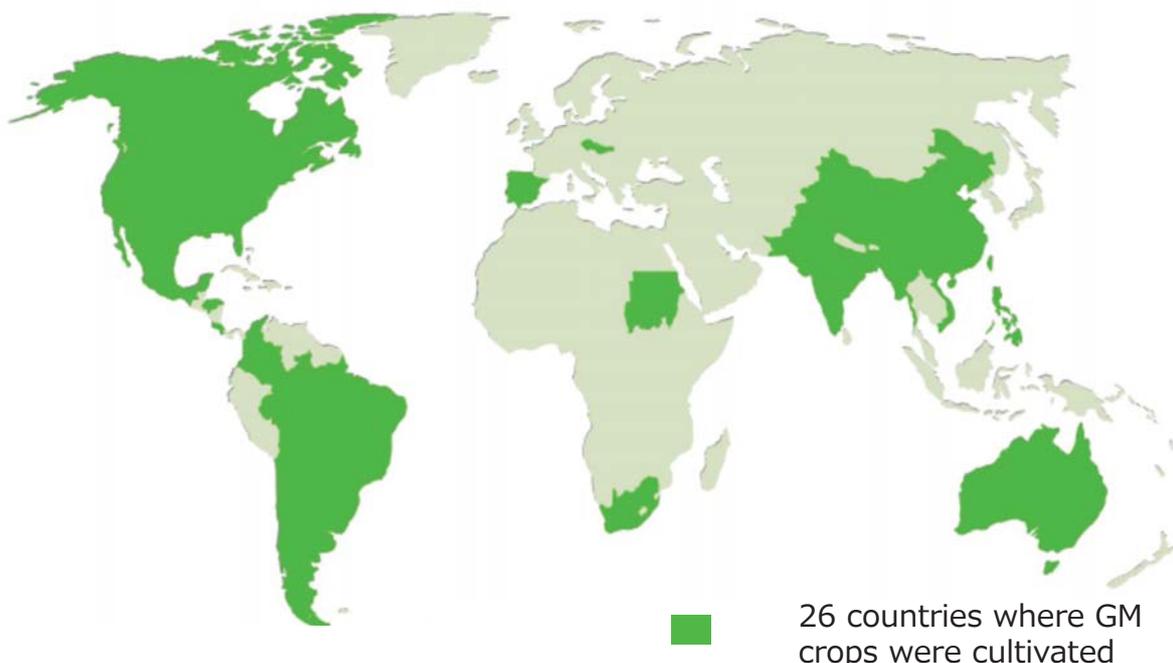
Through such efforts, we will continue to foster public acceptance of biotechnology and strive for practical realization of the research outcomes in society.

# Communication strategy and consumer outreach by Ministry of Agriculture, Forestry and Fisheries (MAFF)

Hiroaki Yamada  
(MAFF, Japan)

## Global area of genetically modified crops in 2016

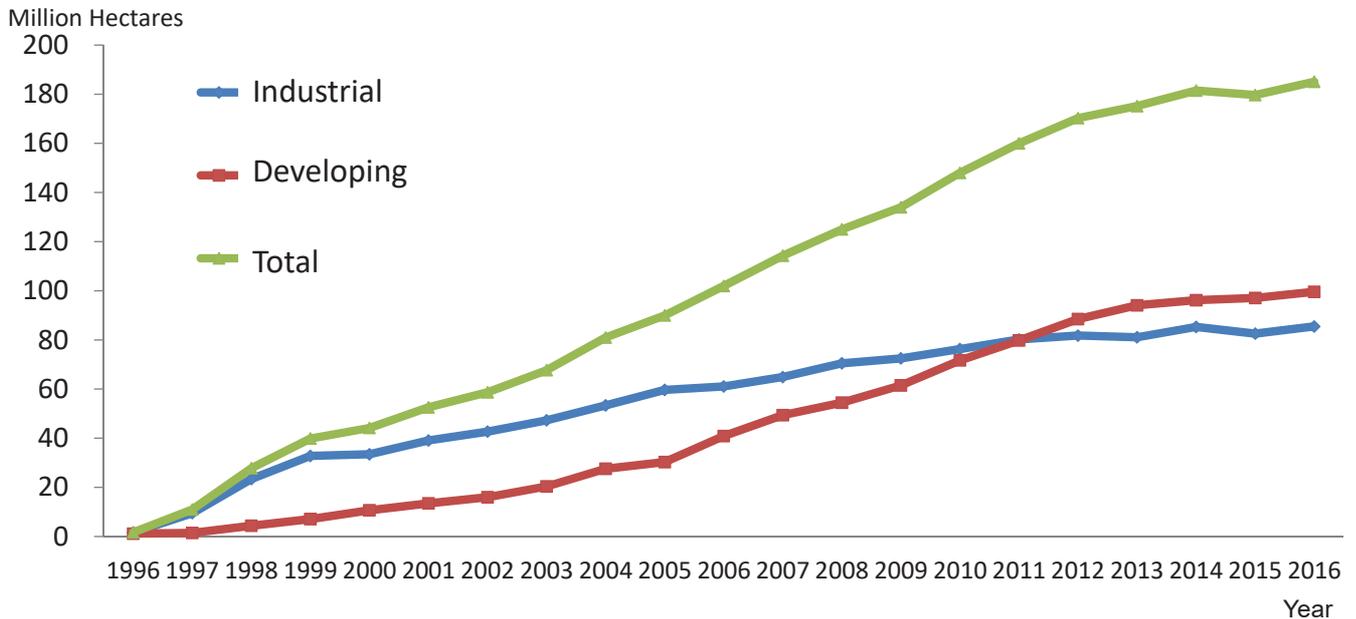
- GM crops were cultivated in 26 countries in 2016.



Source: The International Service for the Acquisition of Agri-biotech Applications  
「Global Status of Commercialized Biotech/GM Crops: 2016」

# Global changes in the cultivation area of GM crops

- GM crops are cultivated in a total of 185.1 million hectares in 2016. (12% of the total crop cultivation area (1.5 billion ha))
- The cultivation area of GM crops have increased by 5.4 million ha from 2015 to 2016.



Source: The International Service for the Acquisition of Agri-biotech Applications [Global Status of Commercialized Biotech/GM Crops: 2016]

## Japanese import of major cereals in 2016

### Maize

Country	Import (1,000T)	%
USA	11,427	74.5
Brazil	3,734	24.3
Russia	102	0.7
Others	79	0.5
Total	15,342	100

% of GM maize in the USA **92%**

### Soybean

Country	Import (1,000T)	%
USA	2,238	71.5
Brazil	524	16.7
Canada	340	10.9
Others	29	0.9
Total	3,131	100.0

% of GM soybean in the USA **94%**

### Canola

Country	Import (1,000T)	%
Canada	2,249	95.1
Australia	116	4.9
Others	1	0.0
Total	2,366	100

% of GM canola in Canada **93%**

### Cotton seed

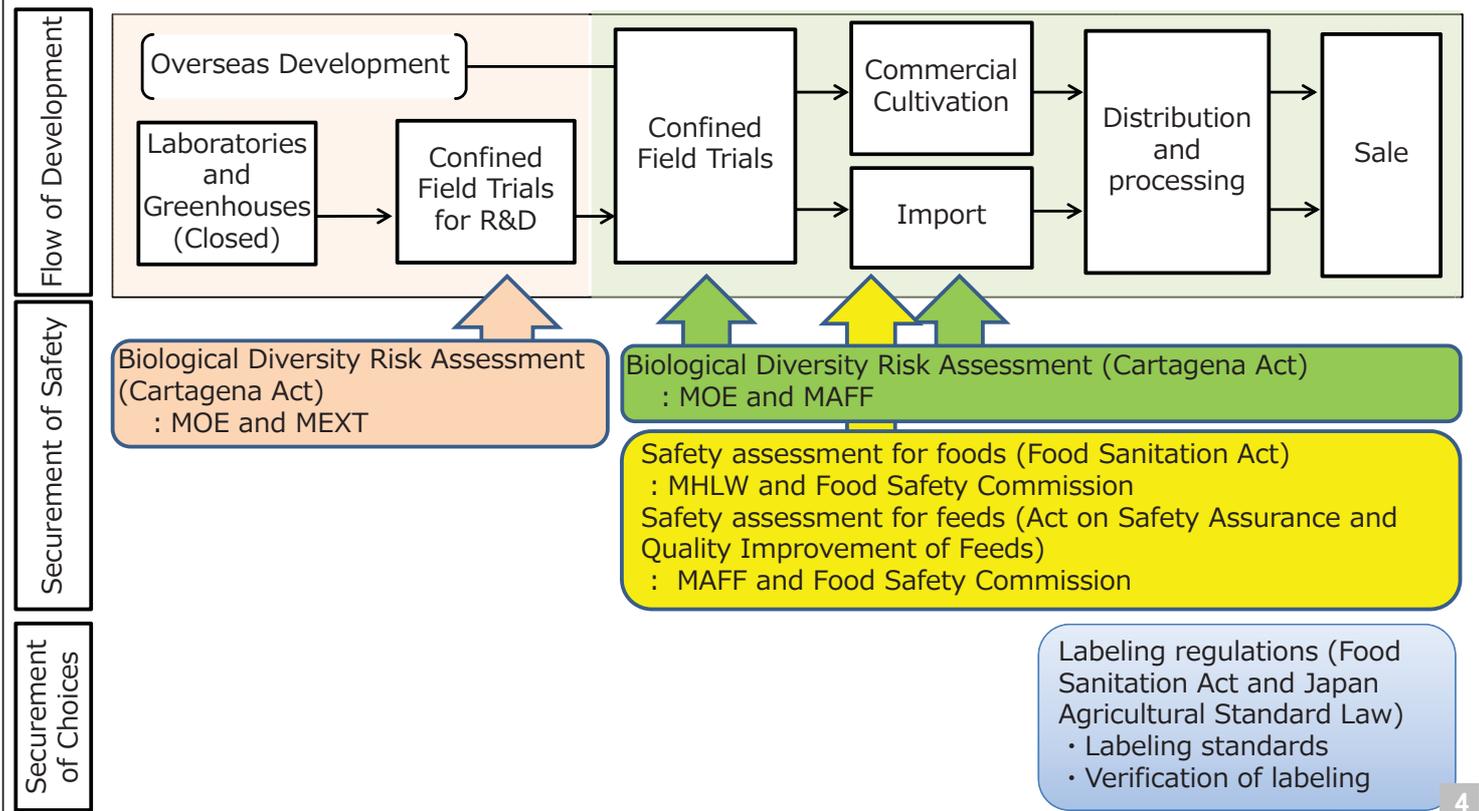
Country	Import (1,000T)	%
Australia	56	56.4
Brazil	29	29.3
USA	8	7.8
Others	7	6.5
Total	100	100

% of GM cotton in Australia **98%**

Source : Trade Statistics of Japan, ISAAA

# Framework of GM Regulation in Japan

○ For the commercialization of GM crops, they require food, feed and environmental approvals from the regulatory authorities.



4

## Organisms Subject to the Regulation of the Cartagena Act

○ **Act on the Conservation and Sustainable Use of Biological Diversity through Regulations on the Use of Living Modified Organisms (Act No. 97 of 2003) (“Cartagena Act”)**

(Definitions)

Article 2

(2) In this Act, “living modified organism” shall mean an organism that possesses nucleic acid, or a replicated product thereof, obtained through use of the any of the following technologies:

- (i) Those technologies, as stipulated in the ordinance of the competent ministries, for the processing of nucleic acid extracellularly
- (ii) Those technologies, as stipulated in the ordinance of the competent ministries, for fusing of the cells of organisms belonging to different taxonomical families.

○ **Enforcement Ordinance of the Act (MOF, MEXT, MHLW, MAFF, METI & MOE Ordinance No. 1 of 2003)**

Article 2 Technologies stipulated in the ordinance of the competent ministries under Article 2 paragraph 2 subparagraph 1 of the Act shall be the technology for processing nucleic acid extracellularly for the purpose of introducing the nucleic acid into cells, viruses or viroids to transfer or replicate the nucleic acid, while excluding those mentioned in the following:

- (i) Technology for processing by using, as nucleic acid to be introduced into cells, only the nucleic acid shown in the following:
  - A. The nucleic acid of living organism belonging to the same species as that of the living organism which the cells originate from
  - B. The nucleic acid of living organism belonging to the species that exchanges nucleic acid with the species of the living organism which the cells originate from in natural conditions
- (ii) Technology for processing by using, as nucleic acid to be introduced into viruses or viroids, only the nucleic acid of viruses or viroids that exchanges nucleic acid with the viruses or viroids in natural conditions

5

# Guideline for cultivation experiment on GM crops

MAFF provide guidance for appropriate management based on them to research institutes under MAFF and checks their compliance with the laws and the regulations.

## Guideline for cultivation experiment on GM crops approved for type 1 use

### Subject

Field cultivation experiment conducted by National Research and Development Agency under MAFF

### Compliance rules

#### Conduct of cultivation experiments

- 1 Formulate cultivation experiment plan
- 2 Prevent crossing with crops grown by general farmers
- 3 Prevent contamination into harvested or experimental materials at the agencies

#### Provide information on cultivation experiment

Provide information on pre- and post-cultivation experiment and in the interim

#### Deploy management system concerning cultivation experiment

Deploy systems in which all cultivation experiment manager, work management chief and information provision chief take responsibility

6

# Challenges for using genome editing technology

- Agricultural products developed by using genome editing techniques could be similar to the ones found by selection from natural diversity or developed by conventional breeding techniques. It is important to clarify legal basis for regulating such products and also share information with public.

### ○ Mutation of the gene that controls seed shattering of rice



The 612th base of the first chromosome of rice is substituted

Nipponbare	ATT★TCA
Kasalath	ATTGCA

Left: Nipponbare (Japanica)  
Right: Kasalath (Indica)

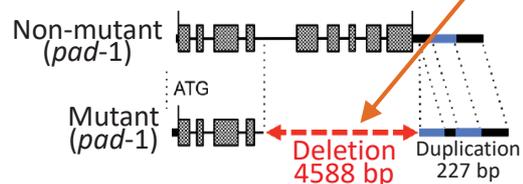
Source: Saeko Konishi *et al.*, Science (2006)  
(Institute of the Society for Techno-Innovation of Agriculture, Forestry, and Fisheries)

### ○ Mutation of the gene that controls fruit growing of egg plant without pollination



A mutant strain (PCSS) grows large without pollination.

The part of *Pad-1* gene is truncated, and the gene loses its function.



Source: Press release from NARO (National Agriculture and Food Research Organization) and TAKII & CO.,LTD., 21/Oct./2015

7

## Recent trends on regulatory consideration in Japan

- October 2013      New Plant Breeding Technique Study Group was established under the auspice of MAFF.
- August 2014      The GM Crop Committee of Science Council of Japan published a report titled “Current Status and Issues of New Plant Breeding Techniques (NPBT)”.
- September 2015    The new plant breeding technique study group published a report titled “Towards the development and practical application of crops in using new plant breeding techniques (NPBTs) such as genome editing.”
- August 2016      Central Environment Council (Ministry of Environment advisory committee), in a review concerning the state of enforcement of this Act, referred to genome editing techniques.

8

## New Plant Breeding Technique Study Group

- A study group consisting of expert scientists was established in October 2013, under the auspice of the Agriculture, Forestry and Fisheries Research Council Secretariat.
- The report titled “Towards the development and practical application of crops in using new plant breeding techniques (NPBTs) such as genome editing” was published in September 2015.

### **Initiatives towards Promoting the Social Understanding recommended by the report**

- Compliance with GM regulations  
(while using GMOs which have extraneous nucleotides in breeding process)
- Methods to provide public with information and to communicate
- Promotion of international harmonization pertaining to regulatory framework

For further details, visit

<http://www.affrc.maff.go.jp/docs/committee/nbt/attach/pdf/top-2.pdf>

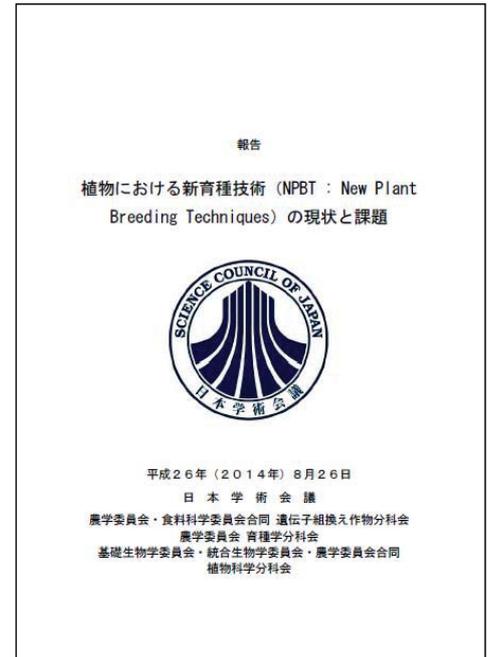
9

## The Report of Another Academic Council

- The GM Crop Committee of Science Council of Japan published a report titled “Current Status and Issues of New Plant Breeding Techniques (NPBT)” in August, 2014.

### Recommendations from the report

- 1) For the application of NPBT, public acceptance is essential. Scientists should provide sufficient information of NPBT for public.
- 2) Scientists should not judge their products as non-GMO based on the absence of foreign genes by themselves. Since all experiments need some recombinant technology to prepare genome editing tools, scientists follow the current regulation protocols and accumulate knowledge of NPBT.



For further details, visit

<http://www.scj.go.jp/ja/info/kohyo/pdf/kohyo-22-h140826.pdf>

10

## Central Environment Council

- In August 2016, Central Environment Council (Ministry of Environment advisory committee) referred to genome editing in a review of the enforcement status of the Cartagena Act.

The council pointed the need for careful consideration on how to handle organisms developed by genome editing. The council recommended regulatory authorities to have the framework, such as prior consultation, to guide developers on a case by case basis.



Currently, MAFF is widely informing development companies and research institutes the prior consultation with regulatory agencies before commercial use about necessity of whether their products are subjects to the Cartagena Act.

11

# The survey on attitude toward GM crops

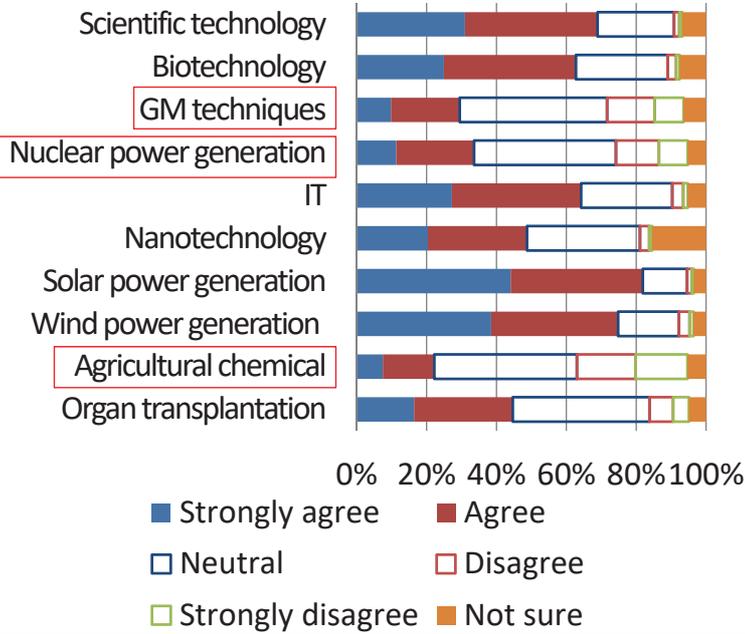
The survey on attitude toward GM crops (MAFF)

Period : September – December 2007

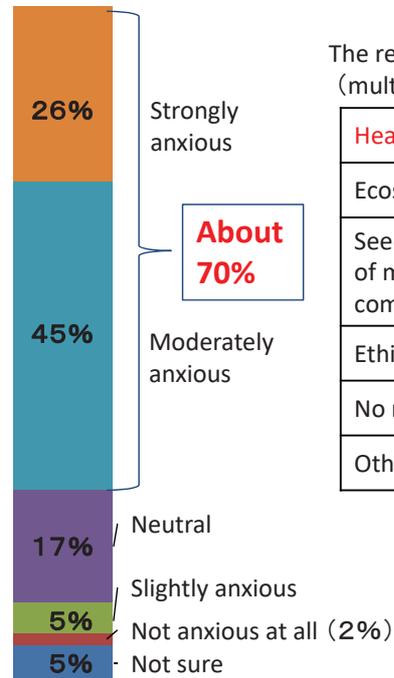
Subject : sample of 10,720 adult men and women nationwide

## ○ Image of scientific technology

Do you expect beneficial outcome from following technology?



## ○ Anxiety over GM crops



The reason of anxiety (multiple answers allowed)

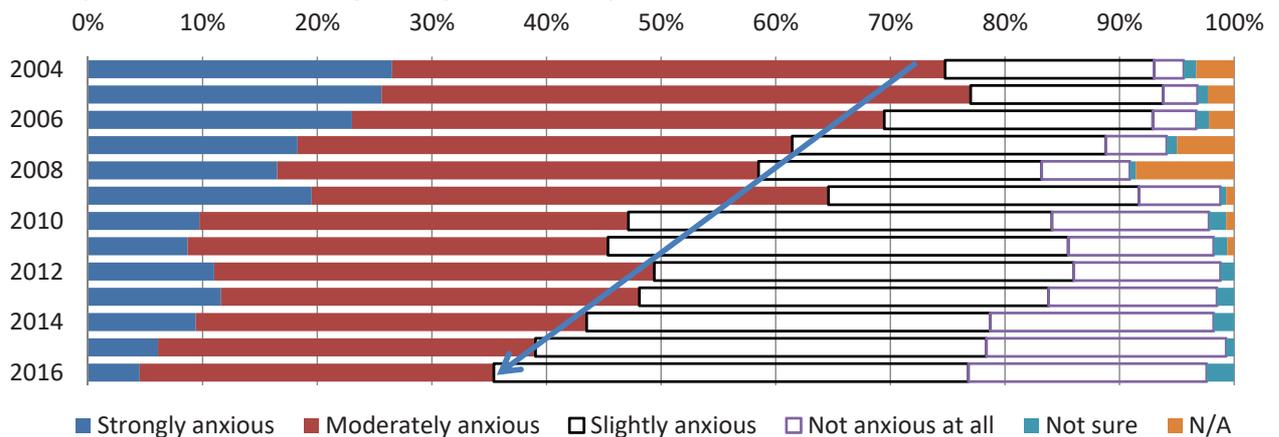
Health	91%
Ecosystem	65%
Seed control of major companies	34%
Ethics	28%
No reason	25%
Others	1%

# The survey on attitude food safety

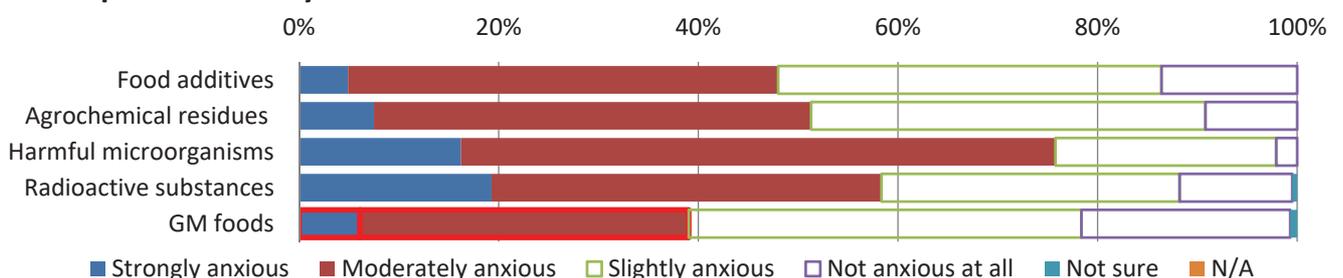
The survey on attitude food safety (Cabinet Office, Food Safety Commission)

Subject : sample of 470 men and women

## ○ Anxiety over GM foods regarding food safety

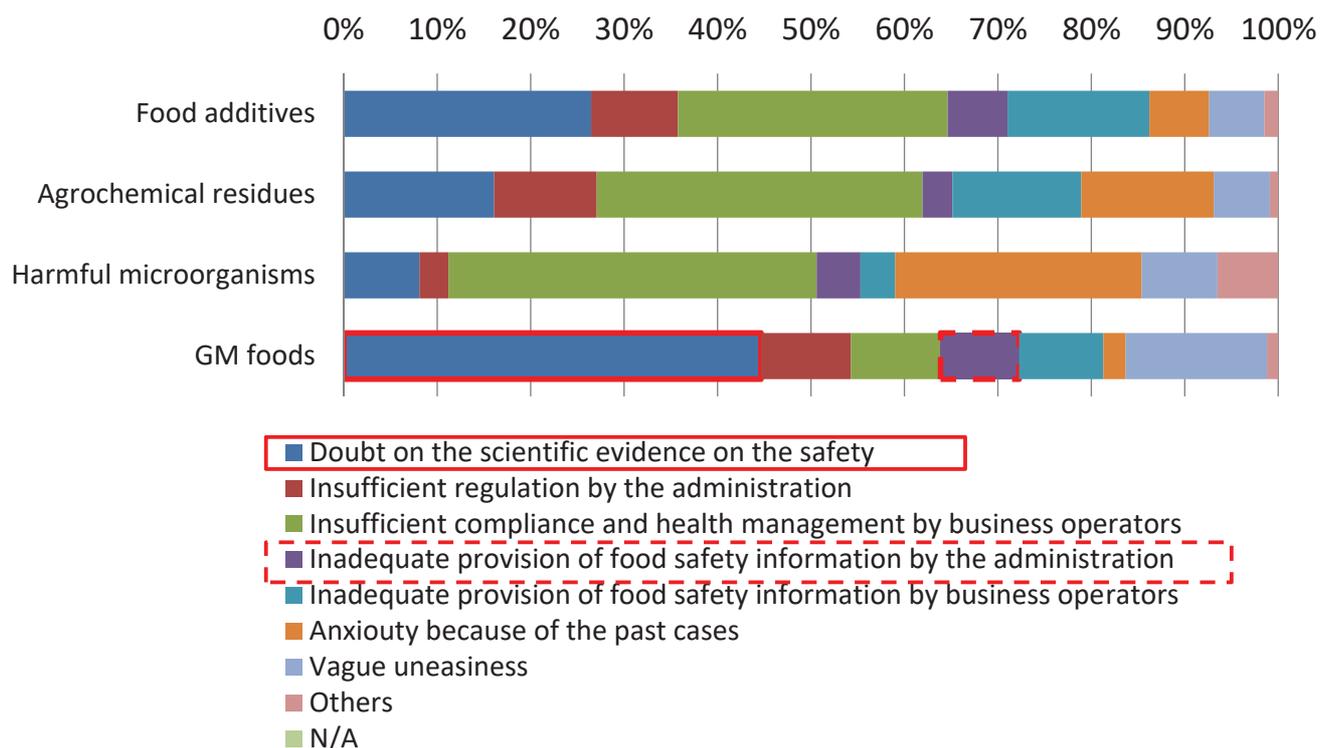


## ○ Comparative survey on uneasiness with other factors in 2015



## The survey on attitude food safety

### ○ The reason of anxiety in 2015



14

## The Factors of Consumer's Acceptance

- ✓ Psychological factors determining consumers' acceptance of science and technology are as follows:
  - ① Risk perception
  - ② Benefit perception
  - ③ Trust in business operators
- ✓ The acquisition of risk literacy is important to determine the risk and benefit of scientific technology and to judge whether to accept them or not.
  - Risk Literacy
    - ① Existence of biases in risk perception
    - ② Impossibility of zero risk
    - ③ Risk-benefit trade-off thinking
    - ④ Risk-risk trade-off thinking
    - ⑤ Existence of biases due to media

Yutaka Tanaka (2013). Risk perception of general public in scientific technology. ESI-NEWS, 31(5), 196–200.

15

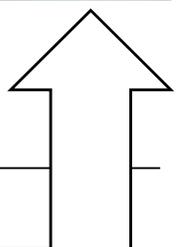
# Issues and Solutions for Social Acceptance

- Under Strategic Innovation Promotion Program (SIP) of the Cabinet Office, Japanese government actively 1) gathers scientific evidence for appropriate regulatory judgment and 2) conducts risk communication activities and science outreach activities to foster public acceptance.

Issues	Solutions
<ul style="list-style-type: none"> <li>✓ Clarification of NPBTs under the GM regulation</li> </ul>	<ul style="list-style-type: none"> <li>✓ <u>To gather scientific evidence for appropriate regulatory judgment (Regulatory Science)</u> <ul style="list-style-type: none"> <li>→ Establishment of the methods to verify the absence of transgenes</li> <li>→ Information-gathering about natural mutations</li> <li>→ Information-gathering about information about safety etc.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>✓ Increasing consumer acceptance</li> </ul>	<ul style="list-style-type: none"> <li>✓ <u>Risk perception</u> <ul style="list-style-type: none"> <li>→ Risk communication based on scientific evidence</li> </ul> </li> <li>✓ <u>Benefit perception</u> <ul style="list-style-type: none"> <li>→ Proposal of health-improvement food products etc. in collaboration with private sectors</li> </ul> </li> <li>✓ <u>Building public trust</u> <ul style="list-style-type: none"> <li>→ Information disclosure, promotion of communication from the early phase of R&amp;D, reinforcement of science outreach activities by researchers, etc.</li> </ul> </li> </ul>

16

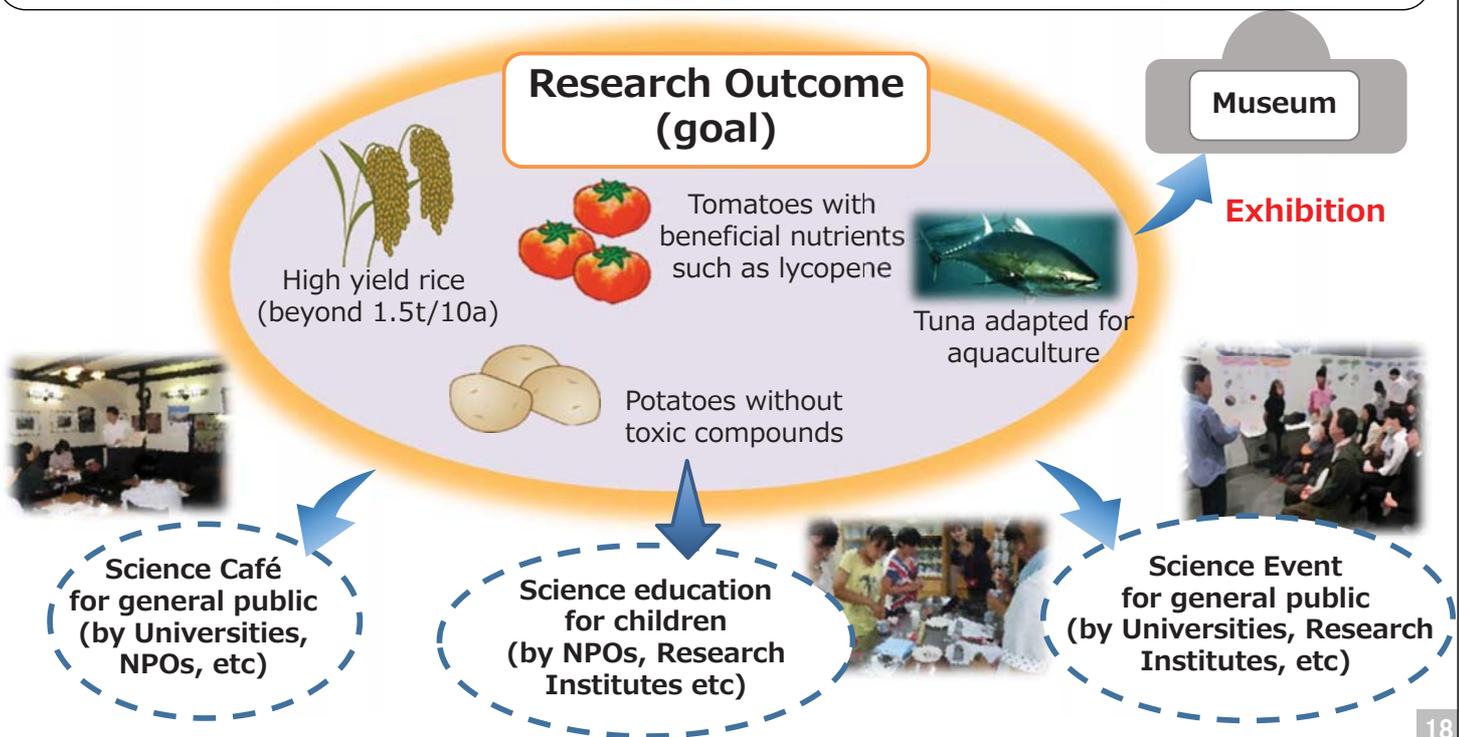
# Information Sharing and Communication

Opinion Leader (Consumer groups, Mass media, etc.)	<p><u>Information sharing about the risks based on scientific evidence in a comprehensible manner</u></p>  <p>Workshop for consumer groups</p> <p><u>Reinforcement of communication including social and economical significance</u></p>  <p>Science Cafe</p>
General Consumers	<p><u>Making the condition to foster better understanding of the benefit</u></p>  <p>Exhibitions of research products</p>  <p>Science education for children</p> 
Producers, Food business operators	<p>Making products beneficial to the nation, Marketing strategy</p> 

17

## Activities to promote public acceptance

- MAFF conducted science outreach project. In the project, interactive communication between public and scientists are provided.
- In 2016, MAFF had exhibitions of research and development related genome editing and more than 1,100 people participated in science café, class or event.



18

## Initiatives towards Promoting Social Understanding

### Compliance with GM regulations

- Handle appropriately in accordance with the Cartagena Act during breeding process.
- Have prior consultations with the regulatory authorities and ask them if the products to be subjected to the regulation, before cultivating final products or using them for food or feed.

### Methods to provide public with information and to communicate

- Promote communication with various interested parties from the R&D stages, and reflect the voices of anticipation, anxiety and concerns from such parties on the R&D and the process of practical application.

### Promotion of international harmonization pertaining to regulatory framework

- Accelerate the formulation of scientific opinions in Japan and, simultaneously contribute to sharing such scientific information and views, and thereby international harmonization on the regulatory status.

19

The Global Innovation Index (GII) is the premier reference for measuring a country's innovation performance. The 2017 report of GII reviews the state of innovation in agriculture and food systems across various sectors and geographies: chapter contributions to the 2017 report include technological reviews, a look at implications for nutrition, and government- and country-specific views.

The report presents Japanese current situation of agricultural R&D conducted in the SIP program, such as **the development of ground-braking varieties by genome editing technology and the adoption of ICT/AI on agriculture (smart agriculture)**.



***Thank you for your kind attention !***

**COI Disclosure Information**  
Hiroaki Yamada

I have no financial relationships to disclose.