PROSPECTION, UTILIZATION AND MANAGEMENT OF MICROBES (IN MALAYSIA)

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OUTLINES

1. INTRODUCTION

2. STATUS OF MICROBIOLOGY RESEARCH IN MALAYSIA

3. BIOPROSPECTION AND CONSERVATION

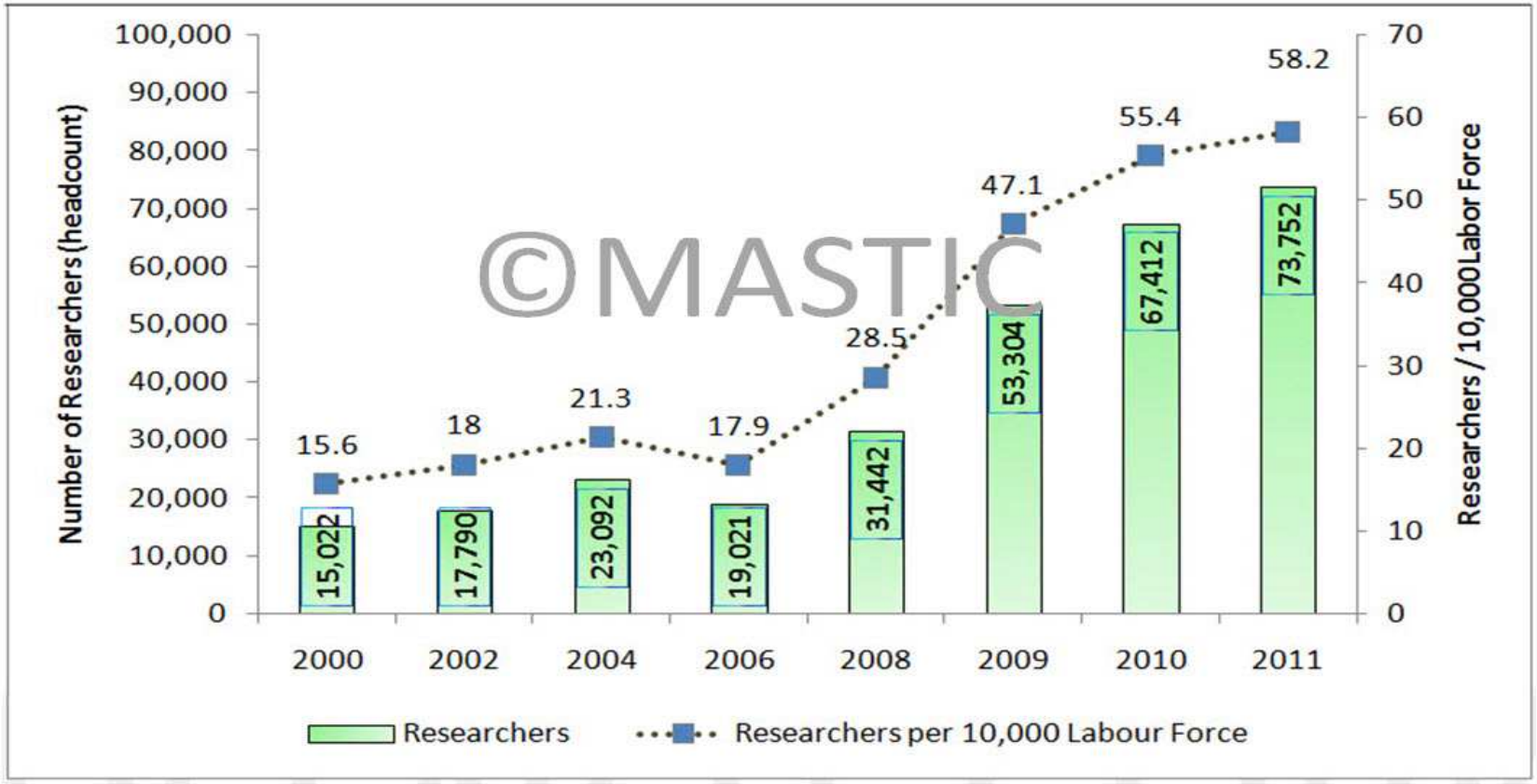
4. PRODUCT DEVELOPMENT

INTRODUCTION

Land area: 126,853 sq mi (328,549 sq km);

Population (2013): 29,628,392

Number of researchers/ Number of labour forces



Increased number of active researchers from 2000-2011, wit for 10,000 labor forces there are 58 researchers

ORGANIZATION /AGENCIES INVOLVED IN RESEARCH RELATED TO MICROORGANISM

RESEARCH INSTITUTES	MINISTRY
SIRIM	Ministry of Finance
MPOB	Ministry of Plantation Industries and Commodities (MPIC).
MALAYSIAN RUBBER BOARD (LGM)	Ministry of Plantation Industries and Commodities (MPIC).
MALAYSIAN TIMBER INDUSTRY BOARD (MTIB)	Ministry of Plantation Industries and Commodities (MPIC).
MALAYSIAN COCOA BOARD	Ministry of Plantation Industries and Commodities (MPIC).
MALAYSIAN PEPPER BOARD (MTB)	Ministry of Plantation Industries and Commodities (MPIC).

ORGANIZATION /AGENCIES INVOLVED IN RESEARCH RELATED TO MICROORGANISM

RESEARCH INSTITUTES	MINISTRY
FOREST RESEARCH INSTITUTE OF MALAYSIA (FRIM)	Ministry of Natural Resources & Environment (NRE)
INSTITUTE AGRO-BIOTEKNOLOGI MALAYSIA (ABI)	Ministry of Science Technology and Innovation
MALAYSIA GENOME INSTITUTE (GENOM MALAYSIA)	Ministry of Science Technology and Innovation
MALAYSIAN NUCLEAR AGENCY (NUCLEAR)	Ministry of Science Technology and Innovation
MALAYSIA AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE (MARDI)	Ministry of Agriculture and Agro-Based Industry,Malaysia (MOA)
MALAYSIAN MUSHROOM SOCIETY	SOCIETY
MICROBIOLOGY SOCIETY OF MALAYSIA	SOCIETY

****UNIVERSITIES**

POLICIES AND ACTS

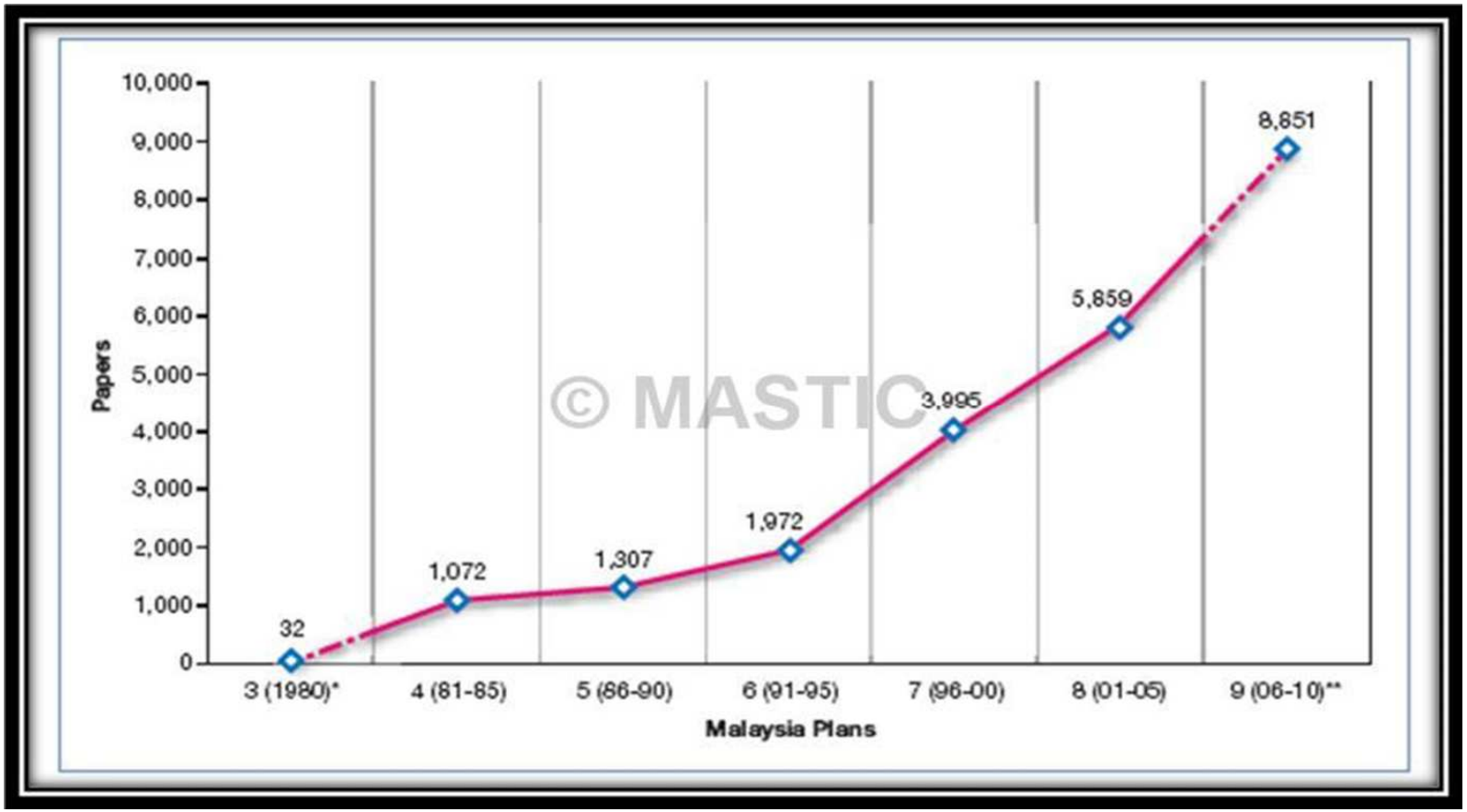
National Agro-food Policy (2011-2020)	**28 September 2011, effectively replacing the National Agriculture Policy. This policy has been put in place to address the issue of food supply in Malaysia. With this policy, it guarantees that there will be a sufficient amount of food supplies which would also be safe for consumption in our country**
Malaysia's National Biodiversity Policy (1998)	Malaysia,Ministry of Science, Environment and Technology to conserve malaysia's biological diversity and to ensure that its components are utilised in a sustainable manner for the continued progress and socio-economic development of the nation
National Biotechnology Policy (2005-2020)	The National Biotechnology Policy envisions that biotechnology will be a new economic engine for Malaysia, enhancing the nation's prosperity and well-being. The policy aims to build a conducive environment for R&D and industry development whilst leveranging on the country's existing areas of strength. Trust 1 is about agriculture biotechnology development – transform and enhance the value creation of the agricultural sector through biotechnology

POLICIES

National Policy on Climate Change (Nov 2009)	**Integrate climate change responses in national development plans to fulfil the country's aspiration for sustainable development**
National Policy on the Environment (2002)	For continuous economic social and cultural progress and enhancement of the quality of life of Malaysia through environmentally sound and sustainable development
National Green Technology Policy (July 2009)	Green Technology shall be a driver to accelerate the national economy and promote sustainable development

NEW ACTS

Access to Biological Resources and Benefit Sharing Act 2012
Antartica Act 2011



Publication related to Science and Technology

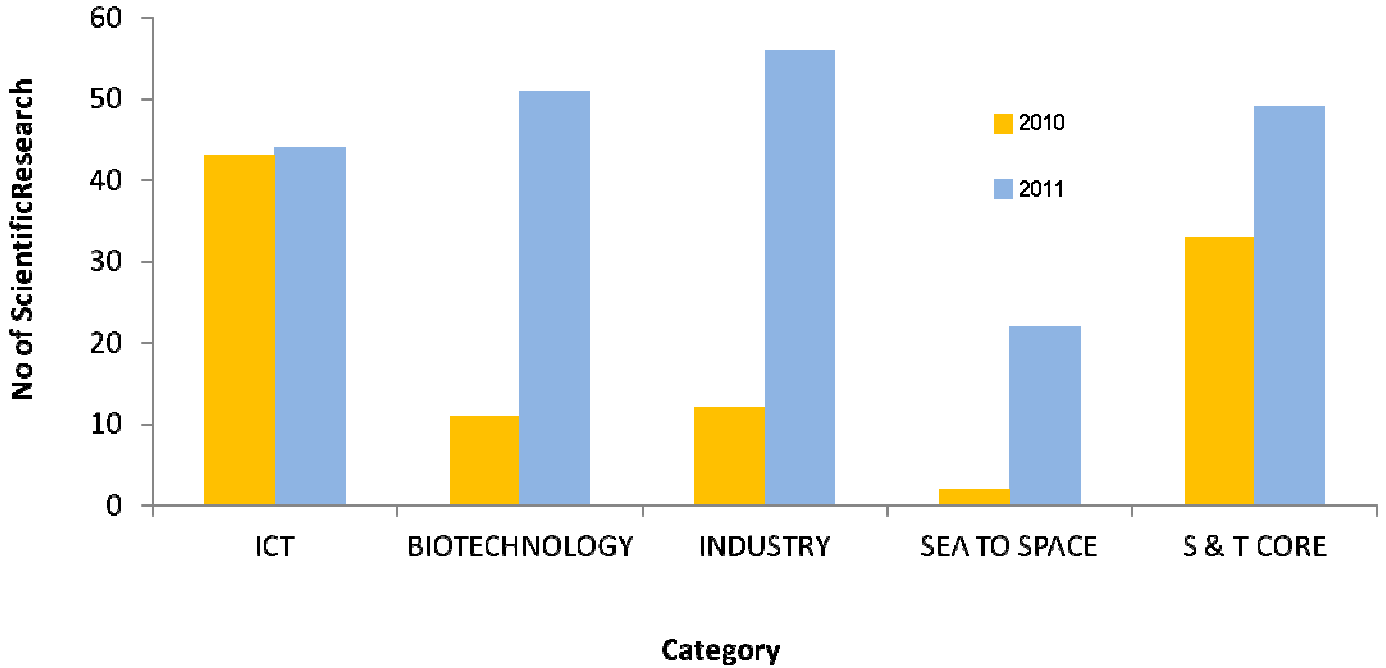
Publication to researchers – Low

* Some of the researcher - do administration work

RESEARCH GRANT AVAILABLE

1	SCIENCEFUND (PRODUCT DEVELOPMENT)
2	ER-BIOTEK
3	SCIENCEFUND-NOD
4	TECHNOFUND (UPSCALING AND PRECOMERCILIZATION)
5	INNOFUND
6	COMMERCIALISATION OF R&D FUND (CRDF)
7	TECHNOLOGY ACQUISITION FUND(TAF)
8	AGRO-BIOTECHNOLOGY R&D INITIATIVES (ABI)
9	GENOMICS AND MOLECULAR BIOLOGY R&D INITIATIVES(MGI)
10	PHARMACEUTICAL & NUTRACEUTICAL R&D INITIATIVES(IFNM)
11	DEMONSTRATOR APPLICATION GRANT SCHEME(DAGS ROLL-OUT)
12	E-CONTENT FUND
13	STRATEGIC FUNDING FOR ICT
14	MSC MALAYSIA R&D GRANT SCHEME(MGS)
15	MSC PRE SEED FUND
16	BIOTECHNOLOGY COMMERCIALISATION GRANT (BCG)
17	BRAIN GAIN MALAYSIA

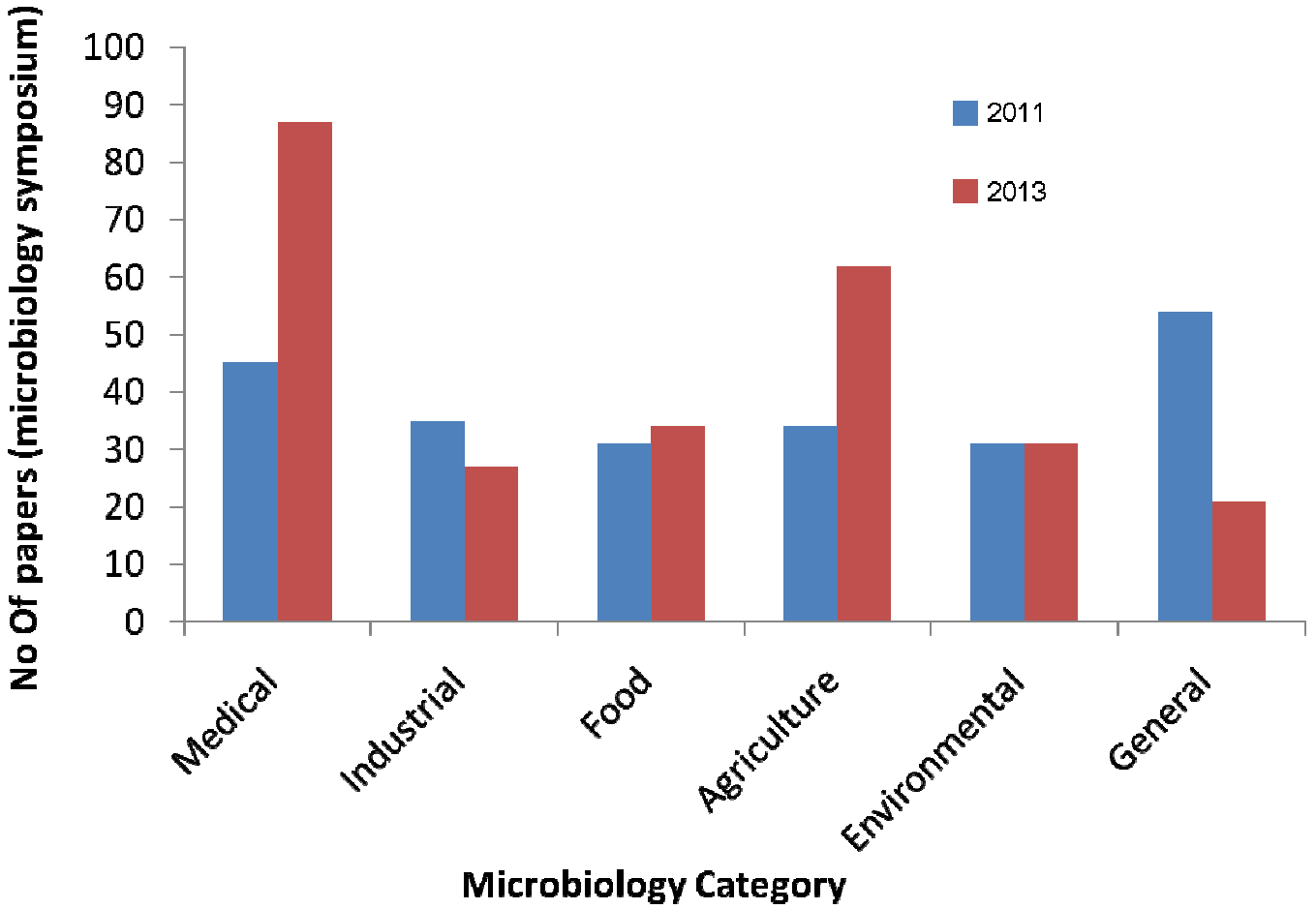
STATUS OF MICROBIOLOGY RELATED RESEARCH IN MALAYSIA



Number of Scientific Research Funded by Sc Fund
2010 = 101, 2011= 241

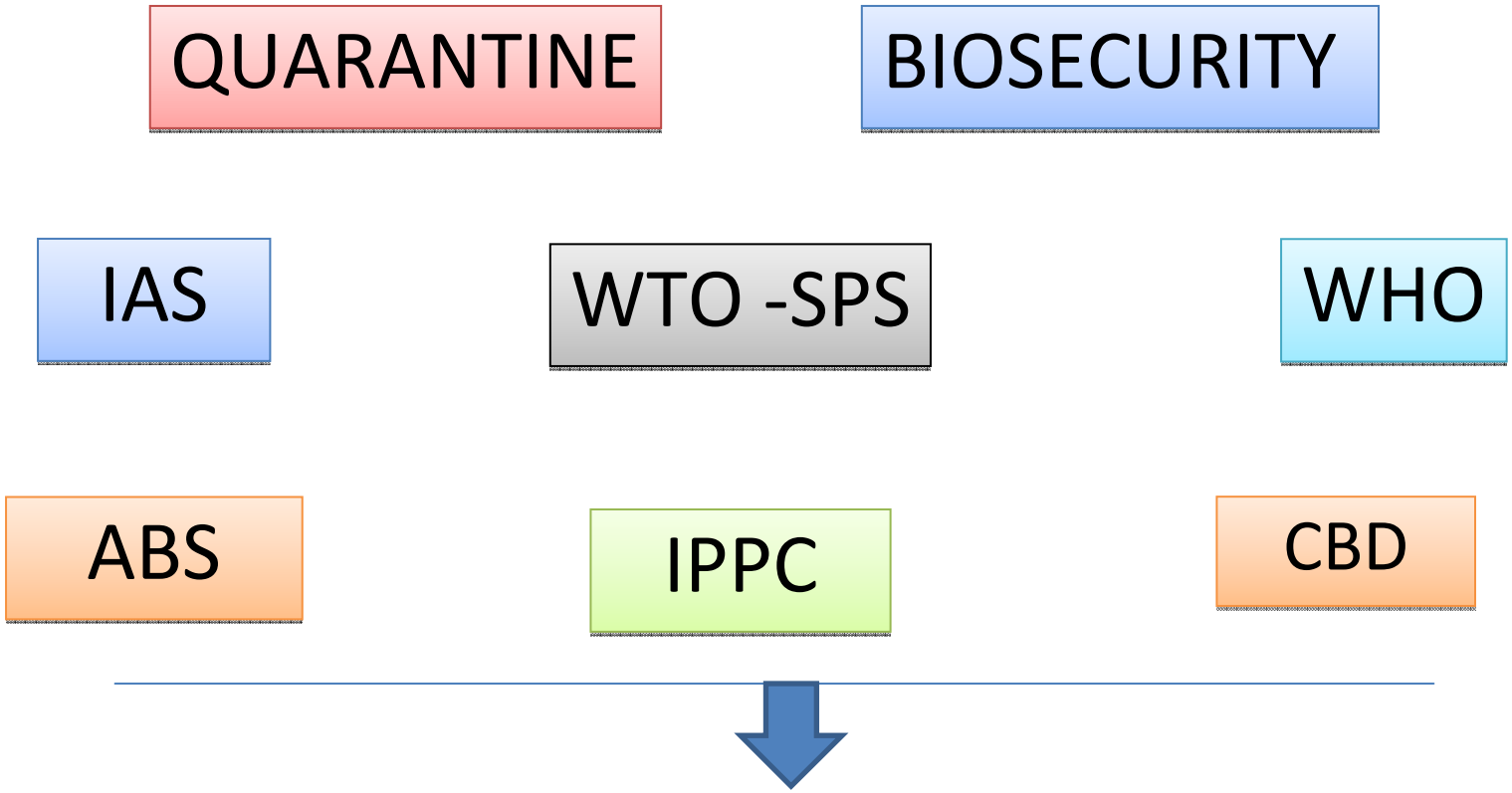
Number of research related to microbiology = 19 (mostly falls under biotechnology category

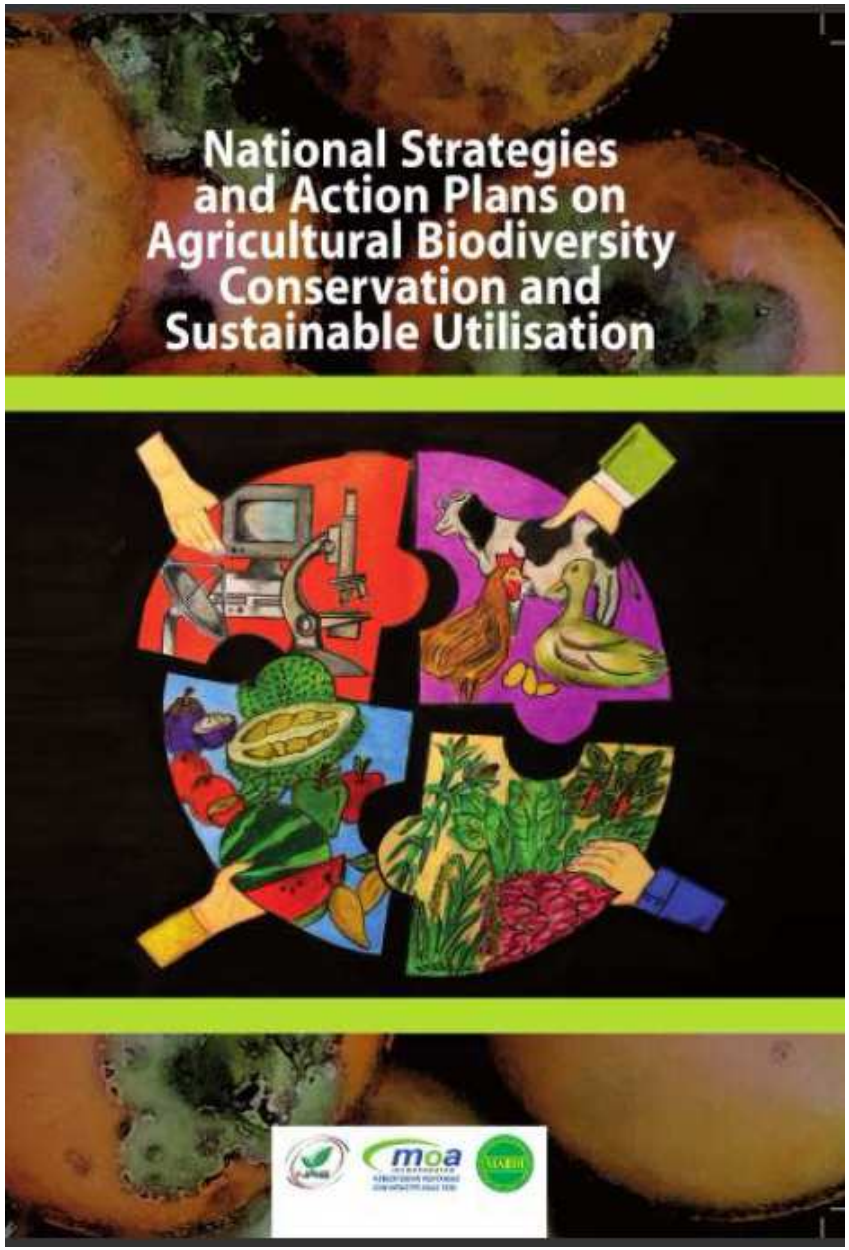
Total application by MARDI = 62 – only 13 related to microbiology



Number of microbiology related papers presented during microbiology symposium in 2011 (230) and 2013 (262)

DIRECT AND INDIRECT COMMITMENT





First publish in 2010

Revised in 2012 and for awareness

Launched on 25 Sept 2012 – during the

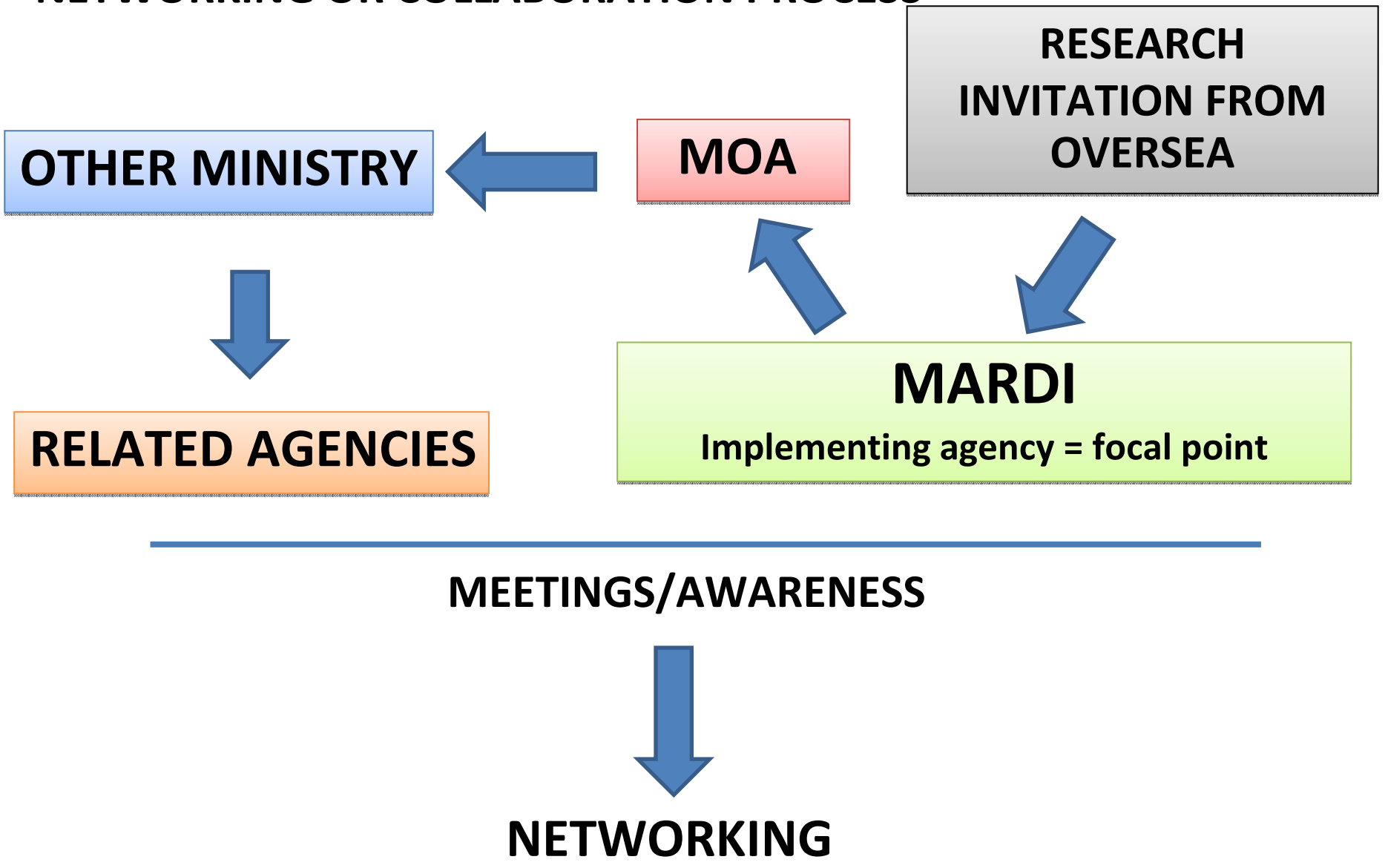
Regional Agrobiodiversity Conference 1

With the cooperation of MOA and NRE

HIGHLIGHTED ISSUES

1. EDUCATION AND PUBLIC AWARENESS
2. CAPACITY BUILDING
3. RESEARCH AND MONITORING
4. LEGAL AND INSTITUTIONAL FRAME WORK

NETWORKING OR COLLABORATION PROCESS



BIOPROSPECTION AND CONSERVATION

MICROBIAL GENETIC RESOURCE FOR FOOD AND AGRICULTURE

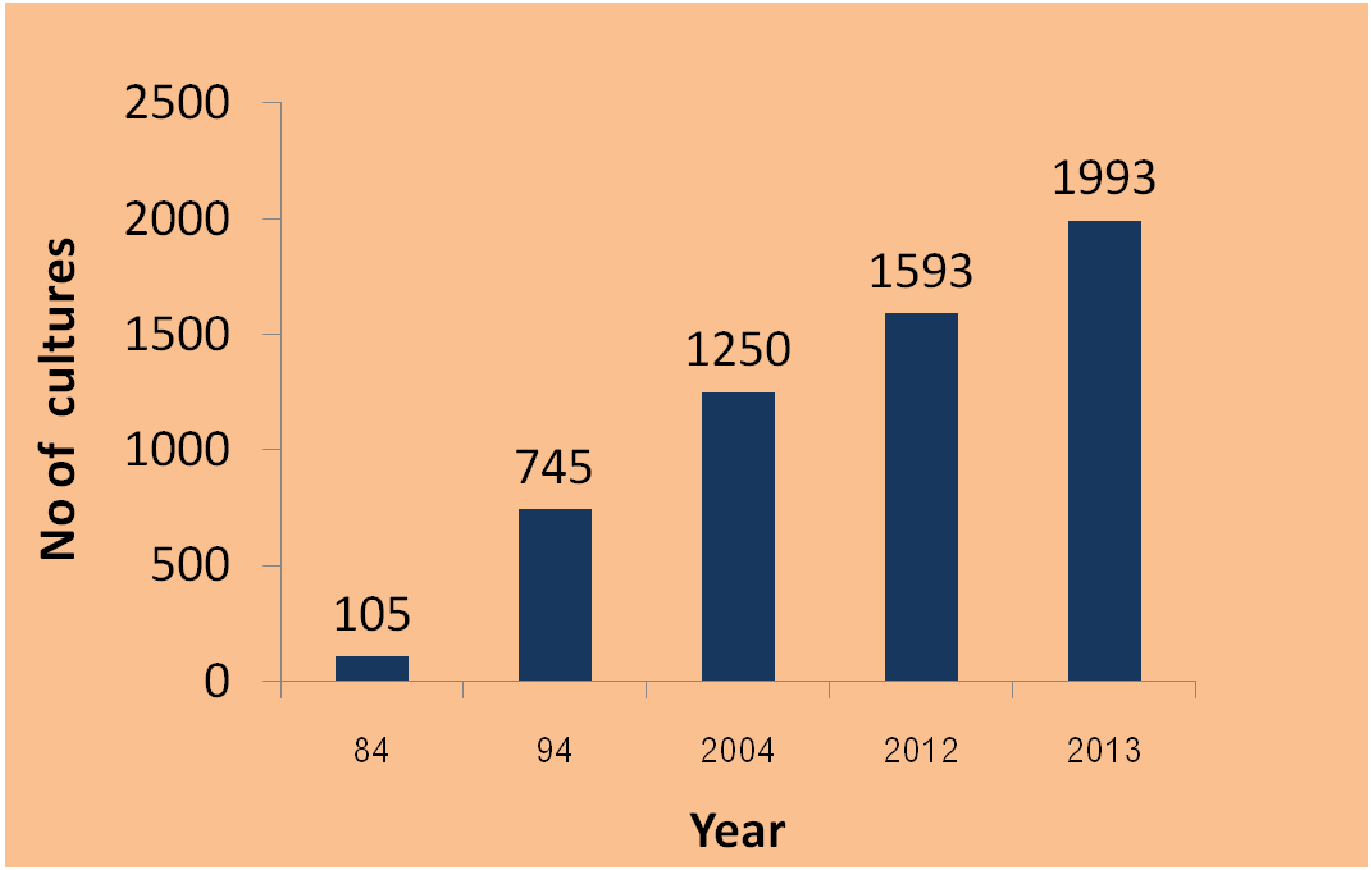
ONE OF THE STRATEGY IS TO DO RESEARCH AND MONITORING

Action Plan: Bioprospecting for microbes in natural and disturbed environments

Propose Plan: Survey, isolate, identify, document and maintain the cultures in referral centres

MICROBIAL GENETIC RESOURCES FOR FOOD AND AGRICULTURE

No.	Functional Group	Targeted Industries	Microbial Use In Malaysia
1.	Fungi	Agriculture (biofertilisers, biopesticides), food, animal feed and other biotechnological industries (e.g. about 48 companies for biofertiliser,10 for fermented foods, 1 for animal feed)	*Mycorrhiza* as plant growth enhancers *Trichoderma* spp. as biocontrol agents for plant diseases *Exserohillum longirostratum* as bioherbicides against plantation weeds *Aspergillus, Trichoderma* for PKC and silage production Edible mushrooms *Rhizopus oligosporus* in food industry *Aspergillus niger* for fermentation
2.	Bacteria	Agriculture (biofertilizers, biopesticides), bioremediation, food, bio-fermentation (probiotics) and other biotechnological industries (e.g. about 48 companies for biofertiliser,10 for fermented foods, 1 for animal feed, 4 for probiotic foods)	*Azospirillum brasilenses and Rhizobium* as nitrogen fixers Phosphate solubilizing bacteria for nutrient recycling *Bacillus thuringiensis, Burkholderia* sp. as bioagents in plant diseases, *Lactobacillus* spp. in health drinks and probiotics Yeasts in food fermentation *Agrobacterium* as source of transgenes
3.	Virus	Agriculture (biopesticides) and other biotechnological industries	Nucleopolyhedrosis Virus (NPV) against *Spodoptera litura* Oryctes virus against Rhinoceros beetle


2500
2000
1500
1000
500
0
No of cultures
105
745
1250
1593
1993
84
94
2004
2012
2013
Year

NUMBER OF MICROBES MAINTAIN BY SELECTED AGENCIES/UNIVERSITIES

No Of Cultures/isolates vs No of Culture with ID		
Institute	**No of collection**	**No of collection with 1D**
MARDI	1993	255
SIRIM	20000	1500
USM	640	640
UPM	402	402
Total	**24084**	**2797**

PRODUCT DEVELOPMENT

GENKIMO

GenKimo baja teknologi hijau

Oleh KHAIRUNNISA SULAIMAN
Gambar HAYAT SUEET

Penggunaan pelbagai jenis racun dalam pertanian menyebabkan ketidakseimbangan ekosistem.

Justeru penggunaannya perlu dihadkan dan digantikan dengan pelbagai mikroorganisma bermanfaat (IMO).

Selain menggantikan racun serangga, IMO boleh digunakan dalam proses penapaian sisa tanaman industri bagi makanan ternakan.

Hasil daripada silaj berkenaan bukan saja boleh digunakan bagi makanan ternakan tetapi juga sebagai baja sekali gus menghalau serangga dan mengurangkan bau busuk.

Dr. Rami Mohd. Noor bangga dengan kejayaannya menghasilkan GenKimo di Sentang, baru-baru ini

GANOEF

Basal stem Rot – Ganoderma

Myagri® Nursery and Replanting Booster Program

Suitable for All Crops

mycogold®

CROP ENHANCER

Spore AMF
≥ 250 Spore / 50gm

Each bag of **mycogold®** has been tested and shown to improve the development and establishment of roots and shoots which in turns spell a shortened Nursery Stage

mycogold® Benefits

- ☑ Protects against drought, salinity & heavy metals
- ☑ Increases nutrient and water uptake
- ☑ Reduces chemical fertilizer
- ☑ Provide resistance to soil borne disease
- ☑ Less transplanting stress or shock and improved survival
- ☑ Better growth
- ☑ Early maturity
- ☑ Maintain soil fertility
- ☑ **Promotes Higher Yield !**

Bacto-10 non pathogenic microbes (P-sol) isolated from palm oil and selected medicinal plant roots

Effective control of Rhinoceros Beetles

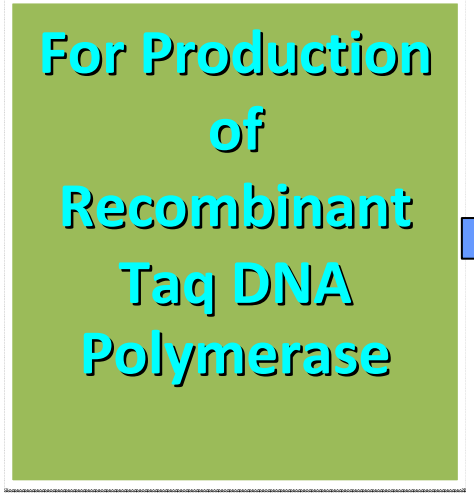
ORY-X is a product of intensive joint research by the Malaysian Palm Oil Board (MPOB) and Felda Agricultural Services Sdn Bhd (FAS). The product contains spores of Metarhizium which has been proven to be highly pathogenic to the rhinoceros beetle, Oryctes rhinoceros.

Tiger Milk Mushroom

Recombinant Taq DNA Polymerase

Work Started in Year 1997 :

Creation of *E.coli* "Super-Microbe"



MUNG BEAN TEMPE

PROJECT LEAD BY MARDI COLLABORATION WITH UPM

BIOFACT LIFE SDN. BHD

National Record

Cert No : 2537
Rec No : ST0167

THE MALAYSIA BOOK of RECORDS

This Is To Certify That

BIOFACT LIFE SDN BHD

is listed in

THE MALAYSIA BOOK OF RECORDS

for being the

FIRST COMPANY TO CULTIVATE CORDYCEPS

Annual harvest: 25 to 30 tonnes

Date: Jan 31, 2007

Venue: Muar, Johor

THE MALAYSIA BOOK OF RECORDS · VERIFIED ENTRY

DATUK DANNY OOI PJN
Founder

MEMBER · MBR ACHIEVERS CLUB

This certificate was issued on March 10, 2008

WHAT NEXT?

Human Resource Development

1)To increase knowledge and enhance technology and expertise:

- ❑taxonomy (knowledge and people)
- ❑utilizations of microbial diversity

2) To develop interest and to established expertise for preservation, maintenance and management of culture collection