

International Trade and Biological Invasions: International Collaboration on IAS Management under One Belt and One Road Initiative

Fang-Hao Wan

**Institute of Plant Protection, Chinese Academy of Agricultural Sciences
B&R International Collaboration Program Working Group**

wanfanghao@caas.cn

Outline

- **International Trade and Biological Invasions**
- **IAS Problems between China and ASEAN**
- **New Challenges in One Belt & One Road New Situations**
- **Responses and Actions**

1 International Trade and Biological Invasions

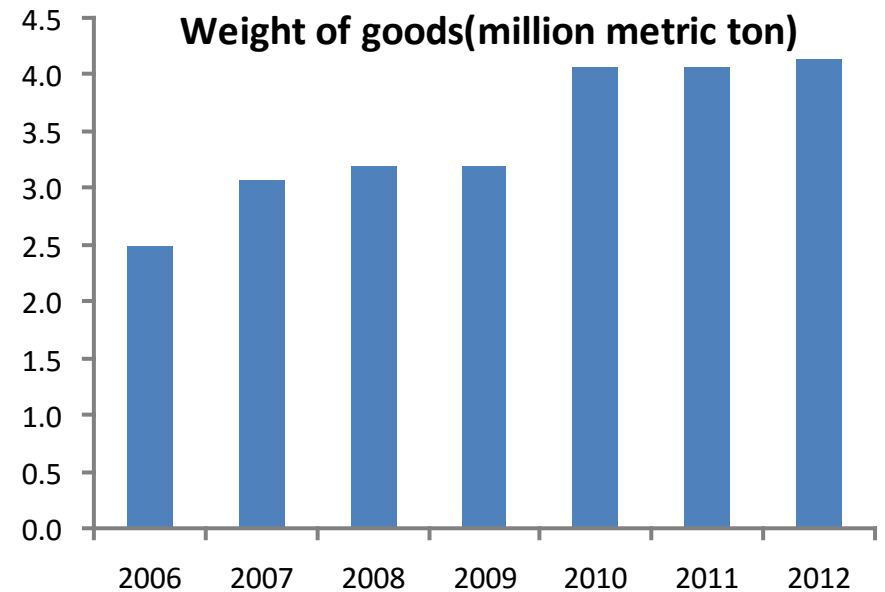
Why are invasive alien species a problem?

Impacts of invasive alien species



Why are invasive alien species a problem?

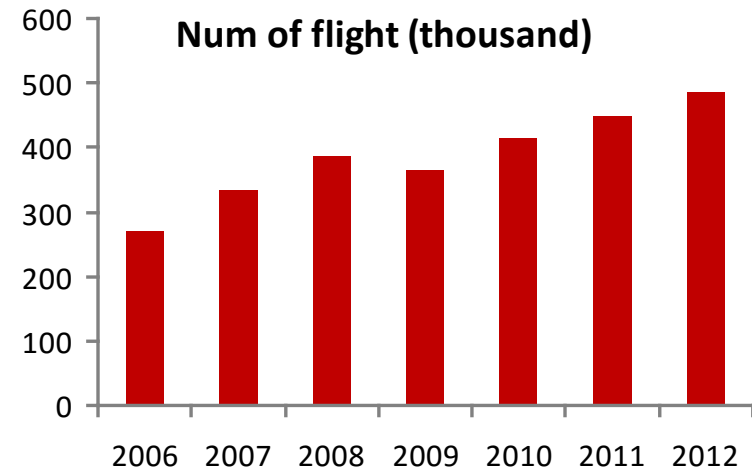
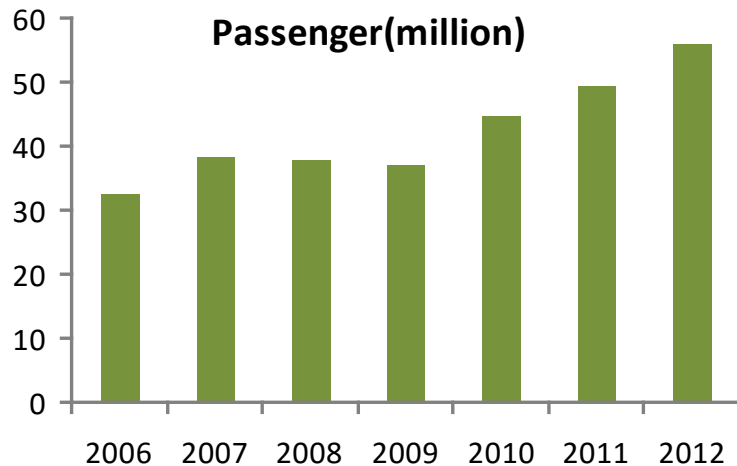
- Biological invasions increase as international trades and tourism increase



The international trade volume of China in recent decade

Why are invasive alien species a problem?

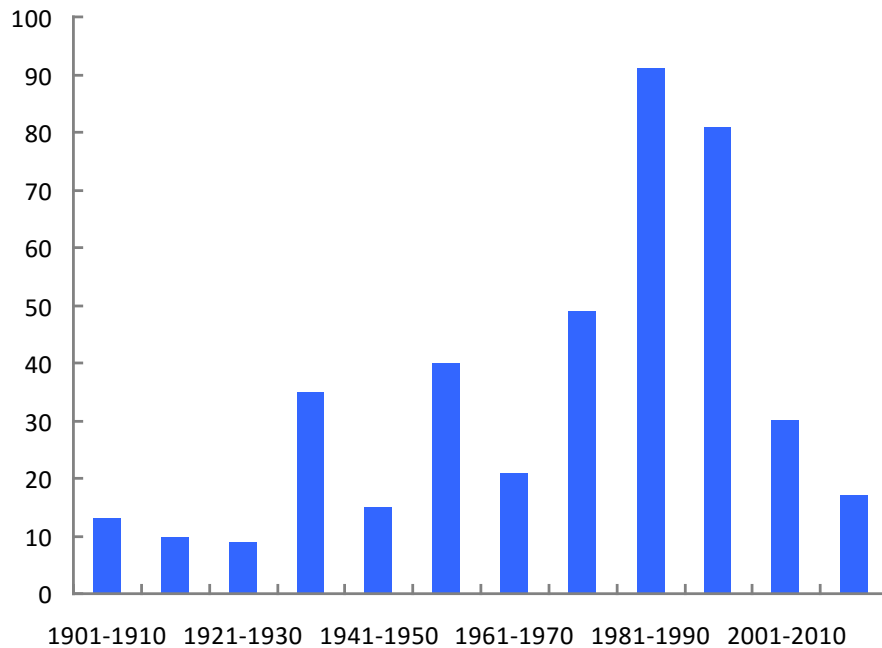
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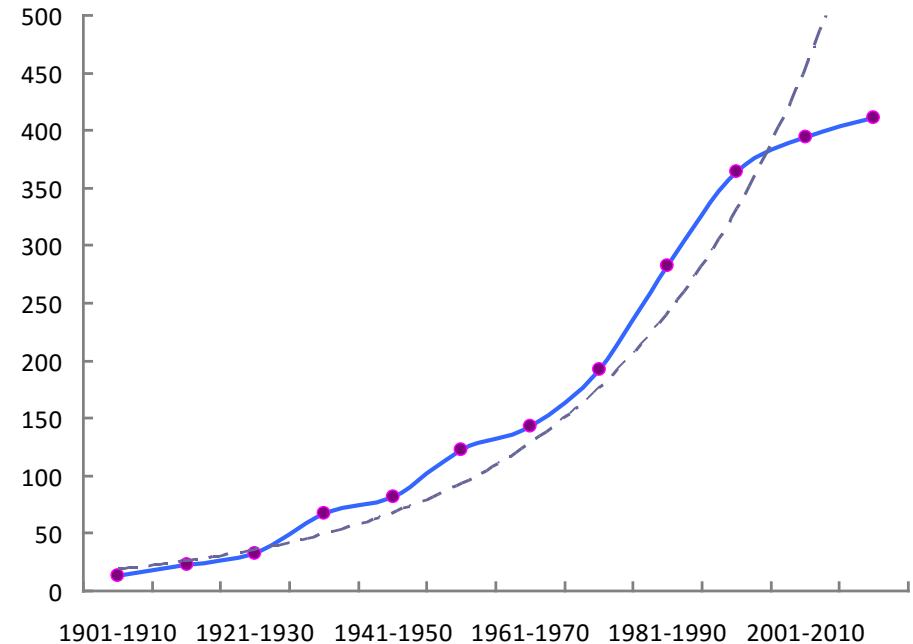
The tourism and transportation volume of China in recent decade

Why are invasive alien species a problem?

- Biological invasions increase as international trades and tourism increase



New alien species into China per 10 years

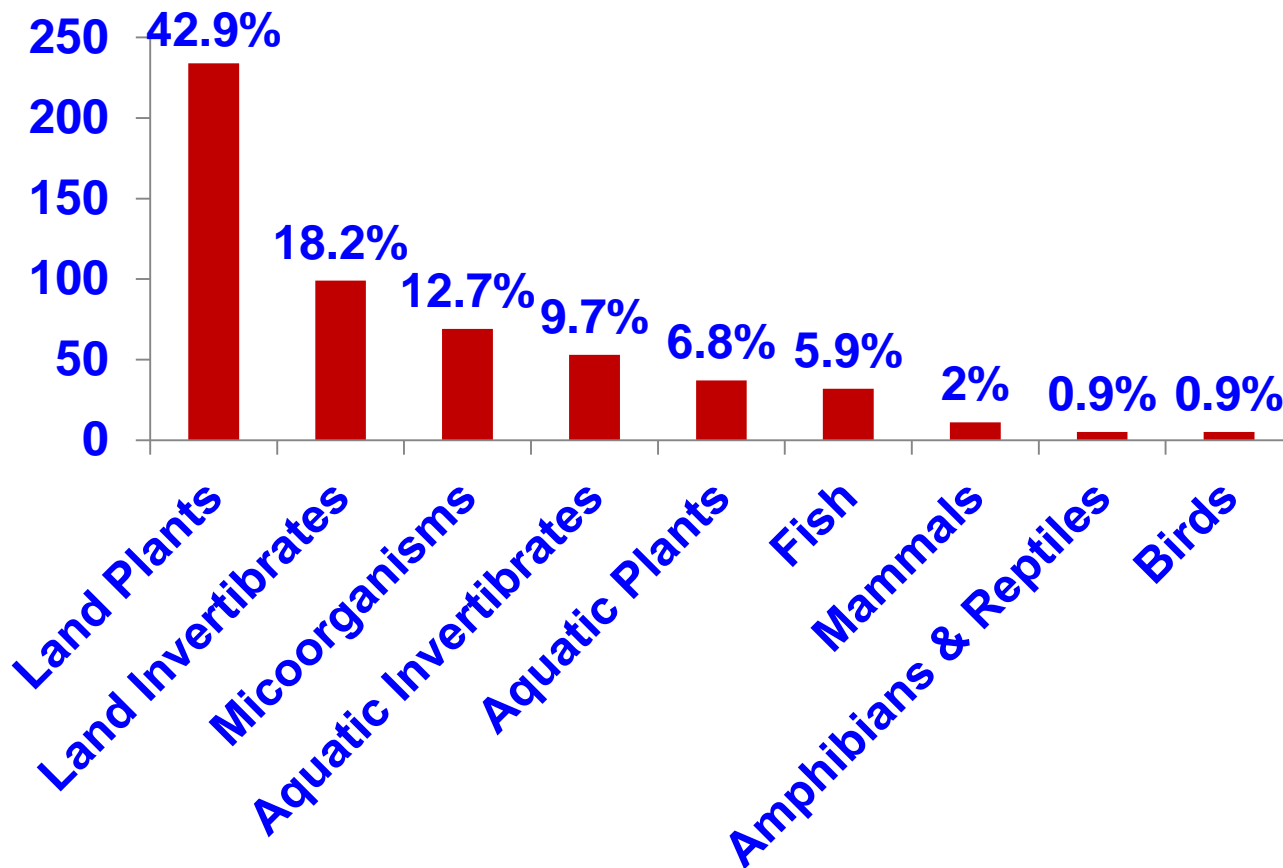


The cumulative number of alien species
(Exponentially growth tendency)

Why are invasive alien species a problem?

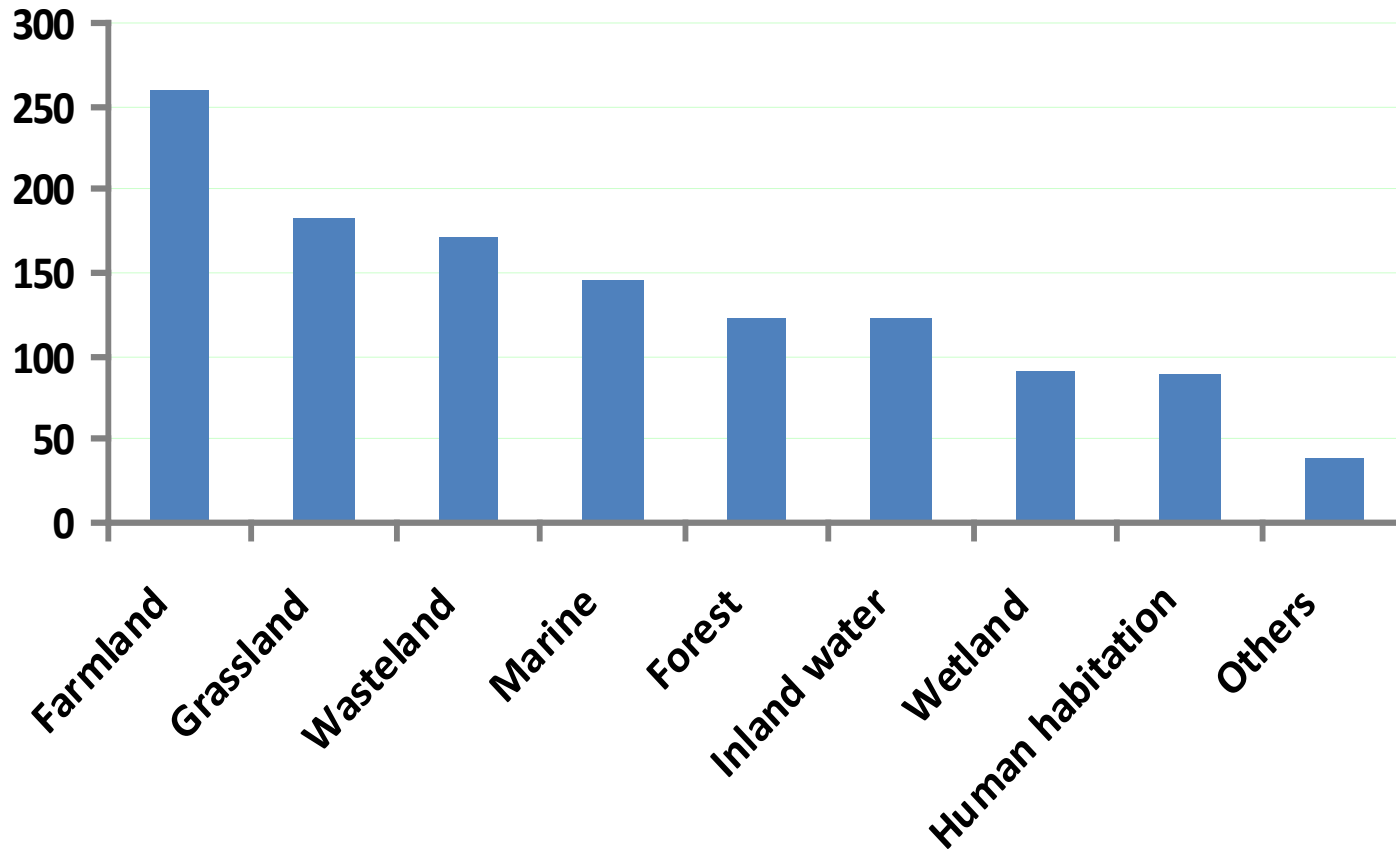
A large number of invasive alien species

Species Identified: 544 IAS (plants:269, invertebrates: 152)



Why are invasive alien species a problem?

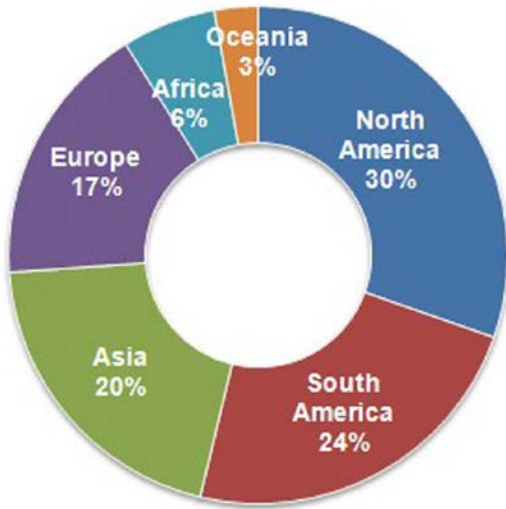
The various habitats of invasive alien species



Number of IAS in each habitats

Why are invasive alien species a problem?

A wide range of pathways and original regions



Origin of alien species

Various pathways for alien species invasions and spread

Impacts of Invasive Alien Species

- ❑ Biological invasion are threatening the food safety, ecological security, and human health.
 - **IAS reduced biological diversity in China**
 - **IAS aggravate ecological erosion in specific areas**
 - IAS intensify greater losses from agricultural pests
 - IAS endanger public health



Monoculture of Crofton weed in Yunnan Province



Canal of Dongting lake covered by Alligator weed

Impacts of Invasive Alien Species

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 - **IAS endanger public health**



Damage caused by tobacco whitefly



Symptoms of red imported fire ant

- ❑ China encounters severe challenge from biological invasions, especially for the Agriculture and Environment
- ❑ Biological invasion is increasingly recognized as one of the greatest threats to the sustainable development of Chinese agriculture.
- ❑ Chinese government has inserted huge efforts to prevent and manage IAS in agriculture, forestry and environments (for example: total of 100 millions US\$ for scientific research in recent 10 years)

2 IAS Problems among China and ASEAN

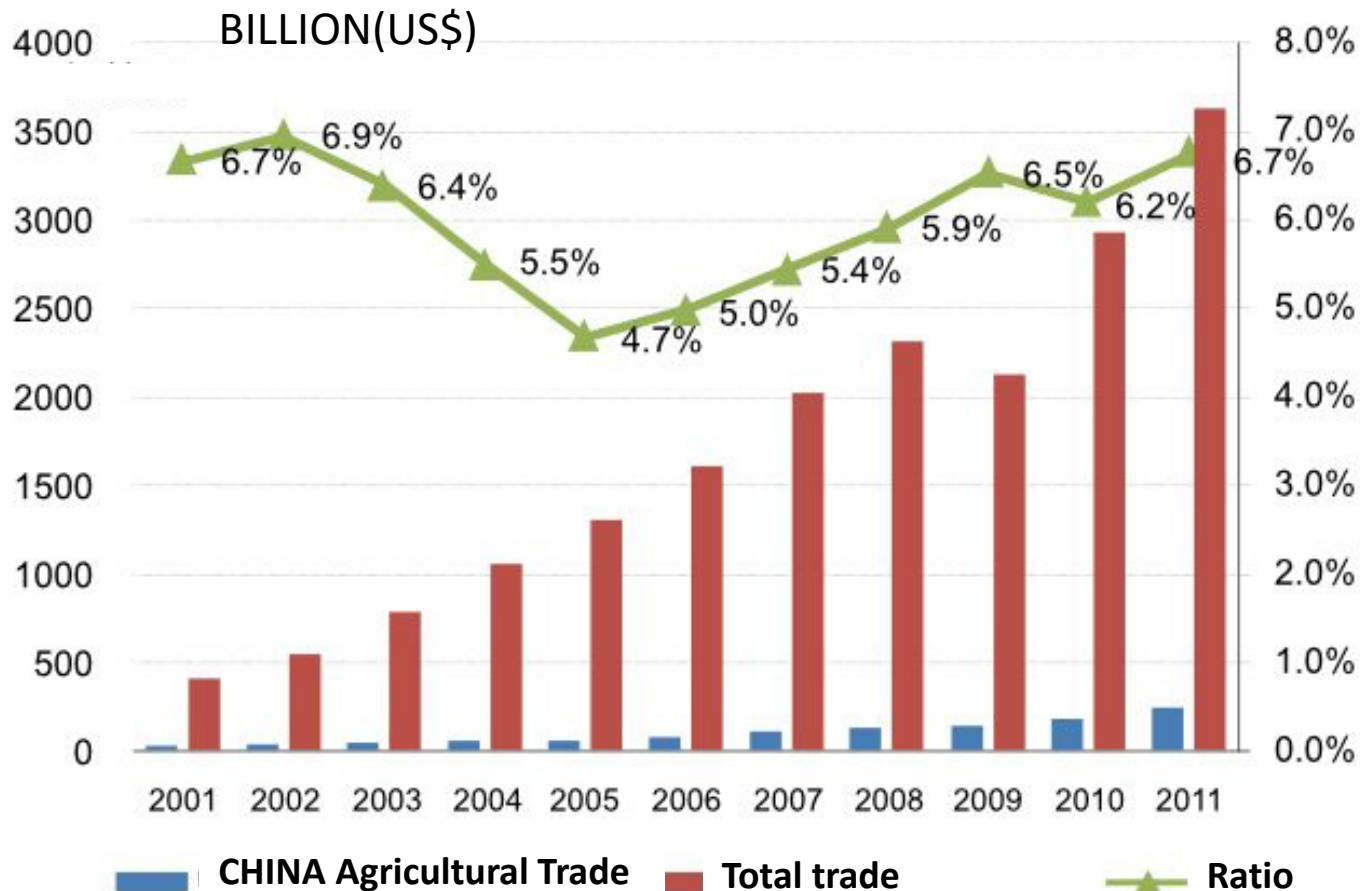
China – ASEAN Trade

Biological Invasions between China and ASEAN



CHINA – ASEAN Trade

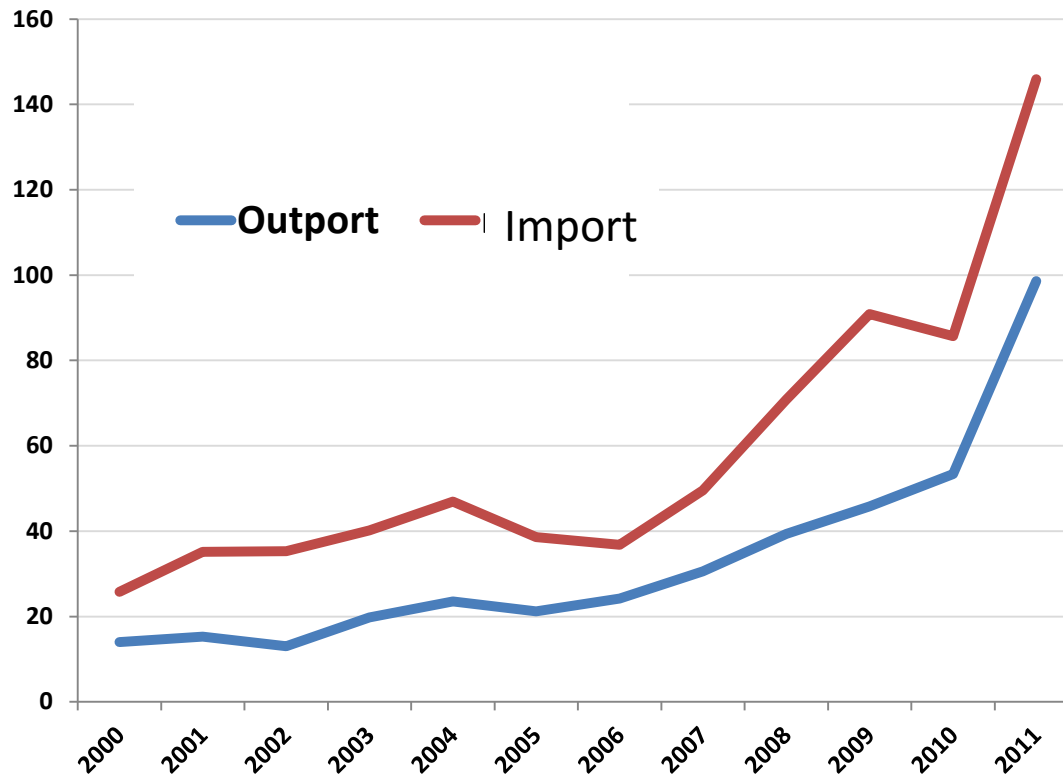
- Trade between China and ASEAN keeps in increasing



CHINA – ASEAN Trade

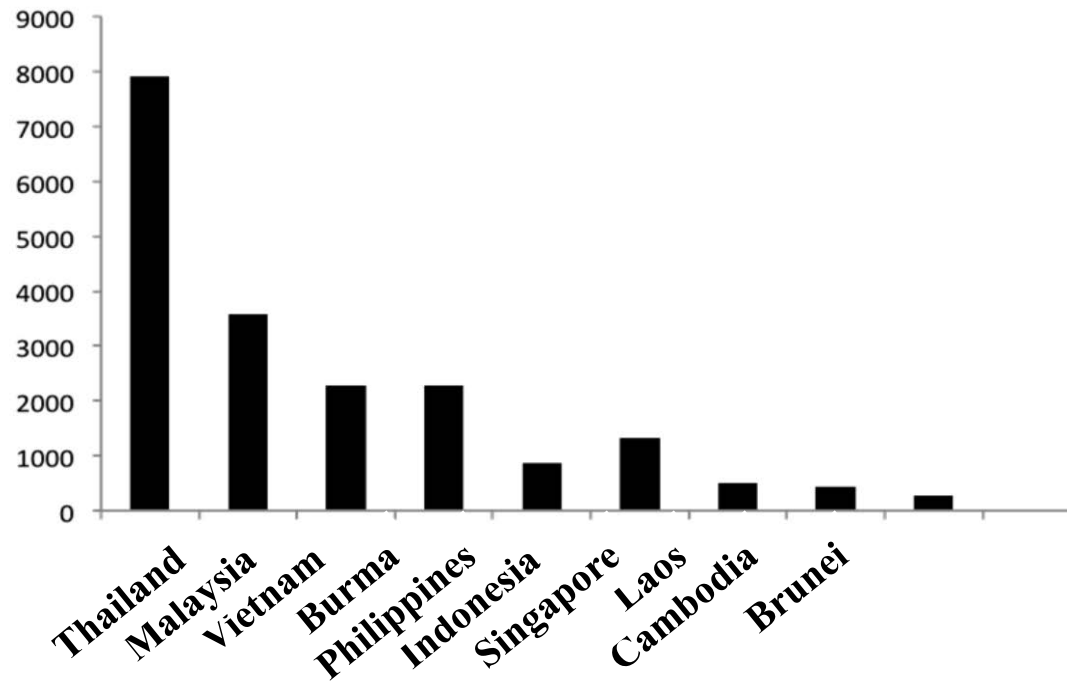
China: Import > Output = more IAS incoming > outgoing

Agricultural trade (10 million USD)



Quarantine pests comes from ASEAN

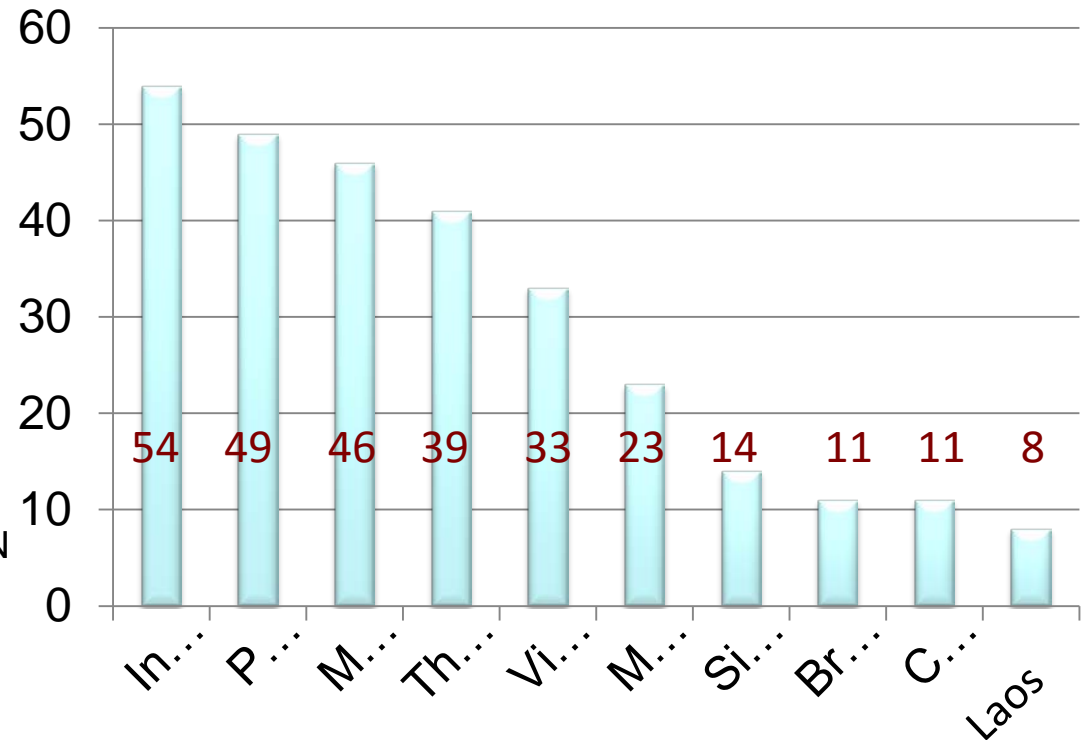
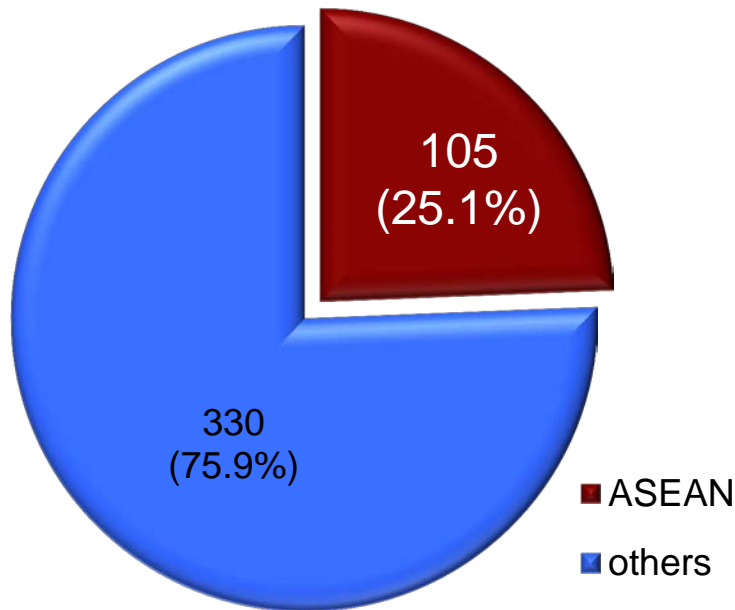
- CHINA: Governmental list - 435 quarantine pests
- The custom intercepting frequency (number * species) of quarantine pests is increasing in recent year, especially from Thailand and Malaysia.



Number of Quarantine Pests Intercepted by Chinese Customs

Quarantine pests comes into ASEAN

105 quarantine pests of China occurs in ASEAN countries



Economic Important Quarantine Pests of China Occur in ASEAN

Insects: 30

Scientific name	English name
<i>Acanthoscelides obtectus</i> Say	Bean weevil
<i>Sinoxylon</i> spp.	Auger beetle
<i>Sternochetus</i> spp.	Mango weevils
<i>Trogoderma</i> spp.	Waterhouse beetle
<i>Bactrocera</i> spp.	Tephritid fruit flies
<i>Dacus</i> spp.	
<i>Brontispa longissima</i> (Gestro)	Coconut leaf beetle
<i>Coptotermes</i> spp.	Subterranean termites
<i>Heterobostrychus aequalis</i> (Waterhouse)	Oriental wood borer
<i>Hypothenemus hampei</i> (Ferrari)	Coffee borer beetle
<i>Solenopsis invicta</i> Buren	Red imported fire ant
<i>Zabrotes subfasciatus</i> (Boheman)	Mexican bean weevil
<i>Coptotermes curvignathus</i> Holmgren	Rubber termite
<i>Phenacoccus manihoti</i>	Cassava mealybug
<i>Phenacoccus solenopsis</i> Tinsley	Solenopsis mealybug
.....	

Economic Important Quarantine Pests of China Occur in ASEAN

Fungus: 6

Scientific name	English name
<i>Fusarium oxysporum</i> Schlecht f.sp. Cubense Snyder et Hansen Race 4	Panama disease of banana (Musa spp.)
<i>Mycosphaerella fijiensis</i> (Morelet)	Black Sigatoka
<i>Mycosphaerella muscola</i>	Yellow Sigatoka leaf spot disease
<i>Peronospora hyoscyami</i> f.sp. tabacina	Blue mould of tobacco
<i>Sphaeropsis tumefaciens</i> Hedges	Sphaeropsis tip blight
<i>Stagonospora sacchari</i> Lo & Ling	sugarcane scorch

Economic Important Quarantine Pests of China Occur in ASEAN

Bacteria: 8

Scientific name	English name
<i>Xanthomonas axonopodis</i> pv. <i>citri</i>	Citrus canker disease
<i>Candidatus liberobacter asiaticum</i> Jagoueix <i>et al.</i>	Citrus greening disease
<i>Erwinia amylovora</i> (Burrill)	Fire Blight
<i>Burkholderia glumae</i>	bacterial panicle blight of rice
<i>Xanthomonas oryzae</i> pv. <i>oryzicola</i>	bacterial leaf streak of rice
<i>Xanthomonas oryzae</i> pv. <i>oryzae</i>	bacterial blight of rice
<i>Xanthomonas axonopodis</i> pv. <i>vasculorum</i>	Sugarcane gumming disease
<i>Pantoea stewartii</i> subsp. <i>stewartii</i>	Stewart's disease, bacterial wilt

Economic Important Quarantine Pests of China Occur in ASEAN

Nematode, Virus and Viroid: 5

Scientific name	English name
<i>Radopholus similis</i>	banana-root nematode
Banana bract mosaic virus, BBrMV	
African cassava mosaic virus, ACMV	
Sugarcane streak virus, SSV	
Cococnut cadang - cadang viroid, CCCVd	

Economic Important Quarantine Pests of China Occur in ASEAN

WEEDS: 9

Scientific name	English name
<i>Merremia boissiana</i> (Gagn.) van Ooststr.	Jin zhong teng
<i>Mimosa diplotricha</i> var. <i>inermis</i> (Adelb) Veldlx	Giant sensitive plant
<i>Mikania micrantha</i>	Mile-a-minute vine
<i>Ageratina adenophora</i>	Crofton weed
<i>Chromolaena odorata</i>	Common floss flower
<i>Eichhornia crassipes</i>	Water hyacinth
<i>Alternanthera philoxeroides</i>	Alligator weed
<i>Chenopodium pumilio</i>	Clammy goosefoot
<i>Echinochloa crusgalli</i>	Cockspur grass

Geographical distribution in ASEAN :

Top 10 Important Quarantine Pests of China

Scientific name	English name	Country
<i>Solenopsis invicta</i> Buren	Red imported fire ant	Malaysia
<i>Bactrocera dorsalis</i> (Hendel)	Oriental fruit fly	Vietnam, Laos, Cambodia, Myanmar, Thailand, Malaysia, Singapore, Philippines, Indonesia
<i>Sternochetus</i> spp.	Mango weevils	Myanmar, Thailand, Philippines, Malaysia, Indonesia, Vietnam, Cambodia
<i>Trogoderma granarium</i> Everts	Khapra beetle	Vietnam, Myanmar, Thailand, Malaysia, Philippines, Indonesia
<i>Acanthoscelides obtectus</i> (Say)	The common bean weevil	Philippines, Indonesia, Singapore, Vietnam, Thailand, Myanmar
<i>Zabrotes subfasciatus</i> (Boheman)	Mexican bean weevil	Vietnam, Myanmar, Malaysia, Indonesia
<i>Coptotermes curvignathus</i> (Holmgren)	Rubber tree termites	Vietnam (south), Cambodia, Myanmar, Malaysia (West), Thailand, Singapore, Brunei, Indonesia
<i>Heterobostrychus aequalis</i> (Waterhouse)	Oriental wood borer	Vietnam, Myanmar, Thailand, Malaysia, Indonesia, Philippines
<i>Brontispa longissima</i> (Gestro)	Coconut leaf beetle	Indonesia, Malaysia
<i>Radopholus similis</i> (Cobb) Thorne	Banana-root nematode	Vietnam, Indonesia, Malaysia, Philippines, Thailand, Brunei

- ❑ China and ASEAN are facing the same problem of biological invasions
- ❑ Need more closely collaborations
- ❑ The IAS prevention and management should be the first priority for international collaboration.

3 New Challenges in OBOR New Situations

Why is One Belt and One Road (OBOR)?
What are the main components of OBOR?



ONE BELT and ONE ROAD





Covers 65 + countries



main lines ranging 81,000 km



Population: 4.4 billion, 63%



ECONOMIC VOLUME: 21 TRILLION USD, 29%



Service Trade: 23.9%



Industry zones: 77 from 118 economic & trade cooperation zones globally

One Belt and One Road Visions: Six Economic collaboration Corridors

- 1 China-Mongolia-Russia economic collaboration corridor
- 2 China-Central Asia-West Asia economic collaboration corridor
- 3 China-Pakistan Economic collaboration corridor
- 4 China-Bangladesh-Myanmar-India Economic collaboration corridor
- 5 China-Southeast Asia-South Asia economic collaboration corridor
- 6 China-South Sea – South Pacific economic collaboration corridor



One Belt and One Road Visions: Six Economic Corridors

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- ⑥ China-South Sea – South Pacific economic collaboration corridor

➤ **OBOR Investments: 890 Billions US\$**

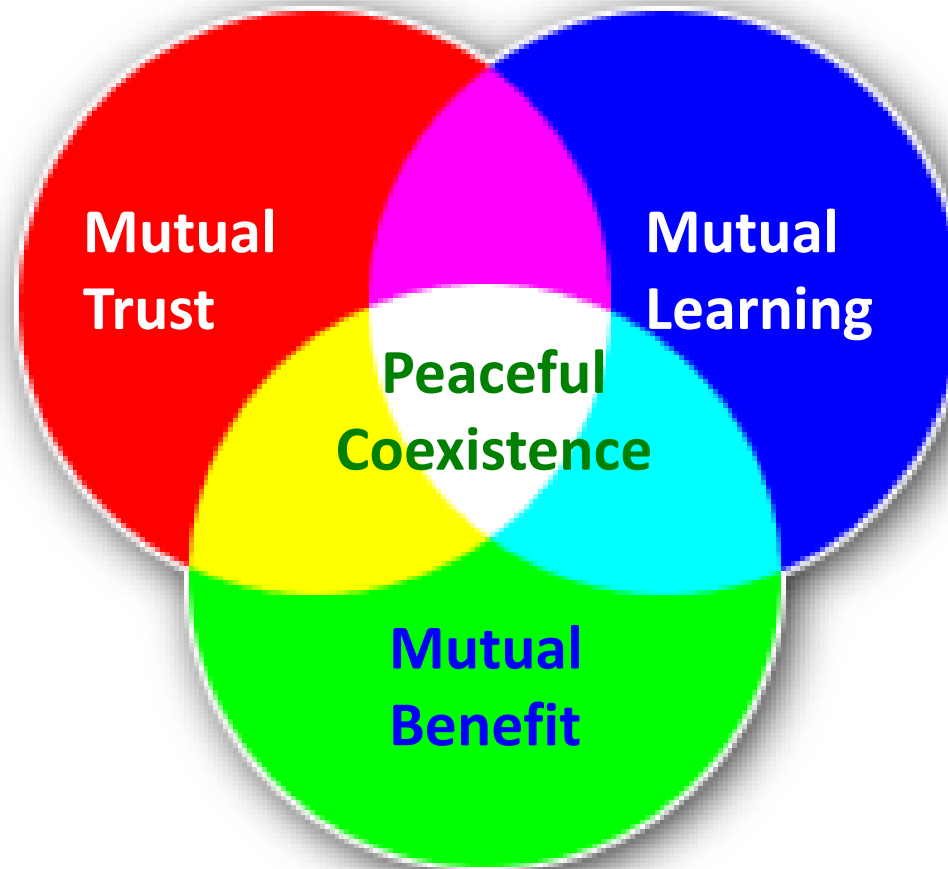
➤ **Infrastructure Projects: > 900**

(High-speed railway, Express highway, Power-grid, Gas-pipeline, Oil-pipeline...)

➤ **Countries: more than 60**



OBOR Principles



- Speeding up the International trade
- Promoting economic development among OBOR countries



OBOR Cooperation Priorities

http://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1249618.shtml (accessed on 20 April 2015)

Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road

2015/03/28

Issued by the National Development and Reform Commission,
Ministry of Foreign Affairs, and Ministry of
Commerce of the People's Republic of China,
with State Council authorization

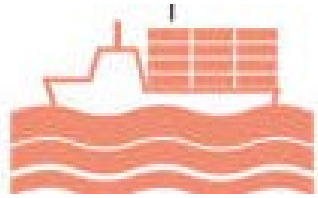
March 2015

First Edition 2015



AIIB

Financial integration



Unimpeded trade



Policy coordination



People-to-people bond

High-speed railway
Express highway
Power-grid
Gas or Oil-pipeline
...

Facilities connectivity



S & T in agriculture
Information sharing
Joint Lab/TT Center
Education and training
...

Challenge 1:

- Increase the introduction of invasive alien pests in China, v.v. in other OBOR countries

Unimpeded
Trade

Facilities
connectivity

People-to-
people bond

Need to:

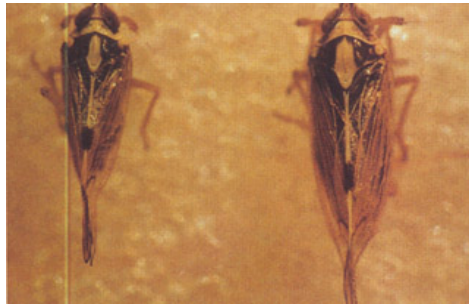
- “Enhance **customs cooperation**: information exchange, mutual recognition of regulations...”
- “Improve **bilateral and multilateral cooperation**:
inspection and quarantine, certification and accreditation, standard measurement”

Challenge 2:

• Movement of cross-regional migratory pests through the corridors

Environmental disturbance -- Facilitation of distribution

- Southeast Asia – South Asia: rice planthopper; rice leaf folder
- Central Asia – Russia – Mongolia: beet webworm; grasshopper
- Southeast Asia – South Asia – Russia – Mongolia: beet armyworm



- ❑ In-time chances for expanding international collaboration in plant protection from the biosafety and food-security points among OBOR countries
- ❑ In OBOR document, Chinese government encourages and stimulates scientists to strengthen “DEEPLY” international collaboration in scientific research, technology transfer, platform establishment(oversea joint lab/technology transfer center, information sharing and education system...)
- ❑ **Ministry of Science and Technology** (MOST) will / should provide fundings if a “GOOD” Plant Protection International Collaboration Proposal be developed into the OBOR vision by **Chinese Scientists and International Partners**.

4 Responses and Actions

Main Actions:

- **Consortium:** OBOR Plant Protection International
- **Proposal:** OBOR Plant Protection International Collaboration Project Plan

Initiated by

Chinese Society of Plant Protection
Chinese Academy of Agricultural Sciences
CABI East-Asia



Action 1

OBOR Plant Protection International Initiatives

National Consultation Meeting on Establishing 'One Belt,One Road' Plant Protection International Consortium and Developing International Collaboration Program

IPP-CAAS Beijing China, 16 May 2015

“一带一路”植保国际联盟（筹）及重大国际合作项目发展磋商讨论会
北京 2015.05.16



Action 1

OBOR Plant Protection International Initiatives

INTERNATIONAL CONSULTATION MEETING on

Plant Protection Cooperation and Development Symposium

– ‘One Belt, One Road’ Plant Protection International Consortium &

Multi-lateral Collaboration Programme Development Consultation Workshop

Changchun, China, 10-12 September 2015

13 countries, 140 delegates



OBOR Plant Protection:

- ① Changchun Declaration
- ② Partnership Statement
- ③ International Consortium
- ④ International Collaboration Programme

Multi-lateral collaboration:

A call to governments, non-governmental and international organisations and other interested actors in the field of plant health along OBOR countries following the **principle** of mutual benefits and safety to **agree on** more profound, high level and deep regional **collaboration in agriculture**, based on the bilateral and multilateral collaboration mechanisms.



Action 1

OBOR Plant Protection International Initiatives

OBOR Plant Protection:

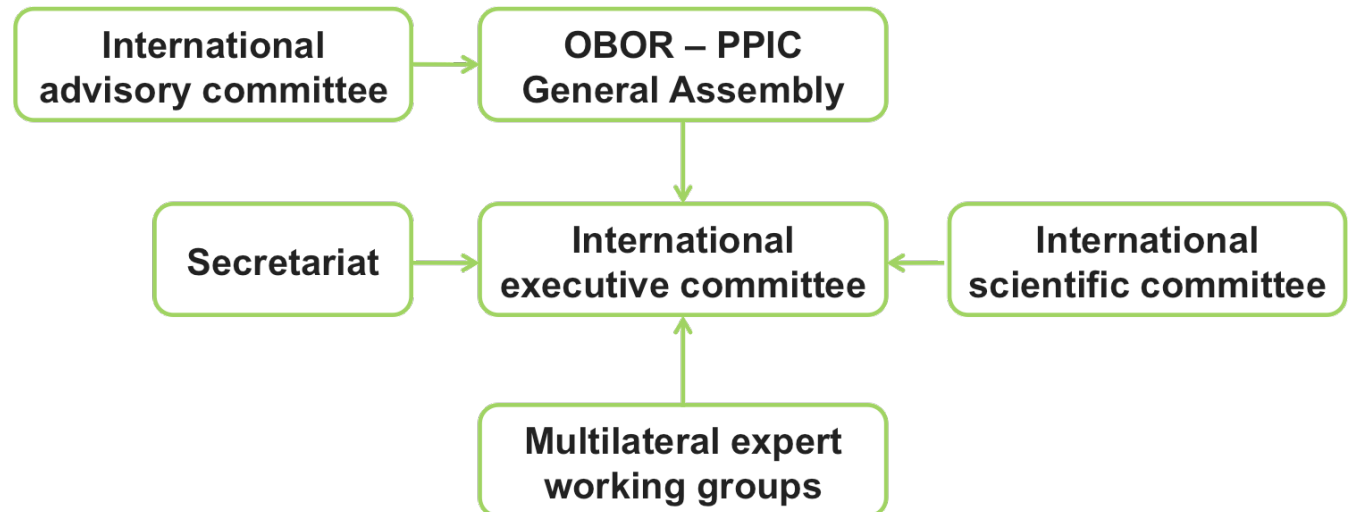
- 1 Changchun Declaration
- 2 Partnership Statement
- 3 International Consortium
- 4 International Collaboration Programme

Signed by delegates from 60 universities, institutions, organizations of OBOR countries



Governance:**OBOR Plant Protection International Consortium (OBOR-PPIC)**

function as organising scientific collaborative research, conducting international academic exchanges and training, and providing scientific technology transfer and consultancy services for decision makers.



Action 3

OBOR Plant Protection International Collaboration Plan

Joint research

Area: **agriculture, forestry, grassland, oasis agriculture, tropical crops**
(rice, corn, wheat, soybeans, cotton, cassava, natural rubber, palm, characteristic fruits and vegetables, horticultural crops, etc.)

Pests: **Cross-regional pests (diseases, insects, weeds, rodents):**

- **Invasive alien species**
- **Migratory pests**
- **Original/native key pests in OBOR countries**

Species of crops and pests are open, inclusive, depended on each OBOR countries' specialty

Share and transfer well-developed plant protection technologies:

- **Early warning technology** (Risk analysis, data and information sharing...)
- **Rapid detection technology** (DNA barcoding identification, Gene chips, etc.)
- **Field monitoring technology** (Real-time remote unmanned monitoring technology, mobile pest diagnostic services...)
- **Emergency treatment technology** (spread-blocking, eradication, etc.)
- **Area-wide ecological manipulation technology**

Share and transfer environmental friendly control products

➤ Natural enemy insects

Parasitoids: *Trichogramma*, *Aphelinids*, etc.

Predators: predatory mites, ladybirds, stink bug, lacewing, etc.

➤ Microbial agents: BT, insect virus, etc.

➤ Botanical pesticides

➤ Pheromone products:

Insect sex pheromones, Botanical trapping/repellent pheromones, etc

➤ Microbial metabolism product preparation (agricultural antibiotics, etc.)

➤ Plant immune regulation preparation

Action 3

OBOR Plant Protection International Collaboration Programme

Joint labs / international technology transfer centers

Europe
Central Asia
West Asia
South Asia
Africa



Northeast Asia
Southeast Asia (ASEAN)

- Form international overseas joint core laboratory group covering OBOR countries.
- Each labs or centers may have different tasks, purposes and functions, based on different demand of local plant protection technology

Action 4

Working Group related OBOR Plant Protection

1. International Biological Control Products Working Group on Cross-regional Pest Issues in OBOR Countries (2015/9/6, Beijing)



2. Genomics Working Group for Key Invasive Alien Species Management in OBOR Countries

1st National meeting: 2015/4/5, Nanjing

2nd International meeting: 2015.11.17-19, Beijing



Action 4

Working Group related OBOR Plant Protection

3. Technology transfer working group (leading by CABI China)
4. Area-wide biologically and ecologically-based integrative manipulation Working Group (leading by Zhejiang University)
3. Big Data Working Group (leading by Fujian Academy of Agricultural Sciences)
4. Enterprises Working Group (by Beijing Biocontrol-Agent Ltd Company)
5. ...



Information Sharing

Technology innovation and transfer

Products innovation and transfer

Scientists exchange and scientific training



Looking for your SUPPORT

We have:

- Chinese Ministry of Agriculture (MOA) has supported a initial funding on OBOR plant protection (4 million RMB, 2016)
 - 5 fact-finding groups will be established and make visits to different countries
 - Investigating fundamental data

Next:

- More financial support from Chinese government
- Looking for collaborations with institutions, universities and interested actors in OBOR countries
- Hoping the OBOR plant protection collaborations will be encouraged and supported by OBOR country governments.

THANKS

OBOR Spirit: Peace and Cooperation, Openness and Inclusiveness, Mutual Learning and Mutual Benefit



中国植物保护学会

Dear Dr. Zhang Feng, Dr. Li Hongmei and Mr. Wan Huanhuan,

On behalf of China Society of Plant Protection, I would like to express my sincere appreciation to CABI East Asia Centre, especially Dr. Zhang Feng, Dr. Li Hongmei and Mr. Wan Huanhuan, for their great contributions and excellent work in organizing the International Symposium on the Belt and Road Plant Protection held in Changchun.

The International Symposium on the Belt and Road (B&R) Plant Protection International Consortium (B&R-PPIC) and Key Collaboration Programme Development was successfully held on 10-12 September, 2015, in Changchun, China. The symposium was hosted by the China Society of Plant Protection, co-organised by Chinese MOA-CABI Joint Laboratory for Bio-safety, Institute of Plant Protection of Chinese Academy of Agricultural Sciences, et al. More than 140 participants from 13 countries, including China, Russia, Mongolia, Pakistan, Malaysia, Hungary, Israel, Italy, Turkey, Vietnam, India, Switzerland and Australia, attended this impressive event.

After two days reports and group discussions, the participants reached the consensus on establishment B&R-PPIC; partnership statement on B&R Plant Protection International Collaboration was signed within 32 institutions from China and 12 abroad countries as well as international organization; B&R-PPIC Changchun Declaration was announced; 'B&R Key International Collaboration Programme Development Plan' was promoted.

CABI East Asia Centre, especially Dr. Zhang Feng, Dr. Li Hongmei and Mr. Wan Huanhuan have made great efforts from all aspects to help to achieve such outcomes, and they keep on promoting further progress on establishing B&R-PPIC and developing of B&R International Collaboration Program. I would like to thank you all, and I hope we will carry on our close collaboration in the future.

Yours sincerely

Dr. Wan Fanghao
Vice President
China Society of Plant Protection



OBOR-PPIC Contacts



Dr. Fang-Hao Wan wanfanghao@caas.cn

Institute of Plant Protection(IPP),
Chinese Academy of Agricultural Sciences (CAAS)



Dr. Feng Zhang f.zhang@cabi.org

CABI, China



Dr. Ju-Lian Chan jlchen@ippcaas.cn

IPP, CAAS



Dr. Nian-Wan Yang yangnianwan@caas.cn

IPP, CAAS



Dr. Hong-Mei Li h.li@cabi.org

CABI, China