



newsletter  
工作通讯  
20

**Plant and Food  
Biosecurity**  
植物和食品  
生物安全

Sino-Italian Cooperation Program  
**Environmental Training Community**

中-意合作计划  
环境培训园地

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# Plant and Food Biosecurity 植物和食品 生物安全

Sino-Italian Cooperation Program  
**Environmental Training Community**

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环境培训园地



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It is a great pleasure for me to introduce this issue of the newsletter which will be released on the occasion of the 10<sup>th</sup> International Congress of Plant Pathology, organized in Beijing from August 25-31 by the International Society for Plant Pathology, under the presidency of Maria Lodovica Gullino.

The Italian Ministry for the Environment, Land and Sea has supported the transfer of research and technology activities of the plant pathologists, led by Lodovica Gullino at the University of Torino, since 1992, fully recognizing the role of plant pathology in ensuring not only safe food for a growing world population, but also the protection of the environment.

The cooperation between the Italian Ministry for the Environment, Land and Sea and Agroinnova, began in Italy to address the need to reduce the usage of methyl bromide as a fumigant, and it has expanded to include many other topics and countries, including China. This issue of the newsletter covers the topic of plant biosecurity, which is relevant for its implications on trade and food safety. The deliberate or accidental introduction of plant pathogens on crops can have very serious economic consequences. Farmers already spend billions of euros worldwide on pest control for naturally occurring insects and diseases, and lose as much as one third of production despite these efforts.

I wish to praise Agroinnova for having been able to bring such a topic to the attention of European researchers, politicians and the public at large. Sharing scientific ideas, research results and best practices is crucial and I hope that the discourse that will be generated at this congress will help in the advancement of research in this field.

**Corrado Clini**

Director General, Department for Sustainable Development, Climate Change and Energy, Italian Ministry for the Environment, Land and Sea

The venue of an international congress is decided well in advance and depends on a number of factors. The fact that the 10<sup>th</sup> International Congress of Plant Pathology takes place in Beijing, occurring at the end of my presidency of the International Society for Plant Pathology, gives me great satisfaction.

Such an appointment, which closes five years of an exciting experience, occurs in a country that I deeply love and where I spent long periods over the past 14 years. I had the chance to interact with many institutions and universities, acquainting myself deeply with the reality of a country that has changed very much over this period.

I was able to assist directly in its incredible economic growth, having the unique opportunity to understand the strength of both the country and its people.

I am very grateful to the Italian Ministry for the Environment, Land and Sea and, in particular, to Dr. Corrado Clini for the opportunity given to Agroinnova to be part of China's growth during the participation of the Sino-Italian Program, which he, with his long term vision, put in place in the year 2000. Many thanks also go to Venice International University for providing me with the opportunity to devote this issue of the newsletter to the topic of plant and food biosecurity, distributing it at the 10<sup>th</sup> International Congress of Plant Pathology.

**Maria Lodovica Gullino**

Director of Agroinnova and President of the International Society for Plant Pathology

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国际植物病理学协会第十次会议将于8月25-31日在北京召开，玛丽.古里诺教授（Maria Lodovica Gullino）担任该协会主席。《中意合作计划环境培训园地》第20期通讯将在该会议上发放，我很高兴向大家隆重推荐本期通讯。

意大利环境、领土和海洋部充分认识到植物病理学不仅在为不断增长的世界人口提供安全食品方面、而且对环境保护也发挥着极其重要的作用。为此，自1992年以来，意大利环境部一直支持由玛丽.古里诺教授带领的植物病理学家们进行科研工作和技术转让。

意大利环境、领土和海洋部与意大利农业技术创新中心的合作始于减少熏蒸剂中甲基溴的使用，随后合作领域逐步扩大，参与合作的国家也逐步扩大到包括中国在内的许多国家。

植物安全是本期通讯的主题，它对于进出口贸易和食品安全等都具有十分重要的意义。一次有意识、或无意识地引入植物病虫害可能会带来严重的经济损失。世界各地的农民们为了控制自然生长的昆虫和病虫害，已经投入了千百万亿欧元；然后由于病虫害所导致的损失仍然接近其产量的三分之一。

我非常赞赏意大利农业技术创新中心长期以来不懈呼吁欧洲社会各界，包括研究人员、政治家和公众对此问题给予高度关注。我认为将科学观点、研究成果和最佳实践经验进行相互比较、共同分享非常重要。我希望即将召开的国际大会能够充分讨论，从而不断推进该领域科研取得进步。

**Corrado Clini**

意大利环境、领土和海洋部可持续发展、气候变化与能源司司长

选择举办国际会议的地点往往事先决定，并取决于多个因素。国际植物病理学协会第十次会议在北京举办，是在我担任国际植物病理学协会主席期间决定的。我本人对这个决定非常满意。

会议的召开意味着将结束5年来令我兴奋的经历，而这一切将发生在过去14年里我长时间流连并深爱着的国家。我有幸和中国多个大专院校科研院所合作，对这个高速发展的国家的情况了解颇深。

在这个举世瞩目高速发展的国家，我有幸对这个国家和她的人民有所了解，并对其发展助一臂之力。

对意大利环境、领土和海洋部，特别是对克里尼（Corrado Clini）博士本人，我深怀感激。是他在2000年的战略性决定，给了意大利农业技术创新中心这个宝贵的机会，使我们能够通过“中意环保合作计划”参与到这个日新月异的国家之发展中。

特别感谢威尼斯国际大学把“植物与食品安全”作为本期通讯的主题，并在第十届国际植物病理学大会上发放。

**Maria Lodovica Gullino**

意大利农业技术创新中心主任，国际植物病理学协会主席



### 欧盟27国可再生能源占总能源消费13%

今年4月份欧盟统计局——欧盟的官方统计部门发布了欧盟可再生能源发展和能源消费情况。在总能源消费中扩大可再生能源所占比例是所谓“欧洲20-20-20战略”的一个基本组成部分。欧盟27国的目标是到2020年可再生能源将达到总能源消耗的20%。各成员国据此依各自不同的起始点、可再生能源的潜力和经济形势，来具体确立本国具体实施目标。该报告介绍了2010-2011年期间在全欧盟范围内如何将可再生能源逐步提高到占能源总耗的13%。比例最高的国家分别为：瑞典（可再生能源占能源总耗的46.8%）；拉脱维亚（33.1%）、芬兰（31.8%）和奥地利（30.9%）。爱沙尼亚（25.9%）提前9年实现了国家目标。意大利距其17%的国家目标尚有些距离；但进步还是相当大的，已从2004年的4.9%提高到了2011年的11.5%。该报告可在线阅读：

### Renewables Up to 13% of Energy Consumption in the EU27

Eurostat, the statistical office of the European Union, published a report last April on the development of renewable energy consumption in Europe. The increase of the renewable energy share in the total energy consumption is a fundamental part of the so-called Europe 20-20-20 Strategy. The target for the EU27 to be reached by 2020 is a share of 20% renewable energy use in gross final energy consumption. National targets are then established, taking into account the member states' different starting points, renewable energy potential and economic performance. The report highlights how in 2010-2011 the share of renewable energies steadily grew all over Europe, now accounting for 13% of global consumption. The highest percentages were reached in Sweden (46.8% renewable energy sources within the total consumption), Latvia (33.1%), Finland (31.8%) and Austria (30.9%). Estonia (25.9%) exceeded its national target nine years ahead of its time. Italy is still some way off its national target of 17%, but increased its share of renewables from 4.9% in 2004 to 11.5% in 2011. The report is accessible online at: [http://epp.eurostat.ec.europa.eu/cache/ITY\\_PUBLIC/8-26042013-AP/EN/8-26042013-AP-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-26042013-AP/EN/8-26042013-AP-EN.PDF)

### Climate Change: CO<sub>2</sub> Concentration Reached Alarming Levels

Independent measurements made at the beginning of May by the US National Oceanic and Atmospheric Administration showed that global atmospheric concentrations of carbon dioxide, as measured atop Hawaii's Mauna Loa



volcano, reached 400 parts per million (ppm). This means that CO<sub>2</sub> concentration is rapidly and dangerously approaching the threshold of 450 ppm, set as the UN's goal to contain global warming within 2° above manageable effects. Beyond this threshold, a series of potentially irreversible phenomena could be triggered and the effects of climate change could become catastrophic. Scientists recalled that the last time in the earth's history we saw similar levels of CO<sub>2</sub> was probably about 4.5 million years ago when the world was warmer than today by 3 or 4° Celsius, there was no permanent ice sheet on Greenland, sea levels were much higher, and the world was a very different place. For our world, this warming scenario will likely mean that hundreds of millions of people will be displaced from their homelands in the near future, as climate change economist Stern pointed out. "When temperatures rise to that level, we will have disrupted weather patterns and spreading deserts," he said. "Hundreds of millions of people will be forced to leave their homelands because their crops and animals will have died. The trouble will come when they try to migrate into new lands, however. That will bring them into armed conflict with people already living there. Nor will it be an occasional occurrence. It could become a permanent feature of life on Earth."

### Record Breaking Eco-Building in China

The name is ambitious, 'Sky City': a 838-meter high vertical city spread over 220 floors within a total of 1,200,000 square meters, including a hotel, hospital, schools, offices, sporting facilities,

[http://epp.eurostat.ec.europa.eu/cache/ITY\\_PUBLIC/8-26042013-AP/EN/8-26042013-AP-EN.PDF](http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-26042013-AP/EN/8-26042013-AP-EN.PDF)

### 气候变化：二氧化碳浓度将达到惊人水平

美国国家海洋和大气管理局(NOAA)五月初通报，位于夏威夷的冒纳罗亚天文台监测到的二氧化碳浓度已经达到400ppm。这意味着二氧化碳浓度正快速并危险地接近联合国确定的450ppm阈值，即：将全球上升温度控制在2°以内。超过这个阈值，一系列潜在的、不可逆的现象将发生，气候变化所带来的影响将是灾难性的。科学家们回忆起上一次地球上的二氧化碳浓度接近当前类似浓度是在大约450万年前。当时地球温度比现在高出约3到4摄氏度。格陵兰岛上没有永久性冰层，海平面也比现在高出许多，整个世界都很不一样。

气候变化经济学家斯特恩指出，在我





shopping malls, residential apartments and indoor farms for food production. The project, from Broad Sustainable Construction, has been approved and will be completed in only 90 days in Changsha, central China, employing nearly 20,000 workers within the four-months of industrial production in the factory and the remaining three months of on-site assembly. According to its designers, Sky City would reduce energy consumption by 80%, resist a magnitude 9 earthquake and up to 3 hours of fire, thanks to the outer ceramic envelope. Among the main environmentally-friendly solutions adopted is a 50 cm highly insulating exterior envelope,

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quadruple-glazed windows, LED lighting, energy production from the descending elevators, external sunscreens cutting the need for cooling by 30%, a cogeneration plant fed with recovered waste providing electricity and heating, photovoltaic panels, solar thermal panels and a rainwater collection system. Confronted by the challenge of massive urbanization trends, China is exploring ways of sustainable building, either in the form of the numerous satellite eco-cities blooming across the country, or in the form of innovative vertical cities such as the one planned for Changsha, which will also answer the problem of building lot scarcity. The success of the first experiments has been varied, but nonetheless the trend marks a new awareness of the need to reduce the impact of the building and transportation sectors on atmospheric pollution and global warming.

们的世界里，这样的全球变暖情景意味着在不久的将来上亿人会因此被迫离开自己的家园。他说：“当温度升到如此之高后，将破坏气候规律并且使得沙漠面积增大；上亿的人群会因为农作物和家畜的死去而离开他们的家园。当他们试图迁移到新的地方才是麻烦来临的时候。他们会和在当地的人们产生武装冲突。这决不会是一个偶然的现象，而很有可能变成居住在这个地球上永久存在的问题”。

#### 创新纪录的中国生态建筑

天空城市这个名字看上去非常雄心勃勃：整个建筑高达838米，共有220层，占地120万平方米，包括一家饭店、一所医院、学校、办公室、体育设施、购物中心、居住公寓和室内农作物种植等。该项目已经获得批准，并将在90天内在中国中部城市长沙建成。为此共组织了2万名工人、耗时4个月在工厂内生产；然后再花3个月的时间进行现场安装。根据该建筑的设计人员介绍，天空城市的能耗将降低80%，抗9级地震，并且由于其外墙使用了特殊陶瓷材料，可耐受长达3小时的火灾。该建筑采用很多种环境友好技术，其中包括厚度为50厘米的高性能外



#### China to Build Unified Low-Carbon Certification System

China will build a unified certification system for low-carbon products as part of its efforts to boost the consumption of green goods, according to the country's top economic planner. An independent third-party agency will assess the carbon footprint of products and services and grant low-carbon certificates to those that have met certain requirements, according to a document issued by the National Development and Reform Commission (NDRC). NDRC will then issue a catalogue of certified products and an identification mark will be printed on the products' packaging, according to the document. The certification scheme is being piloted in the provincial regions of Guangdong, Chongqing and Hubei. The expansion of the pilot program is part of growing efforts to push for a greener growth model. By the end of 2015, China aims to lower its energy consumption per unit of GDP by 16% from 2010 and lower its carbon dioxide emissions per unit of GDP by 17%, according to the government's 12<sup>th</sup> Five-Year Plan (2011-2015)

保温层、双层中空玻璃、LED灯、下降电梯能源利用、减少制冷30%的外遮阳板、废物能源回收发电和供热、光电、太阳能板、雨水收集系统等等。中国正面临着城市化带来的巨大挑战。解决的出路包括在全国各地建设大批的卫星生态城；或者向长沙学习，采用创新性的立体城市建筑，这也是解决当前住宅紧缺的办法之一。该建筑的首批实验成果情况各异，但这标志着一种新的意识正在形成，即：着力降低建筑和交通对大气环境所带来的污染和引起的全球气候变暖。

#### 中国将建立统一的低碳认证系统

为进一步推动绿色消费，根据中国最高经济规划部门介绍，将在全国建立统一的低碳产品认证体系。根据国家发改委发布的文件，将建立独立的、第三方认证机构，对产品和服务的碳足迹进行评价，对通过评价的产品授予低碳认证书。根据该文件，国家发改委将颁布获得认证的产品目录，并在产品的包装上印刷认证标志。该认证计划已经在广东、重庆和湖北等试点地区进行示范。试点地区将逐步扩大，并成为推动绿色增长模式的具体实践。根据中国十二五国民经济发展规划(2011-2015)，到2015年末，中国将在2010年的基础上将单位GDP能耗降低16%，单位GDP二氧化碳排放降低17%。消息来源：新华社



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# Thirteen Years of Cooperation between Italy and China in the Field of Plant Protection 中意两国携手十三年致力于植物保护

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## 背景

当前, 无论在高度工业化国家还是在发展中国家, 农业都面临着新的挑战。这种挑战包括经济增长的可持续性、农村社区的社会融入与一体化、正确利用新兴全球市场带来的机会等等。截止到2011年, 中国的农村人口占49% (总人口13.4亿)。在这样一个国家向可持续农业转变, 特别是在生物多样性保护方面, 其意义尤为重要。在努力协调经济、社会需求和环境保护的关系过程中, 中国正积极采取措施推动对可持续农业发展。中国政府在推动农业现代化过程中对所出现的社会经济问题高度重视, 对农业环境领域给予的关注也越来越多, 包括对农产品安全、环境保护和自然资源可持续管理等等。一方面, 中国积极承诺遵守对农业可能产生直接影响的多边环境公约和议定书(例如: 保护消耗臭氧层的蒙特利尔议定书、关于持久性有机污染物的斯德哥尔摩公约、生物多样性保护公约、抗荒漠化公约、气候变化框架公约); 另一方面, 中国积极推动采用对环境带来较低影响的农业最佳实践和技术。农作物保护对于农业的可持续发展至关重要。中国是世界上最大的杀虫剂使用、生产和出口国。2012年中国的杀虫剂生产量达356万吨, 与2012年相比增长了19%。中国权威新闻媒体新华社报道, 中国每年的农药使用量为120万吨。根据中国农业部消息, 2006年中国农药使用量超过了140万吨 (农业部2007年报告)。官方统计数据显示, 中国生产约300种农药和800种农药的混合物。2006, 中国生产杀虫剂130万吨, 出口杀虫剂58.3万吨。中国农民为了克服自然资源的局限性和重大病虫害的压力, 往往超剂量使用农药。从食品中检测出的有毒农药、药物残留和工业污染物, 对人体健康带来极大隐患。中国很多生产企业建在农村地区, 或者很接近农业种植地区。工业生产带来的外部成本, 如水污染等, 都由农业生产者来承担了。

## Background

At present, agriculture faces the need to meet new challenges, both in highly industrialized countries as well as in developing ones. Such challenges are represented by sustainable growth, social integration of rural communities and proper use of the advantages derived from emerging global markets. A shift towards sustainable agricultural systems, which are more complex in terms of biodiversity, is very important in countries such as China, where 49% of the population (consisting of 1.34 billion people) lived in rural areas as of the end of the year 2011. In an effort to reconcile economic and social needs and environmental protection, China is undertaking countermeasures towards the promotion of sustainable agricultural practices. The attention paid to activities in the agro-environmental sector has been increasing over time due to the high social and economic priority given by the Chinese authorities to the modernization of agriculture that must be pursued in a sustainable manner, addressing at once food security, environmental protection, economic development and good management of natural resources. On one side, China is committed to comply with the multilateral environmental conventions and protocols that have a direct impact on the agricultural sectors (e.g. the Montreal Protocol on Substances that Deplete the Ozone Layer, the Stockholm Conventions on Persistent Organic Pollutants, the Convention on Biological Diversity, the Convention to Combat Desertification, and the Framework Convention on Climate Change); on the other side, it is pushing for the adoption of agricultural practices and technologies with a low impact on the environment. Crop protection is an important component of sustainable agriculture.

China is the world's biggest user, producer and exporter of pesticides. In 2012, 3.56 million tons of pesticide was produced in China with an increasing rate of 19% in comparison to 2011<sup>2</sup>. According to Xinhua, China's main state news agency, the annual pesticide use in China is about 1.2 million tons, on approximately 300 Mha. According to MOA, the volume of farm pesticide application was over 1.4 Mt in 2006 (MOA, 2007 report). Official statistics show that China produces about 300



**Table 1. - Projects on sustainable crop protection implemented within the Sino-Italian Cooperation Program for Environmental Protection**

表 1. 中-意环保合作框架下实施的关于可持续农作物保护的项目

Project title (duration) 项目名称 (时间周期)	Funded by 资助方	Institutions/companies involved * 参与机构、企业
Alternatives to the Use of Methyl Bromide in Soil Fumigation (2001-2003) 土壤熏蒸中甲基溴的替代(2001-2003)	IMELS	SEPA <sup>3</sup> /FECO; CAU; CAAS; AGROINNOVA
Strengthening Technology and Capacity of Sustainable Agriculture in China (2002-2005) 加强中国可持续农业发展的技术与能力建设项目(2002-2005)	IMELS	SEPA/FECO; Chinese Research Academy of Environmental Sciences; AGROINNOVA
Sustainable Plant Protection in Respect to the Environment: Modern Techniques for the Control of Plant Pests and Diseases of Horticultural Crops in China (2005-2007) 可持续植物环境保护: 在中国园艺种植植物害虫和疾病控制中运用现代技术(2005-2007)	MAP, ICE, CRUI	AGROINNOVA; CAU, Intrachem Bio Italia SpA, Nuovo Centro S.E.I.A. S.p.A.
Organic Farming Systems and Techniques for the Promotion of “Green” Agriculture in Dongtan Chongming Island (2005-2008) 东滩崇明岛推动绿色农业的有机种植系统和技术(2005-2008)	IMELS	AGROINNOVA; Shanghai Environmental Protection Bureau; Shanghai Academy of Environmental Sciences; SIIC Dongtan Investment & Development (Holdings) Co., Ltd.
Innovative Techniques for the Reduction and Recycling of Agricultural Wastes (2006-2009) 农业废物减量化与循环利用的创新型技术(2006-2009)	MAE, MOST	AGROINNOVA; CAU
Technological Innovations in Crop Protection to Enhance Food Quality in China (2006-2008) 提高中国食品质量与植物保护的技术创新(2006-2008)	MIUR, IMELS, University of Torino	AGROINNOVA; CAAS; CAU
Anaerobic Digestion and Composting of Agricultural, Urban and Industrial Wastes for the Valorization of Energetical and Agronomical use of Biomasses in an Ecological Italian Style “Ecofarm” on Chongming Island (2008) 在崇明岛利用意大利的“生态农业”方式, 进行农业、城市和工业废物的厌氧消化和肥料堆置, 以有效利用能源和农业资源(2008)	ICE, MAP	AGROINNOVA; Shanghai Academy of Environmental Sciences; MARCOPOLO Engineering S.p.A.
Organic Farming: Social, Ethical, Economical, Scientific and Technical Aspects within a Global Perspective (2006-2007) 有机农业: 全球视角下的社会、道德和技术方面的思考(2006-2007)	EU – Asia Link	AGROINNOVA, CAU, Zhejiang University, Northeast Agricultural University, Qinghai College of Animal Husbandry and Veterinary, University of Bonn, Wageningen University, University of Tuscia
Tackling Biosecurity between Europe and Asia: Innovative Detection, Containment and Control Tools of Invasive Alien Species Potentially Affecting food Production and Trade (2007-2010) 解决欧洲与亚洲之间的生物安全问题: 对可能给食品生产和贸易带来潜在影响的外来入侵物种的创新性检测、遏制和控制(2007-2010)	EU – Asia Link	Zhejiang University, CAAS Science, Rajamangala University of Technology, University of Lleida and University of Bonn

\*The Italian Ministry for the Environment, Land and Sea (IMELS), the Foreign Economic Cooperation Office of the State Environmental Protection Administration (SEPA/FECO), China's Agricultural University (CAU), the Chinese Academy of Agricultural Sciences (CAAS), AGROINNOVA Centre of Competence for the Innovation in the agro-environmental sector of the University of Torino, the Italian Ministry for Production Activities (MAP), the Italian Trade Commission (ICE), the Conference of Rectors from Italian Universities (CRUI), the Italian Ministry of Foreign Affairs (MAE), the Chinese Ministry of Science and Technology (MOST), and the Italian Ministry of Education, University and Research (MIUR).

\*意大利环境、领土与海洋部 (IMELS), 国家环保总局对外合作中心 (SEPA/FECO), 中国农业大学 (CAU), 中国农科院 (CAAS), 都灵大学农业环境技术创新中心(AGROINNOVA), 意大利生产活动部 (MAP), 意大利贸促会 (ICE), 意大利大学校长会议 (CRUI), 意大利外交部 (MAE), 中国科技部 (MOST), 意大利教育、大学和研究部 (MIUR)。

types of pesticides and an additional 800 types of pesticide mixtures. In 2006, China produced 1.3 Mt of pesticides and exported 583,000 t. Chinese farmers have applied heavy doses of chemical fertilizer and pesticides to overcome natural resource constraints and significant pest pressures. Residues of toxic pesticides, drugs and industrial pollutants detected in food are a potential health hazard. A sizeable share of China's industrial production also takes place in rural areas and in close proximity to agriculture. The external costs of industrial production, such as water pollution, are often borne by agricultural producers. The 12<sup>th</sup> Five-Year Plan is paying much attention to sustainable crop protection, its success in improving agricultural production, safety and quality being directly dependent on the level of application of modern science and technology. Plant protection has become an important profession and subject for study in China. Plant protection, quarantine and research institutions have been established in agricultural departments and in most of the academies of agricultural sciences above the county level. Most of the agricultural schools and universities provide this special field of study and most of the townships have technicians qualified in plant protection. The results of a 13-year cooperation between Italy and China in the field of sustainable crop protection are discussed.

**Technology Transfer between China and Italy in the Field of Sustainable Crop Protection**

A number of projects in the field of sustainable crop protection have been implemented within the Sino-Italian Cooperation Program for Environmental Protection, a framework program jointly launched in 2000 by the Italian Ministry for Environment, Land and Sea and China's State Environmental Protection Administration, and within the European Commission. All projects implemented (Table 1) responded to the primary goal of reducing China's reliance on the massive use of pesticides that is posing serious threats to the environment as well as food safety. Since the launch of the Sino-Italian Cooperation Program, significant investments have been made to phase out methyl bromide, a highly toxic fumigant used in the horticultural sector for pre-plant soil and which was banned by the Montreal Protocol because of its implication in ozone layer depletion. Italy, ranking first in Europe for horticultural crop production and second in the world for methyl bromide use, gained considerable experience in the 1990s in the development of suitable and feasible alternatives to methyl bromide and invested in transferring technologies developed in other countries, such as China. The selection of target technologies also took into account the local level of infrastructure, mechanization, availability of agricultural input and knowledge. Solutions like soil steam pasteurization and soil-less cultivation systems



were ruled out in favour of cheaper alternatives, which were easier to apply and less energy consuming. Soil solarization, the use of grafting on resistant rootstocks and the application of less harmful chemicals at reduced dosages via drip irrigation, resulted in higher acceptance by local growers because, while providing levels of effectiveness comparable to methyl bromide, they required less investment and less changes to traditional cultural practices. All cooperation activities carried out in China pay much attention to the establishment of joint programs enabling the long-term exchange of undergraduate and postgraduate students. Chinese postgraduate students and young researchers spend time at AGROINNOVA for training and laboratory activities on sustainable methods of plant pest and disease control. Moreover, high-level training programs for cadres from Chinese institutions commenced in 2004 and are devoted to the improvement of environmental knowledge of Chinese decision makers and experts. AGROINNOVA is collaborating in the design and coordination of the course modules as well as in providing expertise for lectures and activities focussing on agro-environmental issues.

### Conclusions

The projects represented here are a fruitful example of the cooperation between the private and public sectors in China and in Italy and a model of research and of semi-commercial scale application of innovative techniques and technologies for sustainable crop protection. The project went beyond the merely environmental concerns and strengthened the role of rural areas as multifunctional dynamic systems. This is an important aspect in China, since the present economic growth, urbanization and increased leisure time also increases the demand for tourism and recreational activities in rural areas. A growing trend is for projects linking agriculture to environmental protection and sustainable development to be registered during these recent years. Agriculture is no longer addressed as a separate sector. On the contrary, its deep interconnections to the societal, economical and environmental aspects of sustainable development projects objectives are now recognized. There has been a shift from agriculture *per se* to agro-environment, intended as a complex dimension where food production “internalizes” the principles of environmental protection and sustainable development. As the projects were fully integrated within a broader sustainable development program, they were able to involve all stakeholders in both project preparation and implementation. In particular, government institutions, academic institutions, public research centers and private companies have always been partnered with the aim of creating a long lasting network of local and international researchers and experts

十二五规划对农业可持续发展更加关注，认为现代科学与技术的应用程度直接决定了农业生产力、农产品质量与安全。植物保护在中国已经成为一个重要的研究行业和学科。在农业部门和大多数县级以上农业科学院，都设立了植物保护、检疫和研究机构。农学院和大学都提供专门用于研究的试验田。大部分的乡镇都配备了训练有素的植物保护技术人员。本文介绍了过去13年来中-意两国在可持续农业发展方面所开展的合作情况。

### 中-意两国在可持续农作物保护方面的技术转让

在《中-意环境保护合作框架》下，实施了一系列关于可持续农业农作物保护的合作项目。该合作框架由意大利环境、领土与海洋部和中国国家环保总局于2000年共同发起，欧盟委员会也参与其中。所有合作项目（见表1）的最终目标都是为了改善中国大量使用农药的状况，从而减少对环境

和食品安全带来的威胁。在中-意合作计划框架下，投入了大量资金用于淘汰甲基溴。甲基溴是一种高毒性熏蒸剂，主要用于园艺种植中的土壤熏蒸。该物质由于破坏臭氧层而被列为蒙特利尔议定书的淘汰对象。意大利曾是园艺种植甲基溴用量欧洲第一、世界第二大的使用国。自90年代起在开发甲基溴替代品和替代技术方面积累了丰富的经验，在向包括中国在内的其他国家进行技术转让方面进行了大量投资。所选定的技术需考虑到当地的基础设施水平、机械化程度、农业投入和知识水平。土壤蒸汽杀菌和无土栽培系统被排除在可用的替代品方案外；而相对便宜、操作简便、能耗较低的解决方案更受到当地农民的青睐。土壤日晒，嫁接抗性砧木和低毒化学物质通过滴灌应用减少使用剂量等办法，由于其有效性与甲基溴相当，而所需投资较低，并且不改变传统文化习俗，因此广为当地种植者接受。

在中国实施的所有合作活动中，我们都非常重视建立合作关系，以便长期开展两国本科生和研究生的交换计划。中国研究生和年轻的研究人员可以在都灵大学农业创新技术中心（AGROINNOVA）学习持续控制植物害虫和疾病的方法。此外，自2004年以来，AGROINNOVA为中国的决策者、专家提供了环境保护知识方面的培训，设计、协调了培训模块，提供授课专家并组织了一系列农业-环保方面的活动。

### 结论

这些合作项目是中意两国私营部门、公共部门成功合作的典范，是推动研究、半商业化创新技术进入应用领域的成功模式。该项目已远远超出了单一的环境保护问题；通过项目实施加强了农村地区发挥多功能动态系统的作用。随着中国的经济增长，快速城市化和百姓休闲时间的增加，对在农村地区的旅游和休闲活动需求也将逐步提高。这一点对中国来说是非常重要的。农业项目与环境保护和可持续发展之间存在着密切关系是近年来发展的新趋势。农业已不再是一个单独领域的问题。相反，农业与社会，经济、可持续发展项目的目标之间有着深刻的内在联系。我们已经从农业本身向农业环境转变；作为一个复杂系统，食品生产遵循着“内化”环境保护与可持续发展的原则。

只有当这些项目被完全融入到更广泛的可持续发展计划中，才能让所有的利益相关方参与到项目的准备和设施过程中。特别需要指出的是：政府部门，学术机构，公共研究中心和私人企业始终是这些项目的重要合作伙伴，并形成了持久的、由本地专家和国际研究人员组成的网络；通过这些网络来支持可持续农业系统技术的开发、利用，并建立起与这些创新技术应用相配套的政策支持体系。在中国农村地区实施这些技术转移项目所获得的经验表明：可持续农作物保护对于推动可持续发展有着战略性意义。示范项目、各利益方全面参与和国际合作对于取得这些项目成果具有关键作用。

### 注释

- 1 来源：中国国家统计局
- 2 来源：中国国家统计局
- 3 国家环保总局于2008年升格为环境保护部

supporting the development and adaptation of sustainable farming systems, as well as the design of a new regulatory framework supporting the adoption of innovative technologies. Important in all cooperation projects has been education, training and information activities, which enables the actual transfer into practice of targeted sustainable agricultural technologies. District workshops and seminars have been organized in order to maintain the involvement of partners in project activities informing them of progress as well as informing stakeholders on the scientific, technical and economic feasibility of upcoming new techniques and systems. The experience gained through the implementation of technology transfer projects in rural areas of China shows the strategic role that sustainable crop protection plays towards the promotion of sustainable development. In this regard the demonstration activities, the integration of stakeholders and international cooperation played a key role in achieving good results.

### Notes

- 1 Source: China National Statistics Bureau
- 2 Source: China National Statistics Bureau
- 3 SEPA was elevated to Ministry of Environmental Protection in 2008

# Biological Invasions and Crop Biosecurity in China

## 中国生物入侵现状与作物安全

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### The History and Current Status of Biological Invasions

The 21<sup>st</sup> century has witnessed enormous global changes. Biological invasion has become a hot issue attracting great attention worldwide. China is one of the countries that has been most affected by biological invasion. Currently there are some 527 invasive alien species (IAS) recorded as causing damage in China. Among these IAS, invasive alien plants (268) account for the largest proportion, as compared to invasive alien animals (193) and microorganisms (61).

Invasive alien plants appeared very early in China. By the 17<sup>th</sup> century, 50 invasive alien plants had been recorded and that number went up to 150 by the early 20<sup>th</sup> century. In contrast, invasive alien animals have increased more rapidly since the late 20<sup>th</sup> century. It took 50 years or so for invasive alien plants to develop into an outbreak, whereas it would take only 10 years or so for invasive alien insects and microorganisms to do the same. Some 20 IAS, including the world's most damaging pests, e.g. western flower thrips (*Frankliniella occidentalis*), tobacco whitefly (*Bemisia tabaci*) and pinewood nematode (*Bursaphelenchus xylophilus*), have been found in China in recent decades. These invasive species have posed great threats to agricultural production and forestry in China.

Of the IAS in China, 54% originated from America, in which 30% came from North America and 24% from South America, 20% originated from other Asian countries and regions, 17% from Europe, 6% from Africa and only 3% from Oceania. This is probably because many regions of North America and China are located at the same latitude and share a similar climate. Thus the introduced species from North America can quickly adapt to the habitats in China and establish their populations. This also happens with IAS from some Asian countries. Moreover, human activities such as modern transportation, frequent international trade and the increase of international tourism, reduce and remove geographical barriers between continents and increase the chances of invasion.

The spatial distribution of IAS in China shows a general invasion pattern of species concentration which declines gradually from southeast to northwest. More IAS are found in Guangdong, Jiangsu, Fujian, Yunnan and Taiwan,

### 中国生物入侵历史与现状

在21世纪全球变化的趋势进一步加剧的形势之下, 生物入侵已成为全球关注的热点问题。中国是遭受生物入侵影响最为严重的国家之一。据不完全统计, 目前入侵中国的外来有害物种为527种。其中, 比例最大的是入侵植物, 为268种; 其次是入侵动物193种, 入侵微生物61种。在中国, 外来植物的入侵最早发生。早在17世纪, 有记录的外来入侵植物就有50种; 到20世纪早期, 这一数字增加到150。而外来入侵动物是直到20世纪后期, 种类数才快速增加。就外来物种从传入到暴发成灾的时间来看, 外来入侵植物一般需50年左右, 而入侵昆虫和微生物扩散迅速, 大多数种类在10年左右便可暴发成灾。20余种外来入侵物种, 其中包括世界性的最具危害性的入侵生物, 如西花蓟马 (*Frankliniella occidentalis*)、烟粉虱 (*Bemisia tabaci*)、松材线虫 (*Bursaphelenchus xylophilus*) 均是在近一、二十年入侵中国的。这些外来入侵物种对中国的农林生产造成了巨大的威胁。

对入侵中国的外来有害生物的来源分析表明, 从美洲传入的入侵物种最多, 约占54%, 其中来自于北美洲的约占30%、南美洲的约占24%; 从亚洲其他国家和地区传入的次之, 约占20%; 从欧洲、非洲及大洋洲传入的分别约占17%、6%和3%。这种传入来源的特征可能是因为北美洲与中国位于大致相同的纬度, 有着相似的气候环境, 来自北美洲的外来物种进入中国后能很快适应中国的生境, 建立种群; 一些亚洲国家亦是如此。此外, 现代便利的交通、频繁的国际贸易、发达的国际旅游等人类活动缩小甚至排除了各大陆之间地理上的隔离, 从而增加了外来有害生物入侵的几率。

中国外来入侵生物的空间分布呈现出从东南向西



北外来入侵物种逐渐减少的总体趋势。入侵物种较多的是经济最为发达的沿海省份，包括广东、江苏、福建、云南、台湾等，均为200种以上；而宁夏、青海、西藏的入侵物种较少，各不到70种。

#### 生物入侵对作物安全的影响

外来有害生物的入侵已严重影响中国的经济发展、生态安全、社会安全与国家利益。据估计，中国的13种外来入侵有害昆虫和杂草每年造成的经济损失就达574.3亿元人民币。2000年，外来有害生物对湿地和森林生态系统造成的间接经济损失分别达693.4亿元和154.4亿元人民币。许多外来入侵物种，如烟粉虱及其传播的植物病毒对蔬菜生产造成了极大的影响。

此外，外来有害生物对遗传资源、生物多样性以及生态系统结构形成严重威胁，进而影响到生态系统的整体服务功能。例如，互花米草的广泛扩散不仅对沿海生物的生境造成破坏，而且与本地植物竞争生态位，造成入侵地红树的消失和生态环境的不可逆破坏。

#### 中国的生物入侵研究

在过去十年间，中国的生物入侵研究有了蓬勃发展。2003年以来，科技部支持了生物入侵领域的多个国家项目，总资助额超过一亿元人民币。其中，最为重要的是通过国家基础研究发展计划（“973”计划）连续开展了“农林危险生物入侵机理与控制基础”和“重要外来物种入侵的生态影响机制与监控基础”两项共为期10年的基础研究项目。

国家自然科学基金是中国政府对基础研究进行资助的另一重要渠道。自1999年到2010年十年间，共计302项与生物入侵相关的研究项目得到国家自然科学基金的资助。

在上述项目的支持下，中国的生物入侵研究主要集中于三个科学命题：入侵种种群的形成与扩张、入侵种生态适应性与进化，以及生物入侵对生态系统结构与功能的影响。研究主要针对农林危险入侵物种，如烟粉虱、红脂大小蠹、稻水象甲、松材线虫、互花米草、豚草以及大豆疫霉菌引起的大豆根腐病而展开。

通过上述研究，已经揭示了生物入侵过程中的一

些规律，其中一些规律是：经济最为发达的沿海省份，入侵物种最多，超过200种；而宁夏、青海、西藏的入侵物种较少，各不到70种。

#### Impact on Crop Biosecurity

In China, IAS have posed serious threats on the economy, ecological security, social wellbeing and national interest. It is estimated that just 13 of the invasive alien insect pests and weeds cause RMB 57.43 billion in economic losses per year. The indirect economic loss in 2000 caused by IAS to wetland and forest ecosystems was estimated to reach RMB 69.34 billion and 15.44 billion respectively. Many IAS, such as the tobacco whitefly and the plant viruses it transmits, have seriously affected the production and supply of vegetables.

China's genetic resources, biodiversity, and ecosystem structures are also threatened by IAS, resulting in severe losses of ecosystem services. For example, the extensive spread of smooth cordgrass (*Spartina alterniflora*) has not only destroyed the habitat of neritic organisms, but also competed with native plants for growing space, leading to the disappearance of mangrove trees and the irreversible destruction of habitat conditions in areas that had been invaded.

#### Research on Biological Invasions

In the past decade, research on biological invasions has boomed. Since 2003, the Ministry of Science and Technology of China has supported several national projects in the field of biological invasion, with a total budget of over RMB 100 million. Among those, the most significant project has been a two-phase research project spanning 10 years, from 2003 to 2013: “Invasive Biology and Control Strategy of Alien Species in Agriculture and Forestry” and “Invasion Mechanisms and Management of Major Alien Species”, supported under the National Basic Research Program of China (“The 973 Plan”). The National Natural Science Foundation of China is another important governmental funding source for sponsoring basic scientific research in China. From 1999 to 2010, a total of 302 research projects related to invasion biology were granted by the National Natural Science Foundation of China.

Supported by the above-mentioned and other government bodies, basic research on biological invasions in China has been conducted mainly to address the following three issues: population establishment and distribution expansion of IAS, ecological adaptation and evolution of IAS, and the impact of biological invasions on the structure and function of the invaded ecosystems. Coordinated research projects have been conducted on major invasive pests of agriculture and forestry, including the tobacco whitefly, red turpentine beetle (*Dendroctonus valens*), rice water weevil (*Lissorhoptrus oryzophilus*), pinewood nematode, saltmarsh cordgrass,





些重要生态学现象和生态过程，提出了一些新的观点、假说和理论，例如在竞争或不利条件的内在繁殖潜力、入侵行为的化学信息素调控、入侵种与本地种的适应性互动与协同进化，以及入侵种与其所传播病毒之间的协同入侵效应等。这些研究对入侵生物学学科体系的建立，以及发展外来入侵种治理策略和技术规程起了极大的推动作用。

除了开展基础理论研究以外，中国也启动了一系列专注于外来入侵防控技术创新的专项研究。2006年科技部通过“十一五”国家科技支撑计划，在创建农林外来入侵物种的防控技术体系及发展有效地预防预警、检测监测、应急处理和区域减灾等应用技术研究方面给予了重点支持；国家林业局设立了“椰心叶甲的生物防治”专项等。这些专项研究使得我国生物入侵预防与控制的技术创新与发展步入了一个新阶段。

#### 生物入侵的防控实践

数据库建设：中国现有的农业生物信息数据库中有7个与外来入侵物种相关，这些数据库为普及公众知识、制定防控计划、发展科学研究提供了大量的信息。其中，中国农业科学院植物保护研究所与农业部外来入侵生物预防与控制研究中心建成的“中国外来入侵生物数据库”提供了500多种入侵中国的外来物种的详细信息，具有信息交流、上传图片 and 远程检索等功能。

检测监测：中国已建立检测技术并形成国家或行业标准的检疫性植物病害有34种；以入侵病害及微小昆虫的快速分子检测技术、入侵昆虫的化学信息监测技术和物理监测技术等为基础，建立了60余种重要农林外来入侵物种快速监测的技术体系。这些技术、方法与标准为构建中国应对外来入侵物种突发事件的检测与监测技术平台提供了有力的技术支撑。

预警体系：已构建的中国生物入侵早期预警体系主要包括四个部分：信息体系、技术体系、管理体系和物质体系，其中重要内容是对外来入侵生物的风险分析和控制预案。在应用CLIMEX、DYMEX、GARP、MAXENT和BIOCLIM等软件对外来入侵生物进行适生性评估的基础上，完成了红火蚁、加拿大一枝黄花等64种入侵生物的适生性风险分析，确定了其在中国的潜在分布

crofton ragweed (*Ageratina adenophora*), and soybean root rot disease caused by *Phytophthora sojae*. From these research activities, some important ecological phenomena and ecological processes during invasion have been revealed, and some new viewpoints, hypotheses and theories have come to light, such as the intrinsic propagation potential under competition or adverse conditions, semiochemical regulation of invasion behavior, synergetic effects between IAS and native species, and invasion facilitated by mutualistic relationships between IAS and the pathogens they transmit. These achievements have contributed immensely to the development of invasion biology disciplines as well as the provision of a scientific basis for IAS management strategies and techniques in China. Besides supporting basic research, a series of technology innovation and improvement programs focusing on the prevention and control of IAS have been set up. For example, in 2006, the Ministry of Science and Technology founded the National Key Technologies R&D Program under the Eleventh Five-Year Plan to support research on new technology for the prevention and early warning, detection and monitoring, emergency control, ecological regulation and sustainable management of serious IAS in agriculture; the State Forestry Administration began a thematic program of classical biological control of the coconut leaf beetle (*Brontispa longissima*). These programs have promoted the technological innovation and development for the prevention and management of IAS resulting in a new development phase.

#### Management Practices

**Database Construction:** China has established seven databases related to IAS, which provide a wealth of information for distributing scientific knowledge, developing prevention and management plans and promoting scientific research. For example, the Chinese Invasive Alien Species Database has been established and is operated by the Plant Protection Institute of the Chinese Academy of Agricultural Sciences and the Center for Management of Invasive Alien Species, Ministry of Agriculture. This database provides information on more than 500 IAS in China and supports information retrieval and exchange as well as remote access.

**Detection and Monitoring:** Detection technology and national or industry standards have been established for 34 quarantine plant diseases and pests. Technology systems for the rapid monitoring of over 60 serious IAS have been established, based on rapid molecular detection techniques as well as chemical and physical monitoring techniques. All these techniques, methods and standards provide powerful technological support for the construction of a detection and monitoring technology platform dealing with emergency situations caused by IAS.

**Early Warning System:** The early warning system of biological invasions in China contains four parts: an information system, technological system, management system and material system. The important components of the system are the risk analysis and management plan of IAS. Based on computer simulation and modelling software such as CLIMEX, DYMEX, GARP, MAXENT and BIOCLIM, the potential ranges of distribution of 64 invasive species, such as the red imported fire ant (*Solenopsis invicta*) and the Canada goldenrod (*Solidago canadensis*) have been predicted. In addition, the control plans and management measures for the 64 IAS have been established.

**Spread Blocking:** Spread blocking deals with invasive species that have, until now, only occurred locally but have the potential to spread widely and rapidly, such as the pine wood nematode, Colorado potato beetle (*Leptinotarsa decemlineata*), oriental fruit fly (*Bactrocera dorsalis*) and Canada goldenrod. Research on spread blocking of these IAS to non-infected areas has been conducted and some effective measures have been developed.

**Area-wide control and sustainable management:** Sustainable management deals with IAS that have already spread widely and are causing serious damage to the environment and agriculture or forest production, e.g. some invasive weeds and fruit flies. The aim is to establish area-wide management systems that integrate mechanical, biological and chemical control measures in an effective and sustainable fashion. As an important measure of integrated management, classical biological control has been carried out on more than 20 invasive species in China. More than 40 natural enemies have been introduced into China, of which 20 are of great value in their application and over 10 have performed well after field releases. These IAS management systems, which have biological control as a key component, have achieved great success in the control of IAS in agricultural production.

#### Conclusions

With economic globalization and the rapid development of international trade, challenges posed by biological invasions are likely to become more serious in the years to come and in turn will exert greater pressure on agricultural production in China. While remarkable achievements on the research and management of biological invasion have been made in China, more effort is required to study the subject using a multidisciplinary approach and to develop management systems in accordance with China's actual conditions. An increased joint effort from the relevant sectors within the country must be made to upgrade obligation mechanisms in accordance with international trading rules and international conventions, as well as to lay a better foundation for empowering China's international negotiations on relevant issues.

范围；并在入侵生物风险分析的基础上，制定了这64种外来入侵生物的控制预案与管理措施。

扩散阻断：围绕目前仅局部发生但具有潜在快速扩张的重要入侵物种，如松材线虫、马铃薯甲虫、东方果实蝇和加拿大一枝黄花等10余种农林入侵生物，开展了其扩散狙击和非疫区建设的研究和示范。

区域联防联控和持续治理：针对在中国广泛分布并导致严重环境和农林业生产损失的外来入侵物种，如入侵杂草和实蝇类，进行综合持续治理。综合治理的目的是整合物理、生物和化学防治手段，建立持续有效的区域联防联控系统。传统生物防治是综合治理的重要手段之一，中国已经对20余种外来入侵物开展了引进天敌进行控制的传统生物防治的研究与示范，共引进了40余种天敌，筛选出有应用价值的天敌20种，野外释放后取得较好控制效果的有10多种。组建的以生物防治为核心的外来有害生物持续治理技术体系已在生产中发挥了很好的控制作用。

#### 结论

随着全球经济一体化和国际贸易的发展，生物入侵所带来的挑战越发严峻，对中国农业生产形成巨大的压力。一方面，中国的生物入侵研究已经取得了长足的进展；另一方面，还应进一步发展多学科融合的研究方法，并结合中国的实际情况发展和健全防控系统。必须增强国家各相关部门的合作与努力，升级责任机制，使之与国际贸易规则和国际惯例相匹配，以期为中国在有关问题上的国际谈判奠定更好的基础。

# Biosecurity and International Trade 生物安全与国际贸易

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## Biosafety Versus Biosecurity

According to the most recent definitions, biosafety means, in general terms, the prevention of loss of biological integrity in ecology and human health. When this concept refers to agriculture, it means more specifically reducing the risk of plant diseases and preventing the contamination of food by bacteria, viruses and other biological factors. Biosafety, in addition, concerns the precautions necessary by institutions that experiment or create biological material. In these cases, biosafety standards must be met in order to prevent the accidental release of potentially harmful biological substances. When new threats are considered (bioterrorism, accidental or intentional spread of new viruses or bacteria) the definition and the precautions relevant to biosafety do not cover the full gamut of concern, while the field of biosecurity addresses these new issues. Biosecurity refers to the preventive measures to reduce the risk of transmission of infectious diseases (intentional or accidental). These measures involve a system of practices, policies, scientific investigations and operations designed to safeguard natural resources from biological threats. Biosecurity also involves the prevention of loss, the accidental spread or contamination and the intentional removal of biological materials from research laboratories (laboratory biosecurity). Even though the term "security" is associated with the police and military rules, measures and operation, biosecurity has a more strategic and peculiar meaning for which the international cooperation between scientists, policy makers and legislators is required. In short, while biosafety refers to the integrity and healthy status of biological resources and the environment, the concept of biosecurity refers to the strategic initiatives required to create, restore and safeguard the conditions in which to achieve and maintain biosafety. The two concepts are interdependent and overlap in some cases, though they are different in meaning and scope. According to what is stated by the International Food Safety Authorities Network (INFOSAN), the context of modern biosecurity is influenced by certain factors including:

## Biosafety (生物安全) 与 Biosecurity (生物防护)

根据最新定义, 一般来讲, biosafety是指预防生态和人类健康的生态完整性损失。在农业领域里, 生物安全具体指减少植物疾病风险, 防止食品被细菌、病毒和其他生物因素所污染。此外, biosafety还包括有关机构在实验和创造生物材料过程中所采取的必要预防措施。在这种情况下, 必须符合biosafety的有关标准, 以防止潜在有害生物物质的意外释放。当遇到新威胁的时候(生物恐怖主义, 意外或有意传播新病毒或细菌), 与biosafety相关的定义和预防措施则不能完全胜任。这时候就需要靠biosecurity来解决这些新问题。Biosecurity是指采取预防措施以减少传染性疾病的(有意或无意)传播风险。这些措施包括具体实践经验、政策体系、科学调查和保护自然资源受到生物威胁的行动等等。Biosecurity还涉及到生物材料的损失预防、偶然传播或污染, 以及有意将生物材料从实验室中带出(实验室biosecurity)。尽管“security”一词与警察和军事有关的规定、措施和行动相关, 但biosecurity更具有战略性和特殊意义, 它要求在科学家、政策制定者以及立法者之间开展国际合作。简言之, biosafety是指生物资源和环境的完整性和健康状况; 而biosecurity是制定战略性建议, 来创造、恢复、捍卫和维护biosafety的条件。这两个概念的含义和范围不同, 但它们相互依赖, 并且在某些情况下也会交叉重叠。据国际食品安全局网络(INFOSAN), 现代biosecurity受到以下因素影响:

- \_ 全球化
- \_ 新的农业生产和食品加工技术
- \_ 食品和农产品贸易增长



- \_ Globalisation;
- \_ New agricultural production and food processing technologies;
- \_ Increased trade in food and agriculture products
- \_ Legal obligations for signatories of international agreements;
- \_ Increasing travel and movement of people across borders;
- \_ Advances in communications and global access to biosecurity information;
- \_ Greater public attention to biodiversity, the environment and the impact of agriculture on both;
- \_ Shift from country independence to country interdependence for effective biosecurity;
- \_ Scarcity of technical and operational resources;
- \_ High dependence of some countries on food imports.

### Biosecurity at the Time of Globalisation

During the last three decades, an explosion and a revolution has occurred in technological advances, global communication and international trade of goods and agricultural products. In addition, today more than 750 million people travel internationally per year. This is a thirty-fold increase compared to the 1950s when there were just 25 million international travellers per year. This factor has also influenced the widespread proliferation of harmful bacteria and viruses. Along with the movement of people and goods, there is a potential danger for the accidental and/or intentional diffusion of harmful organisms and biological agents. In the first case, dramatic events have occurred in the recent past (Prions, Avian influenza, Escherichia etc.), which show the vulnerability of the international and global trade of food and agricultural products. Such a diffusion is normally accidental, but could also be intentional as part of a plan to cause damage, to attack and create massive political destabilization among the population. This is the subject of a new field of investigation, alarm and international concern, particularly after the September 2001 events and the subsequent Anthrax attack, or so-called bioterrorism. Biosecurity threats are particularly relevant to plant and food production and transportation, for two main reasons: 1) for the massive expansion of international trade, and 2) for the fragmentation of the production process, particularly within the food supply chain. Such a process involves several stages and steps, both in the production and in distribution phases, during which the potential for accidental or intentional interference by external factors is quite high. In a recent paper, S.B. Sharma *et al.* reported estimations indicating that the introduction of harmful organisms already costs over \$1.4 trillion worldwide annually, close to 5% of global gross domestic product (GDP), and the damage created by these organisms is much higher in developing countries where hunger and

- \_ 国际协议签署国的法律义务
- \_ 旅游和跨国界流动的增加
- \_ biosecurity信息的高效交流和全球访问
- \_ 生物多样性、环境和对农业的影响得到更多公众的关注
- \_ 从单独国家到国家间相互依赖，从而实现有效 biosecurity
- \_ 稀缺的技术和行动资源
- \_ 一些国家对进口食品的高度依赖

### 全球化时代下的生物安全

过去30年里，技术进步、全球通讯与物资及农产品的国际贸易都发生了爆炸和革命。此外，当今时代每年有超过7.5亿人在进行国际旅行。而与20世纪50年代相比，这个数字增加了30倍，当时每年只有2500万名国际旅行者。这个因素造成了有害细菌和病毒的广泛传播。随着人与货物的流动，存在着偶然地和/或有意识地扩散有害生物和生物制剂的潜在危险。在最近几年，戏剧性地发生了第一种情况（朊病毒，禽流感病毒，大肠杆菌等），这表明全球食品与农产品贸易的脆弱性。这种传播通常是偶然的；但也可能是有意识而为之的，可能是制造危害、造成社会巨大政治不稳定计划的一部分。这是一个亟待研究、警惕并得到国际社会共同关注的新领域，特别是在2001年9月事件和随后的炭疽袭击或所谓恐怖事件后，更需引起各方高度关注。与生物安全威胁直接相关的领域包括植物和食品的生产与运输，其主要原因有2个：1) 国际贸易的大规模扩张；2) 生产过程的碎片化，特别是在食品供应链方面。在生产和分配过程中，这个过程涉及几个阶段和步骤，而在此期间发生意外或故意的外部干扰可能性很大。最近S.B. Sharma等人发表的一篇文章中表明，由于有害生物引入所造成世界范围的经济损失已经超过了1.4万亿美元，接近5%的全球国内生产总值（GDP）。与发达国家相比，在被饥饿和贫困所困扰的发展中国家中，这些生物体所造成的经济损失则更高；究其原因，主要是发展中国家缺乏足够的预防和生物安全措施。病原菌进入农业系统和食品供应链的过程可以是缓慢的，也可能是突然的；起初难以察觉，但发展过程迅速，并有可能造成不可逆的损害。例

如，对兽疫性口疮扩散（口蹄疫）的一个模拟实验表明，在美国发现第一例感染通常在被污染后五天内检测出，但与此同时，这种病菌已经蔓延到23个州；并在八天之后，影响到29个州的2300万只动物。另外一个例子可以很好地说明食品供应链的脆弱性和保护食品安全的重要性：在美国由于意外食品中毒一年内造成了5000人死亡、325000人住院治疗。由于生物安全与市场全球化密不可分，因此在各国和国际范围内建立协调一致的预防性和响应措施，既十分必要也很有意义。因此，加强监管、严格执行国际公约非常重要。改变易受侵害的农业和食品生产方式也十分重要，同时对最具威胁的动物疾病进行专门性、大规模的免疫疫苗接种。此外，加强国际科技合作至关重要，有助于识别最致命病毒，并为制定应对政策法规提供相关技术依据。综合系统的预防和应对措施同时需要践行外交、法律和经济方面的承诺，严格执行国际生物安全战略，以减少不断增长的国际贸易所带来的有害生物体扩散的可能性。

### 国际范围内由谁来规制生物安全？

在全球化和国际贸易高度发达的时代，通过制定统一原则、标准、目标，提出推荐建议，实施国际公约和协定是非常必要的，有助于促进商品（包括农产品）在世界各地流动，维护生物系统保持完整性。授权直接或间接管理生物安全的国际组织包括：

- \_ 世界卫生组织和《关于卫生与植物检疫措施协定》(SPS)。该协定建立了贸易的一般性框架和害虫及病毒风险管理的规则。
- \_ 《贸易和运输的全球协定》(GATT) 包括一系列、分具体重点的协议（例如农业协议）。值得注意的是，关贸总协定20条允许各国政府采取贸易限制措施，以保护人类、动物和植物健康，前提是这些行为不带有歧视性，或者是变相的保护主义措施。
- \_ 联合国粮农组织。按照其使命粮农组织承担了《国际植物保护公约》(IPPC)秘书处的任务。该公约旨在采取行动，以预防引入和传播对植物及农产品有害的害虫。

poverty continue to be major concerns. Annual losses due to harmful introduced organisms were estimated to be much higher in developing countries compared to losses recorded in developed countries, mainly because of inadequate preventive and biosecurity measures in the less-favoured countries. The introduction of pathogens into the agricultural system and the food supply chain can be slow or sudden and initially difficult to detect, but the process develops rapidly, as does the potential for irreversible damage. For example, a simulation of the diffusion of *Aphthae epizooticae* (foot-and-mouth disease) in the USA showed that the first infection would have normally been detected only five days after contamination, but in the meantime the agent would have already spread to 23 states and after eight days it would have affected 23 million animals in 29 states. Another example of the vulnerability of the food supply chain and of the importance of preserving food safety is the fact that 5,000 deaths and 325,000 hospitalizations occurred within a year in the USA due to accidental food poisoning. The issue of biosecurity and its international relevance due to the global market requires and deserves a coordinated set of preventative and responsive measures, both at the national and international level. For this purpose, monitoring programs are essential as well as the enforcement of international treaties and regulations. It is also important to modify those agricultural and food production practices that are most vulnerable and to launch specific vaccination campaigns against the most threatening animal diseases agents. In addition, an increased international scientific cooperation is essential both to identify the most virulent diseases and to provide the relevant technical basis for setting appropriate policies and regulations. An integrated system of preventive and response measures also requires the implementation of diplomatic, legal and economic commitments to enforce the capability and the capacity to implement international biosecurity strategies, designed with the scope to reduce the potential diffusion of harmful organisms due to the increase of global trade.

### Who is Ruling the Biosecurity Issue Internationally?

Essential in the enforcement of biosecurity during this time of globalisation and intensive international trade are treaties and agreements, which are supposed to set out principles, standards, criteria and recommendations aimed at facilitating the movement of goods (including agricultural products) around the world, and safeguarding their biological integrity. The most relevant international organizations whose mandate is directly or indirectly related to biosecurity are:

- \_ The World Health Organisation (WHO) and the



Agreement on the Sanitary and Phytosanitary Measures (SPS), which are setting up the general framework for trade and rules for managing risks from pests and diseases.

\_ The Global Agreement on Trade and Transport (GATT) encompasses a series of agreements which can have a specific focus (e.g. the agreement on agriculture). It is worth noting that article 20 of GATT allows national governments to restrict trade in order to protect human, animal and plant health, provided that these actions are not discriminatory or used as disguised protectionism.

\_ The Food and Agricultural Organisation of the United Nations (FAO), which within its general mission hosts the secretariat of the International Plant Protection Convention (IPPC), is devoted to implementing actions to prevent the introduction and the spread of pests to plants and agricultural products.

\_ The World Organisation for Animal Health (OIE) is concerned with biosecurity on animal-based trade. Its mission is to fight animal diseases at the global level. It is the world reference body of expertise on designated pathogens and/or diseases and is also a reference for research, validation and standardization of techniques/procedures related to animal diseases.

\_ The World Health Organisation (WHO) and the International Health Regulation's (IHR) 2005 mission is particularly oriented towards animal diseases transmittable to humans.

\_ The Codex Alimentarius Commission (CODEX) is a body established by FAO and WHO to develop food standards and codes of practice under the joint FAO/WHO Food Standards Programme, whose main purposes are protecting the health of consumers and ensuring fair trade is practiced in the global food market.

\_ The United Nations Environment Protection Programme (UNEP) covers a range of environmental programmes, of which three conventions are related to biosecurity:

\_ *The Convention on International Trade in Endangered Species of Wild Animal and Fauna (CITES) was aimed at limiting the impact of trade on endangered species;*

\_ *The International Maritime Organisation (IMO) aims at improving marine safety and preventing pollution from ships;*

\_ *The Convention on Biological Diversity (CBD) is committed to developing a "comprehensive strategy for sustainable development - meeting our needs while ensuring that we leave a healthy and viable world for future generations". The Cartagena Protocol on biosafety, adopted by the CBD, seeks to protect biological diversity from the potential risks posed by living modified organisms resulting from biotechnology.*

All these organizations have, within their general mission, a specific chapter focused on biosecurity and trade, where this matter is tackled from different angles, according to the specific mandate.

\_ 动物健康世界组织(OIE)。该组织主要关注基于动物贸易的生物安全问题。它在全球范围内防控动物疾病，是认定病原体 and/或病毒的世界参照机构，也是动物疾病的研究、评估、技术/程序标准化组织。

\_ 世界卫生组织(WHO) 和国际健康规定(IHR) 2005, 专门针对向人类传播动物疾病。

\_ 食品法典委员会(食品)是由粮农组织和世卫组织共同建立的机构。在粮农组织/世界卫生组织食品标准计划下，具体负责制定食品标准和行为规范，其主要目的是保护消费者健康和确保在全球粮食市场下进行公平贸易。

\_ 联合国环境署(UNEP) 管理了一系列环境公约，其中三个公约与生物安全有关：

\_ 《濒危野生动植物种国际贸易公约》，旨在限制国际贸易对濒危物种的影响；

\_ 国际海洋组织，旨在提高海洋安全，预防船只污染；

\_ 《生物多样性公约》，致力于制定“全面的可持续发展战略——以满足我们当代的需求，并确保为我们下一代留下一个健康而有生命力的未来”。

《生物多样性公约》下的《生物安全卡塔赫纳议定书》，旨在免受改性活生物体对生物多样性带来的潜在风险，而改性活生物体是生物技术发展所带来的结果。

根据各机构的不同授权，所有这些国际组织在其章程中都有专章从各自角度都来规制生物安全和国际贸易。

### 欧洲情况介绍

长期以来，欧洲生物安全(biosafety)的保护和执法工作与人、动物与植物病原体和毒素密切相关；而生物防护(biosecurity)的重要性在2001遭到恐怖袭击后才进入科学和公众的讨论中。

对于生物安全，欧盟立法主要集中在搬运、运输和贸易危险性生物材料过程中，如何预防出现风险。欧盟成员国应在其国家法律中明确规定防止人、动物和植物健康受到危险生物物质的侵害。在2007年，欧洲委员会准备了一个关于生物准备状态(biopreparedness)的绿色报告，其目的是在欧盟内启动协商议程，以减少生态风险，改善风险应对和准备工作。协商结果则是制定政策文件的基础，最终实现提高各成员国的生物安全。

### The European Scenario

At the European level, the practical and legislative implementation of biosafety measures linked with human, animal, plant pathogens and toxins has a long tradition, while the importance of biosecurity aspects emerged in scientific and public discussions only after the 2001 terrorist attacks.

Common EU legislation on biosafety focuses on the prevention of risks related to the handling, transportation and trade of dangerous biological material. This adds to the national laws implemented by EU member states to protect human, animal and plant health from dangerous biological substances. In year 2007, the European Commission prepared a green paper on biopreparedness, with the intention of stimulating a debate on this issue and to launch a process of consultation at the European level on how to reduce biological risks to enhance preparedness and response. The outcome of the consultation should have been the basis of a policy paper aimed at improving the biosecurity of the member states.

In addition, the EU adopted the Animal Health Strategy, which defines biosecurity as those measures taken to keep diseases out of populations, herds or groups of animals. Biosecurity measures include the quarantine and isolation of sick animals as well as the movement of people, animals and equipment. It is also worth mentioning the Network of Excellence on Plant and Food Biosecurity, sponsored by the European Commission within the 7<sup>th</sup> Framework Programme for R&D. It is a five-year project aimed at improving research and training on crop and food biosecurity in Europe.

The main objectives include the identification of priorities for research and regulations policy on biosecurity; the improvement of disease surveillance and detection systems; the prevention of the establishment and spread within the EU countries of deliberately introduced pathogens; to build up a strong culture of awareness on the matter of biosecurity in all sectors of agriculture and to provide the policymakers and the wider public with the results of the activities of the project.

### Conclusion

The most appropriate conclusion of this article is to quote what was reported by the INFOSAN information note 1/2010: "Biosecurity forms a bridge between agriculture and health. Poor practices in agriculture or food production can favour biosecurity threats and directly have an impact on public health or threaten food security. The benefits of a more harmonised and integrated approach to biosecurity are already apparent in specific national situations. A more holistic approach to biosecurity will enable these benefits to be achieved in a manner that avoids inconsistencies, fills gaps, prevents unnecessary barriers to trade and protects human health in agricultural and food products".

此外，欧盟制定了动物健康战略。这个战略将保护百姓、动物群免受疾病侵害所采取的措施定义为生物安全措施。生物安全措施包括检疫和隔离患病动物以及运输中的人、动物和设备。

另外值得一提的是由欧洲委员会资助在第七个合作计划框架下的“植物食品生物安全最佳实践网”。这是一个为期五年的项目，旨在推动欧洲农作物和食品生物安全的研发与培训工作，主要目标包括：识别生物安全的研究与政策重点；疾病监测和检测系统的改进；防范有意在欧盟国家中引入和传播病原体；在所有农业部门建立起高度重视生物安全的意识，以及向决策者和更多公众提供项目活动的结果。

### 结论

本文最恰当的结束语是引用来自INFOSAN报告(1/2010)中一段话：“Biosecurity在农业和健康之间架起了桥梁。糟糕的农业和粮食生产活动会导致biosecurity受到侵害，直接影响公众健康，并威胁食品安全。保护生物安全更为和谐完整所带来的好处在一些国家已经显现。一套更全面的biosecurity方法将会促使实现这些益处，避免不必要的贸易壁垒，保障农业和食品安全，保护人类健康”。

# Experiences Gained in Projects with China and at International Level 在中国和国际合作开展项目 获得的经验

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二十一世纪随着国际旅行的频更加繁和国际贸易的不断扩大, 各国间的国界已经变得“多孔”起来, 引进外来入侵植物害虫和疾病的风险显著增加, 即: 所谓的外来入侵物种 (IAS)。这往往会引发灾难性疾病的爆发, 造成农作物产量减少, 农产品质量降低, 病虫害控制费用大幅增加, 从而阻碍国际市场和贸易。

在当今无国界的世界里, 如何控制外来入侵物种带来的害虫、病原体和杂草也变得更加重要。贸易的不断全球化和人与货物的大尺度运输都大大增加了引入病原体和害虫的机会, 对自然和农业植物系统造成威胁。随着农林产品的运输和国际贸易机会增加, 引入新害虫或病原体的概率也随之而增加。这会导致严重的作物损失。

此外, 外来入侵物种被认为是全球生物多样性丧失的第二大原因。近年来, 许多国家和国际环境政策和法规已开始管制这个问题。据计算, 超过120000种的非本地物种的植物、动物和微生物入侵美国, 英国, 澳大利亚, 印度, 南非和巴西: 约20-30%的引种物种带来植物害虫, 造成很严重的问题。事实上, 它们中的很多是危害很大的害虫, 对自然和生态系统带来很大破坏, 并对公共健康造成危害。

在控制外来物种入侵方面, 大力倡导共享信息和国际专业经验非常重要, 包括共享生态信息、所造成影响信息和管理外来入侵物种的实际经验等等。随着当今欧亚间的国际贸易日益频繁, 这方面工作显得更加格外重要。在政治层面上, 需要认识到外来入侵物种威胁我们的农产品贸易和粮食供应, 需要给予足够的关注, 并投入充分资源以预防其不断扩散。这是一种新出现的问题, 无论是在欧洲还是亚洲, 都需要从满足市场和社会需求的角度来重新地位科研方向并评价技术能力, 从而迎接外来入侵物种对可持续发展带来的

The expansion of international travel and trade in the 21<sup>st</sup> century has made national borders more porous and dramatically increased the risk of introducing invasive plant pests and diseases – the so-called Invasive Alien Species (IAS), which can cause economically disastrous disease outbreaks, resulting in reduced yields and food quality and higher pest and disease control costs, thus hindering international markets and trade.

Invasive alien species of pests, pathogens and weeds are becoming increasingly important in a progressively borderless world. The continual globalization of trade and the large scale movement of people and goods have greatly increased opportunities for the introduction of pathogens and pests that represent a threat for our natural and agricultural plant systems. The probability of introducing a new pest or pathogen increases with the increasing magnitude of travel and the international transport of agricultural and forestry products.

This causes severe crop losses. Moreover, invasive alien species are considered to be the second largest reason for biodiversity loss worldwide and, in recent years, national and international environmental policy and legislation has begun to recognize this fact. It has been calculated that more than 120,000 non-indigenous species of plants, animals, and microbes have invaded the United States, the United Kingdom, Australia, India, South Africa and Brazil: an estimated 20-30% of the introduced species are plant pests and cause major problems. Actually, quite a few of them become serious pests and inflict significant damage on natural and managed ecosystems and cause public health problems. Sharing information and expertise internationally on the ecology, its impact and the practical management of IAS is therefore a priority. This is particularly true when one considers the increasing commercial relationships between Europe and Asia. At the political level there is a need to realize that IAS threaten our agricultural trade and food supplies and adequate attention and resources should be devoted to the prevention of their proliferation. There is an emerging need, either in Europe or in Asia, to re-orient scientific and technical capabilities towards the market and social requirements in order to meet the new challenges of sustainable development. It is important, with regard to any possible exchange of IAS between Asia and Europe,





to clearly identify the pests possibly presenting a risk and to implement an early warning system. Plant protection has become an important profession and study subject in China. Plant protection, quarantine and research institutions have been established in agricultural departments and in most of the academies of agricultural sciences above the county level. Most of the agricultural schools and universities provide this special field of study and the majority of townships have technicians qualified in plant protection. There are 46,000 technicians in plant protection and more than 5,000 researchers specializing in this subject throughout the country. Regulations on plant quarantine and the use of pesticides have been promulgated and relevant standards established, along with emergency plans for dealing with several major plant pests. Funds totalling 2.58 billion yuan (RMB) were allocated by the state from 1998 to 2006 to build up basic facilities for quarantine and prevention, monitoring and early warning, and emergency control of plant pests. At the same time, the central government increased its yearly financial support for major plant diseases and insect pest prevention and control. In 2006, 272 million yuan was allocated from the central budget to monitor plagues of locusts (*Locusta migratoria manilensis*), yellow rust (*Puccinia striiformis*) and the larvae of the snout moth (*Crambus agitatellus*). All these efforts greatly improved the means of plant protection and working conditions and strengthened the overall protective capacity. The spread of invasive alien species is due mainly to increasing international trade and causes severe economical damage to the agro-food system at large. In the meantime, commercial agricultural trade between Europe and Asia is increasing and will continue to increase due to social and economic factors. The presence of a wide range of habitats and environmental conditions in China makes this country especially vulnerable to the establishment of invasive species of foreign origin. Its rapid economic development, including an explosive growth in international trade and transportation, has increased the potential for new introductions. The great majority of invasive species have been introduced into China accidentally through the transportation of seeds, flowers and nursery stocks. New epidemic situations continually occur with the rapid increase of international trade. In the past 10 years, more than 20 new invasive species of plant disease and pests have been found in China. Some extremely damaging alien species were regularly intercepted by Chinese quarantine authorities. In 2009, 2,500 species and about 200,000 batches of harmful organisms were intercepted, and the numbers have increased annually by almost 20%. IAS management needs to be enhanced worldwide in terms of monitoring, coordination, invasion blocking, early warning, rapid response and information processing. Research and development capacities must be improved in terms of: (1) risk assessment on potential alien invasive species to establish the early warning and eradication



system; (2) development of rapid molecular detection, surveying and monitoring technology to establish management strategies and procedures for controlling biological disasters and public risks; (3) study of the epidemiology of potential invasive pathogens that will pose a high threat to animals and plants in agriculture and forestry as well as the spread and dispersion pathways and mechanisms of invasive pests of major economic crops, in order to develop effective control and eradication technology; (4) development of modern technology and methods for emergent eradication, biological control, ecological management and ecological restoration to establish integrated prevention and control systems for the sustainable management of invasive species. The enhancement of social education capacities must take into consideration the establishment of training centers/networks with a focus on alien invasive species and technology training for personnel in the areas of diagnosis, prevention, removal, control, and eradication of alien invasive species, as well as methods of risk assessment, environmental impact assessment and ecosystem restoration. For these reasons, a partnership between China, Thailand, Italy, Spain and Germany has been established, with a total of eight institutions involved as main partners and associates. It is funded by the European Union under the Asia-Link Programme (CN/Asia-Link/028 108-962) "Tackling BIOSECURITY between Europe and Asia: innovative detection, containment

新挑战。对于欧亚间可能出现的外来入侵物种引进，最重要的是清晰识别可能带来风险的害虫，并实施早期预警系统。植物保护在中国已经成为一个重要行业和研究课题。在农业部门和和大多数县级以上农业科学院，都建立了植物保护、检疫和研究机构。大部分农学院和大学都设立了这方面的专门研究，大多数乡镇也都拥有从事植物保护的专门技术人才。全中国有46000名植物保护技术人员和5000多名从事这门学的科研人员。中国已经颁布了相关的植物检疫和使用农药的法规政策和技术标准，也制定了针对几种主要病虫害的应急计划。为建立检疫防治基础设施，从1998到2006年期间，国家共拨付资金25.8亿元（人民币）用于建设害虫检疫、预防、监测和紧急控制等基础能力。同时，对主要病虫害的防治，中央政府增加了年度的财政预算资金。仅2006年就安排了272万元的中央财政资金，用于监控瘟疫蝗虫（东亚飞蝗），黄锈病（*Puccinia striiformis*）和螟幼虫（*Crambus agitatellus*）。所有这些努力大大提高了植物保护和劳动条件的手段，增强整体防护能力。



国际贸易的不断增加造成了外来入侵物种的传播，给全球农业种植系统带来了严重经济损失。与此同时，欧洲和亚洲之间的商业性农业贸易也在不断增加；受社会经济因素的影响，这种国际贸易还会继续扩大。作为众多物种的栖息地，由于其所提供的独特环境，中国很容易受到外来物种入侵。经济的快速发展，包括国际贸易和运输的爆炸性增长，增加了外来物种入侵的可能性。已被引入到中国的外来入侵物种绝大多数是通过无意的种子、花卉、苗木的运输而引入的。随着国际贸易的迅速增长，新的疫情还在不断地发生。在过去10年中，在中国发现了20多种新的外来入侵物种。一些非常有害的外来物种经常被中国卫生检疫机关截获。2009年，共有2500种和200000批有害生物被海关截获，而这个数字几乎以每年增长20%。

管理外来入侵物种要在世界范围内加强监测、协调、入侵阻断，早期预警，快速响应和信息处理。提高研究和开发能力，必须加强以下几方面：（1）风险评估潜在的外来入侵物种，建立预警和消除制度；（2）开发快速分子检测技术和调查与监测技术，建立控制生物灾害和公共风险管理的战略和程序；（3）加强研究可能对农林业动植物带来高威胁的潜在入侵病原菌、其传播扩散的路径和入侵害虫对主要经济作物危害的机理，并据此制定有效控制和消除害虫的技术方案；（4）运用现代科技和方法建立害虫紧急消除、生态管理和生态恢复系统，建立综合预防和控制外来入侵物种的可持续管理系统。提高社会教育能力必须考虑建立专门致力于外来入侵物种控制的培训中心/网络，提供专业培训，包括对外来入侵物种的诊断，预防，控制及消除的专门人员培训，对风险评估、环境影响评价和生态恢复方法等进行专题培训。

由于这些原因，在中国、泰国、意大利、西班牙和德国间已经建立起伙伴关系，共有八个机构参与了合作项目。该项目由欧-亚链接项目（CN / Asia-Link / 028 108-962）资助。项目题目是：解决欧洲和亚洲之间的生物安全问题：创新检测、抑制和控制工具，以防控对粮食生产和贸易带来潜在危害的外来入侵物种(BIOSEC)。

加强国际经验一直被公认为亚洲和欧洲国家的当务之急。现如今，特别是在全球可持续发展的背

and control tools of Invasive Alien Species potentially affecting food production and trade (BIOSEC)". Strengthening international experience has always been recognized as an urgent priority by Asian and European countries. Nowadays, programming education and research, particularly within the global context of sustainable development, requires an international perspective and multidisciplinary skills. Given the trans-boundary characteristics of IAS management, this project has developed human resources by upgrading the relevant skills of university faculty staff, with particular emphasis on youth and the teachers of the future, within a global perspective. Particular attention has also been given to the involvement of Asian policy makers and stakeholders (e.g. governmental administrations, private and public research centers, associations, NGOs, etc.). The project addressed the need to build positive synergies between knowledge acquired by training and education, with policies and practices oriented toward local sustainable development of the agricultural and forestry sector with regard to IAS management. From this perspective, the action also relies on the support of project associates well acquainted with IAS management, and facilitating direct contact with policy makers and the private sector, a broader diffusion of project outcomes, and the promotion of regional integration of IAS management practices. The development of human resources and relevant educational materials also addresses the integration of the academic, economic and policy aspects of IAS management. Both in Europe and Asia, there is the emerging need to re-orient scientific and technical capabilities towards market and social requirements in order to meet the new challenges of sustainable development. Stimulating the exchange of teaching staff and student mobility has improved and updated the educational, technical and scientific knowledge of target groups in IAS management strategies, providing a direct view in a global context. Expanding the range of known case studies and globally adopted IAS management techniques enhanced the target groups' capacity to properly design and manage education and research on IAS, based on the particular local circumstances. The higher education institutions involved in the project devoted efforts to orient their teaching and research on IAS management towards the preparation of qualified persons able to operate in the private and public sector, so that the technological, economic and social policies can succeed in promoting IAS management practices compatible with sustainable development. Future investments are necessary in order to reduce and prevent the vulnerability of agriculture and prepare strategies for the continuous exchange of information between Europe and Asia.

\* Acknowledgement: EU Asia-Link project "Tackling BIOSECurity between Europe and Asia: innovative detection, containment and control tools of Invasive Alien Species potentially affecting food production and trade (BIOSEC)", (CN/Asia-Link/028 108-962).

景下，规划教育和研究工作更需要国际视野和多学科技能。鉴于管理外来入侵物种的跨国界特点，该项目着力提升学校师资能力，特别是对年轻学者和教师的培养，从而实现开发人力资源的目的。在项目实施过程中，特别关注了亚洲的政策制定者和利益相关方的参与（如政府部门、私人企业和公共研究中心、协会组织等）。在管理外来入侵物种领域，该项目在知识与政策和实践之间建立起正协同效应；前者通过培训及教育可获得，后者则与推动当地可持续农林业发展密切相关。从这个角度来看，项目合作伙伴对外来入侵物种的熟悉程度、推动政策制定者和私营部门的积极参与、广泛推广项目成果、倡导外来入侵物种一体化区域管理等，对于加强外来物种入侵管理尤为重要。

加强人力资源培养，编制相关教学材料，有助于推动学界、经济界与政策制定者之间更加统筹管理外来入侵物种。在欧洲和亚洲，都急需重新定位满足市场和社会需求的科学和技术能力，以迎接可持续发展带来的新挑战。

积极推动教师和学生间的国际交流，有助于提高和更新外来入侵物种管理战略中目标人群的技术和知识，拓展他们的国际视野。在结合当地实际情况的基础上，扩大案例研究成果知晓范围，采用外来入侵物种先进的管理经验，可提高目标人群的设计和管理外来入侵物种的教育和研究能力。

参与本项目的高等教育机构积极围绕外来入侵物种管理来开展教学和研究工作，培养人才进入私营和公共部门从事外来入侵物种管理，并推动形成有助于可持续发展和外来物种入侵管理的相关技术、经济和社会政策。

此外，还需要投入量资金用于减少预防农业业遭受外来物种的侵入，并制定在欧亚间持续交换信息的战略。

\* 致谢：“欧-亚链接项目CN / Asia-Link / 028 108-962”。项目的题目是：解决欧洲和亚洲之间的生物安全问题：创新检测、抑制和控制工具，以防控对粮食生产和贸易带来潜在危害的外来入侵物种 (BIOSEC)。





## VIU training program echo from participants 威尼斯国际大学培训计划 学员回音

This section is written by the Chinese participants in the trainings in Italy. We hope hereby to provide the Newsletter readers with an authentic flavour of the training experience.

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### Chinese Ministry of Science and Technology Renewable Energies: Technology for New Energies and Energy Efficiency

Italy, December 1-13, 2012

38 participants

Trainees at the MOST-IMELS Training Program of Technology for New Energies and Energy Efficiency attended a series of training sessions and site visits in Italy between December 1 and 13, 2012. Lectures were given by officials and experts from IMELS, VIU, ENEL Larderello Geothermal Plant, Renewable Energies Park, Tifs Energy Efficient Building, Energy Efficient Building "Casa Gaia", and ICI Caldaie S.p.A, on a wide range of topics, from science park management and green innovation policies, to solar technologies, biomass technologies, geothermal energy utilization technologies, wind energy technologies, energy-saving building technologies and smart grid technologies, etc. The trainees showed great interest in these topics and had in-depth exchanges and discussions with the lecturers. This training program incorporated case studies and site visits into the lectures, giving the trainees a more vivid understanding of the topics while facilitating more interaction between the lecturers and the trainees.

During the training program, the trainees were greatly impressed by Italy's fine scenery and rich culture and art history. They were mostly impressed by the efficiency of the Italian organizers and the enlightened presentations by the lecturers. On the basis of this training program, and with the current challenges facing Chinese energy, the following sectors were key focal points for the trainees to think about:

- \_ The practice of smart grid building in Italy is worthy of our attention;
- \_ To learn from Italian experience, based on our local conditions and characteristics, to foster science parks with more regional features;
- \_ To improve the current innovation policy system to foster green innovation science parks with more variety and more functions.

It is our hope to further expand cooperation and exchange based on this training program. We hope we can continue to do so after this training course because it is a great way to learn new technology and communicate with foreign experts. For the coming training programs, we suggest that the technology programs be emphasized, especially those on technical application and policy implementation. The interactive way of teaching should be encouraged to allow more involvement from the trainees.

Wang Wenhui,

Wind Machinery Branch of China's Agricultural Machinery Industry Association



### 中国科学技术部

### 新能源与能效技术

意大利, 2012年12月1日至13日

38人参加

中-意可再生能源与能效可持续发展能力建设培训班中方学员于2012年12月1日-12月13日在意大利参加了一系列学习和参观, 听取了来自意大利环境国土与海洋部、威尼斯国际大学、ENEL Larderello 地热能源工厂、可再生能源主题公园、ICI Caldaie 公司、名为“Casa Gaia”的节能建筑以及Tifs节能建筑示范项目的官员、专家、学者及企业代表的介绍, 了解到从科技园区的建设和管理及绿色创新体系政策, 到太阳能技术、生物质能技术、地热能利用技术、风能利用技术、建筑节能技术, 以及智能电网技术等丰富内容, 同时学员们也结合中国国情与意方专家展开了深入的交流和讨论。这种专题讲座、案例分析与实地考察相结合的培训形式便于学员更深入理解授课内容, 便于学员与授课者间的互动, 成效良好。

培训过程中, 意大利的优美环境和丰富深厚的文化与艺术积淀给我们留下美好的印象, 特别是意方认真的工作作风和风趣优雅的待人接物贯彻始终, 培训安排高效紧凑, 授课老师的授课内容大多具有启发性。经这轮培训, 结合中国发展面临的能源问题, 我们深深体会到须在以下几方面需做进一步的学习:

1. 意大利对于智能电网的建设, 其经验值得我们参考。
  2. 完善现有的创新政策体系, 构建形式更多样、功能更丰富的绿色创新科技园。
  3. 吸收意大利各类园区的建立及管理经验, 根据我们自己的区域特点和条件, 结合实际打造具有区域特色的科技园。
- 我们希望今后有机会再次参见类似培训项目, 在学习先进技术的同时, 还可以促进中外技术交流, 并进一步拓展相关合作。在今后的培训中, 希望能进一步加强技术方面的内容, 特别是增强有关技术应用和政策实施案例方面的授课内容。另外, 部分授课老师采取的生动互动教学值得提倡, 对提高学员参与积极性和活跃度有益。

王文辉, 中国农业机械工业协会风力机械分会

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### Chinese Academy of Social Sciences Water Pollution Prevention and Control

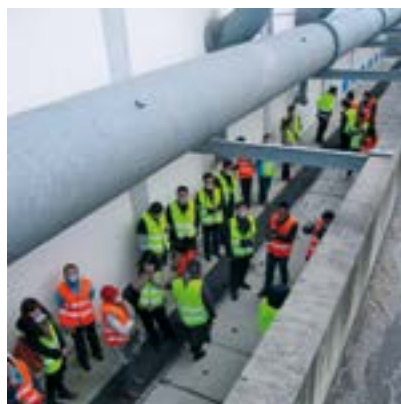
Italy, March 17-28, 2013

38 participants

The 10<sup>th</sup> Eco-Management Strategies and Policies Training Program on Water Pollution Prevention and Control was held in Italy from March 17<sup>th</sup> to 28<sup>th</sup>, 2013, and 38 participants from China attended the 12-day training. The training courses were arranged reasonably and systematically, quite close to the training topic. The training course covered water resource management policy, laws and regulations, basin integrated management, case studies, and site visits etc. Fifteen training lectures were delivered by experts and scholars from government and universities and we visited one laboratory and four water factories, at which all participants learned something. Although there are different national conditions between China and Italy, and different economic development stages, Italy's current eco-management experience and practice pattern is worth learning from and can be used as a reference for our country. The participation of enterprises, citizens and government, and how each play different roles in society shows how Italy overcomes the contradiction between resources and the environment step by step during the course of economic development.

Italy's sewage treatment technology and enterprise management mode is commendable. Their advanced progress in sewage treatment mainly depends on three aspects: the sewage treatment plant improves water quality by optimizing the progress; the wastewater membrane treatment technology is more mature than domestic; and industrialization is ahead of our country. The practice of providing a wastewater treatment service to small and medium-sized enterprises is useful for us to learn.

The training course, jointly held by the Italian Ministry for Environment, Land and Sea and the Chinese Academy of Social Sciences, is a landmark project that provides forward-looking concepts and cutting-edge practices to Chinese participants, at a time when China's modernization is entering a turning point with regard to industrialization and urban development in the building of a beautiful China.



### 中国社会科学院 水污染的预防与控制

意大利, 2013年3月17日至28日

38人参加

第十期“水污染预防和控制”培训于2013年3月17日~3月28日在意大利举办, 来自中国的38名学员参加了为期12天的培训。本次培训的授课内容安排合理且系统, 与培训主题紧紧相扣, 课程设置覆盖了水资源管理政策、法律法规、流域综合治理、案例分析、现场参观等, 内容非常全面。

此次培训一共安排了15次讲座, 来自意大利政府、大学和企业的专家学者亲自为大家授课, 学员们收获颇丰: 尽管中意两国国情不同, 经济所处的阶段也相异, 但是意大利目前生态环境管理经验和实践模式值得我国学习借鉴。企业、居民及政府等不同社会主体的参与及其作用的发挥折射了意大利在经济发展过程如何逐步克服资源环境的矛盾。

意大利污水处理技术、工艺及企业经营模式可圈可点。他们在污水处理方面较我国进步的地方主要在于三方面: 第一, 污水处理厂通过优化工艺流程提高水质; 第二污水膜处理技术较国内成熟, 产业化走在我国前面; 第三, 针对中小企业污水处理服务, 意大利的商业实践模式值得我国学习。

意大利环境、领土与海洋部与中国社会科学院联合举办培训项目是一个意义非同寻常的项目, 特别是在中国现代化发展进入工业化、城市化发展转折时期, 建设美丽中国的关键时期意义重大, 它使科研人员, 学者、大学教授以及企业管理人员能够了解前瞻性理念, 前沿的实践, 对于中国未来的可持续发展意义深远。





**Air Pollution, BMEPB and SEPB**

Italy, November 11-22, 2012

41 participants

Air pollution is a sensitive issue in many Chinese and Italian cities and is a key topic, both from a global and local perspective. For these reasons, the second of the two 2012 courses organized by VIU in collaboration with the Beijing Municipal Environmental Protection Bureau and the Shanghai Environmental Protection Bureau focused on air, in particular on the definition and the management of its quality. The course was held from November 11 to November 22 with 41 participants, 20 from SEPB and 21 from BMEPB.

Many aspects of air pollution were discussed during the course: air pollution control at the EU and Italian level, EU cap and trade policies, air pollution control technologies, air pollution control in industry and sustainable mobility. Not only were academics and researchers involved in the course, but also many experts from local enterprises and regional control bodies.

Although the two municipalities work within different landscapes, they often face common issues. By spending time together and sharing problems and solutions, the participants from Shanghai and Beijing added to the success of the course. In fact, in order to concretely discuss the scheduled themes and, in particular, industrial pollution and pollution control at the local level, many site visits were organized. During these site visits the two municipalities had the chance to discuss their different points of view, collecting useful suggestions and creating a network of fruitful relationships.



**空气污染，北京市环境保护局和上海市环境保护局**

意大利，2012年11月11日至22日

41人参加

空气污染对许多中国和意大利城市都是一个敏感问题，同时也是全球和世界各地面临的重要课题。为此，在2012年威尼斯国际大学与北京市环境保护局和上海市环境保护局合作开展的2期培训中，专门围绕空气、特别是空气质量的定义和管理这一主题组织了1期培训。培训班于11月11日至11月22日举办，共有41人参加，其中包括20名北京市环保局和21名上海市环保局学员。

在课上讨论了空气污染的各方面的问题：欧盟和意大利的空气污染控制，欧盟的控制上限和贸易政策，空气污染控制技术，工业空气污染控制与可持续交通。本期培训不仅有学者和研究人员参加，而且还有许多企业家和区域环保部门代表参加。

虽然这两个直辖市的自然景观不同，但它们经常面临共同的问题。上海和北京市参加培训的代表们交流了各自所面临的环境问题，并分享了各自解决这些问题的办法，因此也使得本期培训变得更加成功。为了能够具体深入讨论拟定主题，尤其是地方层面的工业污染和污染控制，本期培训还安排了许多的实地考察。在实地考察中，两市有机会讨论了他们的不同观点，收集有用的建议并且创建一个卓有成效的关系网络。



### Waste Management, CASS

Italy, March 3-14, 2013

37 participants

One of the most urgent priorities regarding China's environmental concern is the sound management of waste. In fact, as the population continues to grow and adopt high-consumption lifestyles, the amount of Municipal Solid Waste (MSW) produced is constantly increasing. Landfilling is the prevalent waste disposal method in China and, given the peculiar composition of Chinese cities' waste, characterized by a very high level of moisture, the heavy use of landfills should be avoided as much as possible in order to reduce leachate and methane release. Therefore, among the goals to be reached within waste management in China is the improvement of existing landfill management and the identification of new disposal techniques.

Following the well-known waste management hierarchy pyramid, the training course focused on the different options for waste reduction, reuse, recycling and recovery. The 37 participants selected by CASS were introduced to the integrated waste management method adopted in the European Union as a way to reduce the amount of waste generated and improve the way it is treated, in order to limit environmental pollution and health issues for its citizens.

Many case studies were introduced and site visits planned in order to make the participants aware of practical cases of waste recycling, treatment and valorization, together with examples of citizen involvement. Among these were HERAmbiente hazardous waste treatment plant (Ravenna), Treviso Province high-rate recycling best practice, Acegas Aps energy recovery plant (Padua), Veritas-Ecoprogetto RDF production plant (Venice), Depuracque sludge and leachate treatment (Venice), and Centro Riciclo Vedelago plastic sorting and reuse (Treviso).



### 废物管理, 中国社会科学院

意大利, 2013年3月3日至14日

37人参加

中国环境面临的最紧迫问题之一就是如何对废物进行有效管理。事实上, 随着人口的持续增长和采用高消费的生活方式, 城市固体废物 (MSW) 生产量不断增加。填埋是在中国最常见的垃圾处理方法。但是由于中国城市垃圾水分很高的特性, 为了减少渗滤液和甲烷释放, 应尽可能避免大量使用填埋场。因此, 中国废物管理的目标之一就是改进现有的垃圾填埋场管理和寻找新的处理技术。

按照著名的废物管理金字塔模式, 本期培训重点放在了废物减量化、再次利用、再次回收和能源回用方面。本期集中介绍了欧盟所采用的综合废物管理方法。这套方法旨在减少垃圾产生量, 并提高垃圾的处理处置效率, 尽可能减少对环境带来的污染, 从而保护民众健康。中国社科院挑选了37名学员参加了本期培训。

为了使学员了解废物回收、处理处置、能源回收以及公众参与废物管理过程等方面的经验, 本期培训安排了许多实际案例讲解, 包括参观了HERAmbiente危险废物处理厂 (位于Ravenna), 特雷维索省高速循环利用的最佳实践案例, Acegas APS的能源回收装置 (位于帕多瓦), Veritas-Ecoprogetto 垃圾衍生燃料发电厂 (位于威尼斯), Depuracque污泥和垃圾渗滤液处理厂 (位于威尼斯), 和Centro Riciclo Vedelago塑料分拣和再利用企业 (位于特雷维索)。





**Sino-Italian Workshop on  
“NO<sub>x</sub> Emission Reduction from  
Cement Plants and District Heating  
Plants in the Beijing Area”**

From April 15 to 17, a workshop on the project “NO<sub>x</sub> Emission Reduction from Cement Plants and District Heating Plants in the Beijing Area” took place in Beijing. The project is within the framework of the Sino-Italian Cooperation Program on Environmental Protection between IMELS and Beijing Municipality. The overall objective



of the project is aimed at introducing the DeNO<sub>x</sub> regulations and technologies from Italy and the EU to the Beijing area, with a specific focus on cement plants and district heating plants; the project also aims to propose the feasible upgrade of the pilot plants in order to reduce and control NO<sub>x</sub> concentration. The workshop participants included officers from the Beijing Municipality Environmental Protection Bureau, technicians from cement plants and heating plants, as well as Italian experts, EU partners and SICP project supervisors. Italian and Danish experts introduced the mid-term report on the DeNO<sub>x</sub>

**中-意研讨会召开: 探讨如何减少北京  
的水泥厂和居民取暖设施氮氧化物排放**

中-意两国在4月15-17日期间在北京召开了专题研讨会, 探讨如何减少北京的水泥厂和居民取暖设施氮氧化物排放。该项目在中-意环境保护合作框架下, 由意大利环境部和北京市环保局具体负责设施。此项目的最终目标是在北京地区引进意大利及欧盟在削减氮氧化物排放、特别是水泥厂和居民取暖设施脱碳方面的政策与技术。这个项目还将提出可行的设施升级改造方案, 以降低和控制氮氧化物排放。

研讨会的参与者包括北京市环保局官员, 水泥厂和居民取暖设施的技术人员, 意大利专家, 欧盟合作伙伴以及意大利环境部的项目管理人员。意大利和丹麦专家应邀介绍了意大利及欧盟削减氮氧化物的政策和技术中期评估报告。与会官员和技术人员与欧盟专家就相关的管理和技术问题进行了讨论。尽管事实



上欧盟并没有建立固定的水泥厂氮氧化物浓度上限, 但总氮氧化物排放量得到了严格控制。在中国的状况非常不一样, 尤其是在北京。北京已经开始制定更严格的排放标准来控制电厂、水泥厂、供热厂和任何其他严重污染和高耗能企业的氮氧化物的排放浓度。本次研讨会还安排了与会者参观点企业(水泥及居民供热厂)。



专家们认真听取了业主和技术人员对于设施生产能力、生产工艺以及新安装的去氮氧化物设备。他们还询问了这些新安装设施的运行状态和脱氮效果。意大利和欧盟专家还与中方代表就一些详细的技术问题进行了深入讨论。最后一天安排了总结讨论, 并对前几天的交流收获进行了梳理。相关官员和专家团队对所提出的新要求达成一致, 并确定了下一步工作具体时间表。

regulations and technologies in EU and Italy. The officers and the technicians discussed with EU experts both the administrative and technical aspects. Actually, in the EU there is no fixed limit of NO<sub>x</sub> concentration for cement plants; meanwhile the total amount of NO<sub>x</sub> emission is carefully controlled. The situation is very different from that of China, especially in Beijing. Beijing has already started to formulate more stringent emission standards to control the emission concentrations of NO<sub>x</sub> and O<sub>x</sub>, from power plants, cement plants, heating plants and any other heavily-polluted and high energy-consuming enterprises.

The workshop included visits to the pilot plants, (both cement and district heating plants) for all participants. The experts listened carefully to the introduction on the plants from the owner and technicians, including the production capacity, the production process and the newly-installed DeNO<sub>x</sub> facilities. They also inquired into the operation status and the effects of these newly-installed facilities. Several detailed technical questions were further discussed between the Italian and EU experts and the Chinese staff. The last day consisted of wrapping up the work and discussing the outcomes from the previous days. Officers and team experts agreed on the new requirements and set the timetable for the next step.

**Environmental Emergency  
Management Project Presented to  
the Chinese Academy of Governance**

On 14 May 2013, IMELS was invited by the Emergency Training Center of the Chinese Academy of Governance (CAG) to introduce the Environmental Emergency Cooperation Project,



### 向国家行政学院介绍环境应急管理项目

2013年5月14日，意大利环境部应国家行政学院应急培训中心邀请，介绍与中国环保部联合实施的环境管理应急项目。该项目的成果包括土壤的风险评估、溢油应急计划、危险设施数据库和污染扩散模型。

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国家行政学院认为意大利环境部与中国环保部合作的环境管理应急项目非常宝贵，并表示将会把项目成果运用于在应急管理培训课程中。国家行政学院正在开发面向市长、省部级高级官员的应急响应培训课程。

国家行政学院是一个部级机构，直接隶属于国务院。这是一个培养高级公务员和高层次管理人员的重要机构。应急培训中心成立于2010年，将成为应急管理培训、政策研究及国际合作的国家中心。

### “意大利：材料的奥秘”展览在上海中意大利中心揭开序幕

“生命的原始创造性：材料的奥秘”展览于今年四月在上海意大利中心开幕。贸易博览会主席沈权（音译）先生、贸易博览会局长卢春义（音译）先生、意大利驻上海总领事Vincenzo De Luca先生、Triennale服务局总裁Mario Abis先生和

Altgamma基金会总裁Andrea Illy先生等出席了开幕式。同时出席会议的贵宾还有意大利环境、领土和海洋部代表、意大利贸促会主席Claudio Pasqualucci和文化学院负责人Carlo Molina教授等。

“意大利：材料的奥秘”展览是一个永久性展览，由上海博览贸易会具体组织，意大利著名的设计博物馆“La Triennale di Milano”协办。展览会还得到了意大利环境、领土和海洋

implemented with the Chinese Ministry of Environmental Protection. The main project outcomes, including the territorial risk assessment, spill response plan, hazardous plant database and pollution diffusion model were presented. CAG regards IMELS-MEP cooperation on emergency management as a very valuable contribution to the Chinese environmental emergency management, and expresses interest in applying the outcome to the Rehearse Training, which CAG is developing to train the mayors, senior officers of provinces and ministries on how to respond to emergency situations.

The Chinese Academy Governance is a ministerial-level institution directly affiliated with the State Council. It is an important body for training senior civil servants and high-level administrators. The Emergency Training Center was set up in 2010 with the goal to become the national center for training, policy research and international cooperation of emergency management.



### “Italy: the Truth of Materials” Exhibition Opening at the Shanghai Italian Center

The opening ceremony of the exhibition “Primitiveness Creativity Life - The Truth of Materials” took place officially last April at the Shanghai Italian Center. The event was attended by Shen Quan, President of Expo Trade, and Lu Junyi, Director General, as well as Vincenzo De Luca, Consul General of Italy in Shanghai, Mario Abis, President of the Triennale Services, and Andrea Illy, President of the Altgamma Foundation. Also present were representatives



of IMELS and of the Italian institutions in Shanghai, including Dr Claudio Pasqualucci, Director of ICE, and Prof Carlo Molina, Director of the Institute of Culture.

The permanent exhibition “Italy: the Truth of Materials”, organized by the Shanghai Expo Trade and curated by “La Triennale di Milano”, the famous Design Museum from Milan, is also supported by the Italian Ministry for the Environment Land and Sea, and focuses on the theme of materials in their authenticity, which are at the core of excellence of Made in Italy products. It aims to show the public Italy's ability to transform simple materials and common objects into functional, beautiful and environmentally-friendly products, thus giving the precious gift of skill and knowledge.

Visitors can fully appreciate the creativity of Italian production, experiencing the process of material transformation and - thanks to the advanced technology and also the manual ability of its craftsmen and the genius of its artists and designers - the perfect combination of three elements: art, science and technology, historically embodied in Italian style.

The exhibition is divided into four halls and takes visitors through a magical atmosphere created by the mysterious and archaic stone and polychrome marbles, the strong naturally expressive ductility of wood, and ending with a triumph of colors and forms of blended materials. Thanks to technology and the refined tradition developed over the centuries, materials become works of art but also objects of great beauty for everyday life.

The exhibition is on the ground floor of the Italian Pavilion in the main building of the Shanghai Italian Center, located in what was Zone C of Expo 2010, covering an area of 6,000 square meters. During the Shanghai Expo, the Italian Pavilion had more than 7.3 million visitors.

部的大力支持。展览的主题是揭秘材料的本源，这也正是“意大利制造”的精髓所在。参观者可以欣赏到意大利产品的创造性，切身感受到高科技、艺人精湛手艺和艺术家天赋所带来的材料转化过程，欣赏到艺术、科学与技术的完美结合，而这一切深深地内化在千百年铸成的意大利风格中。

本次展览分为四个展厅，依次将游客带入到由神奇而古老的石头、彩色大理石、自然可塑的木头所创造出的神秘而古老的幻境中；并在色彩和混合材料的狂欢中结束了展览。得益于数百年的技术和传统文化的发展，材料已变成了艺术作品，同时也成为日常生活中富有魅力的物品。

这次展览是在上海意大利中心的主楼意大利馆一楼举办。该馆占地面积约6000平方米，位于2010年上海世博会的C区。上海世博会期间，意大利馆接待了超过730万的游客。

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今年的暑假对于威尼斯大学来说并不是休假的时候，日历上排满了对学生、博士生、以及工作人员开放的暑期课程。课程之一就是欧洲暑期学校（今年是第13期）。该活动由欧洲环境与资源经济学家协会 (EAERE) 和 Fondazione ENI Enrico Mattei (FEEM) 联合举办，培训的题目是：不确定性、创新与气候变化。

此外，在六、七、和九月期间，中意高级培训计划还将提供一系列培训课程，许多中国合作伙伴将参与到培训中。

北京市和上海市将参加6月2至13日举办的生态城市培训班。本期培训介绍了许多零排放城市规划和促进生态城市发展的具体项目。

国家发展和改革委员会培训班（6月16至27日）主要针对气候变化能力建设，特别侧重于国际和国家政策的内容讲解。

七月初科技部培训班的主题是关于企业创新和促进可持续发展的绿色技术。

可持续发展：生态建筑和创新管理也是9月份天津市的重点培训内容，其中绿色技术创新、推动生态城市发展是培训的重点。

中国环保部的学员将有机会参加预防和控制水污染的培训（9月8至19日），并进行许多实地考察，以期掌握水污染防治和流域管理方面的指示。

根据“中意对可持续发展培训计划”，威尼斯国际大学在可持续发展协会的框架下，将讲解第二期（9月29日至10月5日）现场实验室：城市弹性和可持续发展。参加该期培训的代表分别来自阿尔巴尼亚、波斯尼亚、黑塞哥维那，克罗地亚，科索沃、前南斯拉夫的马其顿共和国、中东、黑山，塞尔维亚和土耳其等国。



Summer is not break time at Venice International University where the calendar is full of summer programs open to students, PhDs and professionals. Among them is the European Summer School (this year in its 13<sup>th</sup> edition) on *Uncertainty, Innovation and Climate Change*, organized in cooperation with the *European Association of Environmental and Resource Economists (EAERE) and the Fondazione ENI Enrico Mattei (FEEM)*. Moreover, the Sino-Italian Advanced Training Program offers a number of training courses between June, July and September, involving many of the Chinese partners participating in the program. Beijing and Shanghai municipalities joined a course entitled *Eco-City* from June 2-13, in which many examples of city plans for zero emissions and local projects to promote and develop eco-cities were offered. The National Development and Reform Commission training course (June 16-27) deals with *Capacity Building on Climate Change*, focusing in particular on international and national policies. The MOST training course in early July is devoted to

*Innovation of Enterprises and Green Technologies* as a way to foster sustainable development. *Sustainable Development: Eco-City Building and Innovation Management* is also the focus of the Tianjin municipality training course in early September, in which technologies for green innovation are explored in light of the promotion and development of eco-cities. Participants from the MEP will benefit from lectures and many site visits (from September 8-19) on *Water Pollution Prevention and Control* with the aim of acquiring knowledge for water pollution reduction and water basin management. In line with the Sino-Italian training on sustainable development, Venice International University, within the framework of the Sustainable Development Academy, will hold the 2<sup>nd</sup> edition of *Living Laboratories: Resilience and Sustainability of Municipalities*, a training course addressed to participants from Albania, Bosnia and Herzegovina, Croatia, Kosovo, the former Yugoslav Republic of Macedonia, the Middle East, Montenegro, Serbia and Turkey (September 29 - October 5).

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