

China-Africa and triangular Collaboration in Environment Education and Pilot Projects

Li Fengting and Qiao Junlian

UN Environment-TONGJI Institute of Environment for Sustainable Development College of Environmental Sci & Eng, Tongji Univesity,

Email: fengting@tongji.edu.cn

Tel:86 21 65987790 http://www.tongji.edu.cn/

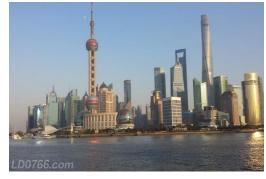
contents

- 1 background for China-UNEP-Africa Water Program
- 2 Joint Research and Pilot projects
- 3 Future leaders for SD
- 4 Potential for cooperation
- 5 conclusion





Established in 1907



Located in Shanghai







Mission: "A sustainability-oriented world-class university"

Key Figures about Tongji University

38,000 Students(full time)

20,000 BA/BSc 10,000 MA/MSc 4,000 PhD 2,200 International Students (from 105 countries and regions)

250,000 Alumni

2,786 Teaching & Research Faculty and Staff

855 full professors, 997 associate professors

481 Degree Programs

74 Bachelor's programs144 PhD programs263 Master degree programs25 postdoctoral stations

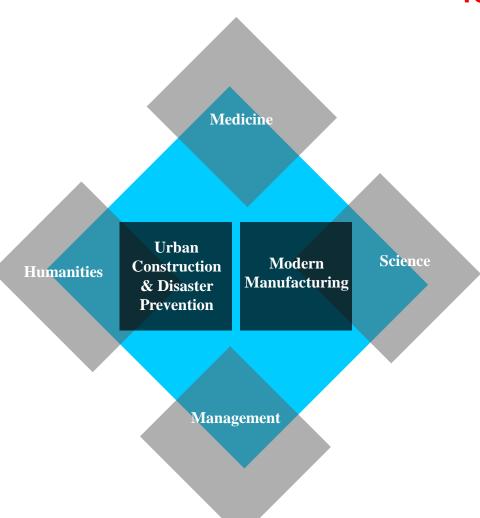
10 Disciplines

science, engineering, medicine, economics, management, humanities, law, philosophy, education, art

2.14 Billion RMB Research Budget

40% public and 60% industrial projects

Top 10 disciplines in China



Discipline	Ranking
Civil Engineering	1
Urban Planning	2
Landscape	2
Environment Engineering	3
Architecture	3
Traffic and Transportation	3
Marine Science	3
Surveying and Mapping	4
Geophysics	5
Design	6
Management Science and	9
Engineering	
Geological Engineering	10
Stomatology	10

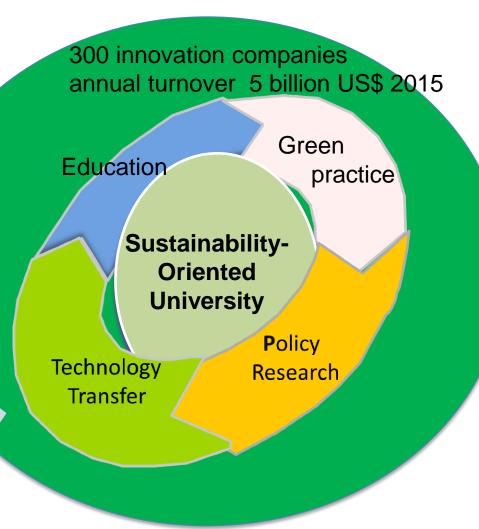
TONGJI VISION SUSTAINABILITY-ORIENTED UNIVERSITY

From green to sustainability

University Competitiveness

smart power

soft power



hard power

2017/4/20

UNEP-Tongji Institute of Environment for Sustainable Development (IESD)



May 9, 2002, Establishment of UNEP-Tongji IESD

MISSION

Two-Track Approach approved by IESD Board Meeting 2015



To develop UNEP-Tongji IESD as a centre education of environmental and SD, south-south and triangular cooperation.



To develop a pathway to build IESD into a globally recognized think tank to Urban Environment.

 Both Mr. Eric Solheim and Mr. Achim Steiner, present and former Under-Secretary-General of UN and UNEP Executive Director Visited Tongji and gave lectures to Tongji's students.



1 background for China-UNEP-Africa Water Program

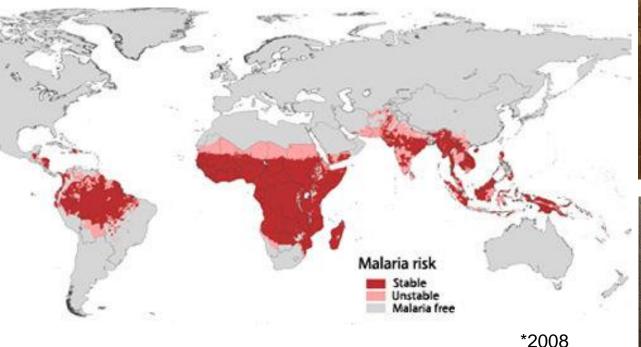


Sustainable Development Goals (SDGs)

Political mutural support in 1960s and 1970s

Medical cooperation to control malaria with Chinese herbs

arteannuin 1960-1970s.







Mr Xi Jinping metioned two Milestone for China and Africa Cooperation

Tanzania-Zambia Railway (1970.10-1976.7)

African Union Conference Center (Donated by China, and Designed by Tongji University. 200M USD, 2012)

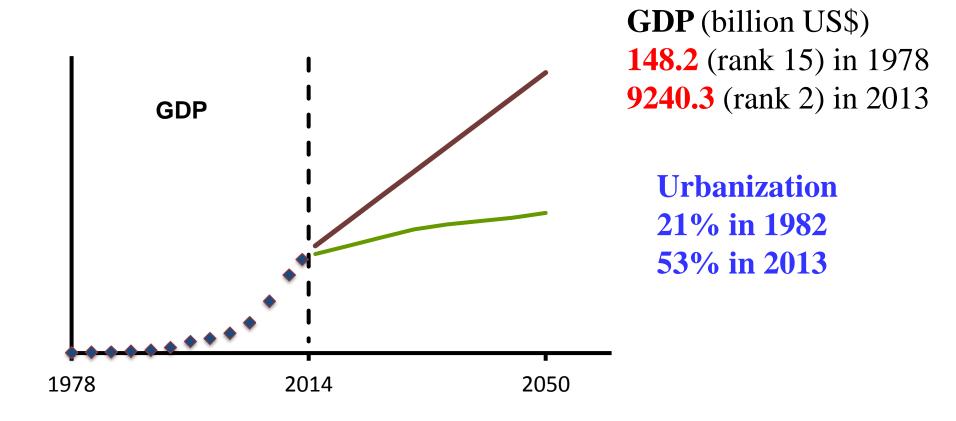




Reform and Opening-up policies since 1978

In December 1978, the government made the historic decision to shift the focus of state to economic development and to introduce the reform and opening-up policies.



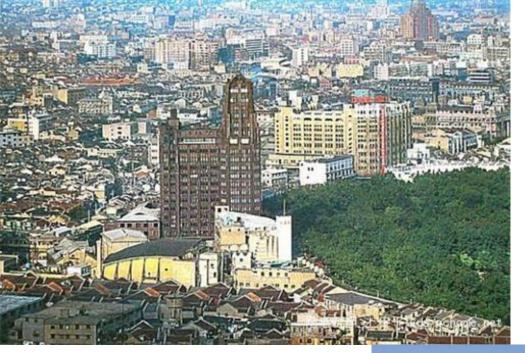


China's rapid growth with on average 9.7% GDP increase over 30 years has accumulated large amount of material welfare, but put great pressures on the environment and ecosystem.





Chinese President Xi Jinping (R) attends a presentation ceremony on which the Chinese government gives the "Zun of Peace", an ancient Chinese-styled wine container, to UN as a gift in New York on Sept. 27. UN Secretary-General Ban Kimoon also attended the ceremony.

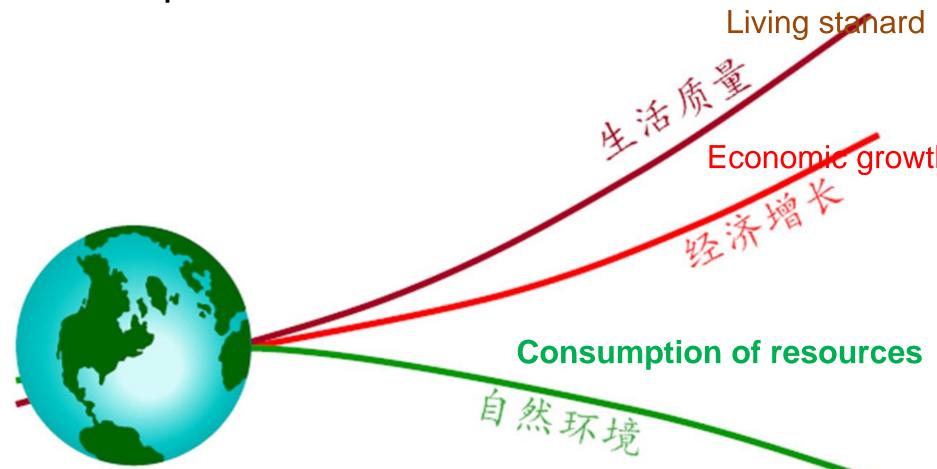


For example in Shanghai, the tallest building was the Park Hotel, 24 stories on Nanjing Road (built in 1932) until late 1980s.

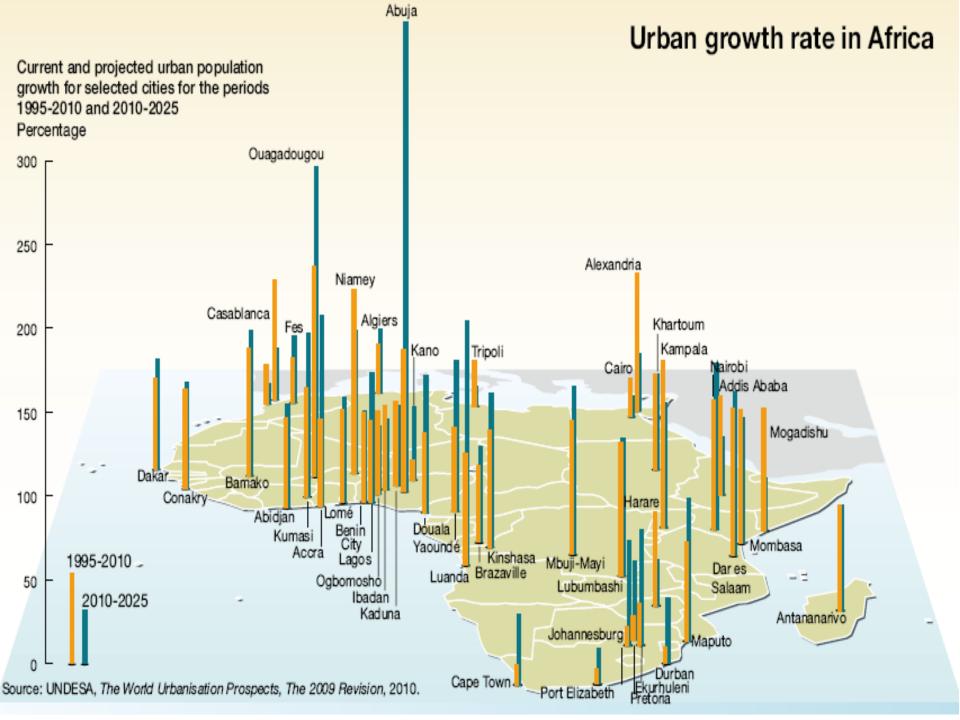


Green Development

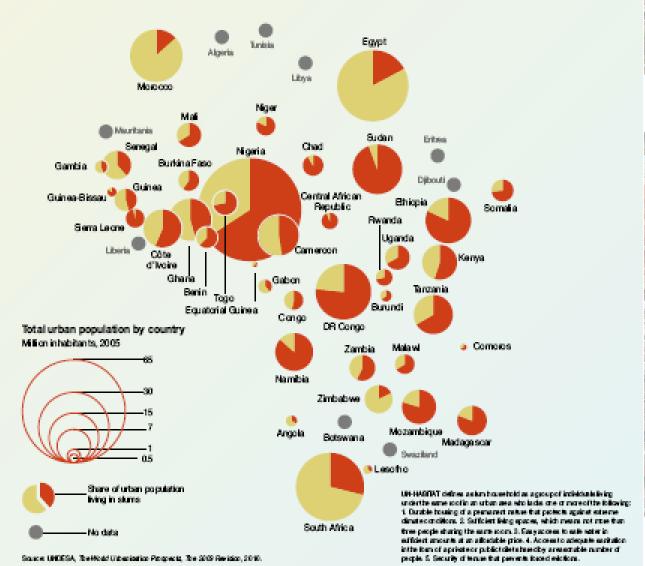
decoupling the link of growth with resources consumption







Slum population in urban Africa



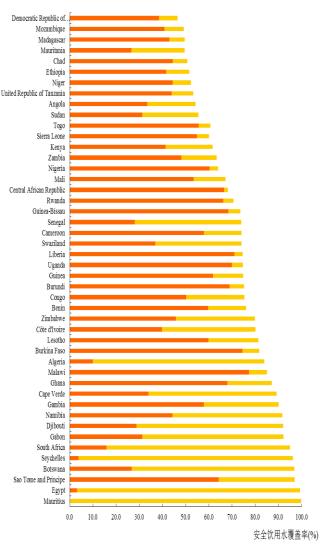




贫民窟给排水点

非洲安全饮用水覆盖率(2012)

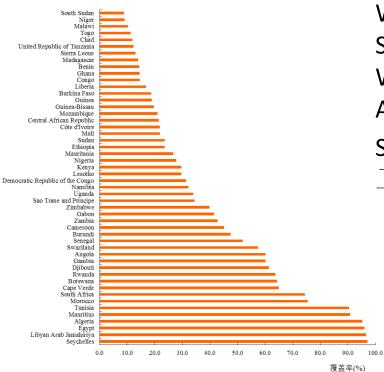
■其他方式 ■管网覆盖



Safe water supply

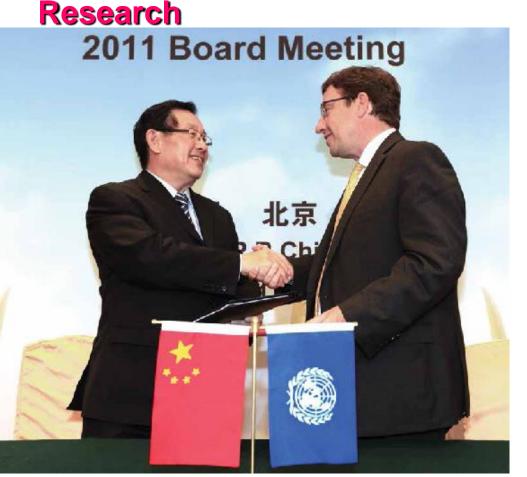
- WHO-UNICEF, A Snapshot of Drinking Water and Sanitation in Africa, 2014
- Drinking water network,%
- 饮用水管网覆盖率





WHO-UNICEF, A
Snapshot of Drinking
Water and Sanitation in
Africa, 2014

Sanitation coverage,% 卫生设施覆盖率



African Water Action

Mr Wan Gang and Mr Achim signed MOU 2009 and 2011 Both raised 10 M USD for phase 1 and 2 projects

Phase 3 will be signed soon

- cooperation for the adaptation for climate change
- Capacity building
- joint research and technology transfer
- education for talents in environment field for African nations

African Water Action

6 subprojects:

- Water resources planning in African typical nations and watersheds;
- Water resources use technology in African typical nations;
- Water resources and ecological protection technology in the Nile river and Tanganyika Lake basin;
- Drought early warning system and adaptive technology in African drought areas;
- Water-saving agricultural technology in Africa;
- Desertification controlling technology and sand industry development in African nations of desertification

中国科技部-联合国环境署-非洲环境合作项目



MOST-UNEP raised 10M USD for pilot project in 16 countries on water in Sahara desert, Nile river catchment and Tanganyika lake 重点在尼罗河、坦噶尼喀湖、撒哈拉沙漠的研究



Project 1: Water resources planning for selected water catchments in Africa





Project 2: Development and demonstration of new technologies for safe water supply (new tech can save Nairobi water 1 M USD a year, 6 million people benefit from this)





Project 4: Drought early warning system and adaptive technologies for the dry areas of Africa







Project 5: Development and demonstration of watersaving techniques for dry land agriculture and agricultural mapping in Africa







Project 6: Development and demonstration on technologies for combating desertification





JOINT STATEMENT





The challenge of providing safe water

and adequate sanitation will be aggravated

by unchecked climate change and

rising urban populations.

Africa's urban population is projected to triple to over 1.2 billion by 2050 in cities already challenged in many places and in many ways by shortages of safe drinking water and inadequate sanitation services.

Access to clean drinking water and sanitation is perhaps one of the most important Millennium Development Goals because of its links to human health and the ability of people to carry out productive employment. It is also linked to gender and the nutrition of women and as well as their role in collecting water for families and communities.

Child mortality is also inextricably linked to water. Globally, at least 1.8 million children under the age of five years, or one every 20 seconds, die every year from water-related diseases. On the overall more people die from water-related diseases than are killed by all forms of violence including wars. Thus access to dean water is in many ways a pre-requisite for sustainable development.

The challenge of providing safe water and adequate sanitation will be aggravated by unchecked climate change and rising urban populations. As the world prepares for the UN Conference on Sustainable Development in 2012, 20 years after the Rio Earth Summit of 1992, water and urbanisation need to be key issues on the sustainability radar.

There is strong and growing evidence that a Green Economy, within the context of poverty eradication and sustainable development, can accelerate and scale-up delivery of these services if countries and communities commit themselves to managing the use and the sources of water such as forests, wetlands and other ecosystems central to this sustainability equation.

Creative and forward-looking policies, alongside partnerships across all sectors including agriculture, will also be key to sustainability.

This report, jointly produced by UNEP and UN-HABINAT n collaboration with the Africa Ministers' Council on Water (AMCOW) and funded by Tongji University, the Ministry F Science and Technology of China and Bayer Foundation shows that there is a way forward for a more sustainable future where restoration of ecosystems, often in the mean hills and watersheds surrounding cities, can provide cheaper, efficient and resilient water supply systems in a changing world.

Launched in Cape Town, a South African city surrounded by green hills that support water supplies to that city, it is our hope that World Water Day 2011 can provide a fresh vision for cities across Africa and beyond.

Achim Steiner

Joan Clos Executive Director, UNEP Executive Director, UN-HABITAT 组织了非洲典型城市 源报告 2011年世界水日发布 2012年里约中文绿色经济 报告

两位副秘书长撰文感谢科技 部和同济大学的支持

challenges for Africa

城市化
greener urbanization
工业化
greener industrialization

"Workshop on Planning for Greener Cities and South-South Cooperation in Africa" Phase I and II



UN HABITAT FOR A BETTER URBAN FUTURE

MOST



- 中国科技部资助,同济大学、联合国环境署与联合国人居署共同举办 Sponsored by China MOST, held by Tongji University, UNEP and UN-Habitat
- 8个非洲城市的市长等25位代表
 25 representatives from 8 African cities attended the workshop
- 启动了两项合作: 亚迪斯亚贝巴绿色城市; 哈拉雷安全水供应 Initiated two joint projects: green city planning & solid waste management in Addis Ababa; safe water supply in Harare





"非洲绿色城市规划与南南合作市长研修班"二期 "Workshop on Planning for Greener Cities and South-South Cooperation in Africa" Phase II

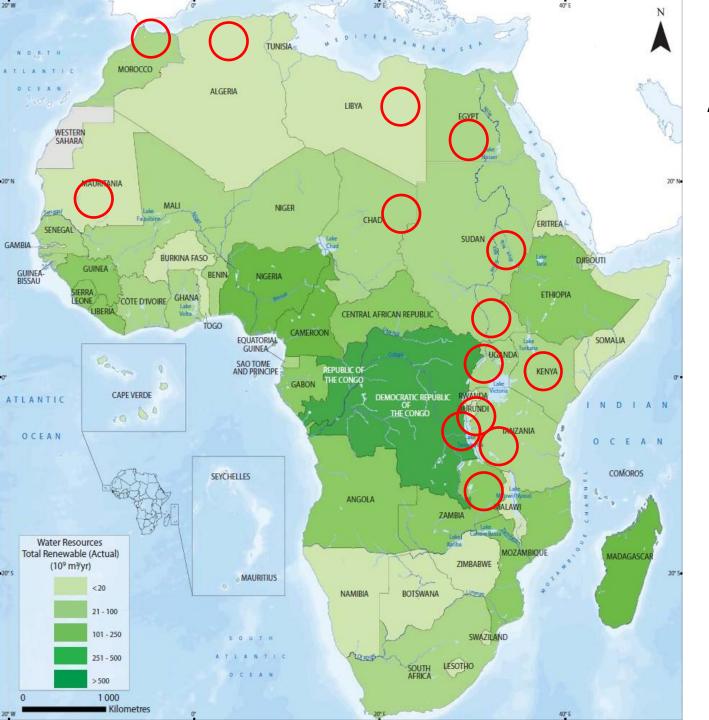
- The workshop had 20 participants from African countries, Egypt, Ethiopia, Kenya,
 Malawi and Sudan. The participants are mayors, general managers, experts and
 engineers from African countries. The Mayor of Arba Minch City (Ethiopia), the Mayor
 of Hawassa City (Ethiopia), the Mayor of Lilongwe City (Malawi) and the Deputy
 Governor of Gedarf State (Sudan).
- 与会代表是来自包括埃及、埃塞俄比亚、肯尼亚、马拉维和苏丹等在内20个非洲国家的市长、政府官员、专家、企业负责人及工程师等,其中埃塞俄比亚阿尔巴门奇市市长、埃塞俄比亚哈瓦萨市市长、马拉维利隆圭市市长、苏丹各达夫州副州长出席。





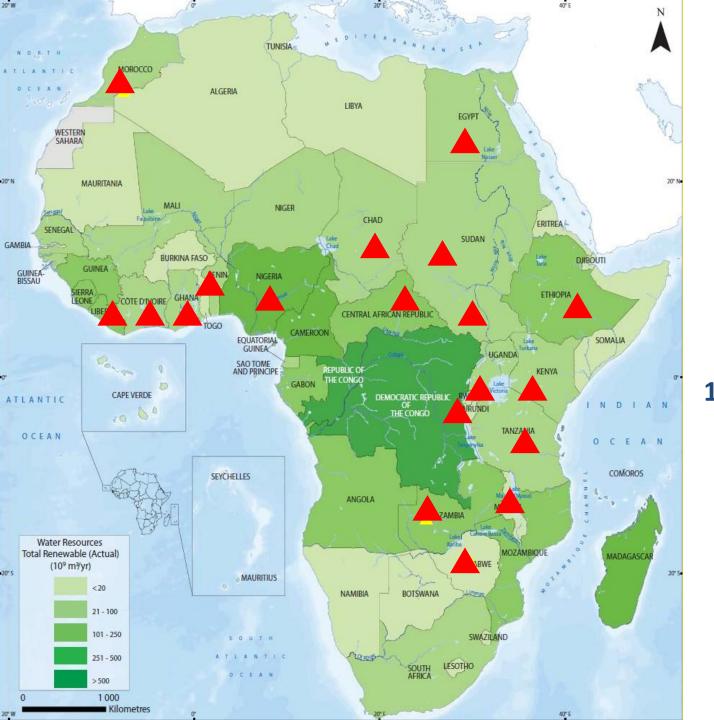
Combine research and education



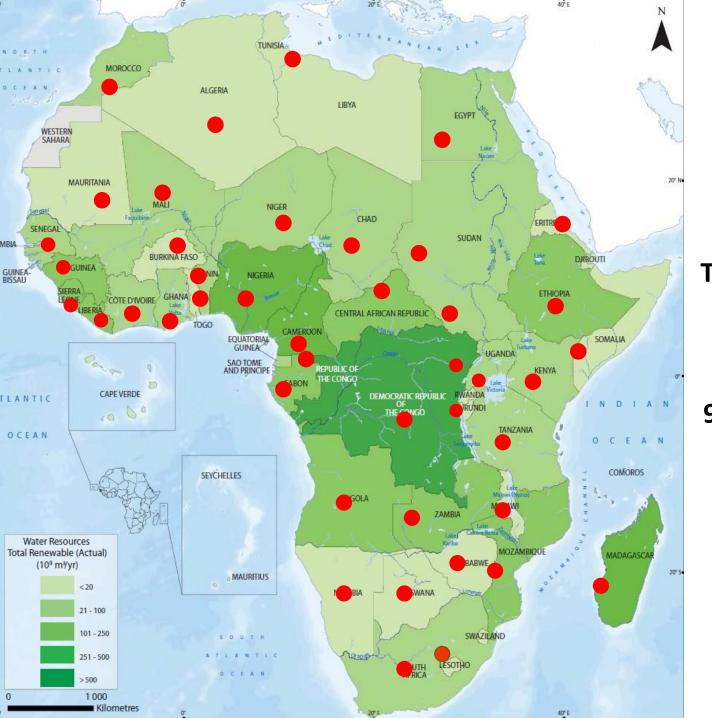


An eco-civilization society need trained talents to build.

Tongji shoulders
the responsibility
to educate future
leaders
and
Combine projects
and Education of
talents







Tongji 2807 students
From 48 nations of
Afrinca in past 5
years and mobilize
90 million USD from
Government

China is the biggest contributor to MDG for poverty reduction in past years Will be biggest player of SDG

A Green Africa

A pillar of culture

A pillar politics

A pillar economy

A pillar human resources

A pillar nature resources

A green and sustainable Africa will be a contributor to the eco-civilization of our planet, if not, it will be a disaster of our world.

Mr. Xi put forward a massive plan to carry out 10 major cooperation projects in the coming three years in Africa with support from China

Industrialization / modern agriculture / infrastructure construction / Finance / green development

investment and trade facilitation / poverty reduction and people's welfare / public health / people-to-people exchanges / peace and security

New proposals

Nairobi Academy of Water(Tongji)

Addisa baba River Remediation and planning

conclusion

China and Africa have similar history and strong link in politics and economy.

China hope to share our experience and lessons and aid the green development of Africa.

China and Japan begin cooperation in Kenya about Geothermal power station



Acknowledge

United Nations Environment

United Nations Habitants

Ministry of Science and Technology, China

Ministry of Commerce, China

Ministry of Environmental Protection, China

Ministry of Education, China

Nature Science Foundation, China

China Academy of Space Technology

China Science and Technology Exchange Center

Chinese University of Geosciences (Beijing)

Gansu Desert Control Research Institute

Gansu Research Institute for Water Conservancy

Institute of Agricultural Environment and Resources

Shanxi Academy of Agricultural Sciences

Institute of Botany, Chinese Academy of Sciences

Lanzhou University

Nanjing Institute of Geography and Limnology(CAS)

Northwest Agricultural and Forestry University

Space Star Technology Co. Ltd

Tongji University

Xinjiang Institute of Ecology and Geography(CAS)

Yijing Environmental Protection Co. Ltd

Yuan Longping High-tech Agriculture Co. Ltd



Cooperation leads to success

Li Fengting, Tongji University, Shanghai, China

TEL: +86-21-65987790 cell +86 13501636620

Email: fengting@tongji.edu.cn

Positions:

Executive Deputy Dean, UNEP-Tongji Institute of Environment for Sustainable Development

College of Environmental Science and Engineering, Tongji University

Main research areas:

Water treatment technology.

Policy and adaptive research on climate change

Education on sustainable development

Prof. Li joined Tongji University in 1997, and has been in his current position since June 2004. In his position, he is instrumental in formulating, developing and implementing international education at Tongji University and spreading UNEP's strategy in Asia-Pacific region and Africa. In recent years, Prof. Li has led multi-disciplinary teams in the areas of education, policy research and facilitated South-South cooperation.





Water Algae Control in China

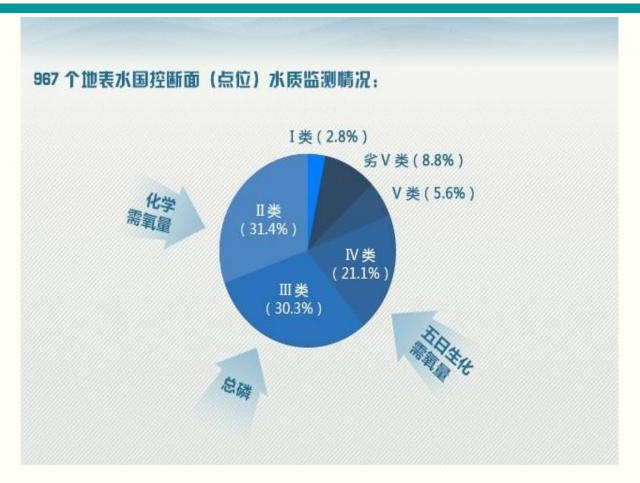
Dr. Junlian Qiao

rol in China

iao



China Environmental Status Bulletin 2015 2015年中国环境质量公报



I~Ⅲ类 64.5% IV~V类 26.7%

劣V类 8.8%。



China Environmental Status Bulletin 2015 2015年中国环境质量公报

5118 个地下水水质监测点水质情况:



5118个地下水水质监测点中,水质为优良级的监测点比例为9.1%,良好级的监测点比例为25.0%,较好级的监测点比例为4.6%,较差级的监测点比例为42.5%,极差级的监测点比例为18.8%。



China Environmental Status Bulletin 2015 2015年中国环境质量公报



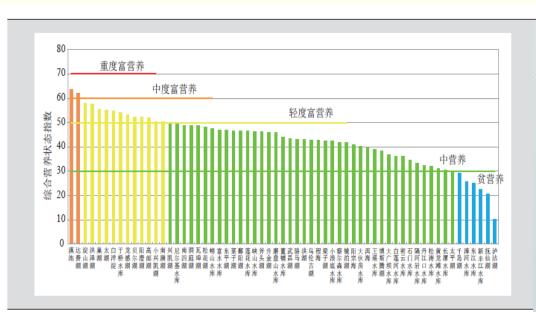
污染海域主要分布在辽东湾、渤海湾、莱州湾、江苏沿岸、长江口、杭州湾、浙江沿岸和珠江口等近岸海域。



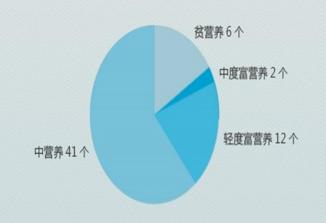
Eutrophication Figures

- 30%~40% of the world's lakes and reservoirs.
- >400 coastal dead zones (expanding at 10% per decade).

Eutrophication in China



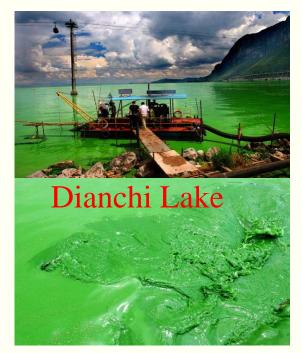
61 个湖泊(水库)营莠状态监测结果:





Algal blooms in China

Eutrophication and harmful algal bloom(HAB) is a global issue. China is one of the country in the world facing diverse and serious HAB problems. Among the Chinese lakes with the problem of eutrophication, the Taihu Lake, the Chaohu Lake and the Dianchi Lake have the worst cases of blue algae outbreak.



















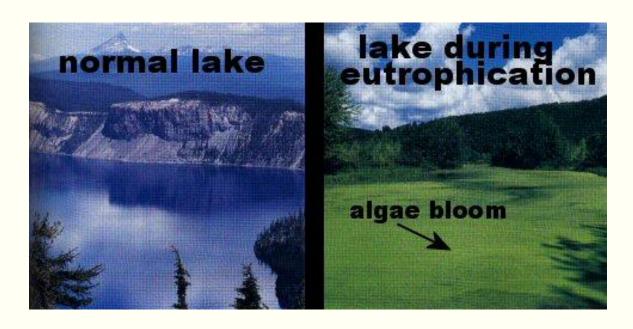






What is Eutrophication?

The runoff of nitrate and phosphate into lakes and streams fertilizes them, and causes accelerated **eutrophication** (eu = true or well; trophy = food) or enrichment of the waters.





What is Algal blooms?

Algal blooms are the result of an excess of nutrients into waters and higher concentrations of these nutrients in water cause increased growth of algae. Algal blooms easily occur in warm, slow moving water. Algal blooms are often green, but they can also be other colors such as yellow-brown or red(Red Tide).







Algae Control

In recent years, the increasingly frequent algae blooms, and its main secondary metabolites of harmful cyanotoxins, have become a focus of environmental problem.

Traditional methods of algae control:

Water diversion

Sediment dredging

Salvage

Coagulation sedimentation

Air flotation

Algicide

Biological methods



Located in the southern part of the Yangtze River delta in Wuxi, Taihu Lake is the third largest freshwater lake in China.





The sluice gate sewage blocking

建闸挡污和控源





Water diversion

Diversion from the Yangtze River into Taihu

Drainage to the Yangtze River

每年太湖都有低水位的"枯水期",在从长江引水进入太湖的同时,借助走马塘、新沟河、锡澄运河向长江排水,太湖将形成"两进三出"的循环系统,通过让水体动起来,改善水质。



Salvage cyanobacteria





Sediment dredging







Ecological Restoration





West Lake is man-made and created after the Chinese love for gardenstyle parks for recreation. It's in the western suburbs, the historic center of Hangzhou. West Lake is the symbol of Hangzhou, and is considered one of the most beautiful sights in China.





Sediment dredging

彻底清淤2次, 1952~1958年、1978~1989年清淤





Water diversion





Ecological Restoration



hydrophyte

constructed wetland



Algae control of Shanghai Qingcaosha Reservoir

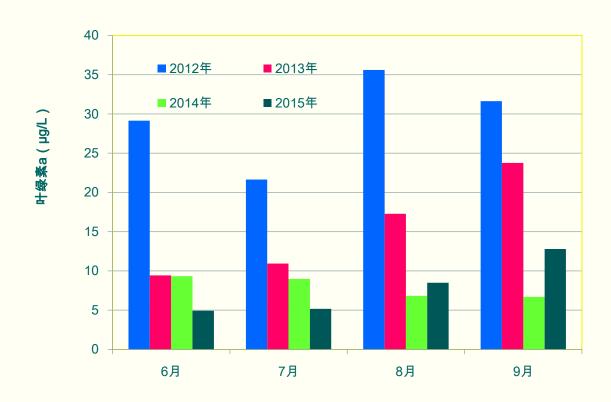
Qingcaosha Reservoir located at Yangtze Estuary of China is a newly constructed and one of the largest tidal reservoirs in the world, which is an important drinking water source of Shanghai.





Algae control of Shanghai Qingcaosha Reservoir

水力调度 Hydraulic control





Algae control of Shanghai Qingcaosha Reservoir

边滩植物 Marginal plant (Reed) Remove phosphate





护坡植物 Slope protection plant



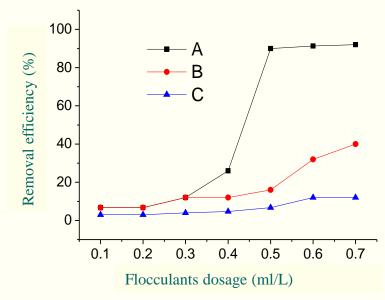
Cyperus alternifolius, loosestrife, Arundo donax, 旱伞草, 千屈菜, 花叶芦竹,



Removal of Microcystis aeruginosa using activated fly ash-modified chitosan

Preparation of FA-MC

Fly ash was dried at 70 ° C and sieved through 60 mesh (0.3 mm). Next, 30 g of fly ash were mixed with 40 ml of 98% HCl in a closed conical flask. The reaction temperature was controlled at 70 ° C and the duration time was 2 h. After that, the reactants were filtrated. Then the filtrate was diluted 40 times with distilled water. At this time, the concentration of hydrogen ion was approximately equivalent to 1%HCl. A certain amount of chitosan was dispersed thoroughly in, and the concentration of chitosan was regulated to be 0.25 g/L. This solution was the FA-MC.



A---FA-MC B--- chitosan C--- fly ash



Thank you for your attention!