



菌草援外20周年成果展

Achievement Exhibition of the 20th Anniversary of Juncao Assistance



2021.9



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前言



上世纪八十年代发源于中国福建的菌草技术，开创了菌与草交叉科学研究新领域，开辟了菌草新兴产业和菌草生态治理新途径。由于在保护生态、消除贫困、应对气候变化、促进可持续发展中的巨大潜能和普遍意义，菌草技术先后获日内瓦和巴黎国际发明展最高奖，被列为国家扶贫开发重点项目和中国与其他发展中国家优先合作项目。

中国政府高度重视菌草技术服务人类发展事业。20年前，中国国家主席习近平在福建工作期间就亲自推动菌草技术援助巴布亚新几内亚项目的成功实施。

20年来，菌草技术还先后被列为中国援助斐济、中非共和国、卢旺达、莱索托、南非、厄立特里亚等国项目，产生了显著的生态、经济和社会效益，受到当地政府和人民的广泛欢迎和高度赞誉。

2017年5月，菌草技术被列为“中国—联合国和平与发展基金”重点推进项目，已经和正在为国际减贫事业和落实2030年可持续发展议程作出特殊贡献。

多年来，通过技术培训、项目援助和国际合作，通过18种文字，菌草技术已经传播到全球106个国家。在亚洲、非洲、大洋洲、南美洲，菌草技术穿越国界、穿越时空、落地生根、开花结果，一个个鲜活的场景和感人的故事为我们打开了历史的画卷……





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Foreword

The Juncao technology, originated in Fujian, China in the 1980s, has opened up a new field of cross scientific study of fungi and grasses, and created the emerging industry and Juncao ecological management. Due to its great potential and universal significance in ecological protection, poverty eradication, climate change response and sustainable development, Juncao technology scored the highest awards in Geneva and Paris International Exhibitions of Invention, was listed as a key national poverty alleviation and development project, as well as a priority cooperation project between China and other developing countries.

The Chinese government attaches great importance to the service of Juncao technology for human development. Twenty years ago, Chinese President H.E. Xi Jinping personally promoted the successful implementation of the Juncao Technical Assistance project to Papua New Guinea when he was the Governor of Fujian province.

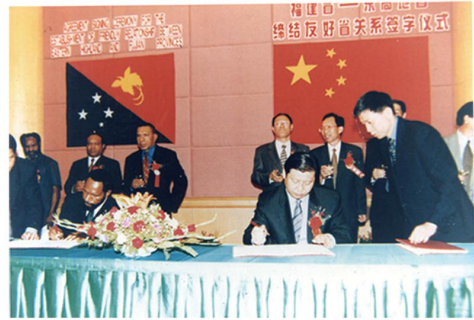
In the past 20 years, Juncao technology has been listed as China's economic aid projects in Fiji, the Central African Republic, Rwanda, Lesotho, South Africa, Eritrea and other countries, and achieved remarkable ecological, economic and social benefits, received wide welcome and high appreciation by the recipient governments and people.

In May 2017, Juncao technology was listed as a key project of "China-UN Peace and Development Trust Fund", which has made and is continuously making special contributions to international poverty reduction and the implementation of the 2030 Agenda for Sustainable Development.

Currently, through technical training, project assistance and international cooperation, Juncao technology has spread to 106 countries in 18 languages. In Asia, Africa, Oceania, South America, Juncao technology across borders, through time and space, take roots, produce blossoms and bear fruit, a vivid scene and touching story for us to open the picture of history...

菌草援外大事记 Memorabilia on Juncao Assistance

11月 Nov.
时任福建省省长习近平对福建教育代表团访问巴布亚新几内亚成果做出重要批示，开启了菌草援助项目落地的历程
H.E. Xi Jinping, then Governor of Fujian Province, made important instructions on the report of "Visit of Fujian Education Delegation to PNG" which initiated the Juncao assistance projects abroad.



5月 May
福建省省长习近平与巴新东高地省省长拉法拉玛签署友好省协议
H.E. Xi Jinping, then Governor of Fujian Province and H.E. Lafanama, Governor of EHP-PNG signed the agreement for "Sisterly Relations" between the two provinces.

启动菌草研究
Initiation of Juncao technology studies

首期援外国际培训班
The first China aid international training course

1983 1994 1995 1997 2000 2001 2002 2003 2005 2006 2007 2009 2010 2011 2012

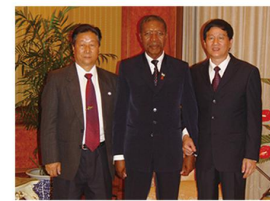
UNDP"中国和其它发展中国家优先领域合作"项目
UNDP "Priority cooperation project between China and other developing countries"



2月 Feb.
南非祖鲁王古德维尔·孜维勒佛尼访问菌草研究所
H.M. Goodwill Zwelithini, Zulu King of South Africa, visited Juncao Research Institute (JRI) of FAFU.



3月 Mar.
圭亚那总统巴拉特·贾格迪奥访问菌草研究所
H.E. Bharrat Jagdeo, President of Guyana, visited JRI of FAFU.



10月 Oct.
莱索托首相莫西利会见福建农林大学代表
H.E. Bethuel Pakalitha Mosisili, Prime Minister of Lesotho, met with FAFU representatives.

10月 Oct.
南非副总统普姆齐莱会见林占熺
H.E. Phumzile Mlambo-Ngcuka, Vice President of South Africa, met with Prof. Lin Zhanxi.



4月 Apr.
卢旺达总理皮埃尔·哈布姆兰伊视察农业技术示范中心
H.E. Pierre Habumuremyi, Prime Minister of Rwanda, inspected "China-Rwanda Agriculture Technology Demonstration Center".



3月 Mar.
柬埔寨国王西哈莫尼访问菌草研究所
H. M. Norodom Sihamoni, King of Cambodia, visited JRI of FAFU.

4月 Apr.
卢旺达农业技术示范中心竣工
Completion ceremony of "China-Rwanda Agriculture Technology Demonstration Center"

4月 Apr.
卢旺达农业技术示范中心奠基
Foundation ceremony of "China-Rwanda Agriculture Technology Demonstration Center"





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5月 May
中国-联合国和平与发展基金菌草项目
启动会在纽约联合国总部举行
Juncao Project of China-UN Peace and
Development Trust Fund was launched
at the UN headquarters in New York.



7月 Jul.
斐济总理姆拜尼马拉马访问福建农林大学
国家菌草中心
H.E. Josaia Voreqe Bainimarama,
Prime Minister of Fiji, visited National
Juncao Research Center (NJRC) of FAFU.

5月 May
首期法语国家菌草技术
国际培训班
The first international
training course on
Juncao technology for
French-speaking coun-
tries

2014

2015

2016

2017

2018

2019

2021



4月 Apr.
坦桑尼亚革命党主席原总统
贾卡亚·姆里绍·基奎特访问国家菌草中心
H.E. Jakaya Mrisho Kikwete, former President
and Chairman of the Revolutionary Party of
Tanzania, visited NJRC of FAFU.



6月 Jun.
斐济总统乔治·孔罗特视察斐济菌草基地
H.E. George Khonote, President of Fiji, in-
spected Fiji Juncao Base.



11月14日 Nov.
习近平主席在对巴布亚新几内亚进行国事访问前夕
发表的署名文章中写到：“18年前，我担任中国福
建省省长期间，曾推动实施福建省援助巴新东高地
省菌草、旱稻种植技术示范项目。我高兴地得知，
这一项目持续运作至今，发挥了很好的经济社会效
益，成为中国同巴新关系发展的一段佳话。”
President Xi Jinping published a signed
article on the eve of his state visit
to Papua New Guinea in 2018.

8月 Aug.
老挝原国家副总理宋沙瓦·凌萨瓦
访问国家菌草中心
Somsavat Lengsavad, former Deputy Prime Minister
of Laos, visited NJRC of FAFU.

9月 Sep.
中非总统福斯坦·阿尔尚热·图瓦德拉
访问福建农林大学国家菌草中心
H.E. Faustin Archange Touadéra, President of Central
African Republic, visited NJRC of FAFU.

4月 Apr.
联合国菌草技术高级别会议在纽约举行
UN High-level Meeting on Juncao
Technology in New York



9月 Sep.
中非总统福斯坦·阿尔尚热·图瓦德拉
视察菌草技术培训现场
H.E. Faustin Archange Touadéra, President
of Central African Republic inspected the
Juncao technology training site

12月 Dec.
密克罗尼西亚联邦国会副议长
埃斯蒙德·摩西率团与国家菌草中心
代表会谈合作
H.E. Esmond B. Moses, Deputy Speaker of
Congress of the Federated States of Micro-
nesia, led a delegation for consultations
with NJRC representatives on cooperation.



12月 Dec.
巴布亚新几内亚总理詹姆斯·马拉佩
视察中国援巴新菌草旱稻技术项目基地
Hon. James Malappe, Prime Minister of Papua
New Guinea, inspected China-Aid Juncao
Technology & Upland Rice Project base.



7月 Jul.
国家菌草中心参加国家国际发展合作署助力
北京市延庆区乡村振兴工作
Participation in activities organized by China In-
ternational Development & Cooperation
Agency to boost rural revitalization in Yanqing
District of Beijing municipality

7月 Jul.
联合国世界粮食计划署驻中国办公室
调研宁夏、内蒙古
菌草科技创新产业园
The representatives of UNWFP China Office
inspected Juncao Technology Innovation In-
dustrial Parks in Ningxia Hui and Inner Mongo-
lia Autonomous Regions.



菌草技术 Juncao Technology

菌草是“菌”与“草”交叉的、新的研究领域，是草品种的一个新类别，是一类新开发利用的农业资源。

概念 Concepts

菌草：可用作培养食用菌和药用菌的培养基质的草本植物。
*已筛选和培育48种菌草（草本植物）可栽培56种食用菌。

菌草技术：运用菌草栽培食用菌、药用菌和生产菌物饲料、菌物肥料等综合利用的技术。

菌草产业：通过应用菌草技术和其他相关技术形成的可持续产业。

Juncao is a new research field, an interdisciplinary science of fungi & herbaceous plant, a new category of grasses and a newly developed agricultural resource.

Jun: mushroom, fungi;
Cao: grass, herbaceous plant
Juncao: Herbaceous plants that can be used as the culture substrate for cultivation of edible and medicinal fungi.
* 48 species of Juncao (herbaceous plant) have been screened and bred to cultivate 56 species of edible and medicinal mushrooms.

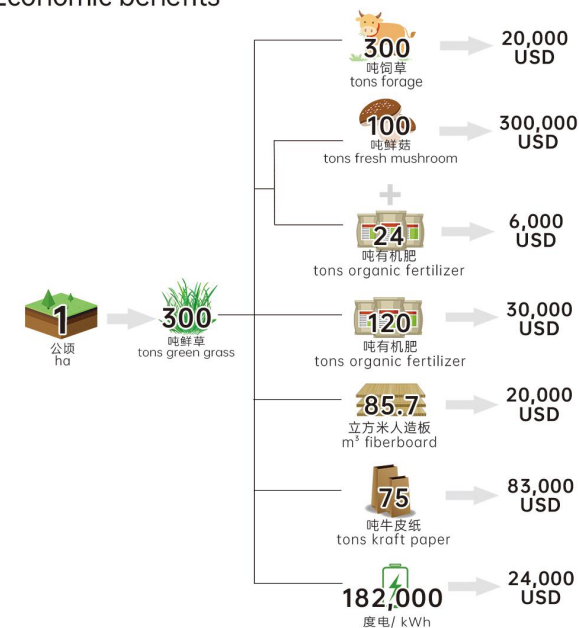
Juncao Technology: A comprehensive technology that utilizes Juncao to cultivate edible mushroom, medicinal mushroom, produce feed and fertilizer.

Juncao Industry: A sustainable industry formed by application of Juncao technology and other interrelated techniques.

菌草草种选育标准 Criteria of selecting and breeding Juncao grass



经济价值 Economic benefits



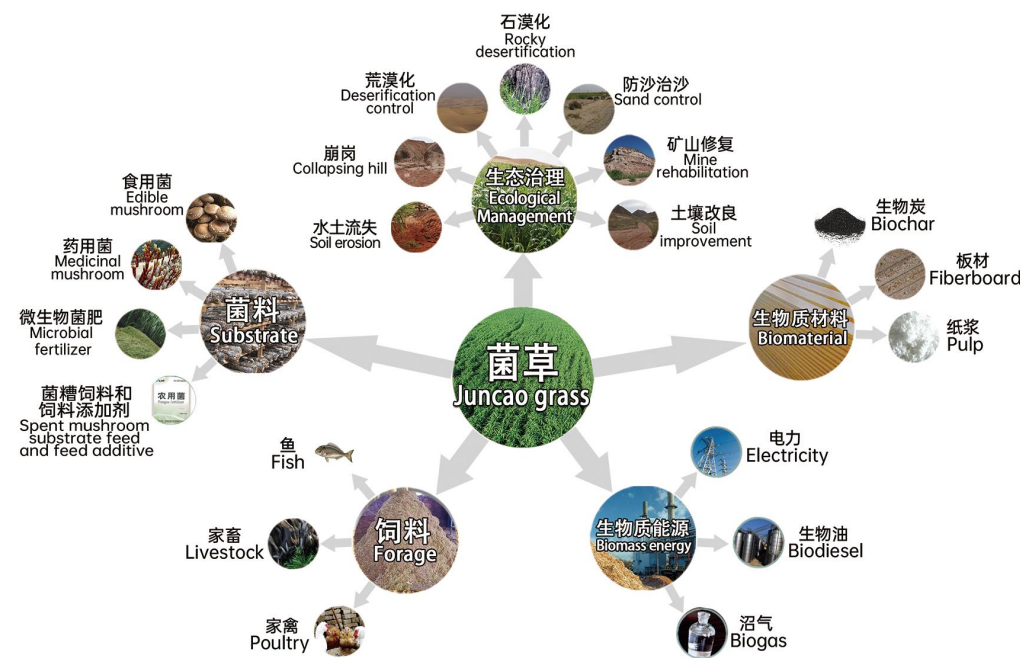
生态价值 Ecological benefits

- 种植菌草：**
- 零除草剂、杀虫剂
 - 碳储量高达67.5吨/公顷
 - 富集土壤重金属如铜3781克/公顷、汞297克/公顷、镉28.8克/公顷
 - 土壤流失量减少97.05-98.9%，水流流失量减少80-91.9%

- 在沙地、荒漠化土地种植：**
- 100天重建植被
 - 单丛固沙面积达18m²
 - 降低风速62%
 - 提高土壤肥力
 - 增加植物、昆虫、土壤微生物的多样性

- Planting Juncao:**
- Zero herbicide, pesticide
 - Carbon storage up to 67.5t/ha
 - Accumulate heavy metals in soil, e.g. Cu3781g/ha, Hg297g/ha, Cd28.8g/ha
 - Reduce soil loss by 97.05-98.9%
 - Reduce water loss by 80.0-91.9%

- Planting in sandy soil or desert:**
- Restore vegetation within 100 days
 - Fix 18m² sand with single cluster of grass
 - Reduce wind speed by 62%
 - Improve soil fertility
 - Increase the biodiversity of plants, insects and microorganism in soil



菌草产业图
Juncao Industry Diagram



菌草技术援外项目 Juncao Technology Aid Project

菌草技术对外援助通过建设示范基地、开展教育研究学术交流、实施培训推广、推进商业合作与组织会议参观等活动相结合，推动菌草技术在各国的应用。

The Juncao technology assistance has promoted the application of Juncao technology in the world, through activities including establishment of demonstration bases, education and academic research programs, trainings and extensions, cooperations with private sectors and conferences and visits.

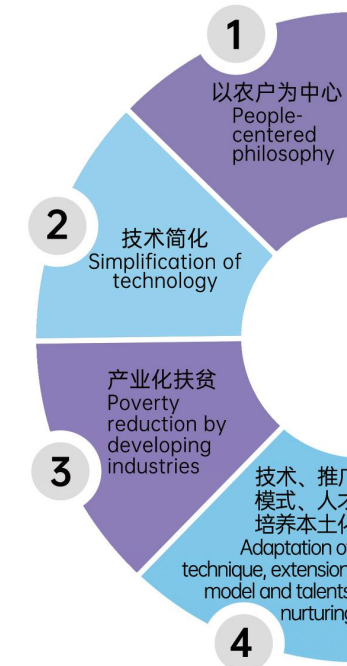
技术内容 Technical Contents

菌草草种繁育		Juncao grass breeding
菌草种植与加工		Juncao grass planting and processing
菌草饲料的生产及养畜		Juncao forage production and livestock raising
菌种与菌袋生产		Mushroom spawn and substrate packs productions
菌类出菇采收与保鲜		Mushroom fruiting, harvesting and fresh-keeping
菌类产品加工		Mushroom processing
水土流失治理		Soil and water conservation
荒漠化治理		Desertification control

8项功能 Eight Functions



4项策略 Four Strategies



推广模式 Extension Model



一看就懂、一学就会、一做就成
Easy to Learn, Easy to Practice, Easy to Succeed





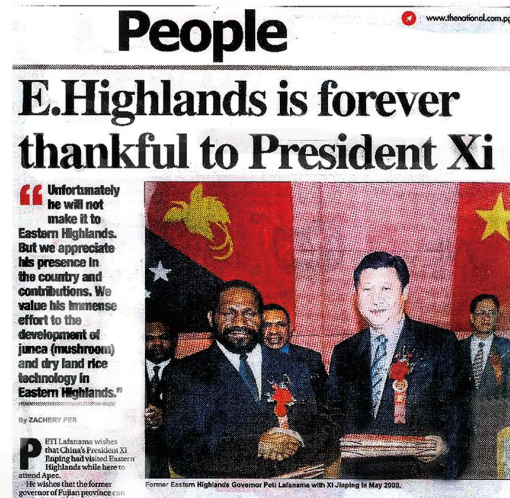
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巴布亚新几内亚 Papua New Guinea

2001年，习近平主席在福建工作期间，对援巴布亚新几内亚菌草技术项目作出重要批示，由此开启了菌草援外由技术培训进入项目落地持续性推进新元年。

In 2001, when President Xi Jinping was working in Fujian province, he made an important instruction on the Juncao technical assistance project to Papua New Guinea, which started the New Era to Juncao assistance from technical training to the concrete projects implementation, a brand-new mode of benefiting the mankind with Juncao technology.



鲁法区召开6000多人参加的菌草技术成功验收庆祝大会
A festive celebration mass rally was convened for the smooth inspection-acceptance of Juncao technology project attended by more than 6,000 people in Lufa District.

2018年11月16日，在习近平主席访问巴新期间，中国政府与巴新政府签订了援巴布亚新几内亚菌草、旱稻技术援助项目换文协议。2019年8月项目正式启动，在东高地省建立示范基地。技术已推广到巴新8个省16个地区，举办技术培训班18期，累计培训1,337人，推广8,600多农户，30,000多民众受益，创造了巨菌草产量853吨/公顷的世界记录。东高地省把菌草作为发展经济、实现可持续发展目标的支柱产业。

On Nov. 16, 2018, during H.E. President Xi Jinping's visit to PNG, the Chinese government and the PNG government signed the Exchange of Letters on Juncao and Dryland Rice Technical Assistance Project. After the official commencement of the project in Aug. 2019, the demonstration base was established in EHP. The technology has been extended to 16 regions in 8 provinces with 18 technical training courses conducted, 1,337 people trained, and routine technical expertise guidance provided to more than 8,600 farmers, and benefited over 30,000 people. The Giant Juncao grass harvest created a record-breaking yield of 853 tons per hectare. Juncao technology has been regarded as a pillar industry for economic development and achieving sustainable development goals in EHP.





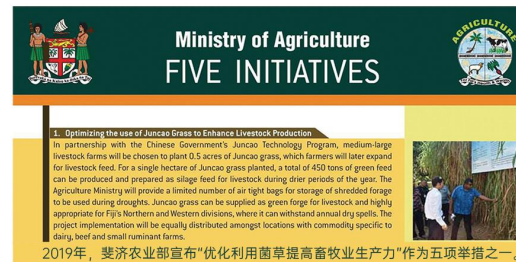
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斐济 Fiji

中国援斐菌草技术示范中心是由习近平主席与斐济领导人共同推动的援助项目。项目自2014年实施以来，菌草种植面积500余公顷，成功示范海岛菌草循环产业发展模式；培训学员1704名，推广农户1700余户，培育一批专业农户；当地菌菇已形成品牌并开始出口；有效缓解当地旱季饲料匮乏难题，促进畜牧业发展。菌草技术在保护环境同时产出高端农产品，被誉为“岛国农业新希望”，为其他岛屿国家提供了可持续发展的样板。

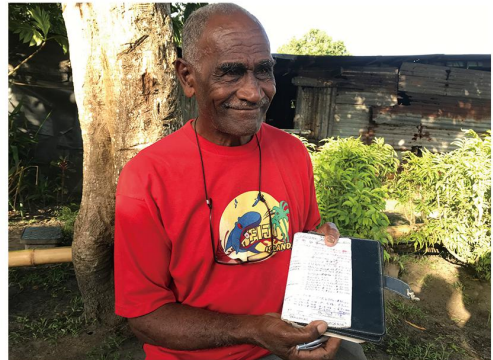
The China-Fiji Juncao Technology Demonstration Center is jointly initiated by H.E. President Xi Jinping and the Fiji Head of State. Since the project was implemented in 2014, the Juncao planting area has exceeded 500 hectares, and Juncao recycling industry development model on the island has been demonstrated successfully, with a total of 1,704 people trained, the technology extended to over 1,700 farmer households, and a bunch of professionals have been fostered. Local mushrooms have acquired different trademarks and started to be exported to world market. Moreover, Juncao technology effectively alleviated the shortage of fodder in the dry season and beefed up the animal husbandry development. Not only Juncao technology produced high-end mushrooms, it also performed well in environment protection. It is recognized as the "New Hope for Island Country Agriculture" and provided an excellent model of sustainable development for other island countries.



2019年，斐济农业部宣布“优化利用菌草提高畜牧业生产力”作为五项举措之一。



中心菌草产品获得斐济工业贸易旅游部的“斐济生产”与“斐济有机”证书。



来自斐济残疾人士雷瓦分会的丽迪亚·娜塔瑞女士组织会员们栽培菌草菇并销售给酒店。



Ms. Litia Naitanui, from People with Disability Rewa Branch of Fiji, organized branch members to cultivate the Juncao mushrooms and sold to the hotels.

Mr. Alusio, a 71-year-old from Muanaira Village, is very happy and satisfied with his harvest and sales record, that within 3 months, he reaped 143 kgs of fresh Juncao mushrooms and earned nearly 1,500 FJD.



中国援斐菌草技术示范中心
China-Fiji Juncao Technology Demonstration Center



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莱索托
Lesotho

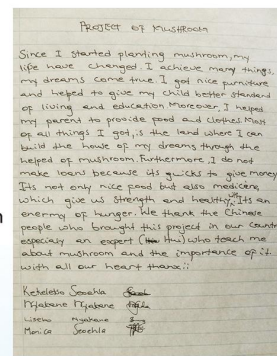
中国援莱索托菌草技术项目自2007年9月起实施。已培训学员3234人，并培养菌草专业硕士3名，推广菌草菇农户约1000户，建设菌草技术旗舰点16个，种草养畜促进了莱索托畜牧业的发展，减少当地因过度放牧造成的水土流失问题。项目为当地技术进步、粮食安全和减贫作出积极贡献。

China-aid Juncao technology project to Lesotho has been implemented since Sept. 2007, with 3,234 people trained, and 3 students majoring in Juncao technology nurtured in FAFU. Juncao industry has been extended to 1,000 farmers' households and 16 Juncao technology "Flagship Sites" built. Growing grass and raising livestock has promoted the development of animal husbandry in Lesotho and reduced local soil erosion caused by overgrazing. The project has contributed positively to local technological progress, food security and poverty reduction.



莱索托妇女菌菇合作社自创自演的赛索托语歌曲“七天菌菇”
A song was written and performed by women from Mabote Mushroom Association of Lesotho, translated from Sesotho language.

"7-Day Mushroom"
Some people say it is a wild crop
Some people say it is the economic lifeline
Oh see this crop, an amazing crop
It is food, medicine and hope
I call it '7-day mushroom'
I planted on last Thursday,
taking care just like a child
Today it is Friday. I harvest, I cook the mushroom
and I even sell
Be hurry, or you will regret
Those from East say, you should not teach a
person to eat fish but teach him to go fishing.
I have attracted you now, my dear women,
working hard so that people can have better life.



一封莱索托农户的感谢信“菌草技术让我梦想成真”
A letter of appreciation from a Lesotho farmer's family "My dreams come true"



南非
South Africa

南非菌草技术项目自2005年开始实施，建成希德拉菌草技术研究培训中心。中心将技术指导与生产实践相融合，为农村地区失业人员提供了200多个固定工作岗位；培训学员507人；辐射多个社区，建设了7个旗舰点、超过40个示范点，1万多户家庭从中受益。当地蘑菇种植从无到有、由少到多，走上了千家万户的餐桌，丰富了当地人民营养来源，为消除贫困作出了重要贡献，被誉为“中南合作成功典范”。

The South African Juncao Technology Project has been implemented since 2005, with the establishment of the Cedara Juncao Technology Research and Training Center. By integrating technical guidance with production practice, the Center has provided more than 200 permanent jobs for unemployed people in rural areas, conducted training to 507 participants, with 7 "Flagship Sites" and more than 40 "Demonstration Sites" set up in many communities, benefiting more than 10,000 farmers' households. From scratch, the local mushroom cultivation has grown to an emerging industry and mushrooms are now common dishes on the dinner tables of thousands of families, enriching the source of nutrition for the local people, and making an important contribution to the eradication of poverty, which is praised as a "successful model of China-South Africa cooperation".



原料车间
Raw Material Workshop

生产车间
Production Workshop

接种车间
Inoculation Workshop





菌草援外20周年成果展
Achievement Exhibition of the
20th Anniversary of Juncao Assistance



中非共和国 Central African Republic

2019年菌草技术成功落地中非，举办2期培训班，建成简易生产线，指导盖灵谷村农户生产菌菇。中国援中非菌草技术项目于2021年5月开始实施，计划3年内推广农户600户，培训1200人。

In 2019, Juncao technology was successfully started in Central African Republic with 2 training courses held and a simple production line built, providing farmers in Nguéréngou Village technical guidance for mushrooms cultivation. The China-aid Juncao Technology Project was implemented in May 2021, with a plan of serving 600 farmers and training 1,200 people within 3 years.



马达加斯加 Madagascar



农业技术员在穆龙达瓦学习种植菌草
Agricultural technicians learn to grow Juncao in Morondava City.



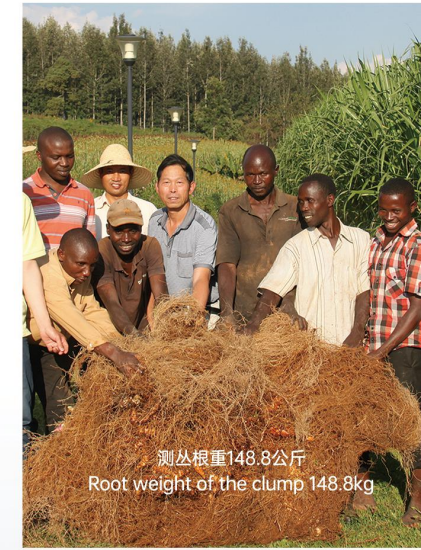
在安奇贝拉市乡村发展及农业应用研究站建立菌草示范基地
Juncao Demonstration Base was established at the Rural Development and Agricultural Application Research Station in Anchibeira City.



卢旺达 Rwanda

中国援卢旺达农业技术示范中心于2011年建成。项目共举办培训班57期，培训学员2109人，培养菌草专业留学生5人，为当地菌草产业发展建立起核心技术骨干队伍。中心接待来访者16000多名，推广农户3800多户，扶持菌袋生产合作社和企业50多家，涌现了一批青年菌草企业家，带头脱贫致富。菌草已经成为当地的新兴产业，受益者超过20,000人，菌草技术和产品从卢旺达辐射到中、东部非洲国家。菌草产业在卢旺达的发展为资源匮乏型国家提供了一个可持续发展的样板。

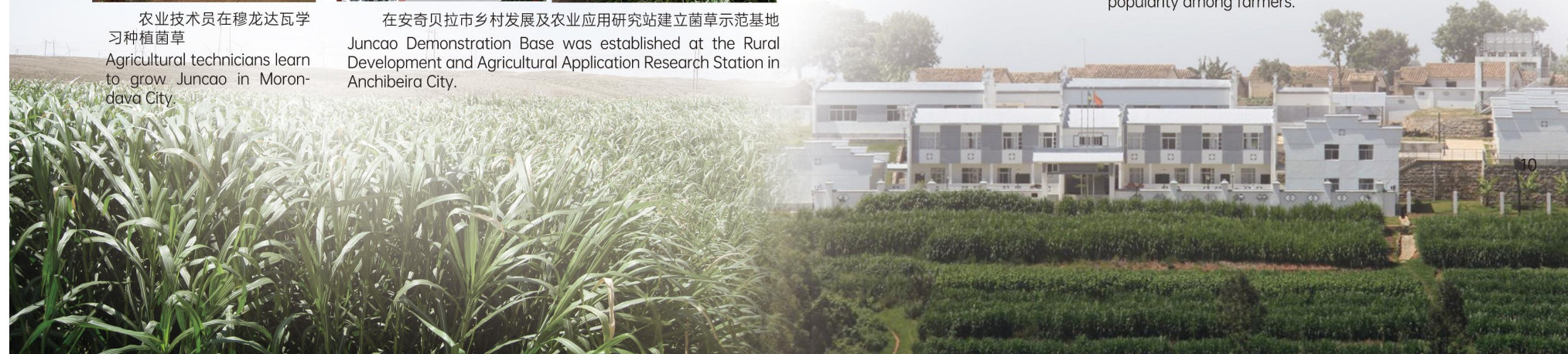
The construction of China-Rwanda Agriculture Technology Demonstration Center (C-RATDC) was completed in 2011. By now, a total of 57 training courses have been offered, 2,109 participants trained, 4 foreign students majoring in Juncao technology cultivated, and a team of technical talents for the development of local Juncao industry built. The center received more than 16,000 visitors, instructed more than 3,700 farmers, supported over 50 substrate bag production cooperatives and enterprises, and a group of young Juncao entrepreneurs emerged to take the lead in shaking off poverty and achieving prosperity. Juncao has become a burgeoning local industry with more than 20,000 beneficiaries. Juncao technology and products have spread from Rwanda to Central and Eastern African countries. The development of Juncao industry in Rwanda provides a model of sustainable development for resource-poor countries.



测丛根重148.8公斤
Root weight of the clump 148.8kg

中心示范“等高线种植菌草”“梯田菌草套种农作物”等与当地传统农业生产相结合的水土保持模式，投入少、见效快，深受农户欢迎。

The water and soil conservation mode that combines local traditional agricultural production is demonstrated at the Center, such as "contour Juncao planting", "Juncao interplanting crops on the Terrace" with low investment and quick returns, which enjoys tremendous popularity among farmers.



萨摩亚 Samoa



第一期萨摩亚菌草技术培训班在线举办，学员与国家菌草中心教师远程合影。
The 1st Juncao technology training course for Samoa was held online. Participants had group photo with lecturers of NJRC in China.

厄立特里亚 Eritrea



中国专家在厄立特里亚示范基地指导菌草种植与栽培食用菌。
Chinese expert gave guidance on Juncao planting and mushroom farming at the demonstration base of Eritrea.

老挝 Laos



老挝农业部为解决饲草短缺引进菌草，已设立菌草种苗基地，为全国各地提供草种。
Laos Ministry of Agriculture has set up Juncao breeding base to supply grass seedlings all over the country.

埃及 Egypt



国家菌草中心与埃及沙漠研究所、艾资哈尔大学以及农业部食品科学研究所合作，联合培养菌草专业的研究生。
NJRC cooperated with Egypt Desert Research Institute, Al-Azhar University and Food Science Research Institute of MOA to jointly cultivate postgraduates in the research field of Juncao.

尼日利亚 Nigeria



包奇州政府支持设立中国-尼日利亚菌草技术示范点。
Bauchi state supports the construction of China-Nigeria Juncao Technology Demonstration Site

朝鲜 Democratic People's Republic of Korea



朝鲜农业部科技人员在平壤菌草基地学习巨菌草种苗越冬技术。
The researchers from the Ministry of Agriculture of North Korea learned the overwintering technology of giant Juncao seedlings at the Pyongyang Juncao base.

南苏丹 South Sudan



南苏丹农业咨询组织建立菌草种苗圃，推广牧区农户种植菌草饲喂家禽家畜和养鱼。
South Sudan Agriculture and Advisory Organization has set up Juncao Nursery and extended Juncao planting in pastoral communities for feeding poultry, livestock and fish.

菲律宾 Philippine



桑托斯将军城农户种植巨菌草养畜。
Farmers of General Santos planted Giant Juncao grass for livestock.

尼泊尔 Nepal



尼泊尔国家科学技术院与国家菌草中心合作，在低海拔与高海拔省份设立菌草研究与推广基地。
Nepal Academy of Science and Technology cooperates with NJRC to establish Juncao Research & Extension Bases at low altitude and high altitude areas.





人才培养 Talent Nurturing

学历教育

福建农林大学招收了**11**个国家**24**名青年学生学习菌草专业(生物学、微生物学、生态学、农业资源与环境等学科),并为留学生开设菌草学课程,包括菌草学研究专题、菌草技术推广与可持续发展等。

Academic Education

Fujian Agriculture and Forestry University has enrolled **24** young students from **11** countries to study Juncao Science with disciplines of Biology, Microbiology, Ecology, Agricultural Resources and Environment, and offered Juncao Science courses for foreign students, including Juncao Science research, Juncao technology extension and sustainable development.

技术培训

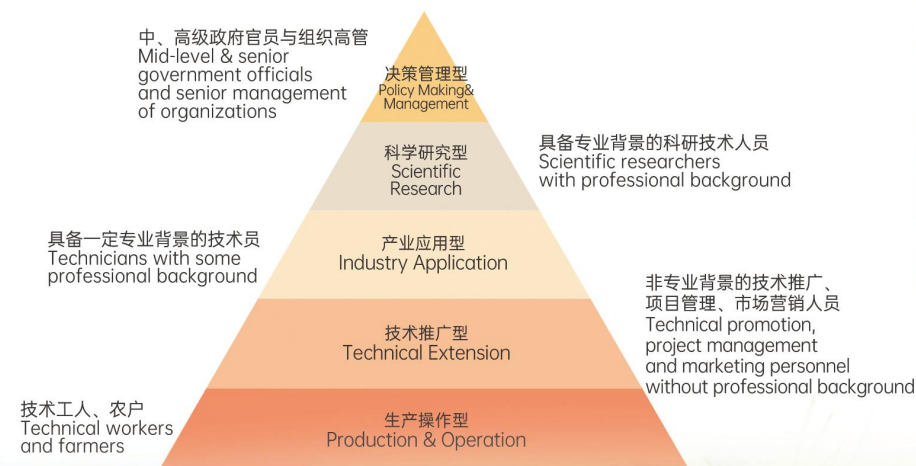
菌草技术援外培训有多种类型,以中国政府主办、福建农林大学承办的技术培训班、官员研修班、双边培训班等,以及在国外实施的援外项目开展的大量培训活动为主。此外,福建农林大学近年来与联合国经社部合作举办多边菌草技术培训班。根据学员不同的专业水平和培养目标,编制了五个层次的课程,使培训更具针对性和实用性。目前有**18**种语言正用于菌草技术的传播推广,已在国内外举办**270**期培训项目,培训学员**10509**人。

Technical Training

There are various types of China aid training for Juncao technology, including technical training courses, training seminars for officials and bilateral training courses sponsored by the Chinese government and undertaken by Fujian Agriculture and Forestry University, as well as a large number of training activities under China aid projects implemented abroad. FAFU has cooperated with UNDESA in recent years for conducting multilateral Juncao technical training workshops in China and abroad. According to the different professional level and training objectives on the part of the trainees, a five-levelled courses to make the training more targeted and practical is in formation. By now, **18** languages are in use for extension of Juncao technology, and totaling **270** training programs have been held at home and abroad with **10,509** participants trained.



"五级"菌草技术援外培训课程
"Five-level" courses of Juncao technology training



合作伙伴代表

Representatives of Partners

巴西 Brazil



阿莱悠吉·赫本博士
巴西农科院基因资源与生物技术所

她持续20多年推动菌草技术在巴西与南美的本土化研究与传播，组织举办53期培训班，培训2000多人，把《菌草技术》翻译成葡萄牙文，并出版4部书籍。

Dr. Araidle Urben
EMBRAPA Genetic Resources & Biotech

She vigorously promoted the adaptative research and dissemination of Juncao technology. She has organized 53 training sessions for more than 2,000 participants, translated "Juncao Technology" into Portuguese and published 4 books.

伊拉克 Iraq



哈密德·阿里·哈德旺博士
联合国粮农组织植物生产与保护司副农业专家

他率先提出在沙漠中发展菌草产业的思路，积极在伊拉克推广应用菌草技术，致力于伊拉克与中国的农业合作，促成福建农林大学与伊拉克农业部签署以菌草技术为主的合作备忘录。

Dr. Hamid Ali Hadwan
National Agriculturalist, Plant Production and Protection of FAO

As the first to come up with the idea of developing Juncao industry in desert, he actively promoted the application of Juncao technology in Iraq and committed to the agricultural cooperation between Iraq and China. Due to his hard work and great efforts, FAFU and the Iraqi Ministry of Agriculture signed a memorandum of cooperation on Juncao technology.

巴布亚新几内亚 Papua New Guinea



布莱恩·瓦依
巴布亚新几内亚省长顾问

他把菌草技术引进巴新，促成菌草技术首个境外扶贫项目的落地，持续20多年在巴新推广菌草技术，为福建和东高地省的友好交往以及中-巴新友好作出贡献。

Brian Wall
Advisor for Governor of Eastern Highland Province, PNG

He introduced Juncao technology into PNG and facilitated the implementation of the first overseas poverty elimination project. Over the past two decades, he has promoted Juncao technology in PNG and made a positive contribution to the friendly exchanges between Fujian Province and Eastern Highlands Province and the bilateral friendship between China and PNG.

卢旺达 Rwanda



列奥尼达斯·穆施米伊玛纳
企业家

他在基加利创建得意公司生产菌菇，“我致力于消除营养不良和创造更多就业机会。菌草技术对我的工作帮助很大”。他开幼儿园提供菌菇营养餐，并向家长普及菌草技术，成为当地受人尊敬的成功企业家。

Leonidas Mushimiyimana
Entrepreneur

He created DEYI Co. Ltd to produce mushrooms in Kigali. "Juncao is a great help in my efforts to eliminate malnutrition and create more jobs." Operating a kindergarten to provide nutritious meals of mushrooms and popularizing Juncao technology to parents, he is widely respected and highly successful as a local entrepreneur.

马来西亚 Malaysia



李玉春
沙巴州农村发展机构项目经理

她在沙巴进行试验和推广菌草技术，并建立菌草菇的示范基地，成为当地农村扶贫发展的重要项目，促成国家菌草中心与沙巴州农业厅的合作。

Lee Nyuk Choon
Project Manager of Sabah Rura Development Agency

She conducted trials and promotion in Sabah and set up the Juncao demonstration base. The project has become the primary project for poverty alleviation and development in local rural areas. She facilitated the cooperation between the Ministry of Agriculture of the Sabah State and FAFU.

斯里兰卡 Sri Lanka



马海西·伽马吉
企业家

他前来福建农林大学培训两次，在国家菌草中心的指导下，成功创建该国首个菌草菇工厂化生产企业，并为当地妇女提供就业。

Mahesh Gamage
Entrepreneur

He came to FAFU for training twice. Under the guidance of the National Juncao Research Center, he successfully established the first factory production workshop of Juncao mushroom in Sri Lanka and provided employment for local women.

刚果(金) The Democratic Republic of the Congo



卡帕塞雷·约瑟夫
总统府国家服务综合发展局

他在刚果(金)大力宣传菌草技术，扶持建立菌草菇合作社，组织培训农户推广菌草养畜和水土保持技术。

Kabasele Joseph
National Service of Presidency

He gave widespread publicity to Juncao technology in the Democratic Republic of the Congo, supported the establishment of Juncao Mushroom Cooperatives, and organized training courses on Juncao technology for farmers to develop animal husbandry and water and soil conservation techniques.

尼日利亚 Nigeria



拉瓦迪·易卜拉克·达提
福建农林大学菌草专业博士毕业生

他在福建农林大学接受菌草技术培训后获奖学金完成菌草专业的硕、博士学位。在尼日利亚北部干旱地区设立菌草示范点，进行菌草荒漠化治理结合养畜的示范与培训。

Lawandi Ibrahim Datti
A PhD graduate of Juncao technology from FAFU

After receiving the Juncao technical training at FAFU, he was awarded a scholarship to obtain his master's and doctorate degrees in Juncao technology. He has set up Juncao demonstration site in the arid area of northern Nigeria to conduct demonstrations and trainings on desertification control and livestock raising.



助力可持续发展 Promoting Sustainable Development



粮农组织南南合作司代表卡洛斯·沃森在第17届国际菌草产业发展研讨会上发言。(中国福州)
Carlos Wilson, representative of OSS, FAO made a speech on the 17th International Symposium on Juncao Industry Development. (Fuzhou, China)



“通过菌草技术，中国给我们讲了一个伟大的故事，这个故事现在已经分享到100多个受益于这一创新的国家。在福建省点燃的火花已经显示了一个创新的潜力，如果将其善加培育和部署得当的话就能改变世界各地人们的生活状况和改善他们的生计。”

——第73届联合国大会主席玛丽亚·费尔南达·埃斯皮诺萨·加西斯在联合国菌草技术高级别会议上致辞

Through Juncao technology, China has a great story to tell—a story now shared with over 100 countries who have benefited from this innovation. The spark lit in Fujian Province has shown the potential of a single innovation—if nurtured and deployed wisely—to change lives and improve livelihoods across the world.

——Statement by H.E. Mrs. María Fernanda Espinosa Garcés, President of the 73rd Session of the UN General Assembly

菌草援助形成一个有效的综合性解决方案，对落实13个可持续发展目标能起到积极作用。联合国经社部、联合国粮农组织、世界粮食计划署等联合国机构积极支持菌草技术推广与应用，推动南南及三方合作，帮助发展中国家破解发展难题。

Juncao assistance provides an effective and comprehensive solution that plays a positive role in the implementation of the 13 sustainable development goals. UNDESA, FAO, and WFP actively support the promotion and application of Juncao technology, promote South-South and triangular cooperation, and help developing countries further enhance their independent development capabilities.



世界粮食计划署农村发展卓越中心举办菌草技术综合利用线上会议。
WFP Center of Excellence for Rural Transformation organized the “Virtual Workshop on Comprehensive Application of Juncao Technology”



联合国第13届防治荒漠化缔约方大会菌草技术边会。(中国鄂尔多斯)
Juncao Technology Side Event on the 13th Session of the Conference of the Parties to the United Nations Convention to Combat Desertification. (Ordos, China)



菌草技术能力建设区域研讨会——助推太平洋小岛屿发展中国家发展可持续农业，实现可持续发展目标。(斐济楠迪)
Regional Capacity Building Workshop on Juncao Technology and its Support to Achieve Sustainable Agriculture and the Sustainable Development Goals for Pacific Small Island Developing States. (Nadi, Fiji)





菌草援外20周年成果展
Achievement Exhibition of the
20th Anniversary of Juncao Assistance



菌草情谊
Friendship



斐济总统孔罗特赞扬菌草项目是好项目，中国专家是好朋友。
H.E. George Khonote, President of Fiji, praised "The juncao project is a good project, and Chinese experts are good friends."



中非学员赠送的蝴蝶画《菌草万岁》Juncao" presented by students from Central African Republic.



中非总统福斯坦·阿尔尚热·图瓦德拉在61周年国庆日上为6名中国菌草专家颁发“国家感谢勋章”。
H.E. Faustin Archange Touadéra, President of Central African Republic, awarded the "National Medal of Merit" to six Chinese Juncao experts on the 61st National Day.

菌草技术

菌草技术，是谁孕育了你，
你是整个团队辛勤劳作的成果，
你是整个国家万众一心的结晶，
你是福州和福建农林大学的女儿，
你已亭亭玉立，走向世界舞台，
如春雨甘露般带给人希望。
你是福建的骄傲，
你是兄弟之爱 and 知识共享的诠释，
菌草，你驱赶了世界上的饥饿和贫困，
你打破了世界各国人民之间的界限，
你团结世界各国人民去抵制贫穷、饥饿、自私。
你保护了破碎的森林和环境，
你恢复了退化的土地，抑制了沙漠的推进，
生活在森林、草原和沙漠的所有人，
说声“谢谢你”。
你让人们一年四季都能品味鲜菇，
你帮人们增收创富，
你是雄鹰，承载着福建的美誉展翅翱翔，
飞越中国和抵达世界。
在东方巨龙的引领下，
你把中国的知识和技能传播到了五洲四海，
你是地球上各大洲之间的纽带，
那些深陷于贫困和饥饿泥潭中的人们啊，
拥抱菌草，重新燃起希望的火苗。
菌草技术，
愿你砥砺前行，再创辉煌，造福万民！
2019年中非共和国培训班学员创作

Juncao Technology

Juncao technology,
you who are conceived and born of research
You are the fruit of hard work of a whole team,
You are the outcome of the love of a well-done job by a whole nation.
FAFU and Fuzhou Daughter, you have reached maturity,
and you go over the world,
bringing hope to men like an off-season rain.
Fujian pride, you are the expression of brotherly love
and knowledge sharing among men.
Juncao, you break the chaos of starvation and poverty in the world,
You break the boundaries between the world's peoples,
You united the nations of the earth
against poverty, hunger and selfishness,
You preserve the forest and environment from destruction,
You restore degraded areas, you restrain the advance of the desert,
Thanks to you,
all people living in the forest, savannah, and desert
Can eat the mushroom in any season,
You generate income for the people who adopted you
As the royal eagle, you carry on your wings Fujia n's fame
Throughout China and beyond,
Driven by the dragon of the east,
you bring knowledge and pride of China in the world,
You are a link between all the continents of the planet earth.
May he who is drowning in the ocean of poverty and hunger
Cling to Juncao's straws and he will see hope rekindle in him.
Juncao technology, may you march forward with sheer endeavor,
deliver more golden fruits and bring benefits to the entire humanity.
By the participants of 2019 training course
for Central African Republic

菌草宣言
同一个世界，同一个梦想

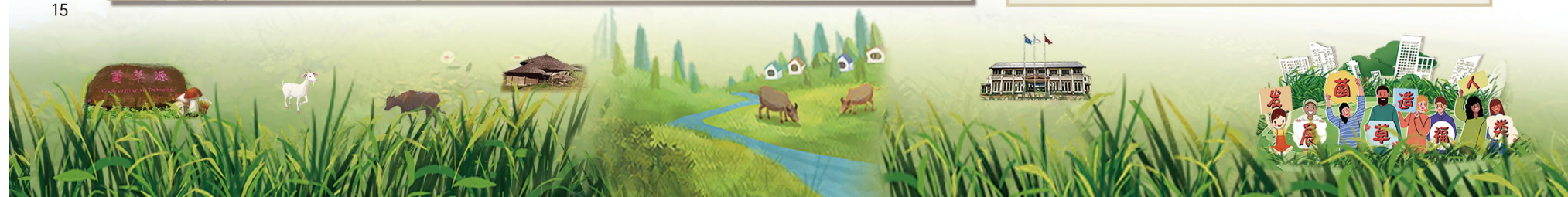
人类面临着共同的难题：贫困、饥饿、失业、生态环境退化、艾滋病等。2008年国际菌草技术培训班来自35个发展中国家的学员们因此决心推广菌草技术，使之国际化，并把菌草技术作为一个工具，通过科学和技术的创新以及赋予平等参与的权利来应对这些全球性的难题。
我们通过菌草技术走到一起，为了我们和后代，要把世界变成一个更美好的地方。我们为了地球上的生命得以延续而所提供的任何帮助都不是用金钱可以衡量的。这是人类的使命。
2008年11月8日

The Declaration of Juncao
In One World with One Dream

Mankind is faced with Common Problems. Poverty, hunger, unemployment, ecological degradation and HIV/Aids have placed mankind under starvation.
The Participants of 2008 International Juncao Technology Training Course from 35 Developing countries hereby resolved to Popularize and Internationalize the Juncao Technology in order to combat some of these global calamities through Science, Technological Innovation and Empowerment with Equal Participation. They further resolved that Juncao Technology will be employed as a "Tool" to combat these issues.
We come together through the Juncao Technology to make this world a better place for us and the future generation. No monetary values in this world will measure any valuable assistance as we give to sustain LIFE on earth. It is the honorable responsibility of mankind.
08th November, 2008

成长吧！菌草！
菌草技术，中国菌草来自发展中国家的我们听闻菌草技术并爱上它决心学会菌草技术帮助国家发展成长吧！菌草！成长！
.....
我们团结一心在各国土地上应用菌草技术为子孙后代带来福祉成长吧！菌草！成长！
2013年发展中国家菌草技术培训学员创作

(节选)
Juncao technology, China Juncao
We are from the developing countries
We have heard of Juncao technology and we love it
We want to learn this technology
To help our nations grow
Grow Juncao grow
...
We are all one people united together
We will apply this technology in our lands
For the benefit of generations to come
Grow Juncao grow
By the participants of
2013 training course for developing countries





菌草援外20周年成果展
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菌草产业扶贫与乡村振兴 Juncao Industry Poverty Alleviation and Rural Revitalization



全国第二届菌草技术扶贫研讨
The 2nd National Symposium on Poverty Alleviation with Juncao Technology.



2016年菌草产业扶贫培训班
2016 Training Course on Poverty Alleviation by Developing Juncao Industry.

在时任福建省省长习近平的关怀指导下，菌草技术从福建走到西部，走向全国，在国内31个省（市、区）的506个县进行应用。他亲自推动建设的福建省菌草科学实验室，已经发展为国家菌草工程技术研究中心，引领着国内外菌草技术科研、教育与应用。至2020年，在福建举办菌草技术扶贫骨干培训班121期，培训全国学员6925名。在外地培训的技术人员、扶贫干部和示范生产户据不完全统计达9万多名。福建农林大学国家菌草中心与全国14个集中连片特困区和贫困县共建菌草技术扶贫示范点71个，为促进各地脱贫攻坚和乡村振兴作出积极贡献。

Under the care and guidance of Xi Jinping, then Governor of Fujian Province, Juncao technology has been applied in 506 counties in 31 provinces (autonomous regions/municipalities) across the country, from Fujian to the west. He personally promoted the establishment of Fujian Provincial Juncao Science Laboratory, which has developed into the National Juncao Technology Engineering Research Center (NJRC), playing a leading role in scientific research, education and application of Juncao technology both at home and abroad. By 2020, 121 domestic training courses have been held at FAFU with a total of 6,925 trainees from all corners of the country. According to the incomplete statistics, more than 90,000 technicians, poverty alleviation officials and demonstration producers have been trained in the different project locations. NJRC of FAFU collaborated on the establishment of 71 demonstration sites with 14 concentrated continuous poverty-stricken areas across the country, made positive contributions to facilitate poverty alleviation and rural revitalization in various provinces/regions.



菌草技术援疆成效显著，菌草业成为农牧民增收的特色产业
Fujian Agriculture and Forestry University has scored remarkable achievements in its technical assistance to Xinjiang. Juncao has become a specialty industry for farmers and herdsmen to increase their income.



菌草技术为高原藏区的生态治理和藏民脱贫攻坚开辟了新途径
Juncao technology has opened up a new way for the ecological management of Tibetan plateau areas and the poverty alleviation for Tibetans.



由全国农业技术推广总站和福建农学院举办的全国野草栽培食用菌培训班
The National Training Course on Cultivation of Edible Mushrooms with wild Juncao Grass was held by the National Agricultural Technology Extension Station and Fujian Agricultural College.



在江西宁冈县开展菌草技术扶贫培训班
Juncao Technology Poverty Alleviation Training Course in Ninggang County, Jiangxi Province

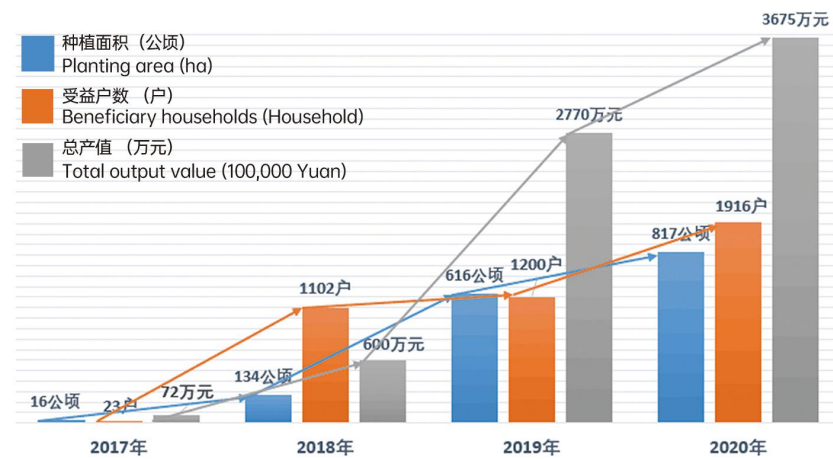




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甘肃省定西市2017-2020年种植巨菌草扶贫情况
Poverty alleviation by planting giant Juncao grass in
Dingxi City, Gansu Province from 2017 to 2020



甘肃省定西市2017-2020年种植巨菌草扶贫，共种植23000多亩，受益农户4000多户。
From 2017 to 2020, more than 23,000 mu (1533 ha) of Giant Juncao grass was planted with over 4,000 beneficiaries in Dingxi City of Gansu Province.

在宁夏干旱荒漠地区，菌草技术10年里帮助17500多农户告别贫困，农户的平均年收入从1998年的80美元增长到2007年的1024美元。

In the arid desert of Ningxia, Juncao technology helped more than 17,500 households up and out of poverty, and as a result the farmers' average annual income grew from \$ 80 in 1998 to \$ 1,024 in 2007, in only 10 years.



2021年2月，习近平主席庄严宣布中国脱贫攻坚取得全面胜利，菌草技术扶贫转向助力乡村振兴新阶段。先后在宁夏石嘴山、内蒙古磴口、河南武陟等地建立菌草科技创新产业园，促进菌草新型产业高质量发展和黄河流域生态环境治理。

In February 2021, President Xi Jinping solemnly declared that China had won an all-round victory in poverty alleviation, and the Juncao technology shifted from poverty alleviation to the new stage of rural revitalization. In order to promote the high-quality development of the new industry and improve the ecological environment along the Yellow River Basin, "Juncao Science and Technology Innovation Industrial Parks" were set up at a number of selected places in Shizuishan of Ningxia, Dengkou of Inner Mongolia, and Wuzhi of Henan provinces.

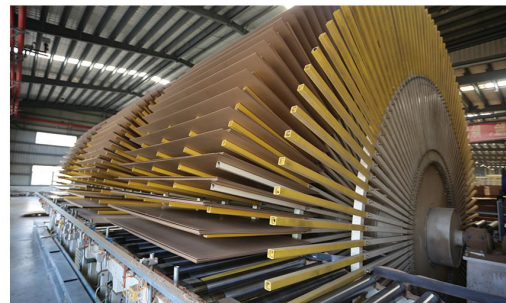




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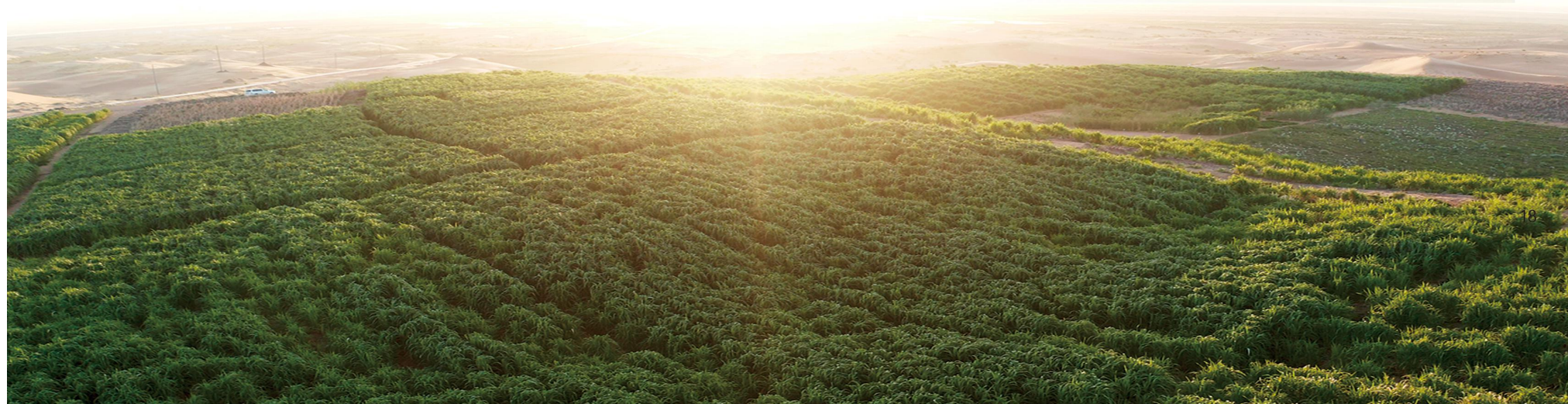


菌草工业化利用 Industrial Utilization of Juncao



一些菌草品种可完全替代木质材料制作高性能的人造板，可替代木浆应用于造纸。菌草具有快速、大量固碳的优势。木材生长缓慢，速生桉要5-6年才可采伐，一般优质木材要12年才采伐，而菌草种植当年可收割利用。在福建，菌草的土地利用率是桉树的5.7倍。因此，大力发展菌草产业，“以草代木”，不仅能减少森林采伐、置换出宝贵的森林碳汇资源，而且菌草可在各类型边际土地上种植，种植过程还可增加储碳量。菌草产业形成从生态农业到生态工业的大循环，对提升国土资源的利用效率和促进生态建设与高质量发展具有重要意义。

Some Juncao varieties can completely replace wood to make high-performance artificial boards, and replace wood pulp to make papers. Juncao is fast at fixing carbon in quantity. However, timber grows quite slowly, even the fast-growing eucalyptus takes 5-6 years for harvest, and the general high-quality wood would need even 12 years, while Juncao can be harvested and used in the year planted. In Fujian, the land utilization rate of Juncao is 5.7 times more than that of eucalyptus. Therefore, developing Juncao industry to substitute wood reduces forest logging and replaces valuable forest carbon sink resources. In addition, Juncao can be planted on various types of marginal land, in which process carbon storage increases accordingly. The Juncao industry forms a large cycle from ecological agriculture to ecological industry, which is of great significance for facilitating the utilization efficiency of land resources, promoting ecological construction and high-quality development.



菌草生态建设 Juncao Ecological Management



矿山种植菌草适宜季节100天可恢复植被
Successfully restoring vegetation in mines
100 days after planting Juncao grass



在平潭长江澳风口种植菌草防风阻沙效果显著
Planting Juncao grass on the Changjiang'ao
proluvial bay at Pingtan City coast - the
world famous tuyere for wind and sand re-
sistance, scored excellent results.

菌草用于生态治理形成了一系列国际领先的成果，形成“菌草—生态治理—综合循环利用”为一体的产业发展模式，开辟了一条生态效益与经济效益、社会效益相结合的可持续发展的新途径。在中国，以菌草为先锋植物进行防沙治沙正成为新举措。种植菌草具有节约成本、节省时间、附加经济价值等优点。在生态脆弱地区如黄河流域和青藏高原及一些干旱和半干旱地区成功发展菌草产业，为各国提供了良好示范。

A series of internationally leading achievements have been made in the use of Juncao in ecological management, and the industrial development mode of "Juncao-ecological management - comprehensive recycling" has been formed. It has opened up a new way of sustainable development that integrates ecological benefits with economic benefits and social benefits. In China, desertification control by planting Juncao grasses as pioneer plants has become a new initiative with advantages of cost and time-saving, and more lucrative. The success of developing Juncao Industry in ecologically fragile areas such as Yellow River basin and Qinghai-Tibet Plateau and those arid and semi-arid areas has set a good example for other countries.



在福建长汀县菌草治理崩岗产鲜草191.7吨/公顷
Juncao grass was planted in Changting County of Fujian Province for management of col-
lapsing hill areas where the yield of fresh grass was 191.7 tons per hectare of land.



黔西南种植巨菌草治理石漠化
Rocky desertification control by planting Giant Juncao grasses in the southwest of
Guizhou Province



在pH < 8.7的盐碱地种植菌草有效改良土壤
Planting Juncao grasses at saline-alkali land with pH < 8.7 which effectively improves the
soil condition



在青海贵德海拔2350米高寒地区洪积扇种植菌草
Juncao grass was planted in proluvial fan of cold region of Guide county, Qinghai
province at altitude 2350m.





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中国：内蒙古乌兰布和沙漠，一些根系发达的菌草仅需生长80-100天就能固沙。
China: Some Juncao grass species with well-developed root system take only about 80-100 days to fix the sand, in Ulan Buh Desert, Inner Mongolia.



一节巨菌草种植约100天后根系分布面积高达18平方米，可固沙11立方米。
After planting one node of Giant Juncao grass 100 days, its root system spreads to 18m² and fixes sand 11m³.



黄河河岸刘拐沙头菌草阻沙固沙试验示范点
Experiment and Demonstration site of sand resistance and fixing in Liuguashatou on the banks of the Yellow River.





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结语



发展菌草业，造福全人类。菌草技术20年的援外之路只是中国政府和中国人民与国际社会团结协作、共谋发展、努力构建人类命运共同体的一个生动缩影。当今世界各国仍然面临应对气候变化、消除疾病疫情、改善生活品质、促进可持续发展诸多共性难题和共同责任，唯有同舟共济、互助互利，携手书写创新创业的时代篇章，才能走向共同繁荣发展的光辉未来。

科学无国界，人类共命运。菌草技术在世界各国之间架起了一座座播撒希望的绿色之桥、发展之桥、合作之桥、友谊之桥，菌草之路在延伸，菌草的传奇故事在延续……

Conclusion



Develop Juncao industry, Benefit all mankind. The 20 years of China aid practice with Juncao technology has only been a vivid microcosm of how the Chinese government and people worked together with the international community to seek common development and build a community with a shared future for mankind. At present, countries in the world still face many common challenges and common responsibilities in tackling climate change, eradicating epidemic, improving the quality of life and promoting sustainable development. Only by working together for mutual benefit and jointly writing a new chapter of innovation and entrepreneurship can we usher in a much more glorious future of common prosperity and development.

Science knows no borders, and mankind shares a common destiny. As a bridge to hope and a platform of ecological cooperation, development, and friendship, the road of Juncao technology is extending, and the legendary story of Juncao technology is going on and on...

主办/HOSTS

国家国际发展合作署 福建省人民政府
China International Development Cooperation Agency
People's Government of Fujian Province