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AGRICULTURAL TECHNOLOGY INTEGRATION AND DEMONSTRATION FOR GREEN RICE DEVELOPMENT IN CHONGMING ISLAND, SHANGHAI

May 2022

SDGs:



Country: The People's Republic of China

Project Code: TCP/CPR/3702

FAO Contribution: USD 223 000

Duration: 1 May 2019 – 31 December 2021

Contact Info: FAO Representation in China
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Implementing Partners

Ministry of Agricultural and Rural Affairs.

Beneficiaries

Rice farmers, extension workers and agricultural professionals in Chongming Island.

Country Programming Framework (CPF) Outputs

CPF (2016-2020) Priority Area 1: Fostering sustainable and climate resilient agricultural development.



BACKGROUND

In recent decades, chemical pesticides and fertilizers have been widely applied in agricultural production in China. Although this has improved production in terms of quantity, it has also diminished soil health, jeopardized the natural environment, and affected the quality of both food production and people's health. In response, the Ministry of Agriculture and Rural Affairs initiated a programme of Zero Growth of Pesticide and Chemical Fertilizers by 2020. Following a call from central government, the major rice production area of Chongming Island of Shanghai needed to establish new standards and practices for the production of quality green rice with zero chemical input. Chongming Island is located in the northern part of Shanghai Municipality and serves as the estuary of Yangtze River to the Eastern China Sea. It offers unique geographical and ecological advantages for agriculture development, possessing 25 percent of Shanghai's rural areas and grain production, and accounting for 22 percent of total rice production in Shanghai.

Ecological agriculture development is at the top of Chongming Island's development agenda. Green rice development and e-agriculture in general constitute an integral part of the vision set by the Shanghai Municipal Government to promote multi-functional urban agriculture development in Shanghai, to explore the integrated development of first, second and tertiary industries in urban-rural settings in the Yangtze River Delta region, and to transform Chongming Island into the world's first Zero-emission Island.

Despite the progress made so far, there remain a technical gap and bottlenecks in applying the technological package for green rice development throughout the value chain. The extension of the technical package to local farmers could also prove ineffective if conventional classroom-type training modalities continue. With the aim of innovating, integrating and extending green rice development technologies, the Government of China therefore requested FAO assistance.

IMPACT

Thanks to the project, concrete innovative rice production technologies and relevant international best practices have been introduced to support Chongming green rice development. Soil fertility levels have been enhanced, along with air and environmental conditions, achieving first-class indicators in 2021. After adopting green rice production, the irrigation water body has improved and the risk of water surface pollution been reduced. The number of natural enemies in the demonstration areas of green rice and green prevention and control has also increased significantly. Most significantly, the mindset of local stakeholders, from government officials to extension staff and local farmers, has changed in favour of green rice production, taking into consideration the ecosystem benefits as a whole.



ACHIEVEMENT OF RESULTS

The project made a significant contribution to green agriculture production on Chongming Island. Farmers' production technology level was improved by the training provided, and technical regulations and standardized rice production were formulated, while the scientific and technological activities conducted under the project supported the development of the entire industrial chain of high-quality rice. The total consumption of nitrogen, phosphorus, and potassium in the island decreased by 5.3 percent when compared with 2019, and the income per mu of Chongming rice trebled. In 2020, the green certification of Chongming rice reached 91.8 percent, while the production scale of green rice increased from 10 000 to 30 000 mu.

Specifically, the project identified a series of innovative green rice planting technologies, ranging from rice variety selection to landscape ecological regulation, winter green manure, biodiversity, non-chemical control (agronomic management, insect pheromones, natural enemy conservation and utilization, microbial insecticide and disease prevention), organic fertilizer and non-artificial chemical product addition. A high-quality rice evaluation index system in major rice import and export countries was analysed, and the result was fed into the development of green sustainable agriculture standards for rice. Domestic study tours were organized to seven units, including the China Rice Research Institute, to learn about high-quality rice planting technology and advanced experiences in rice production, processing and brand promotion.

Around 10 000 mu (666.67 ha) of paddy rice land from five green rice production bases was involved in the demonstration and testing of technologies introduced by the project. Technical regulations and standards were developed to guide standardized production and bring about value addition.

In terms of training, 34 participants from agriculture technology service agencies at district and township level and local green rice cooperatives participated in training of trainer (TOT) sessions from September to October 2019. A total of 450 rice farmers, including 151 women, received training in 14 Farmer Field Schools (FFS) from June to October 2020, while 3 000 local rice planting farmers were outreached and sensitized with the technical package introduced by the project.



IMPLEMENTATION OF WORK PLAN AND BUDGET

A Project Steering Committee was put in place, consisting of representatives from all stakeholders, including the budget holder in FAO China, the Lead Technical Officer, the Ministry of Agriculture and Rural Affairs and Shanghai Municipal Department of Agriculture and Rural Affairs, as well as national consultants. Led by the National Project Coordinator from Chongming District Department of Agriculture and Rural Affairs, a project management office (PMO) was established when the project was launched. The PMO was responsible for the day-to-day management and implementation of the project. For each project task, a work plan was designed and strictly observed during implementation. These measures ensured the effective management and delivery of the project. As a result of the travel restrictions imposed in response to the COVID-19 pandemic, certain activities, such as the final workshop and impact assessment, were delayed and a no-cost extension was requested in order to implement them. This was granted and all activities were completed within the envisaged budget, with the exception of an international study tour, rendered impossible by international COVID-19 restrictions. The project fell into the low risk category and, with the exception of the COVID-19 pandemic, no risks arose.

FOLLOW-UP FOR GOVERNMENT ATTENTION

It is recommended that the agricultural department of Chongming District increase its financial investment and continue to work with relevant scientific research institutes in the research, promotion and application of related technologies of green rice.

SUSTAINABILITY

1. Capacity development

Policy support has been strengthened and green rice planting subsidies have been implemented. The Chongming District Agriculture and Rural Committee and the District Finance Bureau jointly issued the Notice on the Issuance of Chongming District to Promote the Accelerated Development of Urban Modern Green Agriculture Policy (Shanghai Chongming District Agriculture and Rural Committee [2020] No.2). The main producers of green rice, vegetables and fruit identified by the District Agriculture and Rural Committee will be subsidized. Scientific and technological research has been stepped up, and agricultural science and technology projects such as the selection and breeding of new varieties of green rice, research on planting technology, establishment of international standards and certification system for rice and degradation of plastic film, have been implemented.

The project is in line with Chongming's agricultural industrial system of "taking green as the background and green rice as the characteristics", which accords with Chongming District's adherence to the concept of the ecological island. The supporting agricultural science and technology projects will continue to be carried out after the completion of this project.

Through project implementation, the cooperative relationship with the Shanghai Academy of Agricultural Sciences, the Institute of Regional Planning of the Chinese Academy of Agricultural Sciences and other scientific research institutes has been deepened, and the technical support system for green rice has been improved.

The construction of the green rice agricultural product system will continue to be developed and a new model of sustainable agricultural development explored. The possibility of co-organizing an international low-carbon agricultural cooperation forum around the themes of carbon peaking and carbon neutrality in agriculture will also be explored.

2. Gender equality

Of the total number of FFS trainees, 151 were female, accounting for 33.6 percent, which met FAO requirements of 30 percent of female trainees. The training adopted a participatory method, in which men and women participated equally in various production practices, and learned and gained the same knowledge content, in the expectation that they will be treated equally in related work in the future.

3. Environmental sustainability

The green rice planting technology implemented under the project strictly prohibits the use of chemical synthetic inputs and zero application of chemical fertilizers and pesticides was achieved in the production area. As a result, residues of chemical pesticides in the environment and food were avoided, fertilizer and drug reduction in green rice production was promoted throughout the region and the production environment in Chongming was optimized. The content of organic matter and hydrolysed nitrogen in the soil increased between 2019 and 2021, which improved the level of soil fertility. In 2021, the air and environment were classified as excellent. After adopting green rice production, the irrigation water body generally improved, and the risk of water surface pollution was reduced. The number of natural enemies in the field in the demonstration areas of green rice and green prevention and control also increased significantly.

4. Human Rights-based Approach (HRBA) – in particular Right to Food and Decent Work

The right to food is a basic human right. The project aimed for the green production of local rice in Chongming, in alignment with the right to safer and more nutritious food produced in an economically and environmentally more sustainable way.

Of the total number of trainees in the project training, 151 (33.6 percent) were female. Both men and women participated equally in all production practice activities. Farmers and counsellors who participated in the training actively took part in learning green rice skills, and increased their employment opportunities and entrepreneurial ability in related aspects as a result. The high level of specialization of green rice also provides more relevant employment opportunities and posts.



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5. Technological sustainability

Based on the actual situation in Chongming, a comprehensive prevention and control technology system for green rice production was established, by screening high-quality and suitable varieties, optimizing stubble, fertilizing the soil with a combination of nutrients, researching and integrating high-level green rice cultivation technology protocols, and formulating Chongming District green production technology protocols of green rice, high-quality rice production protocols, green rice group standards, and Chongming soft rice evaluation standards, thus laying the foundation for later promotion and application.

Through the participatory training and study of the industrial chain of green rice production, the comprehensive agricultural technical literacy of agricultural professionals and farmers in Chongming has been improved. TOT and FFS trainees have mastered technologies in the whole process of green rice production, and are now able to carry out the related technology promotion and guidance independently.

The agricultural department of Chongming District will increase financial investment and continue to work with relevant scientific research institutes in the research, promotion and application of related technologies of green rice.

6. Economic sustainability

Relevant agricultural departments in Chongming District have set up several supporting projects for the major project, with an investment of around CNY 8 000 000. At the same time, special planting subsidies for green rice have been implemented. The principal producers of green rice, vegetables and fruit identified by the District Agriculture and Rural Committee will be subsidized at the rate of CNY 600/mu, CNY 1 000/tonne for high-concentration organic fertilizer and 90 percent of the premium for income insurance of agricultural products in Chongming.

Beneficiaries received free training and technical services during project implementation and will not have to resort to external funding. All the introduced technologies are affordable for ordinary rural households.



ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Expected Impact	Agriculture production capacity increased by conserving and enhancing environmental quality		
Outcome	Green agriculture development promoted in Chongming Island		
	Indicator	A green rice development technological integration and extension package.	
	Baseline	0	
	End Target	1	
	Comments and follow-up action to be taken	The project introduced and strengthened an integrated package of technologies and standards for green rice development in Chongming District throughout its value chain. The technical package could also be of reference to the green development of other crops and vegetables in the District.	
Output 1	Innovative technologies for green rice development in line with international standards identified		
	Indicators	Target	Achieved
	Number of innovative technologies identified and introduced.	5	Yes
	Baseline	0	
Comments	Innovative technologies for green rice development in line with international standards were identified.		
Activity 1.1	Identify the innovative green rice planting technologies that cover the dimensions of landscape ecological regulation, winter green manure, biodiversity, non-chemical control (agronomic management, insect pheromones, natural enemy conservation and utilization, microbial insecticide and disease prevention), organic fertilizer and non-artificial chemical product addition		
	Achieved	Yes	
Activity 1.2	Analyse the high-quality rice evaluation index system in major rice import and export countries		
	Achieved	Yes	
Activity 1.3	Organize international study tour (a maximum of three persons to two countries) and domestic cross-visits to draw from the existing best practices on green agriculture/rice development		
	Achieved	Partially	
	Comments	An international study tour was not possible owing to the travel limitations imposed as part of COVID-19 control measures. Domestic study tours were organized from 18 to 21 October 2021 to learn about high-quality rice planting technology and advanced experiences in rice production, processing, and brand promotion, etc. The mission visited Jiangsu Sheyang Rice Industrial Park, Sheyang Rice Seed Base, Shanghai Haifeng Farm, Xinghua Rice Brand Operation Center, Xinghua Modern Agricultural Industrial Park, Xinghua Rice Industry Chain Demonstration Base and the China Rice Research Institute.	

Output 2	Technologies for green rice development tested and demonstrated		
	Indicators	Target	Achieved
	Area of demonstration field testing new technologies introduced by the project.	100 mu of demonstration field established.	Yes
Baseline	0		
Comments	Around 10 000 mu (666.67 ha) of paddy rice land was involved in the demonstration and testing of new technologies introduced by the project.		
Activity 2.1	Establish a 100 mu demonstration field to test and validate the technologies introduced and observe the effects		
	Achieved	Yes	
	Comments	A total of five green rice production bases was selected, including Beihu Organic Agriculture Demonstration base, Shanghai Chunrun Aquaculture Cooperative base, Shanghai Chunrun Aquaculture Professional Cooperative, Shanghai Xiping Agricultural Planting Cooperative, Shanghai Wanhe Vegetable and Fruit Professional Cooperative and Shanghai Fanxin Agricultural Planting Professional Cooperative. Around 10 000 mu (66.67 ha) of paddy rice land was involved in the demonstration and testing of new technologies introduced by the project.	
Activity 2.2	Optimize the technical parameters and formulate concrete easy-to-operate and replicable technical standards and/or codes based on the field test demonstration results and expert recommendations		
	Achieved	Yes	
	Comments	Technical regulations and standards were developed to guide standardized production and bring about value addition. Specifically, the Chongming District High-quality Green Rice Production Technical Regulations, Chongming Rice Evaluation Standards, and Chongming Soft Rice Evaluation Standards were formulated.	
Output 3	Green rice production technologies extended and partnership for rice development enhanced		
	Indicators	Target	Achieved
	Numbers of extension workers and rice farmers that received the training.	3 480 trainees, including 30 extension workers and 450 famers, graduated from whole-season whole value chain FFS, and 3 000 local rice-planting farmers trained.	Yes
Baseline	0		
Comments	A total of 34 participants from agriculture technology service agencies at district and township level and local green rice cooperatives participated in the TOT sessions from September to October 2019. In addition, 450 rice farmers, including 151 women, were trained in 14 FFS from June to October 2020, while 3 000 local rice-planting farmers were outreached and sensitized with the technical package introduced by the project.		
Activity 3.1	Establish and advocate on good green rice development practices among various stakeholders include farmers, technology extensionists, government, enterprises, and other market players		
	Achieved	Yes	
	Comments	Green rice development practices were advocated to various stakeholders on various occasions.	
Activity 3.2	30 extension workers benefited from whole-season whole value-chain TOT sessions; 450 famers graduated from whole-season whole value chain FFS; another 3 000 local rice planting farmers aware of the green rice production technologies and standards. Women's participation will account for at least 30%		
	Achieved	Yes	
	Comments	<p>A total of 34 participants from agriculture technology service agencies at district and township level and local green rice cooperatives participated in TOT sessions from September to October 2019.</p> <p>The training content includes the following three aspects:</p> <ol style="list-style-type: none"> 1. Paddy eco-system. Recognize paddy eco-system and its main factors. Rapid agro-ecosystem analysis (following the steps: field investigation–drawing–analysis–exchange–decision making). Recognize major nature enemies and their function, conversation and utilization nature enemies.' 2. Green rice cultivation technologies. Recognize major species of insects, diseases and weeds, paddy sunning, resistant variety, utilization of organic fertilizer, eco-cultivation system and land conservation, and green manure in winter. Yield estimation measure and determination. 3. Improvement of skills and team dynamic, including but not limited to, communication skills, exchange skills, observation skills, presentation skills, group dynamic game. <p>A total of 450 rice farmers, including 151 women, received training in 14 FFS from June to October 2020.</p> <p>Altogether, 3 000 local rice planting farmers were outreached and sensitized with the technical package introduced by the project.</p>	

Partnerships and Outreach

For more information, please contact: Reporting@fao.org

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