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SUSTAINABLE LARGE-SCALE GREEN PRODUCTION AND VALUE PROMOTION OF QUINOA IN QINGHAI

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SDGs:



Country: The People's Republic of China

Project Code: TCP/CPR/3803

FAO Contribution: USD 210 000

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Contact Info: FAO Representation in China
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Implementing Partner

Ministry of Agriculture and Rural Affairs.

Beneficiaries

Quinoa growers and agricultural technology extension staff in the project localities.

Country Programming Framework (CPF) Outputs

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



BACKGROUND

Quinoa is a crop with high nutritional value, and the demand for quinoa products in the domestic and international market has been in constant growth in recent years. The Qaidam Basin (including Dulan County, Ulan County, Delingha City and Golmud City), located in Haixi Tibetan and Mongolian Autonomous Prefecture of Qinghai Province, has unique natural, climatic and ecological characteristics that make it one of the best quinoa planting areas in China. Quinoa produced in the Qaidam Basin has advantages in yield and quality compared to that produced in other regions in the country; the quality meets or exceeds international standards, with products that are favoured by consumers at home and abroad.

Introduced to Qinghai in 2012, quinoa underwent two years of planting trials from 2012 to 2013 and three years of large-scale cultivation from 2014 to 2016. In 2017, the planted area of quinoa in the Qaidam Basin reached 30 000 mu, with an average yield of from 230 to 300 kg/mu and an output value of from CNY 3 000/mu to CNY 3 500/mu, three times that of crops such as wheat and rapeseed. The Qinghai Implementation Plan of Agricultural Modernization (2016-2020) was proposed to develop the quinoa industry, which has great potential for farmers in the deeply impoverished areas of Qinghai.

Ten years after quinoa was introduced to China and planted on a large scale, several challenges remained. First, according to an investigation in 2014, the varieties introduced had uneven plant heights, different colours for plant and ear, and inconsistent maturity. As there was no selection and breeding of varieties, the purity of the varieties could not be ensured. Second, the level of quinoa production, processing and marketing could not meet the needs of green production and value promotion.

The aim of the project was to develop, demonstrate and extend innovative green production technology, deep processing technology, and straw comprehensive utilization technology of quinoa in Qinghai in order to promote the sustainable and green development of the quinoa industry, and, eventually, to improve nutrition and increase farmers' income.

IMPACT

The envisaged project impact was improved food security and nutrition and an increase in farmers' income through the sustainable and green development of the quinoa industry. Thanks to the project, this has been achieved. The planted area of quinoa has been substantially extended in the project area, the awareness and skills of quinoa producers and others involved in the quinoa value chain have been developed, and the income derived from quinoa production has been significantly enhanced, to the benefit of local farmers.

ACHIEVEMENT OF RESULTS

The project achieved its outcome, that of promoting the sustainable large-scale green production and increased value of quinoa in Qinghai. Under Output 1, technical standards and specifications for the green planting of quinoa in the Qaidam Basin were developed. Under the second output, 160 mu of pilot fields were established in the Qaidam Basin for the breeding and selection of improved varieties. Training of trainers (TOT) was provided to 30 local technicians and cooperative representatives, and eight farmer field schools (FFS) were established to train 300 farmers in green quinoa development. Altogether, the pilot nurtured the production of 352 000 kg of seed exemplars, all of which were made available for cultivation to affiliated cooperatives and farmers in the Qaidam Basin. A demonstration base of 5 530 mu was established in Ulan County, Delingha City and Xiangride County to showcase the technical standards and/or technical specifications for the green planting of quinoa.

The demonstration led to an additional 12 000 mu of plantations of quinoa by local farming communities. With an average return of CNY 500/mu, the demonstration helped to create a total economic return of CNY 6 million for the benefit of local farmers. Output 3 regarded the production of a draft policy for the development of the quinoa whole industry chain in the Qaidam Basin. A policy report, with recommendations for quinoa value chain development in the Qaidam Basin, was provided to Haixi Prefectural Government.

IMPLEMENTATION OF WORK PLAN AND BUDGET

As a result of delays caused by restrictions imposed in response to the COVID-19 pandemic, the project was granted a no-cost extension in April 2022 to enable it to complete its envisaged activities. All project activities, including the project inception workshop, procurement, national consultancies, technical missions, domestic study tours and the project final review workshop, were completed within the original budget.

With regard to risk management, the Project Steering Committee (PSC) was established and met for project inception, the mid-term and final review of the project, and on a needs basis when the risks, results and overall progress were monitored. In consultation with stakeholders, the project workplan was revised at the inception workshop and project activities were undertaken in accordance with the agreed workplan. National consultants provided the necessary technical and programme development support, which also contributed to minimizing the risks of the project, including social and environmental ones.

FOLLOW-UP FOR GOVERNMENT ATTENTION

It is recommended that the indications of the draft policy report produced by the project be taken into consideration for the development of the entire quinoa industry chain in the Qaidam Basin.



SUSTAINABILITY

1. Capacity development

The International Cooperation Department of the Ministry of Agriculture and Rural Affairs paid great attention to project implementation and provided in-kind contributions to facilitate its success. Investments and subsidies were allocated by Qinghai Provincial Government and Haixi Prefectural Government to support the piloting and demonstration of the breeding and planting of the selected quinoa varieties. Qinghai Provincial Department of Agriculture and Rural Affairs will continue to collaborate with field implementers and TOT graduates to extend the project's results, while FFS methodologies will continue to be used as the principal means of participatory training. These measures will ensure the long-term effect of the results of the project. The provincial and country project management team will also continue to function on a regular basis to promote quinoa development in the Qaidam Basin. In addition, the raised awareness and enhanced capacities of both direct and indirect project beneficiaries will enable them to continue with the planting, processing, and marketing of quinoa.

As a result of project implementation, the network and linkages have been strengthened among the Ministry of Agriculture and Rural Affairs, Qinghai Provincial Department of Science and Technology, Qinghai Provincial Government of Agriculture and Rural Affairs, Haixi Prefectural Department of Agriculture and Rural Affairs, the Northwest Institute of Plateau Biology of the Chinese Academy of Sciences, and Qinghai Three Rivers Fertile Soil Agricultural Technology Co. Ltd. These entities will continue functioning in their respective areas as they did during the project, contributing to the sustainability of project results from an institutional point of view. In addition, the Qinghai Haixi Qaidam Quinoa Industry Association, which was established during the project, is expected to play a larger role, connecting the public and private sectors and the farming communities for quinoa development.

Thanks to the study tour organized under the project, stakeholders in Qinghai have established networks with the Shanghai Centre for Excellence in Molecular Plant Sciences of the Chinese Academy of Sciences, Inner Mongolia Zhongli High Tech (Beijing) Technology Co. Ltd and Shanxi Jiaqi Agriculture Technology Co. Ltd, as well as with the National Agro-industry Integration Development Demonstration Park for Multigrain. Those networks will be beneficial for the long-term value chain development of quinoa.

Under the project, quinoa breeding, planting and processing technologies were introduced and extended. The project results were reviewed and commended at the expert consultation forum held at the end of implementation. A policy report with recommendations for quinoa value chain development in the Qaidam Basin was provided to Haixi Prefectural Government. At the project workshop, local government expressed full commitment to the further promotion and application of the technologies and solutions introduced in order to effectively promote the enhanced development of the quinoa industry in the region.

2. Gender equality

Concrete measures were taken to incorporate gender equality in the implementation of project activities. Priority was given to women when selecting participants for project activities to the best extent possible. Women participants accounted for 40 percent and 30 percent, respectively, in the TOT and FFS sessions.

Significant attention was paid to gender equality from project formulation to implementation, monitoring and reporting. Some of the technologies demonstrated under the project, such as conservation tillage methods and mechanized quinoa processing techniques, have great potential to reduce labour for both men and women.

3. Environmental sustainability

Environmental and ecological protection, as well as biodiversity, were taken into full consideration in large-scale quinoa development. Adaptation to environmental conditions and climate change was among the key factors considered for quinoa variety breeding. Green, ecological and organic planting methods were also promoted under the project.

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

The breeding, planting and marketing technologies and methods introduced by the project improved quinoa production and the livelihoods of farmers, contributing to a more prosperous and sustainable rural economy in the Qaidam Basin. Farmers' awareness and capacity for quinoa cultivation were improved, as were the awareness and capacity of local stakeholders in applying participatory training methods and improving nutrition education.

The project results contribute to "The Right to Adequate Food", issued by FAO in 2004.

In selecting project beneficiaries, gender perspective was fully accommodated. Young people, women and ethnic minorities were prioritized.



5. Technological sustainability

The cultivation technologies and methods introduced by the project are both appropriate and effective for quinoa development in the Qaidam Basin. Following the successful demonstration of the project, a total of 12 000 mu of quinoa was planted by local farming communities. With an average return of CNY 500/mu, the demonstration resulted in a total return of CNY 6 million for the benefit of local farmers. The extended planting area and benefits validate the effectiveness of the breeding, planting and marketing practices introduced under the project.

Under the project, four new quinoa varieties were identified and approved. These varieties were selected based on local genetic germplasms. The varieties selected show great adaptability to local climatic situations in the Qaidam Basin.

Through season-long TOT and FFS, the awareness and capacities of local agricultural technology extension staff and local farmers in extending and applying the quinoa cultivation technologies and practices introduced were greatly improved. The test results and questionnaire indicated a substantial increase in knowledge, attitude and performance of the beneficiaries.

6. Economic sustainability

The Ministry of Agriculture and Rural Affairs, as well as its provincial and prefectural subordinates in Qinghai and Haixi, provided in-kind contributions to the implementation of project activities. The Qinghai Provincial Department of Agriculture and Rural Affairs and the Haixi Prefectural Bureau of Agriculture and Rural Affairs will continue to allocate earmarked resources to extend the technologies developed by the project.

Research institutes such as the Northwest Institute of Plateau Biology of the Chinese Academy of Sciences will continue to support with their earmarked budgets the breeding of quinoa varieties suitable for local cultivation. Subsidies to purchase premium quinoa seeds will be provided by local government. Training manuals and information notes on green and sustainable quinoa cultivation will continue to be distributed to more local farmers free of charge.

ACHIEVEMENT OF RESULTS - LOGICAL FRAMEWORK

Expected Impact	Improved food security and nutrition and increase of farmers' income		
Outcome	Sustainable large-scale green production of quinoa promoted and value increased in Qinghai		
	Indicator	Provincial agricultural planning process supporting investment and partnership for quinoa value chain development in Qaidam Basin.	
	Baseline	0	
	End Target	1	
	Comments and follow-up action to be taken	In December 2022, Qinghai Provincial Department of Agricultural and Rural Affairs released Guidance Recommendations to Promote High-quality Development of Quinoa Industry. In March 2023, Haixi Prefectural People's Government of Qinghai Province issued Action Recommendations for the Promotion of High-quality Quinoa Industry Development. According to the action plan, by 2025, the quinoa plantation area in Haixi Prefecture will be expanded to 50 000 mu, quinoa processing conversion rate will exceed 65% and the contribution rate of agricultural technological advances will exceed 65%, generating a total quinoa value chain of CNY 1 billion.	
Output 1	Technical standards and/or technical specifications for green planting of quinoa in Qaidam Basin developed		
	Indicators	Target	Achieved
	Technical standards and/or technical specifications for quinoa production in Qaidam Basin.	1	Yes
Baseline	0		
Comments	In 2021, four new quinoa varieties were officially validated and approved in Qinghai. Both the Quinoa Variety Standard (DB63/T 2038-2023) and the Technical Specifications for Quinoa Breeding (DB63/T 2040-2023) were issued in 2022 as a provincial standard in Qinghai.		
Activity 1.1	Conduct investigation in quinoa planting areas in Qaidam Basin, Qinghai, and develop the technical standards and/or technical specifications for green planting of quinoa in Qaidam Basin throughout its growth cycle, including but not limited to breeding, cultivation, planting, field management and harvesting		
	Achieved	Yes	
	Comments	In 2021, four new quinoa varieties were officially validated and approved in Qinghai. Both the Quinoa Variety Standard (DB63/T 2038-2023) and the Technical Specifications for Quinoa Breeding (DB63/T 2040-2023) were issued in 2022 as a provincial standard. Identification and standard development resulted from the joint efforts of government entities, national experts and enterprises participating in the project, including the Qinghai Provincial Department of Science and Technology, Qinghai Provincial Department of Agriculture and Rural Affairs, Northwest Institute of Plateau Biology of the Chinese Academy of Sciences, and Qinghai Three Rivers Fertile Soil Agricultural Technology Co. Ltd.	
Activity 1.2	Organize international and domestic study tours to learn and exchange experience and practice of quinoa planting and industrial development		
	Achieved	Partially	
	Comments	Because of the restrictions brought about by the COVID-19 pandemic, international study tours were not feasible. In their place, as agreed by PSC members, domestic study tours were held from 29 October to 5 November 2023 to Shanghai, Inner Mongolia and Shanxi provinces (municipalities/regions), which are renowned for their advantages in quinoa research, planting technology and deep processing.	

Output 2	Improved capacity in green production of quinoa in Qaidam Basin		
	Indicators	Target	Achieved
	- Pilot demonstration. - Capacity improvement of technology extension officers and farmers.	- 100 mu. - 30 technology extension officers, large growers and cooperative members, 300 farmers.	- Yes - Yes
Baseline	0		
Comments	<p>A total of 160 mu of pilot fields was established in the Qaidam Basin, Qinghai Province, for the breeding and selection of improved varieties.</p> <p>A demonstration base of 5 530 mu was established in Ulan County, Delingha City and Xiangride County to showcase the technical standards and/or technical specifications for the green planting of quinoa.</p> <p>A 15-day course of TOT was provided to 30 local agricultural technicians and cooperative representatives and model farmers. Eight FFS were established to train 300 farmers in green quinoa development.</p>		
Activity 2.1	Establish 200 mu pilot field for breeding and selection of improved varieties		
	Achieved	Partially	
	Comments	<p>In 2022 and 2023, 160 mu pilot fields were established in the Qaidam Basin, Qinghai Province, for the breeding and selection of improved varieties. The pilot nurtured the production of 352 000 kg of seed exemplars, all of which were made available to affiliated cooperatives and farmers in the Qaidam Basin for cultivation.</p>	
Activity 2.2	Establish 300 mu pilot field to demonstrate technical standards and/or technical specifications for green planting of quinoa		
	Achieved	Yes	
	Comments	<p>A demonstration base of 5 530 mu was established in Ulan County, Delingha City and Xiangride County to showcase the technical standards and/or technical specifications for the green planting of quinoa. The demonstration attracted an additional 12 000 mu plantation of quinoa by local farming communities. With an average return of CNY 500/mu, the demonstration resulted in a total economic return of CNY 6 million for the benefit of local farmers.</p>	
Activity 2.3	Train 30 agricultural technology extension officers, large growers and cooperative members to practise the green planting technical standards and/or technical specifications of quinoa		
	Achieved	Yes	
	Comments	<p>The first phase of TOT was held from 12 to 21 July 2022 in Haixi Prefecture. The second phase of the TOT took place from 24 to 28 July 2023. In total, 15 days of training were organized during the quinoa growth season.</p> <p>A total of 30 trainees, including local agricultural technicians, representatives of leading quinoa planting and processing cooperatives and enterprises, and selected model farmers, received training. Of the 30 trainees, 12 were women, accounting for 40% of the total. The 30 trainees came from different ethnic backgrounds in addition to Han, including Tibetan, Mongolian, Hui, and Tu ethnic minority groups.</p> <p>The TOT covered the following topics:</p> <ul style="list-style-type: none"> - Understanding of farmland ecosystems, methods of analysis of farmland ecosystems. - Biological characteristics and cultivation characteristics of quinoa, selection of quinoa varieties and seed quality, quinoa cultivation and management techniques (sowing, water management, fertilizer management, growth period management, pest and disease control, harvesting, straw return and no-till conservation planting, etc.). - Mechanized quinoa cultivation techniques. - Quinoa post-production processing and equipment operation. - Quinoa product quality standards, organic quinoa production norms, value chain enhancement. - Skills improvement and team building. 	

Activity 2.4	Promote the application of green planting technical standards and/or technical specifications of quinoa to 300 farmers through Farmer Field Schools		
	Achieved	Yes	
	Comments	<p>Eight FFS were organized to promote the application of green planting technical standards and/or technical specifications of quinoa to 300 farmers. Women accounted for 30% of the total participants.</p> <p>The following main topics were covered by the FFS sessions:</p> <ul style="list-style-type: none"> - Quinoa research and production status quo: biological characteristics of quinoa plant, cultivation characteristics and field cultivation techniques, cultivation methods, quinoa varieties, plant density and irrigation methods. - Qinghai quinoa standard setting and definition: quinoa stock cultivar standard, seed quality, Qinghai quinoa commodity quality standardization and control, etc. - High-yield quinoa plantation technique: Effects produced by quinoa fertilization methods on capacity and soil productivity, quinoa no-tillage conservational planting techniques, local quinoa disease and pest green prevention technology, existing key issues and improvement measures during the planting process. - Quinoa premium stock cultivating technology: quinoa stock cultivating technology, on-field investigation of quinoa cultivar exemplar farm, analysis and discussion of quinoa seed quality and sprouting test result. - Quinoa primary processing technology control: quinoa mechanical plantation technology, quinoa primary processing technology control, and on-site inspection of quinoa processing techniques and devices. 	
Output 3	Draft policy for the development of quinoa whole industry chain in Qaidam Basin		
	Indicators	Target	Achieved
	Draft policy for the development of quinoa whole industry chain in Qaidam Basin.	1	Yes
Baseline	0		
Comments	Policy report with recommendations for quinoa value chain development in the Qaidam Basin was provided to Haixi Prefectural Government.		
Activity 3.1	Propose policy suggestions for the development of quinoa industry chain in Qaidam Basin, based on the baseline survey, impact assessment and comparative analysis of quinoa production, processing and market at home and abroad		
	Achieved	Yes	
	Comments	A policy report with recommendations for quinoa value chain development in the Qaidam Basin was provided to Haixi Prefectural Government.	
Activity 3.2	Organize project review meeting in combination with expert seminar or large-scale promotion activities, where possible		
	Achieved	Yes	
	Comments	The project's final review and consultation workshop was organized in Wulan County, Haixi Prefecture, Qinghai Province, from 26 to 27 September 2023, on the occasion of the local quinoa festival.	

Partnerships and Outreach

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

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