PEREZ-GUERRERO TRUST FUND FOR ECONOMIC AND TECHNICAL COOPERATION AMONG DEVELOPING COUNTRIES, MEMBERS OF THE GROUP OF 77

GOVERNMENT OF PEOPLE'S REPUBLIC OF CHINA

Final Report

On

The Technical Extension and Application of Sustainable Aquaculture in Namibia and Mozambique

FRESHWATER FISHERIES RESEARCH CENTER OF CHINESE ACADEMY OF FISHERY SCIENCES

JUNE 2014 WUXI, CHINA

I. Project Description

1. **Project Title:** The Technical Extension and Application of Sustainable Aquaculture in Namibia and Mozambique

2. **Abstract:** Aiming to help with the capacity building and sustainable industry development of aquaculture sector of Namibia and Mozambique, and with the support from Chinese government and Perez-Guerrero Trust Fund (PGTF), Freshwater Fisheries Research Center (FFRC) of Chinese Academy of Fishery Sciences, Ministry of Agriculture, P.R.China, successfully implemented "the Technical Extension and Application of Sustainable Aquaculture in Namibia and Mozambique" project during June 2013 to June 2014. The whole project was generally divided into three phases: first, second and third phase, respectively focusing on preparation, implementation and follow-up & evaluation. With the project, five aquaculture experts from FFRC were assigned to carry out on-site technical extension, training and consultation in Mozambique and Namibia, which, with expected outcome fully met, was highly appraised by both the beneficiaries and authorities for their devoted work, professional level and contributions to local aquaculture development as well as to poverty alleviation in the long run.

3. **Background and Rationale**: It is only in the last few decades that the development of aquaculture as a source of income and food has begun to be exploited in Africa. Although African fish consumption is relatively low, aquaculture production potential in Africa has been recognized by many experts worldwide. Yet, this potential remains largely untapped. Currently, with the decline in marine fish stock, aquaculture could be considered as one of the most important sectors in terms of contributing to food security and improved nutrition in-take. Aquaculture does not only provides animal protein but also makes a significant contribution to the process of improving social security through providing employment opportunities in the sector and increasing income of people, either directly or indirectly; therefore, aquaculture has attracted more and more attention in most of African countries.

   As far back as 2004, in the working plan of Namibia Government, inland fishery has been identified as the key industry supported by Namibia Government. Though the freshwater fishery resources in Namibia are very rich, the major farmed species are rather limited, with tilapia and catfish dominating. The aquaculture production grows year by year, but at a quite slow pace and with limited quantity, with marine sector exceeding one millions tons per year and freshwater sector less than 500 tons. Mozambique has an area of 13,000 km² inland waters which include a large number of rivers, lakes, reservoirs, dams and streams. In recent years, Mozambique government set out a five-year plan for developing aquaculture, hoping to improve the annual aquaculture production from 1000t to 2000t, and increase the farms from 2000 to 4000. The main cultured species include Mozambique tilapia, Nile tilapia, prawn and some freshwater fish induced, but generally, fish grows slowly and the production is low. Namibia and Mozambique have a lot in common in terms of the major constraints on their fishery development which are mainly centered on:

   a. Lack of quality seed and feed (Namibia has only one feed plant while

Mozambique relies on importing for commercial feed);
b. Lack of qualified and skilled human resources in the sector;
c. Poor aquaculture techniques, especially on artificial propagation, fish seed rearing, pellet feed production, adult fish culture, prevention and treatment of fish diseases, etc.;
d. Poor farm management;
e. Poor farm infrastructure;
f. Lack of fund for aquaculture and other projects.

In terms of global aquaculture production, China is the leader in world aquaculture production with about 43 million tons in 2014 (over 70 percent of world production). With a long history of fishery and aquaculture practices, China has accumulated advanced and practical techniques, theories, management modes, and industrialized system, especially since the reform and opening-up in 1970s. Regarding sustainable aquaculture development, China has matured experience and success stories and is willing to share with African countries.

II. Project Implementation

Initiated in June 2013, the project went smoothly and step-by-step till the successful completion in June 2014. The whole project can be generally divided into three phases: first, second and third phase, respectively focusing on preparation, implementation and follow-up & evaluation.

1. Phase One: Preparation, June-September, 2013

Mission group designation: Upon the granting of the project, FFRC set out to select the proper mission group members. After rounds of selection and discussion, a mission group composed of five experts was formed, lead by Prof. ZHU Jian, Chief of Division of Research Administration. The expertise fields of the group covered healthy aquaculture (technology and management), aquaculture of tilapia, catfish and Chinese carps, integrated fish farming, feed and nutrition, hatchery management, and aquaculture development plans, policies and strategies, etc.. All the members had experiences in international training, teaching and technical consultation.

Mission group members

Reference book series

Kick-off meeting

Reference book compilation: To facilitate the technical consultation and training, seven reference books were complied respectively on Common carp aquaculture, Integrated fish

farming, Site selection and pond construction, Tilapia breeding and aquaculture technology, Catfish breeding and farming, Fishery cooperative in China, and Healthy aquaculture. The compilation of the series was based on China's most advanced technologies and experiences, as well as the demand analysis accumulated during over 30-year's international training and communication with the target counterparts of Namibia and Mozambique.

Schedule discussion and refinement: After several rounds of coordinating and opinion exchanges, a detailed and reasonable schedule came into being which was later proved to be a feasible guideline and reference for fruitful daily work in both countries.

Others: Other preparing work included equipment purchasing, communication with counterparts for the settlement of training, meeting, travelling, accommodation, etc., and a kick-off meeting, among others.

2. Phase Two: Implementation, October-November, 2013

As the core part of the whole project, this phase began on 9 October when the mission group set out to travel to Namibia. Spending about two weeks in each country, the group carried out a series of activities according to the schedule to help the local people with aquaculture development through improved practices and management.

2.1 Baseline survey

Even though a lot of background information on the current aquaculture development of the target countries was collected during the preparing stage, efforts were made to learn more about what was currently most needed in local aquaculture development. With the help of the counterparts, respectively National Institute of Aquaculture Development (INAQUA), Ministry of Fisheries (MOF) in Mozambique and Department of Aquaculture (DOA) of Ministry of Fisheries and Marine Resources (MFMR) of Namibia, the mission group had survey meetings with related officials, especially extension officials for more information on managerial level and extension aspect. Highly valued by the governments of both Namibia and Mozambique, the mission group were received respectively by Mr. Herminio Lima Alberto Tembe, Permanent Secretary (PS) of MOF, Mozambique, and Ms. Ulitala M. Hiveluah, PS of MFMR, Namibia.

Meeting with Mr. Tembe, PS of MOF, Mozambique

Exchange with fishery officials of DOA

Meeting with Ms. Hiveluah, PS of MFMR, Namibia

2.2 Technical consultation

To make the technical consultation more scientific and practical, the group visited many local farms, hatcheries, experiment stations, etc. to get more authentic firsthand information on one side, and on the other side, to give more practical and feasible suggestions and guidance to the farmers and managerial personnel based on the real situation.

In Mozambique, the group successively visited Magid Tilapia Hatchery in Maputo province—a private hatchery owned by Mr. Magid, Margarida Guitunga Fish Farm, Unidade Fish Farm in GAZA province, certain small private farms and some project stations of INAQUA. While giving advices on how to solve the problems they were facing and to improve their aquaculture practices, the mission group also gave them certain fishery appliances brought from China such as water test kits, fish net, DO meters, etc. and taught them step-by-step how to use them.

Showing Mr. Magid et. All on how to use water quality test kit

Examining the fish feed quality used in Magid Tilapia Hatchery

Visiting a small-scaled fish farm in the suburb of Maputo

Exchanging with the manager of Gaza station of INAQUA

Demonstrating the application of DO meters to technicians

Exchanging with Mr. Mikosa on problems of his ponds

In Namibia, technical consultation was first carried out in the North West regions, where two of the research/extension centers of DOA were located, namely Ongwediva and Onavivi Inland Aquaculture Center (IAC). Centered around IAC, the group visited successively visited the local aquatic market and one processing plant for aquatic products, 3 national hatcheries and farms, and 4 small-scale fish farms in Oshana/Ohangwena region. Facing the difficulties encounters in these regions such as shortage of continuous water resources, slow growth, unidentified mortality, etc. the expert group gave professional advices. When it came to the low FCR (food conversion ratio), in order to figure out the fundamental reasons, the group paid a special visit to Onavivi Fish Feed Plant—the only one in Namibia and the major supplier for most of domestic fish farms— where they found that the low heating temperature of the feed machine caused the poor-cooked feed, which further led to the poor digestion and absorption of the feed. While in the North East, where

water resources are more available, the group visited the Kamutjonga Inland Fisheries Institute (KIFI) and 5 tilapia farms and hatcheries.

Visiting a private fish farmer in North west

A small fish farm for local unemployed females

Visiting Onavivi Fish Feed Plant

Local fish market in Namibia

Facilities in KIFI

Studying on water quality

2.3 Technical training

The need survey, study tours and consultation paved the way for the technical training to be more targeted toward what was really needed and applicable under the local conditions.

In Mozambique, with the assistance of INAQUA, two batches of trainings were organized for altogether 46 participants including local fishery technicians, extension officials, fish farmers, etc.; meanwhile, over 300 reference books were given out. Similar in Namibia, with two training sessions respectively in Ongwediva IAC and KIFI, 42 technicians, extension officials and farmers were trained mainly on healthy aquaculture, scientific aquaculture technologies, technical extension, etc. and about 300 reference books. Based on the different local conditions, actual problems and development levels, the training sessions differed also in terms of the difficulty level, teaching modules and contents. In Mozambique, the training was more focused on fundamental culture techniques, raw materials selection and analysis for fish feed, scientific feeding, fish farm management, etc., while in North East of Namibia, where aquaculture is relatively more developed, the training was divided into the following modules: pond design and preparation, brooder nursing, seed production, feeding techniques, water quality management and the diagnosis of parasite diseases.

The technical training integrated in-door lectures together with case study, simple lab works, demonstrations and outdoor practices, which were more effective and much easier for the trainees to understand and to apply, and gained high praise and positive feedbacks from both the participants and the local authorities.

Lecture in INAQUA

In-door training in Ongwediva IAC

Training session in KIFI

Labwork on disease diagnosis

Practice on catching brooders

Demonstration on instrument use

Handing out of reference books

Demonstration on pond cleaning

Hormone injection practice

2.4 Workshop on future cooperation

To further strengthen and broaden the cooperation between FFRC and the correlated parties of both Namibia and Mozambique, and based on what been learnt through the technical consultation and training activities, workshops on future cooperation were held to discuss and exchange on how to build a sustainable long-term cooperation. With all sides recognizing the necessity and possibility for further cooperation, a Memorandum of Understanding (MOU) was signed between FFRC and INAQUA with the following fields as cooperation priorities:

1. Training of fish farming communities: seed production, feed production, safety and quality control, Disease prevention and treatment, and Mariculture (fish and mollusks culture), etc.;
2. Collaborative research: management of brood stock and feed production, etc.;
3. Technical assistance: extension strategies, aquaculture information technology, etc..

Another one was signed between FFRC and MFMR, laying emphasis on the following field

for mutual cooperation in the near future:

1. Training on fish farming: seed production and hatchery management, feed development, pond management, disease prevention and treatment, technical extension and demonstration, freshwater prawn culture, etc.
2. Collaborative research: selective breeding and sex reversal control of tilapia, aqua-feed development and beneficiary bacterial development, etc.
3. Technical assistance and cooperation: design of new fish farming system, establishment of fishery technical demonstration bases and capacity building of research fellows, etc.

MOU discussing and drafting with INAQUA

Giving INAQUA instruments

MOU discussing and drafting with MFMR

2.5 Project evaluation

As the counterparts for the project, both INAQUA and DOF provided great assistance for the whole project implementation, without which, the implementation could not be carried out so smoothly and effectively. At the end of the technical consultation, both INAQUA and DOF gave the mission group very high evaluation on their devoted and painstaking work, the achievements they made, and the favorable feedback from most of the beneficiaries.

3. Phase Three: follow-up and project summary, December-November, 2014

Upon back from Africa, the mission group continued to keep in touch with the beneficiaries to follow up the effects of the implemented project. Much good news has been heard for example, the fish farmers being trained in North west Namibia have learnt how to ferment the raw manure to fertilize the pond and thus the water quality is turning better; the feeding techniques are well acquired and applied by many farmers and technicians, starting to fix the feeding time, place and quantity; among others. Based on the feedback and the actual implementation, the summary work including the financial summary and the whole project report, etc. has also been worked out to conclude the experiences and lessons for future project to draw on.

III. Financial Costs and Expenses

The uses and allocation of the project fund was strictly based on the financial budget, with a few adjustments according to the actual number of mission group members and that of participants of the training sessions. Each sum of money was spent in place, and all the process was under the monitor of the project leaders; FFRC financial staff have also evaluated and reviewed the project expenses.

Project fund expenditure

No.	Items	PGTF Fund	FFRC Fund	Total
1	Reference book compilation	US$1,000	US$2,000	US$3,000
2	Training & meeting of Chinese experts	US$1,000	US$1,000	US$2,000
3	International Travel fees of Chinese experts	US$5,000	US$8,000	US$13,000
4	Board and lodging for Chinese experts	0	US$16,000	US$16,000
5	Allowance for Chinese experts	US$5,000	US$5,000	US$10,000
6	Training fee for Chinese experts	0	US$5,000	US$5,000
7	Transportation for Chinese experts in Namibia and Mozambique	0	US$8,000	US$8,000
8	Travel tickets for farmers of Namibia and Mozambique	US$3,000	US$5,000	US$8,000
9	Board and lodging for farmers of Namibia and Mozambique	US$3,000	US$7,000	US$10,000
10	Pocket money for farmers of Namibia and Mozambique	US$3,000	US$3,000	US$6,000
11	Fees for training management	0	US$1,500	US$1,500
12	Training equipment purchase	US$1,000	US$2,500	US$3,500
13	Materials translating, editing, copying, printing, internet etc.	US$500	US$2,000	US$2,500
14	Wrap-up and report	0	US$1,000	US$1,000
15	Miscellaneous Component Total	US$500	US$500	US$1,000
	Total	**US$23,000**	**US$67,500**	**US$90,500**

IV. Over-all assessment

1. Project management and monitoring

FFRC attached high importance to this project and made great efforts in scientific managing to ensure the successful implementation, and strictly follow the high-quality & high-efficiency principle from mission group members section and training, reference book compiling, schedule designing, training contents, to risk management and safety guarantee. Besides, the Ministry of Agriculture of P.R. China gave much support and guidance on the project implementation, the Economic and Commercial Counsellor's Office of Chinese Embassy in the two countries provided valuable information and instructions regarding the

project, and the Ministry of Fisheries of Mozambique, Ministry of Fisheries and Marine Resources of Namibia and related departments and authorities greatly facilitated the whole implementation process.

2. Implementation

During the implementation, the mission group spared no efforts to help the local people with aquaculture development. Under the precondition to strictly follow the schedule, they managed to visit more fish farms, to give more professional advices, and to answer more questions from the training participants. They withstood the trail of the extreme hot weather, the tough long-distance travelling, the harsh living conditions especially in rural areas, the maladaptation of the environment…no one complained, but fully devoted every bit of energy to the work. With the assistance of local counterparts and the joint effort of group members, they conducted dozens of study tours in each country, four training sessions for 86 participants which is two times more than the expected number, and, successfully and effectively implemented the project with many favorable feedbacks and praises.

3. Outcomes and significances

Better understanding of the real needs of the two countries in aquaculture development: Having visited dozens of fish farms, hatcheries, institutions, plants, etc. in each country, the mission group collected valuable firsthand information on the current status of their aquaculture, the real demands and urgent needs for them to break the bottleneck in fishery industry, as well as the natural conditions and potentials for future development. All these would be used as important references for future training programs, cooperation, and exchanges which will be organized and implemented by FFRC.

Improved knowledge of local fish farmers and technicians on scientific fish farming: Through the on-site technical consultations and well-targeted training sessions, a lot of problems and difficulties have been solved, and scientific methods and techniques have been shared with the farmers and other beneficiaries, who, after the consultation and training, were much impressed with the simple and practical knowledge they learnt from the Chinese experts, for example: increased awareness of the importance of pond aeration, especially the pond bottom, mastered the simple way to measure the DO of pond water and the method to increase pond bottom DO with pipes; methods to ferment organic fertilizer and the proper applying time and quantity of it; how to tell the health status of fish through observing their behaviors, diagnosis some common fish diseases, and prevent diseases with simple methods such as applying VC, quicklime, etc.; other key techniques in scientific feeding, seed nursing, grow-out culture, hatchery and fish farm management.

Increased confidence of the managerial authorities to strengthen support on aquaculture: In recent years, the governments of Namibia and Mozambique began to pay high attention and attach great importance to aquaculture. Yet with the lack of qualified personnel, technology, financial support, undesirable natural conditions in some area, and market uncertainty, etc., they encountered many difficulties and frustrations, but with this project, the fishery officials for management and extension expressed that China's successful experiences in aquaculture development could be largely referred to and even

borrowed, they also wished for more technical assistance from China.

Promising future cooperation in fishery research, business and trading: With the MOU signed, all sides will spare no efforts to search and strive for opportunity to put the MOU into practice. Besides, during the implementation, upon the local need and request, the mission group helped to get in touch with some famous fishery enterprises in China, especially of fish feed, fishery machine and feed machine, and negotiation between interested parties in the two countries and those enterprises are right now on-going toward promising cooperation.

Published papers and strengthened friendship: Based on the information collected during the consultation, 4 academic paper have been written respectively on aquaculture status in Namibia, aquaculture status in Mozambique, suggestions on fishery cooperation with Namibia and Mozambique, and fishery cooperatives in the two countries, of which 2 have been published and the others under review. Another important benefit brought by this project would be the strengthened friendship, which laid solid foundation for further communication and cooperation between each part in fishery and aquaculture.

Appendix

1. Schedule of the Technical Extension and Application of Sustainable Aquaculture in Namibia and Mozambique
2. Evaluation of MFMR on the project implementation
3. MOU between INAQUA and FFRC
4. MOU between DOA/MRMR and FFRC
5. Name list of mission group members

Appendix 1

Schedule of the Technical Extension and Application of Sustainable Aquaculture in Namibia and Mozambique

Date/Day	Time	Activity	Notes
Oct 9-10	All day	Travel from Wuxi, China Arriving at Johannesburg, South Africa Visiting NEPAD, meeting with fisher officials	
Oct 11	09:00 11:00 14:00	Travel to National Institute of Aquaculture in Mozambique, Meeting with fishery officials and Mrs. Isabel Omar; Opening session; Orientations	Responsible person: Mrs. Isabel Omar
Oct 12-13	All day	(Sat & Sun) Break	
Oct 14	Morning	Debriefing to the Chinese Embassy in Maputo	Experts
Oct.15-16	All day	Visit to the provincial or district fishery extension services and education institutions; Preparing of the training manuals; Training and seminar (I) for fishery managers and extensionists	Mr. Alcino Justino Chemane
Oct 17-18	All day	Farm visits (private and collective) and consultations	Ditto
Oct 19-20	All day	(Sat & Sun) Day off	
Oct 21-22	All day	Preparing of the training manuals and venue Training and seminar (II) for fish farmers	Ditto
Oct 23-24	All day	Meeting with fishery officials and debriefing of the collaboration programs in the future; Wrapping up with project proposal	Ditto
Oct 25	Morning	Submission of the collaboration program to the Chinese Embassy in Maputo (Bilateral proposal with signed MOA)	Ditto
Oct 26	All day	Departure for Namibia	

Oct 27	All day	Weekend break	Klein WHK Guest House
Oct 28	09:00 11:00 14:30	Morning: Briefing Meeting at MFMR Courtesy call at Permanent Secretary office Afternoon: Visit to the Embassy of China in WHK	Ms P Elago and the experts team
Oct 29		Travel by road to North West regions (+-700)	Ongwediva Town Lodge Africa Staud Haus
Oct 30	08:00 10:00 12:00 14:30	Visit the Ongwediva Inland Aquaculture Center (IAC) & Brief on Center Training session: Introduction on Technological supports to Chinese aquaculture Introduction on Fishery and aquaculture development in Namibia by Namibia expert Meeting with extensionists in the region	Ms P Elago All experts; Technicians & Biologist By Prof Zhu Jian By Ms P Elago
Oct 31	08:00 13:30	Study tour on fishery and aquaculture development around Oshana/Ohangwena regions Technical meeting on the envisaged consultation/program of the following days	Ms P Elago; Mr A Ngulu All experts Extension services personnel in NW
Nov 01	All day	Site visits - Ongwediva, Onavivi & Epalela, Fish Farmers visits around NW Model fish farmers initiative	Ms P Elago Experts Extension services personnel in NW
Nov 02		Break	
Nov 03 - 04		2 day Seminar session for Oshana, Ohangwena, Oshikoto r Omusati & Kunene small scale farmers and Extension services team; Training in topics of Tilapia farming, Catfish farming, Healthy Management, Integrated Fish Farming, Technical Extension and Demonstration, Fishery Cooperative Organization	Ongwediva IAC boardroom Experts Extension services personnel in NW
Nov 05		Travel to North East by Road	

Nov 06		Meeting with Rundu staff on extension services Day visit to Cooperative farm (Mpungu Fish Farm) and small scale Fish farmers	Ms P Elago Mr A Ngulu / A Joseph Experts Extension services personnel in Rundu
Nov 07-08		Day session & visit to the Kamutjonga Inland Fisheries Institute (KIFI) Training session of extension services officers Training topics include Aquaculture management; Technical Extension and Demonstration, Tilapia farming, Catfish farming, Healthy Management, Fishery Cooperative Organization	1 day session with technicians and biologists at KIFI Extension services in Rundu
Nov 09		Travel back to Windhoek	
Nov 10	08:00 10:00 11:30	Discussing and drafting Memorandum of Understanding on the Cooperation De-briefing, Wrap up meeting with Directorate of Aquaculture headquarters Signing Memorandum of Understanding on the Cooperation, at Permanent Secretary Office	Ms P Elago Experts Officials, Directorate of Aquaculture headquarters

Appendix 2

Evaluation on the Implementation of the Project "Technical Extension and Application of Sustainable Aquaculture in Namibia" Ministry of Fisheries and Marine Resources, Namibia

The project of Technical Cooperation and Consultation on Aquaculture in Namibia financed by Ministry of Agriculture, China, has been successfully implemented in 2013 by the 4-expert delegation from Freshwater Fisheries Research Center, Chinese Academy of Fishery Sciences (FFRC/CAFS).

With the assistance from the Ministry of Fisheries and Marine Resources, Namibia (MFMR), the Chinese experts have conducted technical trainings and consultations based on local situations and demands, respectively in northwest region, northeast region and south part of Namibia. About 90 fishery officers, technicians and farmers from 14 aquaculture centers, fishery institutes and fish farms have participated in the trainings and benefited a lot from it. Feedbacks from these beneficiaries make the ministry realize that this kind of technical training and consultation is of great practical importance to the aquaculture development in Namibia. The Ministry will take measures to promote the application of what they have learnt in the training and consultation.

With the cooperation potential been highly recognized, the Ministry looks forward to further joint efforts in capacity building, collaborative research and academic exchanges in fields of seed production, feed development, etc. between Namibia and China.

Appendix 3

REPUBLIC OF MOZAMBIQUE

MINISTRY OF FISHERIES

MEMORANDUM OF UNDESTANDING

BETWEEN

National Institute for Aquaculture Development (INAQUA), Herein after designed first signatory**,** located in Maputo, Rua Consiglier Pedroso, n° 347, 2nd floor, represented by Maria Isabel Omar, National Director;

And

Freshwater Fisheries Research Center, Chinese Academy of Fishery Sciences (FFRC/CAFS), Hereinafter designed second signatory, located in Wuxi, China, represented by Prof. Xu Pao, Director;

Considering the cooperation programme between the Government of Mozambique and the Government of China, special attention has been given to the factors that create good environment for the implementation of such cooperation aim.

Therefore, aiming at establishing a cooperation relationship and technical scientific information exchange, between both signatories have agreed to sign the present Memorandum of Understanding which will be based on following articles:

First Article

(Object)

This instrument aims at establishing and regulating the terms and conditions that will govern the institutional cooperation, exchange and collaboration between INAQUA and FFRC.

The implementation of activities in the context of assisting on simple but effective aquaculture technologies, management and aquaculture development aspects in the preparation efficient self-reliant aquaculture activities are the objects of this memorandum.

Second Article

(Cooperation Areas)

The cooperation, exchange and collaboration areas will focus on the following:

4. Training of fish farming communities: seed production, feed production, safety and quality control, Disease prevention and treatment, and Mariculture (fish and mollusks culture), etc.
5. Collaborative research: management of broodstock and feed production, etc.
6. Technical assistance: extension strategies, aquaculture information technology, etc.

Third Article

(Parties Obligations)

1. The FFRC undertakes the responsibilities for training, research and technical assistance with the supports from Governments, International organization, etc.

Forth article

(Follow up)

1. INAQUA should follow implementation of this memorandum by the department of technology and extension.

Fifth Article

(Modifications and rescission)

1. This memorandum can be changed by written expressed request of one of the two parties and agreed by both parties. That will constitute an addendum to this memorandum.
2. In case of the present memorandum rescission by one of the two parties it should be expressed within 90 days.

Sixth Article

(Duration)

The present memorandum is valid for two years, automatically renewable, unless has been expressed by one of the parties.

Seventh Article

(Final Dispositions)

1. The present memorandum is written in English and two original copies containing the same contents, and both parties should hold one copy.

The present memorandum of understanding has effects from the signed dates.

Appendix 4

Republic of Namibia

Ministry of Fisheries and Marine Resources

MEMORANDUM OF UNDESTANDING

BETWEEN

Directorate of Aquaculture, Ministry of Fisheries and Marine Resources (DOA/MFMR), Herein after designed as first signatory**,** located in Brendan Simbwaye Square, Uhland Street, Windhoek, represented by Moses Maurihungirire, Director;

And

Freshwater Fisheries Research Center, Chinese Academy of Fisheries Sciences (FFRC/CAFS), Hereinafter designed as second signatory, located in Wuxi, China, represented by Prof. Xu Pao, Director;

Considering the cooperation programme between the Government of Namibia and the Government of China, special attention has been given to the factors that create good environment for the implementation of such cooperation aim.

Therefore, aiming at establishing a cooperation relationship and technical scientific information exchange, between both signatories have agreed to sign the present Memorandum of Understanding which will be based on following articles:

First Article

(Object)

This instrument aims at establishing and regulating the terms and conditions that will govern the institutional cooperation, exchange and collaboration between DOA/MFMR and FFRC.

The implementation of activities in the context of assisting on simple but effective aquaculture technologies, management and aquaculture development aspects in the preparation efficient self-reliant aquaculture activities are the objects of this memorandum.

Second Article

(Cooperation Areas)

The cooperation, exchange and collaboration areas will focus on the following:

7. **Training on fish farming:** seed production and hatchery management, feed development, pond management, disease prevention and treatment, technical extension and demonstration, freshwater prawn culture, etc.

8. **Collaborative research:** selective breeding and sex reversal control of tilapia, aqua-feed development and beneficiary bacterial development, etc.
9. **Technical assistance and cooperation:** design of new fish farming system, establishment of fishery technical demonstration bases and capacity building of research fellows, etc.

Third Article

(Parties Obligations)

2. The FFRC undertakes the responsibilities for training, research and technical assistance with the supports from Governments, international organizations, etc.
3. DOA/MFMR should provide the necessary supports for the implementation of this memorandum.

Forth Article

(Modifications and Rescission)

3. This memorandum can be changed by written expressed request of one of the two parties and agreed by both parties. That will constitute an addendum to this memorandum.
4. In case of the present memorandum rescission by one of the two parties it should be expressed within 90 days.

Fifth Article

(Duration)

The present memorandum is valid for two years, automatically renewable, unless has been expressed by one of the parties.

Sixth Article

(Final Dispositions)

2. The present memorandum is written in English and two original copies containing the same contents, and both parties should hold one copy.
3. The present memorandum of understanding has effects from the signed date.

Appendix 5

Name list of mission group members

Name	Position	Expertise field
ZHU Jian	Researcher/Chief of Chief of Division of Research Administration	Management on fishery science & management, breeding and culture technology of carps
HE Yijin	Assistant researcher/Deputy chief of Division of Technology Extension	Healthy aquaculture technology and management
HE Jie	Assistant researcher	Breeding and culture of tilapia, African catfish aquaculture
JING Xiaojun	Deputy Chief of Training & Education Division (TED), FFRC	Integrated fish farming, fish farm planning & design
ZHANG Lin	International Program Officer, TED, FFRC	Fishery Cooperatives, aquaculture technology extension