Republic of Malawi

Ex-Post Evaluation of Japanese Technical Cooperation Project

"The Project on Aquaculture Research & Technical Development of Malawian Indigenous Species"

External Evaluator:
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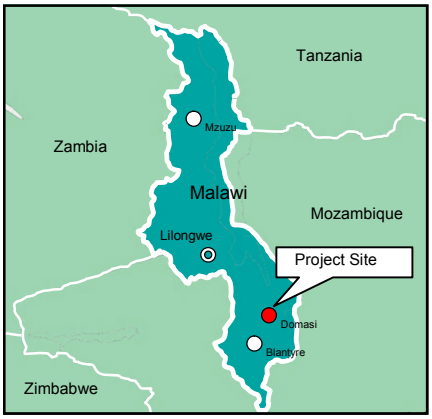
1. Project Description



Project Locations

Fish Pond in National Aquaculture Center (NAC)

1.1 Background

Malawi, a landlocked country in southeastern Africa, has a population of 13 million (as of 2010) and an area equivalent to the combined area of Hokkaido and Kyushu in Japan. Abo ut a fifth of the land is taken up by lakes and marshes; thus, the country is known for its thriving inland fisheries. Since Malawians get some 70% of their animal protein from aquatic resources, Malawi's fishing industry plays an important role in the nation's dietary life.

Meanwhile, since the 1990s, as a result of overfishing and drought, etc., fish catches in Lake Malawi, Lake Malombe, Lake Chilwa, and other large lakes have shown a declining trend. In addition to the concern over the depletion of aquatic resources in lakes, the deterioration of bio-habitats is also feared, as reflected in the total ban on the introduction of alien species in 1992, in order to protect species indigenous to Lake Malawi.

Under these conditions, aquaculture has begun to attract attention as an alternative solution to fishing in lakes. In response to a request made by the Government of Malawi, since 1996, JICA has implemented a "project-type" technical cooperation titled "The Research Project for Small-Scale Aquaculture of Malawian Indigenous Species". Given the attainment of initial goals, including the granting of basic fish-farming techniques, the improvement of the research environment, and the selection of fish species suitable for

farming, in September 1997, based on the output achieved in the research project, the Government of Malawi requested a new technical cooperation project to develop fish-farming techniques.

1.2 Project Outline

Overall Goal	To establish appropriate fish-farming techniques in Malawi
Project Objective	1. To establish seed production techniques for new aquaculture species 2. To establish appropriate fish-farming techniques for existing species
Outputs	1.1 Reproductive ecology and spawning habits of new species are clarified. 1.2 Brood stock rearing techniques of new species are established. 1.3 Induced spawning and larvae rearing techniques for new species are established. 2.1 Appropriate species and farming methods for variable physical, technical and socio-economic conditions are clarified. 2.2 Constant seed production of the Clariid catfish is achieved. 2.3 Techniques developed at the NAC are verified at selected fish farms. 2.4 Farmer's willingness and interest in fish-farming is promoted. 3. Mechanism to continue activities that initiated by the project is established.
Inputs	Japanese Side: 1. Experts: 27 experts in total For Long-Term: 14 experts, For Short-Term: 13 experts 2. Trainees received: 22 trainees 3. Trainees for Third-Country Training Programs: 2 trainees (Dispatched to the Philippines) 4. Equipment: 59.8 million yen (for April 1999 to March 2004) 5. Local Cost: 69.1 million yen (for April 1999 to March 2004), 16.5 million Malawi Kwacha (for May 2004 to May 2006) 6. Others (incl. dispatch of related missions): N/A Malawian Side: 1. 21 Counterparts in total 2. Equipment: Vehicle, Computer, Office equipment, etc. 3. Land and Facilities, Project Office and Utilities: Project site (34 ha.), Project office, Hatchery, etc.

	4. Local Cost: 19.45 million Malawi Kwacha (as a supplemental budget for expenses of the project)
Total Cost	892.54 million yen
Period of Cooperation	April 1999–May 2006 (including the extended period from May 2004 to May 2006)
Executing Agency	Department of Fisheries, Ministry of Natural Resources and Environmental Affairs (at the commencement of the project, currently under the Ministry of Agriculture)
Cooperation Agency in Japan	Tokyo University of Fisheries, Kochi University, etc.
Related Projects	The Research Project for Small-Scale Aquaculture of Malawian Indigenous Species (Apr.1996 to Mar.1999) The Master Plan Study on Aquaculture Development in Malawi (Dec.2002 to Jul.2005) Advisor on Aquaculture Development Planning (2007 to 2009)

1.3 Outline of the Terminal Evaluation[1]

1.3.1 Achievement of Overall Goal

Technical and institutional capacity of National Aquaculture Center (NAC) has been strengthened. Although some restricted circumstances still exist, appropriate aquaculture method for existing aquaculture species has been newly established in Malawi. The project has significantly contributed to enhance the willingness of small-holder farmers located in the vicinity of selected farmers[2], thus proving the great possibility of dissemination of aquaculture in small-holder farmers in Malawi.

1.3.2 Achievement of Project Objective

It is judged that the project objectives are mostly achieved. Seed production techniques for new aquaculture species are largely established on the ground that the project has produced seed of four new species with approximately 70% of survival rate. In addition, since the productivity of Tilapia as existing aquaculture species shows an increasing trend, the second objective of the project has been achieved.

1.3.3 Recommendations

Three recommendations for the period up to 2004 (the original completion year of the project) and two recommendations for the period after 2004 were provided.

[1] In the terminal evaluation, the extended period from 2004 to 2006 was not included in its evaluation although this post evaluation study covers all the project period including the extended one. Here, the results of terminal evaluation only for the original period from 1999 to 2004 are described.

[2] For details on selected farmers, see Section 3.2.1.6.

For the remaining period up to 2004

- The project should refine rearing techniques for existing aquaculture species that can yield acceptance production with less input using locally available manure for small-holder farmers.
- The project should improve dissemination and transfer of knowledge generated by the project widely to the small-holder farmers and aquaculture related institutions.
- The project should enhance active collaboration with other organizations engaged in aquaculture related research and technical development, including those related to Chambo Restoration Strategic Plan.

For the period after 2004

- The government of Malawi should establish self-revenue generation system for necessary activities in NAC, and maintain at least the current level human resources.
- Both governments of Malawi and Japan should immediately commence consultation on the framework of further assistance based on the project results for aquaculture development and improvement of livelihood of the small-holder farmers.

2. Outline of the Evaluation Study

2.1 External Evaluator

Hajime Onishi (Mitsubishi UFJ Research & Consulting Co., Ltd.)

2.2 Duration of Evaluation Study

The following study was conducted for the ex-post evaluation.

Duration of the Study: January 2010–November 2010

Duration of the Field Study: April 25, 2010–May 9, 2010, July 22, 2010–July 30, 2010

2.3 Constraints during the Evaluation Study

The existence of a report prepared by long- and short-term experts dispatched to Malawi from April 1999 to March 2004, that is, during the term of the project, could neither be ascertained nor obtained for this evaluation. Consequently, information regarding the same period was based on four sources: operating guidance reports, (2) terminal evaluation reports, (3) interviews with Malawian counterparts, and (4) interviews with those on the Japanese side[3,4].

[3] In this post evaluation study, i) interviews with government officials (including Malawian counterparts), ii) site investigation (including interviews with farmers at both Domasi and Chingale districts as the target region of the project), iii) beneficiary survey (implemented through a face-to-face interview) are conducted.

[4] The details of the beneficiary survey are as follows:

- Sampling method: Two-stage stratified random sampling
- Number of Samples: 110 samples in total (74 for direct beneficiaries (selected farmers of the project), 25 for indirect beneficiary farmers, 5 for fish farmers who are irrelevant to the project, and 6 for

3. Results of the Evaluation (Overall Rating: C)

3.1 Relevance (Rating: a)

3.1.1 Relevance with the Development Plan of Malawi

(1) Consistency with the national policy

At the time the project was planned in 1999, "poverty reduction", "food security", "sustainable growth", and the "reduction of the disparity between the rich and the poor" were designated as goals in Malawi Vision 2020. In connection to this, the Malawian government set up as one of its priority strategies for achieving these objectives a plan for the "Short- and Mid-Term Development and Growth of Small-Scale Agriculture". While there is no specific mention of fish-farming techniques in Malawi Vision 2020, the overall goal of the project, "developing appropriate fish-farming techniques", ultimately leads to the improvement of the livelihood and nourishment of poor farmers by disseminating knowledge regarding self-sufficient fish-farming and to improved techniques for raising freshwater fish—the Malawian people's main source of animal protein. Thus, there is a certain consistency between the objectives of Malawi Vision 2020 and those of the project.

In 2006, when the project ended, "poverty reduction", "food security", and "improvement in nutrition" continued to be regarded as goals in the Malawi Growth and Development Strategy (MGDS 2006/07–2010/11). Consequently, there was no significant change in the direction of the country's policy. On the other hand, since the MGDS aspires to reduce poverty through economic growth, its approach is different from that of the aforementioned Malawi Vision 2020.[5] According to the logic indicated above, while a certain degree of consistency between the ultimate objectives of the country policy and the overall goal of the project is ensured, there are some differences in the way the two sides intend to achieve them.

(2) Consistency with fishery sector development strategies

At the time of the 1999 plan, in the (1) Fishing Resources Conservation Law (enacted in 1997), the provision of a relevant legal system was emphasized, with the "development of aquaculture" as a priority objective. Along with "promotion of investment in aquaculture in rural areas", "development of new fisheries resources" was regarded as a priority issue in the (2) Fisheries Management and Fish-Farming Policy (formulated in 1999). These objectives are therefore consistent with the overall goal and project purposes.

In 2006, when the project ended (2006), since the policy of "improving Chambo

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farmers who are not involved in fish farming nor relevant to the project)

・ Locations of survey: Chingale, Chididi and Domasi

[5] This point can also be inferred from the fact that the Presidential Initiative on Aquaculture Development (PIAD) 2006–2011, a fisheries sector policy described later, aspires to ensure food security through the promotion of small- to medium-sized commercial enterprises.

farming techniques" is enshrined in the (3) Strategy to Restore Chambo[6] Resources 2003–2015 (formulated in 2003), and since Chambo is a species targeted in the project, it is consistent with one of the project purposes, namely, the development of appropriate fish-farming techniques to increase the population of existing cultured fish species.

Under the leadership of Bingu wa Mutharika, President of Malawi, the (4) Presidential Initiative on Aquaculture Development (PIAD) 2006–2011 set a target for "increasing the production of fish-farming ten-fold by promoting commercial fish-farming", with the development of an elite seed as the main strategy. Under this presidential initiative, a complete change took place from the policy of "developing and disseminating self-sufficient fish-farming by small-holder farmers", which had been the main focus of the government's sector policy up to then, to one of: (1) effectively utilizing the large-scale seed production facilities at the NAC and elsewhere, and (2) disseminating commercial fish-farming techniques on pilot farms. Although some of the facilities and equipment provided under the project are being used in carrying out these activities, the thrust of these activities is a policy change from one stressing self-sufficient fish-farming toward one stressing commercial fish-farming. As such, a slight discrepancy is beginning to appear between these activities being undertaken at the initiative of President Mutharika and those carried out under the project.[7]

3.1.2 Relevance with the Development Needs of Malawi

At the time of the 1999 plan, the sharp reduction in Chambo catches, the main source of protein for the Malawian people, was acknowledged, and therefore, the search for a new source of nourishment through the development of fish-farming became a pressing issue. In this sense, it is easy to imagine that the need for research and development related to fish-farming in general was high.

At the time, the project ended in 2006, although the gross production of inland water fisheries was not on a decreasing trend, the sharp decline in reserves of fish species with high edible value was recognized. Thus, there continues to be a need for the research and development of new sources of nourishment through the development of aquaculture.

3.1.3 Relevance with Japan's ODA Policy

Both at the time of planning in 1999 and upon conclusion in 2006, Japan set out to "increase food production" and "increase food security" as priority areas in its assistance to Malawi. While there is no specific description of inland water fisheries, as stated earlier, the overall goal of the project ultimately lead to the improvement of the living standard and nutrition of poor farmers by improving Malawi's production efficiency of

[6] "Chambo" is the local name of a member of the Tilapia family.
[7] Of course, under this initiative, the spread of self-sufficient fish-farming to small-holder farmers is not considered less serious; rather, its importance as a means of improving livelihood continues to be recognized.

fish farming of freshwater fish, which is the main source of animal protein for Malawians. Therefore, the direction of the Japanese government is consistent with that of the project to a certain extent.

To sum it up, while a certain degree of consistency between the basic strategy of Malawi's priority measures and the goal of the project is guaranteed, the two sides use somewhat different approaches to achieve their similar objectives. Additionally, in terms of sector policy, a policy conversion of sorts has occurred, moving away from emphasis on self-sufficient fish-farming to emphasis on commercial fish-farming at around the completion of the project, implying that a discrepancy is beginning to appear between the project purpose and policies of Malawi in terms of methods chosen to realize their respective policy objectives. However, this does not mean that the dissemination of self-sufficient fish-farming to small-holder farmers is being less emphasized in the country's priority measures and fisheries sector policies. Rather, its importance as a means of improving for the livelihood of small-holder farmers is well recognized. Additionally, there exists a need to research and develop new sources of nourishment by developing fish-farming.

As a conclusion, the project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness (Rating: b)

Evaluation of the project's effectiveness was made comprehensively by assessing the following three perspectives: (1) whether the prescribed outputs (in the case of the project, seven outputs ranging from Output 1.1 to Output 2.4; details of each output is discussed below) were obtained, (2) whether each of the said outputs contributed to the process of realizing the project objectives, and (3) whether the project objectives were achieved through (1) and (2).

3.2.1 Project Outputs

3.2.1.1 Output 1.1: Reproductive ecology and spawning habits of new species are clarified.

The following indicator was set up to confirm the achievement rate of this output: "For at least two fish species, the spawning season and the factors that spur fish to produce eggs will be clarified by March 2004." From the field survey conducted for this evaluation, it became clear that the NAC, Japan's counterpart, was keenly aware of the following four points:[8]

・ By March 2004, the spawning season of four new cultured fish species (Mpasa,

[8] Based on responses given to the questionnaire administered at the NAC and on results of the hearings conducted with four counterparts who were staff members of the NAC at the time the project was being implemented

Nin-gui, Ntchila, and Thamba) was ascertained.

- Through various experiments, water temperature was revealed to be one of the factors that spur female fish to spawn.
- However, no clear understanding about the reproductive ecology of the four new cultured species was achieved. (Although the spawning season of four species was clarified, the reproductive ecology and life history of these species were not well understood[9].)
- The breeding ecology such as the reproductive ecology and life history was not much clarified, thus affecting various activities in the subsequent stage.

As of May 2006, when the project ended, the spawning seasons of the four new species has been ascertained, although the breeding ecology (including reproductive ecology and life history) of the four species has not been clarified entirely. Consequently, it was concluded that "the spawning ecology of the newly farmed species has not been fully clarified."[10]

3.2.1.2 Output 1.2: Broodstock rearing techniques of new species are established.

Regarding this output, the following indicator was established: "For at least two of the four species, stable production of broodstock will be realized by March 2004." The following facts came to light at the NAC hearings held as part of the field survey:

- By March 2004, broodstock were successfully bred from immature fish naturally harvested from the four newly farmed species (Mpasa, Nin-gui, Ntchila, and Thamba).
- Stable production of three species (Nin-gui, Ntchila, and Thamba) was realized.
- A certain number of the broodstock of the abovementioned three species were retained by the NAC.

Consequently, it was concluded that "the technique for cultivating broodstock of the three new aquaculture species is now established to a certain extent."[11]

3.2.1.3 Output 1.3: Induced spawning and larvae rearing techniques for new species are established.

Regarding this output, the following indicator was established: "For at least two of the four new cultured species (Mpasa, Nin-gui, Ntchila, and Thamba), a seed production manual was compiled by March 2004. Further, for at least two of the species, seedlings

[9] The terminal evaluation report describes that clarifying Nchila's growth and maturing process under natural breeding conditions was especially difficult.

[10] In the terminal evaluation report compiled in 2004, it is stated that "the spawning seasons of the four newly cultured species were ascertained and that in three of the four species, warm water was one of the factors that induced spawning. Thus, the prescribed output was obtained." Nevertheless, there is no mention of whether the reproductive ecology has been clarified in its entirety.

[11] The same judgment was made in the terminal evaluation.

will be produced in fingerlings in accordance with the procedure described in the manual." Meanwhile, the following facts came to light in the NAC hearings:

- The English term for fish that have just come out of eggs is "fry" or "larvae", and that for young fish is "fingerlings".[12]
- The biggest technical challenge in seed production is "how to provide fodder to larvae fish at the initial stage in the feeding process and nurture them to fingerlings." In short, the challenge is "how to raise the survival rate from larvae to fingerlings."
- According to the NAC, only Ntchila and Thamba were successfully raised to fingerlings by March 2004. Regarding seed production of these two species, while they were successfully raised, it took a long time to raise them to a size large enough to be marketed (even longer than the existing cultured fish, Tilapia) such that, if various costs are considered, it has to be concluded that the possibility of disseminating them to farmers was quite low. For this reason, during the extended period from May 2004 to May 2006,[13] only existing cultured species—none of the newly cultured species—were targeted for dissemination.
- As for the seed production manual for the new aquaculture species, a manual common to all four has already been compiled.[14]

Summing up the above facts, the common manual on the seed production of the four species was prepared by March 2004, and the seed production of Ntchila and Thamba was successfully achieved. However, these two species were excluded from the candidate species for extension activities to be conducted at the later stage, mainly because of economic reasons, whereas breeding techniques were developed at the laboratory level. Moreover, there is also the issue about how to interpret the survival rate which is the criterion for judging the extent to which a seed production technique is considered established[15], thus it is distinctly difficult to conclude that the prescribed output was obtained.

3.2.1.4 Output 2.1: Appropriate species and farming methods for variable physical, technical, and socio-economic conditions are clarified.

Many unknowns still remain regarding the adequacy of cultured fish species and

[12] Larvae fish refer to fish freshly hatched; fingerlings are about the size of a human finger.
[13] For more details on the reason for the extension and the actual extended period, see Section 3.3.1.3 below.
[14] Given the difficulty of understanding the contents of the manual, at present, the staff at the Department of Fisheries (DOF) is currently preparing a revised edition to make the manual more user-friendly. Before the end of 2010, 3,000 copies of the revised edition are slated to be distributed to farmers. The DOF gives the following reason for the revision: "The writing is too technical. The manual has to be written in a way that ordinary farmers can easily understand." (Source: Results of an interview conducted at DOF)
[15] In the terminal evaluation report compiled in 2004, it is stated that "the average survival rate of juveniles reached 70%." However, since "juveniles" refers to larval fish several days after hatching, and as referred to above, no matter how high the fry/larvae survival rate is raised, it means nothing if they are not raised to fingerlings. Consequently, the survival rate of juveniles may not be a suitable criterion for evaluating the level of seed production techniques.

fish-farming methods. Thus, research in this field continues as of 2010. The main perceptions and outputs regarding fish-farming methods that came to light during the implementation of the project consist of the following:

- Clarification of the relationship between the depth of the aquaculture pond and degree of growth (The rate of growth is faster when the water depth exceeds one meter. This finding was disseminated throughout Malawi as the project's highest output.);
- Confirmation of the superiority of the mono-sex culture method (Enhanced productivity was realized by raising male fingerlings only.); and
- Development of appropriate fertilization technology using a method appropriate for the actual condition of farms (poultry manure, etc.).

From the foregoing, given that uncertainties about appropriate fish species and farming methods still exist, the conclusion is that the degree of achievement of prescribed output was limited. On the other hand, a large number of groundbreaking perceptions were gained concerning fish-farming methods as a result of the research and development efforts made under the project. As referenced above, some of the perceptions gained in the project have been disseminated throughout Malawi. That said, unless there are constraints, it would be desirable to disseminate these perceptions as the "output of the project". Therefore, it would be desirable for interested parties to promote advocacy activities along these lines.

The following recommendation was made in the terminal evaluation (before the completion of the project): "Seek low-investment and low-cost fish-farming techniques that can be applied by small-scale farms by employing fertilizer available to local people." In this regard, specific dissemination activity based on the aforementioned three perceptions was carried out during the extended period of the project from May 2004 to May 2006.

3.2.1.5 Output 2.2: Constant seed production of the Clariid catfish is achieved.

Two indicators were established regarding this output: "By March 2004, (1) an average of at least 100,000 fingerlings a year would be produced, and (2) a seed production manual on the Clariid catfish will be compiled and seed production would be undertaken in accordance with said manual."

Regarding these indicators, it was confirmed through the hearings on the NAC that a seed production manual on the Clariid catfish was compiled, and that stable seed production techniques for farming this catfish would be established by March 2004. While the production volume of fingerlings was set at 14,000 in 2004, the NAC side stated: "Although our production capacity was adequate, the lack of demand prevented us from further production."[16] While doubts may remain about the relevance of setting an average

[16] In the terminal report, "the delay in the construction of the seed production facilities" is cited as another

annual production of 100,000 fingerlings as an indicator, given the actual annualized production volume of 67,000[17] as of 2010, the NAC's explanation was: "While there was capacity for production, the production volume remained low due to lack of demand."

From the foregoing, it is concluded that "constant seed production of the Clariid catfish is achieved."[18]

3.2.1.6 Output 2.3: Techniques developed at the NAC are verified at selected fish farms.

(1) Achievements involving this output and the facts

The various activities involved in the technical demonstration were carried out at selected fish farms during the period between 2002 and 2004.[19] As a result, two factors limiting the dissemination of fish-farming techniques (water leakage in the pond and insufficient amount of sources of nitrogen) were identified, and the real growth potential and reproductive behavior (spawning and fingerling production) of *Oreochromis shiranus* and *Tilapia rendalli* under two conditions—mixed-sex culture and mono-sex culture—were clarified.

In light of the above discussion, during the project's extended period between 2004 and 2006, along with dissemination activities, technique development tests and on-farm research were continued at the selected fish farms, and, targeting the three Tilapia species (*Oreochromis shiranus*, *Oreochromis karongae*, and *Tilapia rendalli*): (1) mix culture tests with the Clariid catfish were administered, (2) the reproduction behavior was clarified, and (3) research for the applicability of animal manure to fish-farming was carried out.

The various activities related to the technical demonstration that got started in 2002 turned out to involve Activities 2.3.1–2.3.5 prescribed in the Project Design Matrix (PDM), and various on-farm research on the techniques developed at the NAC were administered at selected fish farms.[20]

(2) Conclusion

While "a production objective of each fish species for each fish-farming method", which was the indicator of this output, was not established, for the facts referred to above, it is concluded that "the techniques developed by the NAC were verified at selected fish

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factor responsible for the failure to reach the production goal.

[17] Source: Results of a hearing held at the NAC

[18] Regarding the fact that "the production of the fingerlings of the alternative species, thamba, reached 100,000 per annum", since it is unclear whether there is technical interchangeability between the seed production method of thamba and the Clariid catfish, it is believed to be a bit difficult to evaluate Output 2.2 using the actual result of fingerling production of thamba as a criterion.

[19] Farms were first selected during the period between 2002 and 2004 as follows: (1) 12 individual farms, (2) four groups of farms, (3) two churches, (4) two schools, and (5) satellite stations operated by the NAC (located in Chinsue and Chisitu in the suburb of Zomba). During the extended period between 2004 and 2006, the number of targeted farms increased (to 30 individual farms and 15 group farms). Specific dissemination activities were carried out by the farms selected from 2002 to 2004 and those selected during from 2004 to 2006.

[20] The number of fish farms in the targeted areas expanded from nine in March 2004 to 46 in July 2010. (Source: Results of a hearing held at the NAC) It is also said that the number of fish farms are much higher than the above figures.

farms."

(3) Partly commercial fish farms were excluded from the targeted group

Regarding "partly commercial fish farms" that made up one of the targeted groups in the terminal evaluation report, it has been pointed out that the activities used to develop appropriate fish-farming techniques among the same target farms (which are also being covered by a separately implemented JICA development survey) have had only limited effect. To be precise, in 2004 when the project was ended, a decision to remove "partly commercial fish farms" from the target group was made by the DOF, and since 2004, only small-scale farms have been targeted.[21] Additionally, the commercial fish-farming facilities constructed in Kasinthula[22] under previous projects were leased out to a private business.[23]

The DOF decision had a major impact on the direction of the project, such that the counterparts and some of the long-term experts on the Malawian side at that time, as well as JICA's Malawi office side, opposed it vehemently, but to no avail. At the time the decision was made, the PDM should have been revised or changed[24] (by the elimination of "partly commercial fish farms" from PDM, for example).

3.2.1.7 Output 2.4: Farmer willingness and interest in fish-farming is promoted.

As presentation of successful cases, tours of selected fish farms were conducted, and a total of six workshops (Open Field Days) were held during the extended period from 2004 to 2006. According to the terminal evaluation report, as of 2004, the NAC had received a total of approximately 80 inquiries.

From the foregoing, it can be concluded that the motivation of small-holder farmers to convert to fish-farming has been heightened in a convincing way through implementation of the project.

3.2.1.8 Output 3: A mechanism to continue activities initiated by the project is established.

Three types of indicators were set up regarding this output to be achieved by 2004: (1) launch four or more new research programs by the counterpart institutions themselves; (2)

[21] Source: Results of hearings on those involved in the project on the Malawi side

[22] Kasinthula is located 50 km southwest of the commercial city of Blantyre, and at a distance of around 120 km from Domasi, the principal area of project activities.

[23] The commercial fish-farming facilities, including a large-scale aquaculture pond and related pumps, were provided by the Malawian side, along with the National Aquaculture Center in Domasi, as one of the project's research centers. They were expected to be used effectively in the project as facilities for verifying the quality of fish-farming techniques for some commercial fish-farming farms. However, as a result of the aforementioned decision of 2004, they were leased out to a private company, GK Aqua Firm. GK Aqua Firm had been actively running its business in Malawi as a pioneering commercial fish-farming company, along with Maldeco, but due to circumstances beyond its control, has pulled out of Malawi as of 2010.

[24] It should be added that some of the NAC staff expressed the view that, "at the time, the fish-farming facilities in Kasinthula were too big and overly ambitious."

introduce a revolving fund for farmers, and increase the said fund's share of use by farmers; and (3) raise the share of the farmed fish sales for which the revolving fund is used from 20% to 50%.

However, four or more new research programs have not been launched by March 2004 by the counterpart institutions. The revolving fund for farmers that was introduced at one point was frozen as of 2004.[25] However, with regard to the freezing of the revolving fund, as is detailed in the section on sustainability, the Malawian Ministry of Finance has refused to permit the application of the fund because of the compliance requirement and so on. Thus, in a sense, the freeze was unavoidable. Moreover, as is also described in detail in the sustainability section, with the importance it places on the fisheries sector as a remote cause, the government approved the FY2010 budget for fisheries of more than three times as large as any previous budget, paving the way for guaranteeing the financial sustainability of the project.

From the foregoing, it can be concluded that "the system for securing sustainability is about to be established."

Additionally, two recommendations were made in the terminal evaluation report (before the completion of the project): (1) to improve dissemination and transfer of knowledge generated by the project widely to the small-holder farmers and aquaculture related institutions, and (2) to enhance active collaboration with other organizations engaged in aquaculture related research and technical development, including those related to Chambo Restoration Strategic Plan. The first of these two recommendations was dealt with to a certain extent during the project's extended period from 2004 to 2006, while, as is described later in the impact section, various NGOs and international organizations are coordinating their efforts to address the second recommendation.

3.2.2 Achievement of Project Objectives

In order to measure the extent to which the project objectives were achieved, two types of indicators were established in advance: (1) the survival rate involved in the seed production of new aquaculture species; and (2) the increase in production volume among selected fish farms. In addition to the degree to which these two indicators were attained, the two perspectives that have already been described, namely: (i) whether the predetermined outputs were attained, and (ii) whether each of the output discussed above contributed to the attainment of the project objective, were surveyed in a comprehensive manner. The degree of the attainment of project objectives was then evaluated.

3.2.2.1 Indicator 1: Seed production with at least 30% of survival rate is achieved for at least two new aquaculture species by the end of March 2004.

No clear data related to the above was obtained in the present survey. In the terminal

[25] For details, see the section on sustainability.

evaluation, it is concluded that, as of 2004, "the survival rate of four new aquaculture species up to the juvenile stage was around 70%, and the counterparts were now able to collect eggs, hatch them, and raise them to the larvae/juvenile stage. Therefore, seed production techniques for the new aquaculture species have been nearly established." However, as is indicated in Note 11 of Section 3.2.1.3, the size of the survival rate of juveniles is not quite appropriate for evaluating the quality of seed production techniques.

From the above discussion, it is difficult to draw the conclusion that Indicator 1 was achieved.

3.2.2.2 Indicator 2: Production at selected fish farms increased after the project was executed, compared to before.

In the present survey, there is no quantitative data related to the above. However, according to the terminal evaluation, as of 2004, it was confirmed that the production volume of Tilapia increased at 11 out of the 12 farms selected for the project. Thus, Indicator 2 is judged to have been achieved.

3.2.2.3 Degree of the Output's Contribution to Achieve Project Objectives

Regarding Project Objective 1, "To establish seed production techniques for a new aquaculture species," since Output 1.1, which constitutes the essential part of the seed production techniques for a new aquaculture species, was not completely obtained, and also since it is difficult to affirm Output 1.3 as having been obtained, it is concluded that "the contribution of each output to the project objectives is limited."

Regarding Project Objective 2, "To establish appropriate fish-farming techniques for existing species (Tilapia and the Clariid catfish)", it is confirmed that, except for Output 2.1, all outputs have been obtained. In particular, Output 2.3, "the verification of techniques at selected fish farms" was performed by targeting only existing farmed fish species. Additionally, the fact that the expectations of farmers were very high for existing species can be deduced from the activities of Output 2.4. Moreover, with regard to Output 2.1, although it was not completely achieved, many groundbreaking perceptions were gained. It can be concluded these outputs are contributing significantly to the development of appropriate fish-farming techniques for existing farmed fish species.

3.2.2.4 Conclusions

While the seed production techniques for two of the targeted species were established with regard to Project Objective 1, it was determined that they have a low potential for dissemination among farmers, and because subsequently they were removed from the project component, it was concluded that Objective 1 was only partially achieved.

With regard to Project Objective 2, an increase in cultured fish production at selected fish farms was confirmed. In addition, during the period of extension from 2004 to 2006,

in tandem with the dissemination of fish-farming techniques, technique development tests and on-farm research were continued at selected fish farms. “Raising farmer motivation” was one of the outputs and is the best proof that appropriate seed production techniques have been developed, and this objective is judged to have been achieved.

The project has somewhat achieved its objectives, therefore its effectiveness is fair.

3.3 Impact

3.3.1 Achievement of Overall Goal

“The number of cultured fish species for which fish-farming techniques have been established” was established in advance as an indicator for measuring the degree to which the goal of “developing appropriate fish-farming techniques in Malawi” was achieved. However, no meaningful responses were received from the results of a social assessment survey regarding the number of fish species for which fish-farming techniques have been established.

A conclusion drawn from the foregoing is that it is difficult to judge whether a goal was achieved or not.

3.3.2 Other Impacts

(1) Impacts observed from the results of the social impact assessment survey

Arising interest in aquaculture

The social impact assessment survey (shown in Tables 1 and 2 below), which conducted on both the fish farms that were selected and not selected in the project, revealed that interest in aquaculture among farmers in the vicinity of the selected fish farms was motivated via the project, thus paving the way for their participation in fish-farming.

Table-1: Inquiries from Ordinary Farmers to Selected Farmers (N=74)

Responses by Selected Farmers (N=73)	No. of Respondents	%
Received some inquiries from the farmers in the vicinity	48	65.8
Not received any inquiries from the farmers in the vicinity	25	34.2
Total	73	100.0

Source: Results of social impact assessment survey

Note): One of the respondents among 74 did not answer the question.

Table-2: The First Year of Participation in Fish Farming by Ordinary Farmers (N=25)
(Answers to the question of when to start fish farming)

Responses by Ordinary Farmers	No. of Respondents	%
Before 1999	1	4.0
2000	1	4.0
2004	8	32.0
Between 2005 and 2007	15	60.0
Total	25	100.0

Source: Results of social impact assessment survey

A survey concerning the period when ordinary farmers participated in fish-farming found that more than 90% of respondents began participating in fish-farming after 2004, suggesting that the extended period of the project (2004–2006) contributed significantly in changing farmer's behavior.

Contributing to diversifying income sources

The results of the social impact assessment survey administered on the selected fish farms revealed that income from fish-farming accounted for a significant part of farmer income. Although the extent of the project's contribution to the diversification of income sources is unclear, it can be inferred that through participation in the project, fish-farming came to be regarded as an important new source of income, thereby contributing to the presumed diversification of farmer income.

Table-3: Source of Income of Selected Farmers (N=74)

Business Activities for Income	Primary Source	Secondary Source	Tertiary Source
Business in general	5	4	5
Agriculture in general	51	19	1
Fish Farming	16	43	7
Others (Employees of private companies, Remittance from abroad, etc.)	1	1	1
No source of income	1	7	60
Total	74	74	74

Source: Results of social impact assessment survey

(2) Qualitative impacts

As a result of interviews with persons concerned at the time of field survey, it is assumed that the following impacts were generated. No negative impacts were seen.

- Changes in the image of fish-farming: As a result of the massive expansion of various NAC facilities triggered by the execution of the project and previous projects, expectations rose for fish-farming among farmers in the vicinity of Domasi, where the NAC is located. Particularly, it is believed that "the desire of small-holder farmers to participate in fish-farming was greatly motivated." Many people said: "Before the project was implemented, the image that farmers had of fish-farming was akin to 'fish-keeping' (merely keeping fish in ponds), but after implementation, their image changed to 'fish production' (raising fingerlings to adult fish)."
- Better living for small-holder farmers: Many people feel that, for small-scale farms that relied on growing maize and other subsistence farming, the "acquisition of new fish-farming techniques and the adoption of fish-farming have contributed tremendously to improving the livelihood of these farmers."

- Contribution to the dawning of commercial fish-farming: In Malawi, commercial fish-farming began in the 1970s, but it became fully in progress in the second half of 2004 when Maldeco started a fish-farming business.[26] Maldeco received supplies of fingerlings from the NAC for the first two years. Thus, it can be said that the project outputs contributed to the growth of commercial fish-farming in Malawi.
- Collaboration with and contribution to the FAO project: On the premise that it would be able to use the research output of the project related to the fish-farming techniques used for cultivating the Clariid catfish, the FAO implemented the "Small-Scale/Semi-Industrial Aquaculture Promotion Project". In 2009, some 250,000 Clariid catfish seedlings were produced.
- Indirect contribution to NGO activities: In the vicinity of Domasi, where the NAC is located, NGOs from various countries (e.g., World Vision, World Fish Center, Sea Fish, CARE International, Concern International) are engaged in a host of assistance activities involving community development. The introduction of fish-farming is being tried as part of these activities. The NAC provides basic support to these NGOs by offering them fingerlings.

From the foregoing, it can be judged that many positive impacts were generated through the implementation of the project.

3.4 Efficiency (Rating: b)

3.4.1 Inputs

3.4.1.1 Elements of Inputs

Table 6 compares the input plans and actual performance. The amount of input made by Japan is nearly as planned. As for the input amount by the Malawi side, for the period from 1999−2004, the number of counterparts almost doubled, ultimately enabling the Malawi side to secure more inputs than originally planned.

Table-4: Comparison of Inputs before and after the Project

Elements of Inputs	Plan (as of Apr. 1999)	Actual Performance (as of May 2007)	Difference
1. Malawian Side (1) Counterpart Assigned a) Counterpart	12 counterparts	21 counterparts in total (of which 5 are in charge of on-farm research for selected farmers) 7 counterparts were transferred and 1 counterpart was resigned	Increased (9)
b) Other Personnel	1 Fund Manager	Not assigned	Decreased (1)
(2) Land, Building and Facilities	Project sites and seed production facilities to be provided at NAC and Kasinthula	Area of project sites: 34 ha. in total (of which, 17 ha. at Kasinthula was leased out to a	Mostly as planned

[26] Maldeco produced Tilapia using a cage culture system in the southern part of Lake Malawi.

Elements of Inputs	Plan (as of Apr. 1999)	Actual Performance (as of May 2007)	Difference
	Vehicle, Accommodation for NAC staff, Equipment for on-farm research, etc	private firm), Project office, Hatcheries, Vehicle, Office machinery, etc.	
(3) Local Costs	To be decided (costs of expendables, allowances, etc.)	19.45 million Malawi Kwacha in total	N/A
2. Japanese Side			
(1) Experts			
a) Long-term Experts	Chief advisor, Seed production, Rearing techniques, Feeding techniques, On-farm research, Project coordinator	14 experts in total, 272.8M/M in total	N/A
b) Short-term Experts	To be appointed when necessar (Aquaculture management, Reproductive physiology, Bilharzia control, etc.)	13 experts in total, 20.5M/M in total	N/A
(2) Trainees received	10 trainees in total for 5 years (2 trainees per year)	22 trainees in total (more than 3 trainees per year on average)	Increased (12)
(3) Equipment	Equipment for seed production facilities, Vehicle, Equipment for on-farm research, etc.	434 items, 59.8 million yen in total	N/A
(4) Operational Costs	To be decided	69.1 million yen for 1999 to 2004, 16.5 million Malawi Kwacha for 2004 to 2006	N/A

Source: JICA internal documents, Answers to the questionnaires to DOF and NAC, etc.

(1) Relevance of inputs in terms of amount and quality

Asked about the appropriateness of the quality and amount of inputs made, both the DOF and NAC, the two counterpart institutions, said, "hardly no problems".[27]

A comparison of the project[28] with similar projects elsewhere revealed that, as shown in Table 5, the number of long-term experts sent to Malawi was a bit larger than the number sent to Indonesia, where a similar project was held. However, there was not much difference between the two countries in terms of the amount of human resource and financial resource input (including the amount provided in equipment) regarding their respective projects. Moreover, given the fact that the research and development component was not included in the Laotian project, there was not much difference between the amount and quality of the inputs made to the Laotian project and those made to the Malawian project.

[27] Source: This is how the DOF and NAC responded to questionnaires sent to them.

[28] There are two similar projects, one in Laos and another in Indonesia. The former was called the "Aquaculture Improvement and Extension Project"; the latter the "Freshwater Aquaculture Development Project". The Laotian project entailed a smaller ratio of R&D, but included several components, such as: (1) the establishment of an aquaculture development center, (2) improvement in freshwater aquaculture techniques, and (3) the cultivation of the ability to undertake dissemination activities. Thus, in terms of activity content, it bears close resemblance to the Malawian project. The Indonesian project aimed at the development of freshwater aquaculture techniques targeting small-scale fish farmers. The project's outputs—including (1) the development of breeding/raising techniques for new cultured species, (2) the development of breeding/seed production techniques for existing species, and (3) the development of a dissemination model based on the regional characteristics—matches perfectly with the content of the Malawian project.

Table-5: Comparison of Inputs: This Project and Two Other Similar Projects

Items for Comparison	Lao PDR: Aquaculture Improvement and Extension Project	Indonesia: Freshwater Aquaculture Development Project	This Project
Inputs from Japan	Long-term experts: 5 Short-term experts: 5 Trainees received: 10 Equipment provided: 17.61 mil.yen Local costs: 80.0 mil.yen	Long-term experts: 6 Short-term experts: 19 Trainees received: 20 Equipment provided: 152 mil.yen Local costs: 85.0 mil.yen	Long-term experts: 14 Short-term experts: 13 Trainees received: 22 Equipment provided: 59.8 mil.yen Local costs: 69.10 mil.yen (not including all)
Inputs from Recipient Countries	Counterpart assigned: 12 Land and facilities: Provided Local costs: 420 mil.Kip (4.4 mil.yen)	Counterpart assigned: 30 Land and facilities: Provided Local costs: 254 mil.yen	Counterpart assigned: 21 Land and facilities: Provided Local costs:19.45 mil. Malawi Kwacha (12.0 mil.yen)
Total Costs	0.568 billion yen	1.002 billion yen	0.893 billion yen
Period of Cooperation	3 years and 6 months (from Feb.2001 to Aug.2004, incldluing follow up period)	7 years (from Aug.2000 to Aug.2007, including extended period of 2 years)	7 years (from Apr.1999 to May 2006)

Source: Prepared from JICA internal documents, etc.

From the foregoing, since the input amount (human resources and equipment) was considered appropriate, compared to similar projects, the input for the project is judged to be generally relevant.

(2) Timing of inputs

Although there was generally no problem with the timing of the inputs, the project's execution seemed to lack efficiency regarding the following three points:

- Regarding the quality of the inputs, the NAC side said that, "Some of the technical expertise of the experts assigned to the project was inadequate."
- In an interview survey, a respondent pointed out that various problems arose remotely during the execution of the project, caused by a lack of communication between JICA experts and the counterparts on the Malawian side. Additionally, the opinion was expressed that even among JICA experts communication problems occurred.[29]
- Shortening the term of office[30] of long-term experts at the initial stage of the project had a negative effect (especially since the operation in Kasinthula had to be discontinued, which paralyzed operations in the latter stage of the project).

3.4.1.2 Project Cost

The cost of cooperation, including the cost of dispatching experts, came to 892.54 million yen. Regarding the size of the cost of cooperation and the timing of disbursement, the DOF has issued the opinion that "there is virtually no problem."[31] Additionally, the

[29] Source: Results of interviews with the DOF (including a former DOF staff member and former counterpart of the project) and the NAC
[30] Due to illness
[31] Source: Response to a questionnaire sent by the DOF

cost of cooperation for a similar project, the Freshwater Aquaculture Development Project, was about 1 billion yen, or about the same as the cooperation cost of the project. From these comparisons, the cooperation cost of the project is judged to be relevant.

3.4.1.3 Period of Cooperation

Regarding the period of cooperation, as has already been mentioned, the extension of the project period created a gap between the planning period (five years from 1999 to 2004) and the actual period (seven years from 1999 to 2006).

The decision to extend the project period two years was reached on the basis of outputs achieved from 1999 to 2004 and for the purpose of: (1) continuing the on-farm research, and (2) disseminating fish-farming techniques among selected farmers. Although the period was extended to make sure outputs were spread, the dissemination of fish-farming techniques among selected farmers was materially included in the initial action scope, so that by 2004, a certain amount of outputs was expected. In light of these facts, the efficient implemenation of the project was disturbed to some extent, as an afterthought[32].

Therefore, period of cooperation are not so appropriate for producing outputs and achieving the project objective, therefore efficiency of the project is fair.

3.5 Sustainability (Rating: b)

3.5.1 Related Policy toward the Project

The dissemination of techniques for cultivating Tilapia and the Clariid catfish, both existing cultured fish species, is part of the Malawi National Aquaculture Strategic Plan (NASP),[33] which is targeted for 2015. Since the techniques for farming these existing species were developed under the project, the NASP and the project are highly consistency with each other.[34] (The consistency with the three policies that are still valid as of 2010, namely: (1) Malawi Vision 2020, (2) MGDS 2006/07–2010/11, and (3) the Presidential Initiative on Aquaculture Development (PIAD) 2006–2011 was, as discussed in Section 3.1 above, slightly different compared to the present government's policy direction and the project objectives.)

[32] At the same time, the NAC side commented on the relevance of the two-year extension, thus: "Given the significance of ensuring the continuity of the dissemination activities, further extending the period of cooperation was the right thing to do."

[33] The NASP was prepared as an output of the "Master Plan Study on Aquaculture Development in Malawi" by JICA during the period from January 2003 to August 2005, and was approved by the Malawian government.

[34] In 2009, the Malawian government formulated the Agricultural Sector-Wide Approach (A-SWAP), which forcefully stresses the agricultural sector, and designates as priority areas: (1) food security and risk management; (2) commercial agriculture, agricultural processing, and market development; and (3) sustainable land and water resource management. As will be discussed later, the DOF's budget increased substantially as a result of this policy.

3.5.2 Institutional and Operational Aspects of the Executing Agency

Given that the Mutharika government emphasizes the agricultural sector, in 2008, the DOF was transferred from the Ministry of Mines, Natural Resources and Environment to the Ministry of Agriculture. The transfer has not triggered any significant organizational change in the DOF. As for the research and development division, a clear line is drawn between the Fishery Research Unit (FRU), which is located in Monkey Bay, and the NAC. The FRU is in charge of research concerning freshwater fish catches in large lakes (Lake Malawi, Lake Chilwa, Lake Malombe, etc.), while the NAC is in charge of research concerning fish-farming techniques (especially self-sufficient aquaculture). Additionally, since 2005, the total number of DOF staff members has been on the rise. For details, see Table 8 below.

Table-6: Number of Staff in DOF and NAC

Year	Number of Staff	Of which, who are involved in Research and Development (R&D) activities	Average Years of Employment for Staff who are involved in R&D activities
2005	DOF: 305 NAC: 34	DOF: 27 NAC: 13	DOF: 11 yrs. NAC: 12 yrs.
2006	DOF: 300 NAC: 34	DOF: 27 NAC: 13	DOF: 12 yrs. NAC: 12 yrs.
2007	DOF: 325 NAC: 35	DOF: 32 NAC: 14	DOF: 12 yrs. NAC: 12 yrs.
2008	DOF: 330 NAC: 30	DOF: 28 NAC: 9	DOF: 11 yrs. NAC: 13 yrs.
2009	DOF: 352 NAC: 29	DOF: 34 NAC: 9	DOF: 9 yrs. NAC: 10 yrs.

Source: Answers to the questionnaire to DOF

In contrast, the number of NAC staff in charge of the aquaculture division has been on a declining trend. Especially alarming is the number of staff in research and development, which declined from 13 in 2005 to nine in 2009.[35] The NAC cites two reasons for why the staff level is falling: “voluntary resignation” and “personnel cuts accompanied by budget shortfalls”. Staff drain and the lack of replenishment are factors that greatly impact the sustainability of fish-farming techniques, which will be discussed later. Consequently, measures designed to raise staff incentive and prevent staff drain need to be seriously considered.

The following may be pointed out as a source of concern regarding the organizational structure.

- The structure for disseminating fish-farming techniques: Jurisdiction over activities used to disseminate fish-farming techniques has been transferred to the departments and agencies of the local government (District Assembly), which, under the legal system, is called the District Fishery Officer (DFO), and the NAC is not in a position to hold jurisdiction over these dissemination activities. However, with the decentralization of authority still continuing, the separation of actual operations remains unclear, and the DFO’s fish-farming techniques and knowledge are not up to par. As a result, the implementation structure for dissemination activities has been

[35] In percentage terms, this is over 40%. Details are shown in Table 6.

somewhat mixed-up, as reflected in the fact that that, in many cases, NAC staff have to support the dissemination activities. While the budget allocation for the DFO has taken a turn for the better in recent years, the human resources that actually engage in dissemination activities are grossly lacking.[36] Among measures desired going forward are the clarification of jurisdiction over dissemination activities, expansion of the DFO's own funds for the implementation of dissemination activities, and the consideration of a system of cooperation between the NAC and DFO. For instance, steps to be taken might include increasing the frequency of Research Extension Forum meetings, which brings together concerned individuals involved in dissemination activities (e.g., the DFO, disseminators from the Ministry of Agriculture, and disseminators from the fisheries catch business).[37]

3.5.3 Technical Aspects of the Executing Agency

Some of the counterparts in the project from the NAC have either been transferred or have resigned, while other counterparts still work for the NAC. The rearing techniques developed for new aquaculture species (detailed in Section 3.2.1.4) and the various appropriate techniques developed for existing cultured species (also detailed in Section 3.2.1.4) have already been transferred to the counterparts still working for the NAC. Consequently, while no particular training has been given since project completion, there seems to be no problem in handing down techniques.[38]

If the counterparts of the project continue to be employed by the NAC, there appears to be no problem regarding the continuity of fish-farming techniques developed while executing the project. However, as has already been discussed, since the NAC is afflicted with the problem of a loss of staff members, it is necessary to consider taking measures to prevent staff drain and to increase the number of staff. Note that the NAC launched a process to recruit one staff member as of July 2010.[39]

3.5.4 Financial Aspects of the Executing Agency

The budget situation of the DOF as a whole and that of the NAC after 2005 are as described below. As already described, in 2008, under the current government's policy of stressing the agriculture sector, the DOF was transferred from the Ministry of Mines, Natural Resources and Environment to the Ministry of Agriculture, thus paving the way for a substantial budget increase.

However, the budget that was freshly appropriated from 2008 to 2009 was the budget

[36] About one or two staff members in each local government are engaged in dissemination activities, meaning that the total number of such staff members is only 27 for all of Malawi. Additionally, there is even a rumor that the activity expenses of the DFO is paid directly to the individual DFO with funds drawn from the funds of NGOs and international donor organizations.

[37] The Research Extension Forum is held approximately every quarter to facilitate mutual communication between those involved in dissemination activities. (Source: Results of a hearing held at the DOF)

[38] The beneficiary survey yielded no noticeable views on the technical level of NAC staff and the DFO.

[39] Source: Results of interview held at the NAC

related to the aforementioned Presidential Initiative on Aquaculture Development (PIAD) 2006−2011. This budget is the so-called program budget compiled for each project in which use is decided, and the scale of the recurrent budget that serves as a source of funds for regular activities had not been increased for the two years during 2008 and 2009.[40]

That said, in July 2010, it became official that the NAC's FY2010 budget would be 2.4 times larger than the year before. This budget does not include any of the aforementioned PIAD-related budgets. Part of the budget is allocated by the Ministry of Agriculture's ASWAP (Agriculture Sector-Wide Approach Program) budget, all of which is allocated to the NAC as a recurrent budget. The NAC is considering using this budget to fund: (1) the construction of hatching facilities, (2) the strengthening of the production of Tilapia and Clariid catfish fingerlings, and (3) the expansion of on-farm research for selected farmers.

Table-7: Budget Allocation to DOF and NAC

Unit: Thousand Malawi Kwacha (MK)

Fiscal Year	DOF Budget	Of which, Aquaculture - related	Of which, Budget for NAC
2005	37,241	2,788	600
2006	40,107	3,793	600
2007	44,053	6,002	600
2008	66,000	5,622	4,915
2009	67,000	9,697	4,915
2010	Not confirmed	Not confirmed	12,000

Source: Answers to the questionnaires to DOF and NAC
Note-1): 1 MK ＝ 0.61 yen (as of July 2010)
Note-2): A proportion of the development budget to the recurrent budget was not obtained.

The above discussion may be thought of as an obvious manifestation of the Mutharika administration's emphasis on the agricultural sector. Should this trend continue going forward, the project's financial sustainability will improve dramatically.

However, the Ministry of Finance has yet to authorize the use of the revolving fund that was frozen during the execution of the project. Thus, there is little chance of utilizing this system in the immediate future.

3.5.5 Continuity of Effectiveness/Impact

(1) Current status of continuity of effectiveness/impact after 2006 up to now

Fish-farming techniques relating to the existing species such as Tilapia and Clariid catfish are firmly maintained. As explained in Section 3.3 Impact, the FAO implemented the new project on the premise of using the research output of the project related to the fish-farming techniques of Clariid catfish.

Regarding the farmers' willingness to participate in fish farming, a certain level of

[40] At the time of the May 2010 field survey, the NAC said, "The recurrent budget is tending to shrink; the budget shortfall continues."

motivation is still kept by small-holder farmers in the course of the implementation of the project. The interviews with small-holder farmers and groups held in May 2010 revealed that the motivation of farmers in the vicinity of Domasi to adopt fish-farming was heightened greatly by their participation in the project.[41] Furthermore, the results of a social impact assessment survey shown in Tables 1 and 2 below revealed that the selected fish farms received many inquiries from ordinary farmers.

Table-8: Inquiries from Ordinary Farmers to Selected Farmers (N=74)

Responses by Selected Farmers (N=73)	No. of Respondents	%
Received some inquiries from the farmers in the vicinity	48	65.8
Not received any inquiries from the farmers in the vicinity	25	34.2
Total	73	100.0

Source: Results of social impact assessment survey
Note): One of the respondents among 74 did not answer the question.

Table-9: Some Indicators about Inquiries from Ordinary Farmers

Item	Number of Inquiries
The number of inquiries in total (Inquiries to 48 selected farmers)	353
The average number of inquiries per selected farmer	7.5

Source: Calculated from results of social impact assessment survey

(2) Equipment

With regard to granted equipment, for some equipment (dissolved oxygen meters, heat pumps, etc.) spare parts cannot be purchased in Malawi, which is affecting operations. Other granted equipment (analytical equipment, etc.) are running without any problem.

(3) Responses to the recommendations made by the Terminal Evaluation

The following two recommendations were made by the terminal evaluation (after the completion of the project): (1) the government of Malawi should establish self-revenue generation system for necessary activities in NAC and to maintain at least the current level human resources, and (2) both governments of Malawi and Japan should immediately commence consultation on the framework of further assistance based on the project results for aquaculture development and improvement of livelihood of the small-holder farmers. Regarding the first, as has already been discussed, only limited methods are available for raising funds, thus no effective measures have been established, and the NAC is facing the problem of staff drain. Regarding the second, the "Master Plan Study on Aquaculture Development in Malawi" and a follow-up expert dispatch were implemented by JICA, and policy recommendations utilizing the project outputs were made.

[41] In May 2010, in-depth interviews were held at two selected fish farms in the vicinity of Domasi and with one farmers' group (women) in the Chingali district.

3.5.6 Conclusion of Sustainability

With respect to fisheries sector policy, the current Mutharika government is striving to effect a conversion from "improving poor farmer livelihoods by disseminating self-sufficient fish-farming techniques", as advanced by the previous administration, in order to "promote the fishery products industry by, among others, developing commercial fish-farming and contributing to economic growth", through the preparation of PIAD and others.[42]

On the financial front, with the aforementioned policy conversion as a remote cause, the budget of both the DOF and NAC has tended to increase, and the FY2010 budget grew 2.4-fold over the previous year.[43] Improving the livelihood of poor farmers by continuing to promote self-sufficient aquaculture is expected to be stressed as one of the basic policies of the Ministry of Agriculture and the DOF. However, it should be more paid attention to, under the circumstances of more focus on promoting Malawi's fish industry through the development of commercial fish farming, whether the budget appropriation will continue to improve for NAC in the years ahead.

On the technology front, no major problem has risen as of now, but the trend toward staff reduction observed since 2005 poses a critical risk that will have a decisive influence on efforts to ensure sustainability. Thus, unless radical measures for preventing staff drain are taken going forward, the fish-farming techniques established in the project will be of no use. In this sense, it is preferable as a timely measure to address this issue that NAC launched a process to recruit one staff member.

On the system front, the dissemination of fish-farming techniques related to self-sufficient fish-farming, which was one of the outputs of the project, as has already been discussed, is fraught with problems regarding the DFO's capacity and demarcation between NAC and the local authority (DFO). Due to this, at present, systematic activities are not being undertaken, which causes concern about the lack of continuous and effective dissemination activities in the days to come.

In conclusion, ensuring sustainability is difficult in some quarters.

Some problems have been observed in the structural aspects of the executing agency, and the continuity of the project effects is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

Basically, there are no problems with project content and its consistency with the country's policy. Some of the project objectives had been achieved by 2006 when the

[42] To reiterate, the government does not take lightly the effect self-sufficient aquaculture has on improving the livelihood of poor farmers.

[43] This budget is accounted for by the recurrent budget, which becomes the source of funding for all independent activities.

project ended. The project period is the issue in terms of the efficient implementation of the project, and some apprehensions remain regarding the sustainability of institutional and operational aspects. On the other hand, however, many positive impacts have been generated, and dramatic improvement in financial stability can be expected as a result of sharp increases in the size of the budget. In light of the above, this project is evaluated to be fairly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Recommendation 1

Regarding the important outputs of the project, there is a lack of PR and advocacy activities by the DOF and NAC. Particularly, with regard to the three groundbreaking perspectives that were obtained in the project—(1) the relationship between the depth of the aquaculture pond and the degree of fish-rearing, (2) the superiority of the mono-sex culture method, and (3) fertilizer application techniques that use fertilizing methods appropriate to the needs of fish farmers—although the first one has spread to all of Malawi, the other two have spread only through the districts of Zomba and Chingali (the target areas of the project). Thus, immediate dissemination of these perceptions is desired.

Recommendation 2

In order to realize the above recommendations, first, those concerned with the dissemination of fish-farming techniques, including the DFO, agricultural improvement disseminators, and the NAC, should begin carrying out their dissemination activities in a systematic manner.[44] Taking the present situation of sufficient budget appropriation as an opportunity, the building of a concrete implementation structure for promoting dissemination activities should be started. For example, the existing Research Extension Forum could be held more often, in order to begin deliberation on the strengthening of the implementation structure.

4.3 Lessons Learned

4.3.1 Timely Revision of the PDM in response to changes in the Direction of the Project

Regarding the target groups of the project, at the start of the project, two types were envisaged: “small-holder fish farms” and “partly commercial fish farms”. However, in 2004, the decision was made to exclude “some commercial fish farms” from the target group. As has been noted, this decision significantly altered the direction of the project. At the time this decision was made, adjustments and corrections (such as the elimination of “partly commercial fish farms” from PDM, for example) should have been made to the

[44] As has been discussed, because of the division of duties, the NAC is not in a position to take charge of dissemination activities. However, the fact is that, as has been noted, NAC staff members sometimes support dissemination activities.

PDM, and then the details of new objectives and activities should have been fully notified to those concerned, including the Malawian counterparts.