

SIDA Evaluation Report, Rural Development, Southern Africa

1989/2

FISH FARMING FOR RURAL DEVELOPMENT

An Evaluation of SIDA/FAO Supported Aquaculture in Southern Africa



By Karlis Goppers and Jim Miller





Fish Farming for Rural Development

1. EXECUTIVE SUMMARY	1
The Programme.....	1
The Evaluation.....	2
Conclusions and Recommendations	3
2. INTRODUCTION	8
The Programme.....	8
The Evaluation.....	12
Aquaculture in Rural Development.....	13
Aquaculture in Zambia.....	15
Aquaculture in Southern Africa/SADCC	19
3. OBJECTIVES OF THE SIDA/FAO PROGRAMME	23
Background.....	23
SIDA's principles and policies with reference to Experimental and Pilot Activities	25
SIDA's General Development Objectives	28
Goal-hierarchy of Programme	30
4. EVALUATION OF IMPLEMENTATION AND EFFICIENCY IN ACHIEVING TARGETS AND PROJECT OBJECTIVES.....	34
Methodology and questions analyzed in this evaluation	34
1. Pilot activity in Chipata, Zambia.....	34
2. Desk studies.....	40
3. Surveys.....	41
4. Technical consultation.....	42
5. Advisory committee.....	43
6. International contacts.....	44
7. Headquarter site.....	45
8. Counterparts.....	46
9. Publications and information.....	47
10. Likely future effects and impact of the programme.....	47

(continued on next page)

5. CONCLUSIONS WITH RESPECT TO THE PROGRAMME'S CURRENT EMPHASIS AND FUTURE ORIENTATION.....	50
Alternative approaches for aquaculture development.....	50
Time aspects	53
Studies versus practical pilot activities	54
ALCOM – A regional research programme or a service institution for national programmes	57
SADCC's role vs. donor's wishes: possible inconsistency of goals.....	60
APPENDICES	
1. Terms of reference	63
2. Persons met/interviewed.....	67
3. References.....	70
4. Foreign Assistance for Fish Farming in Zambia	72
5. Physical and Climatological Aspects of Zambia's Eastern Province	73

CHAPTER 1

Executive Summary

THE PROGRAMME

The overall objective of the Aquaculture for Rural Development Programme is to develop, test and demonstrate strategies, methods and techniques for assisting rural people in improving their quality of life through the development of aquaculture, either in conjunction with land-based farming or as an alternative to fishing.

The main tasks of the Programme during its preparatory phase, 1986-1988, which is the period under evaluation are to:

- carry out in-depth studies on the social, cultural, economic, biological, technical and environmental aspects of aquaculture in order to understand its role in and implications to rural development;
- establish one or more pilot projects at the community level;
- analyse the experiences obtained and define issues that are likely to arise in other similar development activities, and,
- prepare a set of guidelines and protocols for the selection, formulation, implementation, and evaluation of small-scale aquaculture projects with people participation.

The programme is interregional in scope and initially covers the region of Southern Africa and specifically SADCC countries. Pilot activities are carried out in Zambia, where ALCOM is based.

The preparatory phase of the programme became operational in 1986 and is scheduled to be completed in December 1988. The donor contribution is SEK

7,100,000; an additional amount of SEK 900,000 is at the disposal of the Swedish Board of Fisheries to collaborate with the programme.

THE EVALUATION

The main purpose and scope of the evaluation mission were to:

- assess the effectiveness of the programme in realizing its immediate objectives and the extent to which it has set the foundation for achieving the long-term development objective; and
- assess the efficiency in the implementation and management of the programme.

The evaluation team was composed of Karlis Goppers, Economist and Team Leader, appointed by SIDA and James Miller, Aquaculturist, appointed by FAO. The mission made a three week field visit to Zambia, Malawi and Zimbabwe in May 1988, and spent a total of two weeks in Rome for briefing, report writing and debriefing.

Fish ponds in the Chilanga Government Fish farm in Zambia.



CONCLUSIONS AND RECOMMENDATIONS

Efficiency

The programme is running smoothly and has achieved most of its targets, some with remarkable efficiency. The programme manager, the experts, as well as the APO's are competent, hardworking and committed to doing a good job. The implementation of activities is well managed.

Effectiveness

With respect to attaining its main objectives as well as the likely future longer term development objectives (effects and impacts – which fall outside the period under evaluation), the mission has found that a change in relative emphasis of the programme should increase future chances of success. Generally this means a more practical orientation.

Scope for Programme

The mission raised the fundamental question of whether the programme is justified. Is there a *raison d'être* for it? What would be the proper division of labour that would give the programme a role, a niche, besides existing specialized research organizations (such as e.g. ICLARM) and besides the various donor-supported national programmes that also currently exist? For they all deal with, in one way or another, the broad question: How to get small-scale farmers involved in fish production farm ponds?

On this fundamental question the mission has concluded that there is in fact a reasonable scope and that the programme may have an important role to play. This role is largely given by one of the conclusions that emerged from the Thematic Evaluation (carried out by NORAD, FAO and UNDP in 1984-1987), namely that many aquaculture projects seem to fail because of a lack of knowledge and understanding about the socio-economics and socio-cultural ways and means of the small-scale farmer in an integrated community setting.

Practical "trial-and-error" pilot activities

However, in exercising its role the mission feels that the programme must strike a constructive and fruitful balance in its activities. One of the main conclusions of this evaluation is that the programme already in its preparatory stage should strive to become more practically oriented in its pilot activities and research work. This we feel, will have a better chance of starting a process of active participation of the families in the villages. In the choice between desk studies and surveys on the one hand, and practical "trial and error" activities in the field with the farmers on the other, the mission endorses future increased emphasis on the latter as has already been planned. That, we feel, will have important psychological

as well as practical advantages. An advocacy of such a re-emphasis is not meant to reflect negatively on what has been done so far in the project. For during the project's preparatory phase it was indeed warranted to spend a relatively large amount of time on studies and surveys, as well as on travel and international meetings, in order to build up external contacts.

"High profile"

Even though the programme has mainly operated only in Zambia, it has held a fairly high profile in its contacts with other countries and institutions. While the mission realizes the importance of promotional activities and information in order to spread knowledge of the programme, there may be a risk that future expectations are raised to a level higher than the programme will be able to live up to. The mission feels that it is now time for the programme to concentrate on and emphasize its trial and research activities and establish a reputation for producing practical results. Then, in the measure that such useful results concerning appropriate methodologies start coming out, will it be time to devote more attention to international and other external contacts, and, as it were, raise its profile.

Consistency of Goals

The mission believes there may a possible inconsistency in that the donor SIDA wants to and apparently assumes that it can involve the host governments (formally or informally through the Advisory Board) in a real sense, while at the same time insisting that the programme remain a research and experimental activity. The possible conflict consists in that the host governments may have an instinctive, perhaps subconscious inclination to regard any project – even a research programme as the present one – as one which will bring immediate benefits and provide support of various tangible kinds. But the donor on the other hand, in a research activity, naturally has a need for latitude, and also a legitimate right to pursue various initiatives without asking the recipient(s) approval.

The project needs to balance this risk by directing active and explicit information to the host governments and to SADCC. The donor, FAO, and the project must convince the recipients that this is indeed not a normal development project which may provide resources and other benefits in the near future, but a research programme whose tasks/objectives are chiefly to carry out research and experimental pilot activities. In this informational task SIDA field offices also should be used. At present these offices seem to be barely aware of the programme's existence.

Size of Sample

In its field pilot work the programme should start working with a larger sample of the target group. Presently, after 10 months of field activities and 18 months of operation, it has only six groups for 10 active ponds, of which only three were created by the pilot project's influence.

Counterparts

Presently the programme has only one full-time counterpart staff member. The mission believes that more counterparts should benefit from project activities through on-the-job training during surveys and pilot project activities.



Perhaps fish farming can offer a brighter future for southern Africa's younger generation. Pressing needs focus on improving nutrition, creating jobs and increasing farmers' revenues.

Desk Studies

The four desk studies were started perhaps somewhat prematurely in the beginning of the programme before the manager and the expert were recruited. They therefore participated only in the final stages of the studies. Perhaps for that reason these studies have been of only limited benefit for the programme. The writing in two of these is very academic and of limited accessibility.

Surveys on Fish Farming

The survey of fish farmers represents probably the most comprehensive such effort undertaken in Africa and is to be praised. Analysis of results seems somewhat superficial however, and statistical evaluation is lacking.

Two other such surveys are planned to be carried out by consultants, and the mission recommends that local resources (the Chipata Associate Experts assisted and supervised by the resident expert) be used for a more thorough analysis of findings to date before the new surveys are carried out. This could reveal possible weaknesses in the first study which would permit modifications in subsequent surveys.

Technical Consultation and Advisory Committee

The organization and implementation of these two meetings was a major undertaking requiring considerable organization and co-ordination. The mission thinks that both events were successful and praises project management for its efficiency in carrying them out.

Although participants were not well-informed about the programme before the meeting, exchanges were made formally and informally and the meetings seem to have had an impact on these government officials.

International Contacts

Project management has initiated contacts in all the SADCC countries as well as on a wider international scale. This task has already paid off in the success of the above mentioned meetings. For the future the mission recommends that contacts be pursued also with francophone West Africa rather than possible further expansion of contacts with e.g. Asia. Considerable work in aquaculture has been accomplished in French-speaking Africa and much of it is directly applicable to the southern African countries.

Information, publication

The mission feels that the programme has in general handled information aspects well, but some important shortcomings are noted. In some cases

information material presents the programme in an overly ambitious way. More work remains to be done in the field of information.

Quantifiable Goals

To the maximum extent possible, the programme should strive to develop measurable goals for all of the activities. The mission recognizes however that this is a difficult task in an experimental type project.

CHAPTER 2

Introduction

THE PROGRAMME

The SIDA supported FAO executed Aquaculture for Local Community Development (today using the acronym ALCOM) is a programme for conducting research, surveys and pilot activities in order to learn primarily about the socio-economics of small-scale farmer involvement in aquaculture, but also the technical, biological and environmental aspects of aquaculture. It was started in 1986 with financing from SIDA and execution by FAO and covers initially a three-year preparatory phase and a proposed subsequent implementation phase of five years. The amount of SIDA'S aid is approximately US\$ 1 million for the preparatory phase and US\$ 5 million for the implementation phase as proposed by the programme Manager.

Not a production oriented activity

As repeatedly stressed by all concerned parties, but not always understood by others, the programme is not a development project *per se*, expected to produce tangible outputs, but a research and experimental activity aimed at reaching an understanding of the socio-economic and cultural ways and means of small-scale farmers. Hopefully the programme will assist in developing appropriate methods and approaches in aquaculture which governments and donors can eventually make available to small-scale farmer communities.

Socio-economic aspects

The donor's interest in the programme has been strongly influenced by the conclusions emanating from the comprehensive Thematic Evaluation of Aquaculture carried out by NORAD, FAO and UNDP in 1986.*

* "Thematic Evaluation of Aquaculture". A joint study by the UNDP, NORAD and FAO, Rome, 1987.

One of the conclusions of that study was that, while the technology of fish farming is fairly well known, most projects in fish culture seem to have had a limited sustained impact. The principle reason for this shortcoming is a lack of understanding of the socio-economic and socio-cultural motives and forces that underlie small-scale farmers decisions to try out fish ponds. A people participation approach was lacking and it is now believed to be more useful to work from the bottom up – instead of from the top down – as has been the case in so many projects in the past.

So ALCOM was started with the explicit ambition to also respond particularly to this observed lack of understanding of the socio-economics of small-scale farmers and aquaculture. This ambition, as will be shown in the analysis below, has shaped and influenced the programme throughout.

Interregional

The programme is interregional in scope in that its research and pilot activities will cater to the needs of all developing countries in general. Today its base is in Zambia with its main office in Lusaka and field pilot activity in Chipata, in the eastern province. The programme will work closely with The Southern African Development Co-ordination Conference (SADCC), and it aims at becoming formally part of the SADCC planning system. Involvement of SADCC was also specifically requested by the Programme member countries at the Advisory Committee meeting.

The programme is today staffed with two expatriate experts, four expatriate APOs, two locally employed aquaculturists, two drivers, four secretaries, and one cleaner.

Mode of work

The stated overall objective of the programme is to develop, test and demonstrate (disseminate) methods and techniques by which rural people can improve their standards of living through aquaculture.

Its mode of work can, in the language of one of the programme's information brochures* be summarized as follows: "problems facing the development of aquaculture in a rural community development context are identified, possible solutions to the problems are tried in small pilot activities, each focusing on a special problem or a set of problems. Training is provided for national counterpart staff to establish a cadre with experience of the activity for later larger-scale application. The programme can, upon request, assist governments or non-governmental

* Aquaculture for Local Community Development Programme GCP/INT/436/SWE "A note on ALCOM".

organizations in the preparation of larger scale projects applying the results. In a final stage technical advice can be given for the implementation of national projects. The programme is interregional. The focus is however on the countries in Southern Africa, with priority to the countries belonging to the SADCC. The interregional aspects are taken care of through networking with institutions, organizations, projects and programmes for exchange of information and experiences".

Activities

The activities which the programme has engaged in so far are the following:

1. Based partly on the desk studies (see below) a *pilot project* was started in the eastern province of Zambia. It aims at initiating small scale aquaculture as a component of the existing rural farming system in a few communities through a participatory process. The programme only offers advice to the villagers. No financial support is involved, since the intention is to study the potential for self-help and self reliance. This process is time-consuming and in the year that this has been going on only three groups have completed their ponds while three others are still in the construction process. The socio-economic aspects of the process are monitored and documented.

2. *Desk studies* on socio-cultural, socio-economic, bio and environmental, and bio-technical aspects of aquaculture in rural development have been carried out. These studies were published as a consultants report in 1987.

3. A socio-economic survey was designed and applied on a pilot scale in the northern province of Zambia. The purpose of the survey was to document the current status and outlook for aquaculture, and to identify reasons behind farmers' decisions to start, modify or abandon fish farming. A revised version of the same survey is to be carried out in a few other provinces in Zambia, the aim being to develop a survey methodology which may be applicable also in other countries in southern Africa.

4. A *technical consultation* meeting on aquaculture and rural development was held in October 1987 in Lusaka. Twenty-two aquaculturists, rural sociologists and administrators from eight SADCC countries participated together with other experts from FAO Sweden, and India. The meeting discussed and reviewed the outcome of the desk studies and recommended six target areas for the programme to emphasize in its future work.

5. Immediately following the consultation meeting the first *Advisory Committee* meeting of the programme was held.



Ponds at Domasi, Malawi, encountered water infiltration problems and has effectively sealed its ponds with a technique called "muddling" which involves working a mix of clays and manures into the ponds bottom. Such technique will help assure success to subsistence fish farmers.

6. A *Regional Formulation Mission* was fielded which based its work on the outcome of the desk studies and on the technical consultation. It made visits to Lesotho, Swaziland, Zimbabwe and Tanzania with the aim to identify potential pilot activities addressing the target areas recommended by the Technical Consultancy meeting. This mission was later followed by missions to Mozambique and Botswana. Similar missions are planned for Malawi and Angola.

7. *Relations with SADCC*. Following the Advisory Committee Meeting FAO approached the SADCC co-ordinator for fisheries in Malawi. This contact resulted in an invitation for ALCOM to participate in a technical consultation meeting held by the SADCC sub-committee on Fisheries and Wildlife in Gaborone in March 1988.

8. *International travels* were carried out in order to establish relations with other relevant institutions. These were: The Bay of Bengal Programme (BOBP) in Madras India, the Southern East-Asia Fisheries Development Centre (SEAFDEC), the

Aquaculture Department in Iloilo, Philippines, ICLARM in Manila, Philippines, the Asian Institute of Technology (AIT), in Bangkok, Thailand, and the Network of Aquaculture Centres in Asia (NACA), in Bangkok, Thailand.

9. The programme has established an *information system* which consists of a small library of basic hand books and other publications on subjects related to the proposed target areas for future activities. FAO and other institutions publications on farming systems, nutrition, rural development and aquaculture are regularly received.

THE EVALUATION

There is no mention in the project agreement or in the Plan of Operations of an evaluation. Normally a SIDA-supported project will be evaluated upon completion, or, in the case of projects of longer duration, after four or five years. In this case the donor in September 1987 in a meeting with FAO suggested that the programme be evaluated before the preparatory phase was over in order to establish guidelines for the programme's proposed implementation phase.

Motives

Some documents indicate that Sweden's motive for requesting the evaluation has been strongly influenced by the fact that SIDA thought that the programme was placing comparatively more emphasis on practical field work activities rather than on studies and research. This position was also stressed repeatedly by SIDA during the programme's preparation.

It was decided that a two-partite evaluation mission would be fielded in the spring of 1988. There is no provision in the agreement for the host government to be part of the mid-term evaluation and it was not invited to participate.

The evaluation mission was led by Karlis Goppers, economist of SIDA's Evaluation Section, an independent unit from SIDA's Agricultural division which is responsible for the programme. FAO nominated Jim Miller, Aquaculturist and Project Manager of an FAO aquaculture programme in Haiti.

Field Trip

The mission spent two weeks visiting fish ponds and field works and other relevant institutions in Zambia, Malawi and Zimbabwe and subsequently spent a total of one week writing this evaluation report in Lusaka and in Rome.

Terms of Reference

The full text of the Terms of Reference for the evaluation mission is given in Appendix 1.

The mission is grateful to a number of persons who offered helpful comments to a draft version of the evaluation report. Especially we want to mention: Dora Blessich, FAO, Laura Piriz, Programme Officer, National Swedish Board of Fisheries, and Arne Andreasson, Project Manager, ALCOM.

AQUACULTURE IN RURAL DEVELOPMENT

In most developing countries of Africa, aquaculture has yet to play an important role in rural development for the poorer farmers – this in spite of substantial foreign assistance to this sector over the past 20 years. Nonetheless, this activity is emerging in importance as the technology becomes better understood and the farmers' needs are brought more clearly into focus by extension workers.

Problems in fish farming

Fish farming is not unlike other agricultural activities in that it can provide food and employment as well as revenues for the farmer. Many similarities exist between fish farming techniques and more familiar land-based farming practices, but in spite of this, wide spread development of fish farming has failed to occur. Some reasons for this are advanced as follows:

- Fish farming imposes physical requirements (access to year round water and clay soils) more stringent perhaps than some other farming practices.
- It also calls for water management and conservation practices which are today poorly understood in Africa as compared to Asia.
- The aquatic medium often represents an unknown and feared environment in Africa. It is traditionally considered mysterious by many ethnic groups.
- Fish farming has not received government priority in most African countries. Because of this, it has never developed technologically.
- Communications with farmers have often presented fish farming as a new activity and it has been perceived as one of high risk taking. Extension workers would perhaps have better success by stressing the similarities with accepted farming activities. Water and soil fertility are similar as are simple animal husbandry techniques.

- Fish farming methods applied in extension have often not been well adapted and some fish species used have been undesirable for culture.
- Extension workers as well as planners have traditionally used a purely technical approach with little sensitivity to socio-cultural and socio-economic conditions.

Improving aquaculture

In spite of these problems, positive results obtained in a few areas offer encouragement for continued foreign support and greater commitment from governments.

In some countries the integration of fish farming with agriculture has produced high yields through reciprocating systems including gardening, livestock and fish ponds. The focal point in such farming is the pond, which is essential to the other activities for water supply. Wastes from gardening and livestock serve as compost to the ponds. Where pigs are raised in association with fish ponds, production exceeding 10 tons/ha/year can be realized.

Fish Farming has been shown to substantially increase the revenues of rural farmers in countries such as the Central African Republic, the Ivory Coast, Haiti and Zambia. Preliminary indications in the ICARA (International Conference on

This pond near Rukurye will depend upon the adjacent lake for its water supply. Better sites for ponds exist in the area but farmers prefer sites near their homes to better control theft which is a major problem in isolated ponds.



Assistance to Refugees in Africa) Fish Pond Project show that most of its some 1200 fish farmers today earn up to 25 percent of their total revenues from fish production. Similar results have been observed elsewhere. Thus, presently, the sustained long-term benefits of small-scale fish farming is being tested.

High income, however, has (at least in Zambia's Eastern Province as shown by a survey conducted by ALCOM) proved to be a relatively less-important goal for many small farmers. Poor farmers must find ways to more efficiently use their limited resources and minimize risk-taking. Thus, in the Northern Province of Zambia, a farmer entering into fish production is diversifying and not specializing, as no labour resources are reduced from other farming activities since ponds are built during slack time between crops.

It appears that small-scale aquacultures offer promise of much greater impact on rural development if constraints in communications (e.g. the approach used in extension) and water management can be overcome. It is not the technical aspects that are a problem but the difficulty in transmitting the message. Government priority and support for fish farming however is a necessity.

Large-scale aquaculture

Development of industrial-scale commercial aquaculture in rural areas has been very limited but offers promise if products can be produced at low cost for local consumption. Such farms require large investments and the availability of agricultural by-products for fish feed. A stable investment climate is one obvious prerequisite.

Unfortunately, employment on such large farms is usually limited and if processing facilities are not incorporated into the farm, impact on local employment is minimized.

AQUACULTURE IN ZAMBIA

Foreign assistance

Zambia is today receiving considerably more than other SADCC countries in support for fish farming development with some US\$ 6-7 million in foreign assistance over the past 10 years. (A full listing, with amounts, times, and locations of all foreign aid supported Aquaculture Programmes in Zambia is given in Appendix 4). This effort has succeeded in increasing the production of pond-raised fish from 88 tons in 1967 to some 1,000 tons at present (see report by FAO/Kutty 1988, Reference nr 3).

Rural fish farming

Pond-raised fish (mostly *tilapia*) are today produced in over 5,000 ponds on government farms (47 ha), commercial farms (299 ha) and in small farmers ponds (237 ha). Table 1 gives total pond area as well as total production in Zambia. Yield averages 2.16 tons/ha/year, but some commercial farms report yields ranging up to 8 to 13 tons/ha/year through better management and more intensive methods such as pig-cum-fish and duck-cum-fish husbandries. This represents only a very few fish producers, however, as the vast majority lack feeds and other inputs required for such high-yielding methods. In general, feeds for small animal husbandry are at best limited in availability and variable in quality in Zambia.

Table 1 gives total pond area as well as total production in Zambia.

**Table 1. Fish Producers in Zambia;
Types, Total areas and Production, 1987**

Type of producer	Number of producers	Total pond area		Production (tons)
		(ha)	%	
Government Stations	19	47	10	90
Commercial Farms	90	200	41	700
Small-Scale Ponds	4,371	237	49	230
TOTALS	4,480	484	100	1,020

If such survey results from the Northern Province of Zambia can be generalized for the whole country, we can conclude that the majority of rural fish farmers in the northern province of Zambia have small ponds (200-1800 square metres) and only limited fish production 1-2 tons/ha/year). Little data exist from such farmers as they practise so called *continuous harvesting* which means that they fish several times each month as compared to *batch harvesting* where the pond is totally drained and all the fish harvested. Mixed cultures of *tilapia* are practised with limited composting and feeding of maize bran and other farm-generated wastes.

These rural fish farmers also take few risks in integrating fish pond management into their agricultural activities. No reduction is made in time spent in

crop or livestock activities. Household labour is used for pond construction which is carried out during slack periods between crops. It is also interesting to note that extensive survey studies have revealed that these farmers enter into fish farming without great expectations of high income (reference Wijkstrom and Aase, 1988). It is important to underline this realistic approach as it shows promise for sustained development.

There appears to be a large impact of fish farming in the country.

Department of Fisheries

Government support for fish farming has been hampered by economic difficulties. Low motivation of fisheries personnel (perhaps due to low salaries), and limited funds for operations, as well as transport problems within the Department of Fisheries have reduced production and distribution of fingerling. The presence of three national projects with foreign support and one pilot project of a regional programme does not appear to have greatly improved the situation. These projects are concentrating on station management, training and extension. The three stations are located in Chilanga, Chipata and Mwekera.

The Department of Fisheries staff available for fish farming extension appears disproportionately large in comparison to staff for capture fisheries.

Out of a total of 366 personnel 205 are assigned to fish farming. Of these 86 are technical staff. According to the Fourth National Development Plan technical staff should increase to 204 by 1990 (FAO/Kutty, 1988).

In spite of this large staff, the foreign assisted projects experience chronic shortages of field personnel, especially in extension. The government must try to improve this situation by perhaps transferring under-utilized personnel from other areas and extensively evaluating present personnel usage.

Capture Fisheries

Yield from Zambia's capture fisheries has declined. Current production from lake fisheries is estimated at 60,000 tons at a value of approximately 60 million Kwacha (US\$ 7,500,000). Lakes and rivers cover six percent of the country and capture fisheries are said to directly employ some 25,000 people. Excessive fishing pressure and inadequate extension and law enforcement services are areas needing change to reverse the deleterious effects on the fisheries resource base.

Fish as food

Unlike other meats which in some cultures by tradition are eaten only on special occasions, survey results from the Northern Province indicate that fish is acceptable at any time. The per capita consumption of fish has been declining in recent years from 17 kg per year to 11 kg at present. This is due to increasing

demand and reduced supply caused in part by inter-regional trade between Tanzania, Zambia, Malawi and Zaire which escapes national statistics (FAO 1988).

Consumer demand for fish by 1990 is estimated to be 110,000 tons and the capture fisheries could produce up to 80,000 tons with improved management (RDA, 1987 in FAO/Kutty 1988). The 30,000 ton shortfall will likely go unfulfilled

Table 2. Aquaculture information on SADC countries

Country	Precense of aquacult. programme	Activities in stocking small dams	Potential for aquacult.	Limitations for aquaculture	Aquacult. prod. in tons	Ponds No.	Area (1,000 ha)
Angola	No information available						
Botswana	no	yes	limited	Little available water Lack of expertise		?	?
Lesotho	yes	yes	good	Lack of expertise Lack of training Limited infrastructure Lack of credit Lack of fingerlings	20	132	30
Malawi	yes	yes	high	Need more training Need better extension services Need polycultures	100	582	?
Mozambique	yes	yes	limited at present due to political situation	Lack of expertise Lack of training Lack of feeds and inputs	18	?	16
Swaziland	yes, limited	yes	good	Lack of expertise Lack of training Poor species Lack of credit	?	>100	?
Tanzania	yes	yes	high	Lack of credit Lack enough fingerlings Aquaculture low government priority	375	5000	500
Zambia	yes, public and private	yes	high	Lack of credit Need more extension workers Lack enough fingerlings	1000	5000	300
Zimbabwe	yes	yes	high	Lack of credit Lack of expertise Lack of fingerlings Lack of hatcheries	?	2000-3000	?

given the countries' restrictions on importations and expected limited growth in production from aquacultures.

AQUACULTURE IN SOUTHERN AFRICA/SADCC

SADCC: goals and organization

The South African Development Co-ordination Conference (SADCC) was established in 1980 at a meeting in Lusaka of the nine member countries: Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe. Its aim: to strive for economic independence and regional development based on the resources available in the area.

SADCC is organized on a decentralized basis with responsibilities for the various sectors divided among the member countries. Malawi's Principal Secretary of the Ministry of Forestry and Natural Resources was named as the sectorial coordinator for forestry, fisheries and wildlife.

As regards aquacultures and fisheries, SADCC does not represent a homogenous region. Included in SADCC are countries with no fishery tradition and very low fish consumption (Swaziland and Lesotho), countries with marine fisheries presently exploited mainly by foreign fleets (Angola and Mozambique), and countries heavily dependent on fish for animal protein supply (Malawi and Zambia).*

For aquaculture, three agro-climatic regions exist in the area which technically offer conditions for temperate, semi-tropical and tropical fish-farming. Thus culture species could include trout, carps and tilapias, as well as other species including those for sport fishing which are popular in several countries. A general information on Aquaculture in the SADCC countries is given in Table 2 (opposite).

Nutritional comparisons

Considerable variations exist in calory intake in the region. Five countries within SADCC remain below the African average of 2 165 Kcal with Mozambique rated at only 75 percent of the norm. According to the FAO/NORAD report (1988), only Lesotho, Malawi Swaziland and Tanzania have a satisfactory calory supply. In 1984, the FAO study "SADCC Agriculture Towards 2000" estimated that about one-quarter of the SADCC population risked undernourishment.

As regards protein intake, Malawi and Mozambique have the lowest supply at 50 and 30 percent respectively of the African average. Zimbabwe has a surprisingly low level of 66 percent of the African average of 12 grams per person and day.

* FAO, "Fish Utilization and Marketing Service Report/NORAD", 1988.

Table 3. Nutritional comparisons for the SADCC countries

Country	Calorie supply (Kcal)	Calories as percent required	Animal protein intake (g/person and day)	Freshwater fish catch (1000 MT)	Per capita fish protein intake (grams/day)	Contribution of fish in total annual protein supply
Angola	1926. ¹⁾	82	13	8.0 ⁴⁾	3.2	24.6
Botswana	2150	93	22	1.7	0.8	3.6
Lesotho	2299	101	13	0.0	1.0	7.7
Malawi	2415	104	6	62.1	2.7	45.0
Mozambique	1617	89	4	5.0 ²⁾	1.3	32.5
Swaziland	2556	110	22	0.0	0.0	0.0
Tanzania	2316	100	11	230.0 ³⁾	3.4	30.5
Zambia	2126	92	11	67.7	3.2	29.1
Zimbabwe	2144	90	9	17.4	0.6	6.7
Avg. SADCC	2100	90	9	—	2.4	
Avg. Africa	2165	93	12	—	2.3	

Source: FAO/NORAD Thematic Evaluation 1987

1) 1984/1985 data

2) Total fish catch including marine fisheries = 37.7 MT

3) Total fish catch including marine fisheries = 270.9 MT

4) Total fish catch including marine fisheries = 74.5 MT

Other countries are at or above the average. The very low level of protein intake in Mozambique creates malnutrition among many of its rural populations. The nutritional levels in the SADCC countries are shown in Table 3 above.

Marine fisheries

The marine capture fisheries of Angola and Mozambique account for more than 90 percent of their fisheries output. Angola could be one of the most important fishing nations in Africa with some 650,000 tons of estimated potential yield. However, due to political problems, only a minor percentage of capacity is realized by the Angolan fishing fleet. Both countries' offshore waters are today heavily exploited by foreign fishing fleets.



The evaluation team visits Domasi fish farm. Pictured from left to right are Boyd Haight, Extension Expert-ALCOM, John Balarin of ICLARM, Extension manager of the Domasi farm, Karlis Goppers, economist of SIDA and Jim Miller, agriculturist of FAO.

Inland freshwater fisheries

Inland fisheries account for some 85 percent of the total capture fisheries' landings in the SADCC countries. Landings from the lakes (820,000 tons) account for more than half of Africa's total inland fisheries production and some eight percent of the world's catch.

Many of the region's lakes appear to have attained their maximum sustained yield, however, and for most of these countries (excepting Angola and Mozambique) the only potential for increasing fish production and supply lies in aquaculture.

One of the major problems in all countries is the distribution of the fish, which is very limited because of poor roads and marketing infrastructure.

Aquaculture

Zambia and Malawi are the region's leaders in aquaculture development. Both countries have had a number of foreign-assisted fish-farming projects over the past 15 years and several projects are currently ongoing.

Present realizable production from aquacultures has been estimated at some 10,000 tons maximum or less than one percent of the total fish production in the

area. Information summarized from the country reports of the Technical Consultation Conference indicates today's actual total production to be less than 2,000 tons.

Culture systems and fingerling production

Species cultured include tilapias, carp, and trout in a few places. Most aquaculture development is focused on the subsistence rural farmer although emerging commercial fish-farmers are receiving increasing support from extension services in Zambia, Zimbabwe and Malawi. Nevertheless, culture methods focus on mixed tilapias which enable farmers to be independent with respect to fingerling production. This points to a serious problem in all countries as the fish hatcheries produce insufficient fingerlings. A further complication lies in the lack of transport means for fingerling distribution and extension workers in several countries.

Since some of the hatcheries are situated in semi-tropical areas, tilapia reproduction is limited to the six or so warmer months when temperatures average above 21-22°C. In some cases, poor management and lack of inputs are major factors limiting tilapia reproduction.

Many of the region's emerging farmers and a few subsistence farmers practise integrated agriculture with pig-cum-fish or duck-cum-fish farming. Production may reach 10 tons/ha/year in these cases but most farmers lack the inputs for such intensive systems and yield averages of 1-2 tons/ha/year in most cases.

Small lakes and water bodies

Numerous small lakes and bodies of water exist in most countries and are largely underutilized for both fisheries and aquacultures. Most were built for multi-purpose usage including water supply and irrigation. All of the countries have practised at least some stocking of these lakes. The lakes clearly represent a valuable resource for aquaculture development.

In most cases, this would be limited to downstream aquacultures although some cage cultures could be attempted as a pilot project where feed inputs are available.

CHAPTER 3

Objectives of the SIDA/FAO Programme

BACKGROUND

SIDA's interest in aquaculture goes back to 1982 when its Agricultural Division wrote a memorandum pointing out the need and scope for aquaculture in rural development for small-scale farmers. The National Swedish Board of Fisheries (NSFB) was then asked by SIDA to develop Sweden's position in this area and to present a study outlining possible Swedish future support.

The study* was presented to SIDA in the autumn of 1983. In May 1984 a major international seminar on aquaculture in rural development was held in Sweden, with participants from FAO, other donors as well as international researchers in the field of aquaculture. The theme of the seminar was "Aquaculture for small-scale farming and possible Swedish development support". For the seminar FAO had prepared a background paper.**

Subsequent to this meeting several contacts were made between SIDA, the National Swedish Board of Fisheries and FAO and a programme for support to aquaculture for small-scale farmers was developed by SIDA and FAO jointly. The Swedish project document was elaborated in early 1986 and the formal decision to finance taken in March 1986.

Early Motives

Sweden's interest to engage in aquaculture seems to have been guided by an impression that the field of aquaculture had to a large extent been dominated by a narrow technical approach. This interest was reinforced when the results from the

* "Föreläsningar för Svenskt Stöd till Akvakultur i u-länder, samt förslag till riktlinjer för verksamheten"; National Fisheries Board of Sweden, Development Series No.10, 70 p. Gothenburg, Sweden September 1983.

** "A perspective on needs for technical cooperation in aquaculture in developing countries", FAO Rome, 1984.

FAO/NORAD Thematic Evaluation was released. The study was carried out during 1984 to 1987 and the report was published in Rome in 1987. As seen by SIDA, one of the major conclusions of the study was that – in spite of the fact that a relatively simple and functioning technology was available – fish farming still did not spread as an integral part of rural development. The hypothesis of the Thematic Evaluation, which SIDA shared wholeheartedly, was that this lack of success was due mainly to a lack of understanding of the socio-cultural and socio-economic aspects involved.

Research needed

These conclusions from the Thematic Evaluation subsequently came to be seen by SIDA as the most important reason for Sweden's future involvement in aquaculture development. Based on this viewpoint the Swedes wanted their engagement in aquaculture to be in an experimental or research type project, the objective being to learn about and test methodologies. It was not to be a regular development project with the task of producing as many fish ponds or as many kilograms of fish as possible.

Large african families require a lot of food on the table. For this reason most fish farmers practice intermediate harvesting of fish by hook and line. A pilot project can better evaluate this harvest method to enable extension workers to improve techniques.



The programme is thus explicitly intended to be a research, experimental project and it is designed specifically to study the needs and the motives of the small-scale farmers. As will be seen below, this premise has important bearings on the orientation and shaping of the programme.

Other influences

Apart from the thematic evaluation there are three other sources that can be seen as forming an important intellectual basis for Sweden's support to aquaculture. These are:

- The World Conference on Agrarian Reform and Rural Development, WCARRD, held by FAO in Rome in 1979, which gives guidelines for rural development including resource growth with equity, people participation, and the role of women, nutritional impact, and environmental concern.

- The World Fisheries Conference held by FAO in Rome 1984. One of the outcomes of this conference was that the development of small-scale fisheries and aquaculture could best be done in a rural development context, since the problems in these communities are not only of a technical nature but encompass social, cultural and economic factors as well.

- The World Commission on Environment and Development, which published the report "Our common future" in 1987, emphasized that one objective of development should be an expanded and sustained production from the environment also for future generations.

These sources are today emphasized by the programme as important guiding principles for its work.

SIDA's PRINCIPLES AND POLICIES WITH REFERENCE TO EXPERIMENTAL AND PILOT ACTIVITIES

Sweden's financing of the Programme comes from a special budget called "Pilot Activities and Development of Methodologies" (in Swedish FOM, Försöksverksamhet och metodutveckling) the purpose of which is to seek ways to develop and promote among other things catalytic and participatory methods for experimental development projects. This budget title contains about 100 other, mostly smaller research projects, and pilot activities on a regional as well as bilateral basis.

SIDA's choice to use this budget is in itself a clear demonstration on the donor's part that it does not regard the Programme as a regular development project.

The intention on the Swedish part to regard it entirely as an research and pilot project has been confirmed repeatedly from the preparation stage onwards. This emphasis has on some occasions been the source of some debate between the donor and the implementing agency.

Motives

It is often felt within SIDA that it is the activities financed under the "Research and Pilot" title which are the only ones where Sweden's overall development objectives as well as its adopted rural development strategy can really be applied to the full extent. Because in regular development projects under the bilateral country programme the donor must often compromise its objectives with requirements posed by the recipient country's policies, by other donors or by other circumstances. Another aspect of the "FOM" funds is that projects will favour the use of Swedish experts, the explicit aim being to help develop a Swedish resource base in the subject matter at hand.

Procedure

SIDA has worked out a procedure in six steps to be followed for all projects supported by FOM funds. These six steps have also been stipulated in SIDA's original project document for the Programme in order to emphasize the intended research or trial oriented character of the programme.

Steps of a "FOM"-project

1. Problem identification.
2. Workplan formulation.
3. Research and development (pilot activities, tests, trials, etc).
4. Training of key personnel.
5. Formulation of national projects and programmes.
6. Implementation of national plans.

Phases of the Programme

These six steps then describe the general procedure in which the Programme is expected to operate. In Figure 1 below these six steps are placed into the three phases of the programme. These three phases are:

Phase I: Preparatory phase 1986-1988.

Phase II: Proposed implementation phase 1989-1994.

Phase III: Possible future development programme being induced by work attained in phases I and II.

As can be seen from the chart below (Figure 1), however, not all of the six steps fall within the programme period evaluated here.

Figure 1. Steps of SIDA's research policy in the programme's three phases

Phase I: Preparation					Phase II: Implementation					Phase III: Possible future development projects created if and when ALCOM is able to develop appropriate methodologies		
1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Steps 1 and 2					Steps 3 (and 4)					Steps (4), 5 and 6		

This evaluation deals with only phase I, i.e. the Preparatory Phase in which steps 1, documentation, and 2, planning, are taking place; while the actual implementation of the programme's research work is to take place in the proposed phase II, 1989 to 1994. Concerning step 4, training and extension, it seems somewhat doubtful whether it belongs to phase II or phase III.

Phase III is the desirable and hoped-for outcome of a successful first programme period. In other words, if the programme is indeed successful in developing methods in aquaculture that are appropriate for small-scale farmers, then such methods would be applied in future development projects. That is the time when step 6, the development of national programmes and projects will take place.

It needs to be pointed out that formally, the project document has never explicitly made any division into "preparatory phase" and implementation phase. On the title page it does state "First Phase". However, from the way the activities are designed – e.g. that the programme had to recruit its own officers including the project manager, as part of the programme's activities – and also because of the periods or "cycles" of the donor's financing decisions, it is clear that the implicit intention of the donor was indeed to have a "preparatory" phase of the programme.

In practice the development Phase III can naturally start before the proposed five years of Phase II are over to the extent that appropriate methodology is already being generated prior to the end of Phase II.

SIDA's GENERAL DEVELOPMENT OBJECTIVES

An aspect which is somewhat unclear is to what extent SIDA's four overall development objectives, which are very important in all of Sweden's regular development projects, should also be seen to apply to an experimental research and pilot programme as the present one.

The general overall objectives of Swedish development co-operation, as established by the Swedish Parliament in 1962, are to promote: (1) social and



Sport and food fishing is a very popular activity in many areas as this roadside fishing-worm vendor will attest.

economic equality, (2) economic growth, (3) self-reliance and (4) democracy. In 1987 a fifth development objective was added, namely that of (5) environmental protection.

Applicability of objectives

The relevant project documents do not deal explicitly with this question and it is not possible for the mission to clearly establish the formal role of these development objectives. However, the mission believes that, even in a pointed and explicit research programme like the present, the logical position must be that, although those objectives may not apply in a direct operational way to the activities, they are nevertheless important for providing guidance for the programmes main, long run objective.

In other words: the programme's overall objective of trying to "develop, test and demonstrate methods by which aquaculture can be introduced to small-scale farmers", should be fashioned in such a way that the methods, once developed, disseminated and applied, will promote economic and social equality, economic growth, people participation (self-reliance) and a democratic development.

Participation, democracy

The mode of operation or approach used by the programme in its pilot activity in Chipata is one based very strongly on people's participation, which then places the programme very much in line with objective 1 and presumably also 4, i.e. those of self-reliance and democratic development.

Equality

Further we may note that the target group of the programme is defined entirely as the poorest segments of country-folk or the small-scale farmers, which then places the programme in the vein of the first objective, that of attaining social and economic equality.

Economic growth

Concerning the remaining second objective, namely that of economic growth, we would conclude that this objective, given the programme's very determined and explicit emphasis on the small-scale farmers, and on fish production for increased consumption of protein intake for the villagers themselves rather than for cash incomes, does not apply – at least not in a direct sense – to this programme.

Overall we may conclude that the programme – although completely geared towards research and experimental pilot activities – is also based on the traditional and well established development objectives which Sweden applies in all of its bilateral development aid.

GOAL-HIERARCHY OF PROGRAMME

In this section we will put the programme's entire goal-hierarchy into the analytical approach of the so-called logical framework model, which is today applied in evaluation work by most aid agencies, including the World Bank and the UN system.

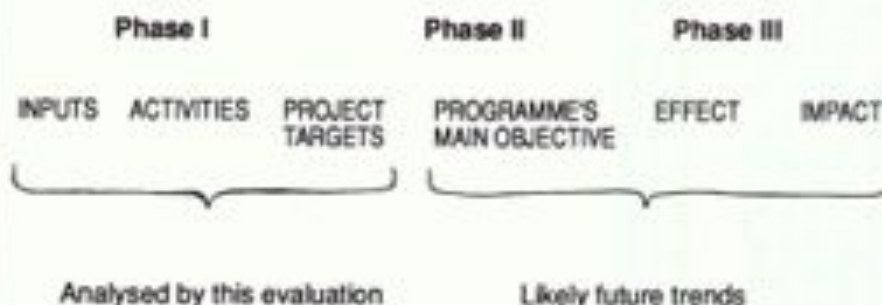
In figure 2 (below) the various levels of the goal hierarchy (inputs, activities, project targets, effect, and impact) are placed in relation to the phases of the programme which were shown in figure 1 above.

Explicit and Implicit goals

In figure 2 the reader will also note that the long term objectives of the programme, Effect and Impact, are in our system placed outside of the project period. They implicitly follow from the main objective which has been defined for the programme.

So the Impact and Effect levels of the goal hierarchy are not explicitly defined within the project period. This is for the logical reason that the project being evaluated here is not a development programme in itself but a research activity which – if it attains its main objectives of arriving at appropriate methodologies – will lead

Figure 2. Time sequence of the programme's goal-hierarchy



to effect(s) and impact(s) in the future. Therefore it is quite logical that they are not formally or explicitly defined in the project document. But nevertheless they are clearly implied there. For that reason we have formally incorporated them into the logical framework model used in this evaluation.

The logical framework model

The entire goal hierarchy of the programme, comprising inputs, activities, project targets, programme objectives as well as long run effect(s) and impact(s) is now presented in Table 4 (next page).

Regarding the programme's main objectives, the evaluation mission notes that there is an expansion in relation to the original definition given in the Plan of Operation, dated 5 March 1986. The result is that the testing and subsequent demonstration (and dissemination) of the methodology developed are also seen as part of the programme's objectives. The original definition was:

"Elaborate effective strategies, policies and methodologies for assisting rural peoples in improving their quality of life through the development of aquaculture either in conjunction with land-based farming or as an alternative to fishing."

Side conditions

In addition to the objectives, the following side-conditions or assumptions for the objectives were specified in the Plan of Operation.

- An appropriate selection of site and target groups should be made.
- An increase in the target group's own control over production and production facilities should be strived for.
- The participation of the target group in all stages of the development programme must be emphasized.
- The products produced will be locally consumed with concomitant improvement in the nutritional well-being of the group; or if produced for national or export market an increase in real income at the producer level.
- Also the women of the target group will share significantly in the benefits of the development programme.

Table 4. Logical Framework: Goal Hierarchy of Programme

Level of objectives	Definitions	
IMPACT	Target group farmers (described as the poorest farmers) will be better off because of fish-farming, nutritionally, economically or both	Defined implicitly by this evaluation
EFFECT	Target group farmers as well as government bodies and other institutions will actually start applying appropriate methods developed for aquaculture by the programme	
PROGRAMME OBJECTIVES	Develop, test and demonstrate effective strategies, methods and techniques by which rural people can improve their standards of living through aquaculture	As given in the plan of operation approved by donor and FAO in March 1986 (p. 5)
PROJECT TARGETS	<ul style="list-style-type: none"> • Carrying out of in-depth desk studies • Establishment of one or more pilot community fish farming activities • Analysis of experience obtained • Preparation of guidelines for selection, formulation and implementation of similar development activities elsewhere • Development of an "umbrella" programme at regional or interregional level (p.4 Plan-of-Operation) 	
ACTIVITIES	<ul style="list-style-type: none"> • Recruit personnel • Initiate multi-disciplinary in-depth studies • Do field analysis of target groups in selected communities • Collect and analyze information on related projects • Gather data on socio-economic and nutritional aspects • Carry out mid-term review • Identify and formulate subsequent phases of project • Provide inputs to national planning for aquaculture development • Prepare draft terminal report <p><i>Added later:</i></p> <ul style="list-style-type: none"> • Arrange technical consultancy meetings 	
INPUTS	<p>In original plan-of-operation:</p> <ul style="list-style-type: none"> • Personnel • Fellowships • Training • Travel • Contractual services • Equipment • Supplies • Operational expenses • Counterpart contribution 	

Assumptions made

The targets specified for the programme did assume that a certain number of input activities would be provided for by the government. This has in some cases not been forthcoming, e.g. the provision of counterpart staff, office space and housing for staff. This lack of delivery then will have to be taken account of in judging the programme's achievements.

Changes made in objectives

We have already noted that the programme's main objective was expanded to also include that methods, once developed, should also be tested, demonstrated and disseminated. This would seem to be a not at all insignificant expansion of the programme's level of ambition.

Further, it appears that during the implementation so far the donor has placed a somewhat increased emphasis on the programme's regional role.

This narrow valley offers good sites for constructing fish ponds or for a small lake which could irrigate gardens and ponds downstream. All options need to be considered to help the subsistence farmers of southern Africa.



CHAPTER 4

Evaluation of implementation and efficiency in achieving targets and project objectives

This chapter assesses and evaluates the implementation of activities and efficiency in achieving programme's targets during its preparatory phase 1986-1988.

METHODOLOGY AND QUESTIONS ANALYZED IN THIS EVALUATION

The analytical framework of this evaluation follows the so-called logical framework model, and can be shown as in Table 5 (opposite). The reader is reminded that of the six levels, this evaluation addresses only the first three: namely inputs, activities and project objectives, which are in fact the only ones relevant for the preparatory phase, which is the one under evaluation.

Disposition of the analysis

The present chapter contains the core of this evaluation report in that it analyses how and with what efficiency the targets and the programme objectives were achieved.

Likely future effects and impact

Also in this chapter we discuss briefly the likely future effects and impacts of the programme. These naturally become relatively less important in this evaluation, since we are dealing with a project which is evaluated mid-term, before any effect or impact has had a chance to come about.

Finally, chapter 5 draws conclusions with respect to the relative emphasis of the programme and its future orientation.

1. PILOT ACTIVITY IN CHIPATA, ZAMBIA

The project, active today in the villages Yokoniya, Rukuzye and Magwero,

Table 5. Scheme of analytical frame of reference used in this evaluation

Defined objectives of the goal hierarchy (Table 4, Chapt 3)	Operational (measurable) criteria	Observed outcomes/ achievements	Questions asked and analysed in Chapter 4
1 Impact(s)	Nutritional levels, and/or cash	Not addressed in this evaluation (see Fig. 2)	Is fish-farming in fact a socially sound and economically profitable proposition for rural farmers in Africa/ Zambia?
2 Effect(s)	How many farmers have actually started fish-farming as a result of ALCOM? Have governments and other institutions started new programmes?	idem	Is the project effective in getting farmers and other institutions into fish-farming? Is the "FOM" approach constructive and fruitful?
3 Project objectives	See Table 4 in Chapter 3	Discussed and analysed in Chapter 4	Has the project succeeded in achieving what the donor/FAO wanted it to do?
4 Project targets	—	idem	Were the targets achieved efficiently?
5 Activities	—	idem	Has implementation been efficient?
6 Inputs	—	idem	Have the inputs been the relevant / adequate/ necessary ones to achieve the target?

seeks to develop improved methodologies, strategies and policies for the extension of aquaculture to rural poor farmers. Technical aspects have received little stress as farmers are slowly induced to discover fish farming themselves through frequent contacts, both formal and informal.

Approach used by project

The programme has applied a people participatory approach in studying the farmers included in the pilot study. No quantitative goals were established in the project objectives and this premise has been carried to the field. It attempts to bring

Figure 3: Description of the awareness building process of small-scale farmers



farmers through an innovation "adoption process" in preparation for acceptance of new technology as described in the figure 3 (above).

The approach is challenging to farmers who are brought to define fish farming in their own terms and make their own decisions regarding their adoption of the technology. It is a truly participatory approach in that it strives to strengthen the self-confidence of the farmer in order to develop his self-reliance and independence from outside inputs.

The Programme's mode of operation is the following:

- Information gathering, analysis of socio-cultural and economic aspects; field visits to existing ponds; discussions with farmers to evaluate available inputs, physical factors, community variables, activities of the target group, access of group to technology and potential sites.

- Initial contact with potential fish farmers – several visits to village and area; acquaintance with village headman and others; organization of meeting to discuss fish farming; authorization of village headman for interviewing farmers.

- Slide show presentation – people participation in describing slides; the audience describes what they see in each image; the farmers discover fish farming through their own descriptions and terms.

- Site selection surveys – appointments are made to visit sites for ponds; potential fish farmers discover how they will build their ponds; appreciation of soils and water supply.

- Use of pamphlets – discussion on pond construction techniques and fertilization; demonstration; decision of farmers to start or not to start pond construction.

- Organization of pond construction – assistance in pond layout; "staking out the pond"; discussion of construction process; follow up.

- Pond management – discussion with pond owners; feeding and composting techniques repeatedly underlined.

- Pond harvest – assistance; continuous harvesting; discussion of results; preparation of pond for new production cycle.

Personnel and Transport

During ten months the pilot project utilized the following staff: 1 Expert Aquaculturist - FAO, 1 Associate Expert Aquaculturist FAO, 1 Associate Expert socio-Economist - FAO, 1 Aquaculturist Government (GOZ), 1 socio-economist for two months (Government), 1 Translator/Secretary FAO - Zambia, 1 Driver - FAO - Zambia.

Thus, in effect, the three expatriates in Chipata only had one counterpart - the aquaculturist from the Department of Fisheries. No appropriate fish scouts/extensionists were made available by the government and no personnel lived in the three target villages which were distant from Chipata by 30 to 60 minutes travel time.

A four-wheel drive project vehicle was made available full time for the Chipata project.

Results

To date, after 10 months of field activities, the pilot project has obtained the following results:

Information gathered from some 100 interviews.

A methodology is being developed and documented (ref. ALCOM, 1988).

A data base has been compiled for the Eastern Province which covers socio-cultural issues, agricultural issues and detailed information relevant to extension (ref. ALCOM, 1988, 58p.). The field team is closely following fish farming in 10 ponds, of which 3 were built as a result of project influence. Three

Table 6. Fish ponds followed by pilot project in Chipata region of Eastern Province Zambia. ALCOM

Community	Pond management	No. of fish farmers	Ponds			
			Active		Under construction	
			No.	Area (ares)	No.	Area (ares)
1. Yokoniya	Communal ¹⁾ youth club	17	1	2.0	0	0
2. Rukuzye	Communal ^{2) 3)}	?	0	0	1	1.0
3. Magwero	Communal ⁴⁾ school	?	5	15.0	0	0
4. Magwero	Individual	1	3	12.0	1	15.0
5. Magwero	Communal ⁵⁾	?	1	1.0	0	0
6. Magwero	Individual	1	0	0	1	1.0
Totals			10	30.0	3	17.0

Source: Elaborated by the mission

- 1) Initiation influenced by ALCOM
- 2) Pond being built in perimeter of water reservoir
- 3) Several abandoned ponds exist in this area from the IRDP project
- 4) Some 300 school children do the work around the pond but the four teachers benefit from the fish produced
- 5) Pond built in the water table – water supply may be limited and seasonal

other ponds are currently under construction (Table 6 above). Quantifiable information as regards fish production however is not yet available.

A financial analysis has been made of one pond (ref. ALCOM, 1988).

Conclusions, comments

1) The number of fish ponds started among the sample families contacted by the programme is presently very small – only 10 fish ponds. Further analysis is needed before valid conclusions can be drawn. Thus the sample of families contacted should be enlarged with the possible inclusion of farmers in other provinces which could be followed by the associate expert based in Lusaka.

The mission feels that an enlargement of the sample can be attained without too

much extra need of resources while retaining the "participatory" approach. This is developed further elsewhere.

2) Insufficient field staff have limited contacts with the target group. This lack of or limited amount of one-on-one contact may have influenced findings and slowed the confidence-building process between farmers and extension workers.

3) The project's goals could perhaps be more realistically achieved with a national staff member living in each of the target villages. This would insure an almost daily contact with a much larger number of farmers from the target group. It would also have given a more valid cross section of the community members. This approach would have likely created more fish farmers for study and information gathering.

4) The "participatory" approach used in letting the farmers discover fish farming themselves appears to have been carried too far – resulting in few subjects under study and limited information. It should be noted that the project's efforts have only influenced the creation of three new ponds in ten months. By any standards this is very little.

5) Limiting the pilot project to the eastern province appears to be a confinement of the project. As already mentioned this region is only marginally suitable for fish farming (limited resources and limited interest from subsistence farmers) and many more suitable areas exist within Zambia which could obviously offer insights into development of methodologies. This approach would offer more information and give the project a broader socio-cultural and technical base from which to draw its conclusions. This last point is especially relevant for a project aiming at obtaining methodologies for the nine suitable southern African countries which contain three broad agricultural climatic zones. The mission is aware however that the short time available may have prevented the project from expansion.

6) The data base and documentation in draft form completed by staff in Chipata contains very useful information on socio-cultural and extension aspects. However it seems difficult to locate information within this report (58 p. single spaced). The report needs to be made more readable and accessible to nationals.

7) The financial analysis, at least in its draft form presented to the mission, fails to present the basic production data relevant to all its calculations. The calculations appear too positive as the calculated return on investment is found to equal 109% over eight months.

2. DESK STUDIES

Four different desk studies were carried out in an effort to identify factors likely to be crucial to the integration of aquaculture into rural development. These studies, each written by an international consultant, were carried out between October 1986 and March 1987 and were focused on the following aspects of fish farming:

- Socio-cultural
- Socio-economic
- Bio-environmental
- Bio-technical

The studies were carried out at the beginning of the project in order to give an orientation and point of departure for project activities.

Perhaps because they were started before the programme had established itself, it appears they were not fashioned so as to be of maximum use and benefit for further programme activities.

Shortcomings

Much potential existed for these studies but it was not realized due to a number of reasons including the following:

Two of the final reports are very academic and contain little accessible information for the majority of readers.

The reports do not offer a cohesive overall position, in part due to no individual being named as team leader or mission chief. Thus no efforts were made to orient the writing as a team effort with central ideas.

The objective would probably have been better served had the desk studies been carried out after project field staff were more informed of conditions and relevant factors. At such time one of the project senior staff could have acted as co-ordinator for the mission's field visits and for elaboration of the desk studies oriented towards real needs already identified by field staff through real experiences.

Such an approach could have also served to bring the "academic" type reports to focus more on practical issues and less on theory.

Use of local experts

Another obvious way in which these studies could have been made more useful in a practical sense for field staff would have been through the use of local experts.

Such experts exist in Africa and most "have their feet on the ground" so to speak. Qualified people from the region have often experienced first-hand the difficulties of life in rural areas and would likely have better understood the focus desired.

3. SURVEYS

At the beginning of the project a fish-farming survey was conducted with the following objectives:

- to identify the current situation and future prospects for rural fish farming;
- to study the significance of factors thought to determine the involvement of rural communities in fish-farming and suggest which other factors may be of importance;
- to study the nature and effectiveness of development support to fish-farmers in rural communities.

Questionnaire

This survey was initiated with a test questionnaire on a small scale (14 farmers) in the Eastern Province. After revisions of the questionnaire, a full-scale survey was conducted in the Northern Province of Zambia in October 1987.

The questionnaire developed through this practical process was very thorough. It required some one and a half hours to conduct an interview with a fish-farmer. In total, 89 such interviews were conducted. The interviews with the fish-farming questionnaire were carried out with 49 practising fish-farmers, 22 former fish-farmers and 21 potential fish-farmers.

Comments

This survey appears to be the most comprehensive study ever conducted on fish-farming in Africa. It reveals a lot of information about the motivation of fish-farmers.

Given the considerable experience of the consultant in Africa, the early timing of this survey at the start-up of the project was not a negative factor.

However, analysis of the considerable information obtained from the questionnaire appears somewhat superficial and it lacks statistical analysis. The mission recommends that such an analysis be carried out and include statistical analysis using a computer.

4. TECHNICAL CONSULTATION

Within the framework of the project's objectives, a technical consultation was held in Lusaka, Zambia, from 27 to 30 October 1987. With the participation of the donor agency, FAO, SADCC representatives as well as others. The conference had the following objectives:

- to clarify the relevance of the desk studies carried out on socio-cultural, socio-economic, bio-environmental and bio-technical aspects of rural aquacultures for the countries of Southern Africa;
- to familiarize the participants with the concept of aquaculture in rural development;
- to identify areas which need further studies and investigations to elaborate on strategies.

A fish pond built at the edge of a lake near Rukurwe provokes a technical discussion on soil types and site selection for pond construction.



Conference organization

The organization and carrying out of this conference was in itself a major undertaking and is to be praised. Eighteen aquaculturists, rural sociologists and planners from eight SADCC countries participated as well as experts from Sweden, India and FAO headquarters. Two participants were invited from each SADCC country, one with experience in social sciences and one with technical aqua-cultural experience.

Nine technical sessions were held over the course of the four-day conference covering the following major subjects:

The concept of aquaculture in rural development; presentations of country papers on aquaculture and rural development – Botswana, Zambia, Tanzania, Mozambique, Lesotho, Swaziland, Zimbabwe and Malawi; participatory planning processes; the role of women; information needs and design of surveys; innovation and/or intensification as approaches to choosing a fish farming system (concentrating on the utilization of small water bodies); extension; social change and aquaculture; environmental aspects on aquaculture.

The report on the proceedings of this conference is a detailed 84-page-document which is useful in that it groups all of the country reports and focuses on the issues facing fish-farming development in the region.

Problems in aquaculture development were well discussed. Emphasis was placed on the need for incorporating a high degree of peoples' participation in planning and project execution. The accent was placed on peoples' participation in aquaculture development and defines a reduced role for the donor country or development agency. This role becomes one of enabling development to occur. Foreign assistance should enable the host countries to do the job of development in their countries.

Conclusions, comments

The mission believes that the technical consultation was successful and achieved its prescribed goals. Although the results are difficult to quantify, it is significant that such a large group was brought together. Much discussion and debate occurred both formally and informally. Real exchanges occurred and the meeting obviously increased awareness and understanding about the programme.

5. ADVISORY COMMITTEE

The project document calls for the programme to select an advisory committee which will advise FAO and the donor country on the planning and activities of the programme.

After initial contacts were made with responsible officials in each country, the

first Advisory Committee Meeting was held in Lusaka from 3 to 5 November 1987, immediately following the Technical Consultancy Meeting, and with mostly the same participants. Two of the countries were unable to send participants for reasons of transportation.

Although this was a very important meeting, the donor country failed to send a representative which, as far as the mission has been able to ascertain, was basically because the donor felt the meeting was convened prematurely.

Sessions held during this meeting covered the following topics:

- presentation of ALCOM and its progress report;
- the role of and terms of reference for the Advisory Committee;
- report of the Technical Consultation on Aquaculture in Rural Development;
- the workplan for 1988;
- the future of the programme;
- liaison.

Conclusions

It is commendable and impressive that this meeting was organized and carried out with such short notice.

6. INTERNATIONAL CONTACTS

ALCOM's objective is to support aquaculture development in the nine SADCC countries. A regional role of international contacts is therefore laid out in the project document.

The project management appears to have done a very good job in this respect. After 18 months of activities and international travel, the programme seems to have carved out a place for itself as a co-ordinator and disseminator of information.

However, the mission questions continuing efforts in all countries. The donors' original goals might be better served with the programme in a more limited role. It would be more effective working in fewer countries where at least a minimum of infrastructure and activities already exist. Lesser advantaged countries should receive special consideration. Once pilot projects have been carried out in several countries, the programme would have more experience and its message would be broadened.

On the other hand, the mission feels it could be a good idea for the programme to open up contacts with a few francophone countries. Few exchanges exist between Anglophone and Francophone countries and the programme could play an important

role in bringing the two together. Much work has been done in Francophone countries and this should not be ignored in aquaculture development in southern Africa.

7. HEADQUARTER SITE

The programme has been based in Lusaka, Zambia, for the first 18 months during its preliminary phase of operations. Since the project was to pass through an initial learning phase with travel between the SADCC countries, no clear definition was made regarding the headquarters' site. This situation remains the same today.

It was originally proposed in the Project Document that the host country of Zambia would provide office space. However, the government has been unable to do so.

After some months of searching, an 8-room house was rented in a nearby suburb of Lusaka where all technical staff have private offices as well as a sizeable reception/secretariat and an office for consultants.

In retrospect, it may perhaps seem unfortunate that the opportunity was missed to have a small office space at the Chilanga fish station. An associate expert could have been based there (the aquaculturist) and this would have insured closer ties with the Government Department of Fisheries and the national fish culture project (supported by the Netherlands and FAO), both of which are based at Chilanga. Such an arrangement could have led to a small pilot project in collaboration with the Netherlands/GRZ/FAO project.

Nevertheless, a decision needs to be made concerning the definitive location of the programme's headquarters. Various criteria can be mentioned for such a site. Mainly these are:

- good communications both nationally and internationally;
- facilities supplied by the host country government:
 - suitable office space
 - local personnel for pilot project activities
- convertible banking facilities;
- security;
- target group for pilot project activities;
- national infrastructure for aquaculture development;
- physical and economic potential for fish-farming in the country.

Proposed sites today seem to centre on Lusaka, Zambia, or Harare, Zimbabwe. Advantages and disadvantages exist for each of these.

Harare appears to have many advantages over Lusaka but, at present, ALCOM

has no activities in Zimbabwe. However, Zimbabwe is also one of the most developed of the SADCC countries. It is today a magnet for the regional Headquarters of many international organizations active in southern Africa.

As for Zambia the several national fish-farming projects would appear to offer opportunities for collaboration on pilot projects.

Malawi offers an interesting alternative but probably is inappropriate for not being one of the donor's regular countries of co-operation.

The Evaluation Mission abstains from recommending any particular site as the most appropriate. This decision must in any case be based at least partly on political criteria.

8. COUNTERPARTS

Presently the programme has only one full time counterpart staff member – in the pilot project in Chipata. No full time counterpart is attached to the programme base staff in Lusaka. This is a definite shortcoming which the mission feels needs to be adressed.

New fish farmers are not solely motivated by increased revenues, but rather by maximizing their cash flow from several agricultural activities as an integrated farm.



9. PUBLICATIONS AND INFORMATION

The programme has produced several well written and easily accessible information memos as well as a six-page brochure in colour and a first issue of a newsletter. Regarding the brochure, this was in response to a direct request from the donor in September 1987 to produce a pamphlet that "would make the programme known and its objectives clear."

In general, the mission thinks that the programme handled information aspects well. However, there are a few, not totally unimportant, shortcomings.

The mission notes two shortcomings. Firstly, the newsletter – although quite well and pedagogically written – raises a few questions of style, which the mission feels should have been edited.

Secondly, both the newsletter and the colour brochure, as well as some of the memos, have passages in which the programme is described in an overambitious way. This may defeat its purpose by creating unrealistic expectations for the programme. The programme should guard against having a too high profile before it has yet had a chance to establish itself in its practical activities and to come a bit closer to its objectives.

However to sum up, the mission feels that with the exception of the shortcomings mentioned above, the programme has addressed the information needs of the programme with skill.

Even so, it is maintained, and this is addressed elsewhere, that more information work needs to be done by the programme (as well as by both the donor and by FAO) in order to spread knowledge about the programme's nature, its objectives and results obtained.

10. LIKELY FUTURE EFFECTS AND IMPACTS OF THE PROGRAMME

The programme obviously need more time than the 18 months it has had so far to develop methodologies, strategies and plans for a successful approach to aquaculture extension and development.

As implied above, this evaluation mission has some doubts whether the approach taken in the management of the field activities in Chipata, Eastern Province, will lead to the desired future effects and impacts, and the programme's longer run objectives.

For one thing, the mission believes the size of the target group sample under study is too small and should be considerably enlarged. The existing small sample of seven fish-farming groups and ten fish-ponds is an insufficient sample from which to draw conclusions.

If the project is to achieve a future impact, the mission feels that farmers in

several different regions of the country should be under study. Thus, this pilot project should be expanded. Closer collaboration with ongoing national projects could provide information from areas more promising for fish-farming and from farmers with perhaps different motivations than those from the more depressed Eastern Province.

Not only will this approach help to ensure that the project will have a greater impact, but it will also help to provide more African field personnel which this project needs. Several of the national projects have fish-scouts in the field and with a short training or retraining of these people, the project would increase its eyes and ears in the field.

If the government continues to be unable to field fish-scouts for the Eastern Province, the project may consider hiring five or ten of the more educated villagers, already residing in impact areas, for carrying out part of the field work. This is an obvious, inevitable necessity if the project is to actively pursue its goals. The hiring of local workers for short-term work is fully justifiable. After a short training, such people could be useful.

The approach of having Zambian extension workers is a good one for other reasons as well. From discussions and experience in other projects, field observations and data collection are better obtained using African field-workers than

Fish pond in central Zambia.



through highly educated Europeans. These "extension workers" would live in the target villages – giving an almost daily contact with interested farmers.

In the mission's judgement the project has sufficient funds already within the existing budget for this change in approach of the pilot project. In order to purchase another vehicle and to pay the salaries (US\$ 50-60 per month equivalent) of the extension workers, the project should to the largest extent possible try to do without expatriate consultants for tasks such as documentation, evaluation and the conducting of future surveys. The project should also try to either hire local personnel e.g. documentalists, and strive for the best utilization of its own staff. As an example, perhaps the APO's can be used to analyse and carry out future surveys.

As regards the surveys, technical consultancy and Advisory Committee, the mission feels an impact has already been made through these activities.

Although the survey requires more review and statistical analysis, much useful information has already been gained through this impressive work. The findings from this survey need to be distributed to other countries for review and application. The mission feels the surveys at present offer the greatest chance for impact.

The technical consultation appears to have had an impact for disseminating project information and promoting exchanges among the participants.

In summary, it is difficult at this early stage to comment on the potential impact of this project's different activities. The mission feels that to give the project a better chance for success, SIDA, FAO and the project's management must continue to pursue the important task of informing the recipients of the character of the programme.

CHAPTER 5

Conclusions with respect to the Programme's current Emphasis and future Orientation

ALTERNATIVE APPROACHES FOR AQUACULTURE DEVELOPMENT

In evaluating the ALCOM project, it is clear that its people participation approach is not the one used by most aquaculture projects. It is a fact that in the past such projects have not brought about the successful catching on of aquacultures as a viable means of agricultural development, neither on a subsistence scale, nor on a commercial level. This subject provides an ongoing debate for aquaculture workers because aquacultures have caught on well in Asia and other areas of the world. Since different approaches are ongoing within Zambia and since practical results are an eventual product of all projects, in this section we will provide some comment on alternative approaches not chosen by ALCOM.

Was the "direct", "more active" or "technical" approach of the past to blame for aquaculture not becoming a widespread activity for rural farmers in Africa? Are technicians who are less sensitive to socio-cultural and economic aspects to blame? Are governments that fail to give adequate support for this activity to blame? It is well-known that in some African countries, at least, the fisheries service has been among the weaker services within the concerned ministry – be it Agriculture or Water and Forests. Personnel assigned to the fisheries sector have in many cases been poorly qualified with limited educational background and limited abilities in conceptualization. Such personnel have had little impact on decision-making and, as a result, financial and other support has often been channelled elsewhere.

In recognizing the lack of success of aquacultures in Africa, one needs to draw attention to the fact that governments have openly supported the active technical approach used up until recent years. In fact the people participation approach was strongly criticized by financially hard-pressed governments that wanted rapid results "on the table", so to speak. Sociologists were seen in a poor light in many countries as their efforts to develop the community and improve the family household through education in nutrition and improved sanitation (latrine construction) were limited in

success. Furthermore these projects proved difficult to evaluate, so funding for such work was limited. In view of this, the sociologists had to change their approach to stay in business; they trained multi-disciplinary extension agents who had a complete, integrated package to extend to peasants including improved farming methods. Thus in order to get their message across, the sociologists attracted the villagers by offering tangible benefits. Through better farming practices, the villagers had an improved income and were more prepared to be concerned about community development. So "community development" projects attached to the ministry of social affairs with multi-disciplinary extension workers were viewed as competitors to technical extension workers of the ministry of agriculture. This problem still hinders integrated development in many countries.

As regards aquaculture development, this evaluation mission feels that a balanced approach is needed as both sides of this issue have strong merits. ALCOM should avoid strong swings in either direction and seek a people participation/technically strong activity that simultaneously produces both understanding of motivations for fish farming and results in terms of fish production. Presently the project is doing too little of the latter.

Asian, South American vs. African Aquaculture Development

It is well known that Asia has had a spectacular development of aquaculture products. What differences then exist between Asia and Africa? We are obliged to consider Asia's strong work ethic and its tradition for practising animal husbandry as part of the basis for its success in aquacultures. We can add Asia's traditional understanding of water management and conservation. These essential qualities are not visible in most African countries.

Asia also has the distinction of hosting the only fish culture system – milkfish farming – in which all fingerlings are collected from the sea. This demonstrates the industriousness of the people and shows one of the many downstream industries developed through aquacultures in this region. In this regard there is no comparison with Africa, where insufficient tilapia fingerling production at poorly managed government stations has so far failed to create successful private producers.

A close look at aquaculture in Asia also reveals a continuing evolution of technology and enterprise not yet observed in Africa – where even the laws of supply and demand sometimes do not seem to apply – as in the above example. Few African fish farmers have gone solely into intensive fingerling production and sales, even though government hatcheries have repeatedly failed to provide supply of fingerling to meet demand from private farmers.

Are poor infrastructure and logistical problems the causes of this situation? Has restrained growth in technology of African aquacultures (monocultures of tilapias, etc.) limited creation of downstream industries and hence discouraged

economic investment and employment? Certainly the poor investment climate and the limited availability of necessary inputs have contributed to the stagnation of aquaculture development in Africa. Animal husbandry in general cannot develop commercially where feeds and other inputs are not available in abundance year-round.

The availability of credit for aquacultures is another major factor for consideration. Government support and available credit have been the catalysts of aquaculture development in Asia, and in the USA with the catfish industry, as well as the shrimp industry in Ecuador which has grown to become one of the world's top producers of shrimps for the export market. In most African countries however, credit is not available for aquacultures.

The development of artisanal or commercial aquacultures depends heavily on efficient government extension services getting the message across to interested farmers. Here again, extension services in general in Africa have all too often borne the brunt of limited budgets or belt-tightening efforts of governments in many countries. Extension workers are poorly trained, poorly equipped and further limited because of lack of transport. Field visits with farmers and field supervision of agents are often the first activities to be cut in a budget crisis, which seems to have become the chronic, operational status quo.

Alternative methods not used by ALCOM

Apart from the straight technical active approach to aquacultures there are some variations which offer interesting parallels.

The ICARA fish pond refugee project in north western Zambia offers a case in point. Here is a project (financed at US\$ 1.5 million by the US government) which paid individual farmers ZK 1000 (ZK 8 = US\$ 1) to build two, 600 square meter ponds. This project has thus paid money to the farmers to encourage them to construct 2,500 fish-ponds covering a water area of 150 ha with an estimated yield of 300 tons of fish annually.

This project was visited and commented on by members of the ALCOM staff who were impressed with the results obtained. The observers felt fish farming was well rooted as more new farmers were presently building ponds (today without the monetary incentive) than were abandoning ponds. Sale of fish from ponds provided 25 percent of income for most refugee households in this region. Motivations for abandoning ponds were related to leaky ponds or heavy predation, instead of dissatisfaction with fish production.

Obviously such a project (presently ending) needs to be followed for a period of years to properly evaluate its impact. Farmers' complaints about fish farming included lack of tools for constructing new ponds, lack of fish feeds and manures

for composting, and fear of their fish eating compost manure. Also the fish were considered too small.

In spite of these problems, the ICARA project appears to have had a good impact on the local villagers/refugees and yet it did not undertake socio-cultural surveys nor seriously become involved in trying to understand farmers' motivations. This project responded to a crisis situation and apparently succeeded in the short term. Obviously the target groups are very different; refugees have little choice about risk-taking in comparison with the fish farmers assisted through ALCOM.

The short duration of the ALCOM project does not permit a complete comparison with the ICARA project, but at present the latter has had a greater quantifiable impact; many people in the field seem to "feel good" about the ICARA project in comparison with ALCOM which so far has few practical results and a limited awareness to show.

All aspects considered, there is merit in pursuing a balanced approach to aquaculture development. Continued practising of aquacultures by farmers depends on both an understanding of their motivations and their economic success in fish production. The programme must obtain sufficient results in both of these areas in order for it to have a long lasting impact. Thus, perhaps, the past projects and the ALCOM project can be considered as extremes. A middle ground must be found which will significantly enhance quality fish productions. In the final analysis it is this criteria and a suitable return on investment that will determine whether or not a farmer chooses to start fish farming and to stay with it. In many ways the mission feels that difficult economic conditions in most African countries have severely limited the development of aquacultures. The type of approach used – "passive" or "active" – is considered of secondary importance. This is discussed further below.

TIME ASPECTS

An important aspect of a research-type project as the present one is the risk of underestimating the length of time needed before any usable results are obtained. The thematic evaluation expresses it in the following way:

"Conflicts between research and demonstration and extension may occur in multiple function projects to the detriment of research. There has been a desire to accelerate the normal time sequence, which first requires pilot trials and only thereafter demonstration units. When the two are combined into a single activity there is danger that the potential fishfarmers will be misinformed."

This is a risk which the donor SIDA has felt strongly about and has on several occasions brought to the attention of FAO and the Programme Manager. Available documents show that SIDA has simply felt that the programme has at times been pushed forward too fast.

SIDA's critique

In a document from the Swedish National Fisheries Board to SIDA dated 4/9/1987 it is said:

"The various items (in the programme) must come in the right sequence . . . great care must be taken to produce documents that can serve as a basis for the trials that will be made in order to create a common view of reality for all concerned parties . . . We should be aware that there may be risks that FAO is rushing the programme forward in order to start activities which have not been sufficiently prepared or which are not called for from a research point of view, just in order to be able to show practical results. This could happen in such a way that it will defeat its own purpose."

The document even goes as far as to suggest that Sweden should indicate that its willingness to continue financing the project hinges upon this aspect. Subsequently the programme has developed in such a way that the donor and its advisor NSBF are both satisfied with its pace.

Assessing the aspect of the risk of going too fast forward the mission feels that the project has so far managed to keep a reasonable pace, and that it has not rushed into any activities too hastily without having the "intellectual" backing to do so.

STUDIES VERSUS PRACTICAL PILOT ACTIVITIES

As elaborated above, the mission feels that, due to circumstances, there has been a relative imbalance between desk studies, surveys and theoretical research on the one hand, and practical field trials on the other.

In this respect the mission cannot share the emphasis that has been given to this aspect by SIDA when it suggested, in the spring of 1986, that the project should postpone the starting-up of the pilot activity in Chipata in order to have time to first carry out exploratory studies on Zambia. And in a letter dated 3/12/1987 SIDA noted with satisfaction that "the toning down of Chipata in favour of studies is well in line with Sweden's outlook."

Psychological factors

The mission takes the view that it is most fruitful to place a relatively larger emphasis on practical field trials. This is done at least in part for psychological reasons; because practical field pilot trials will attract and generate peoples' interest, and is therefore psychologically more conducive to development. In the mission's reasoning, even if it can be shown rationally that a more theoretical approach will produce better results in the long term – i.e. induce more farmers to dig fish-ponds than a more practical trial and error field orientation – this may still not be the best course of action. Because the practical field pilot activities will in themselves have psychologically positive developmental effects.

Two alternative approaches to attain the programme's objectives

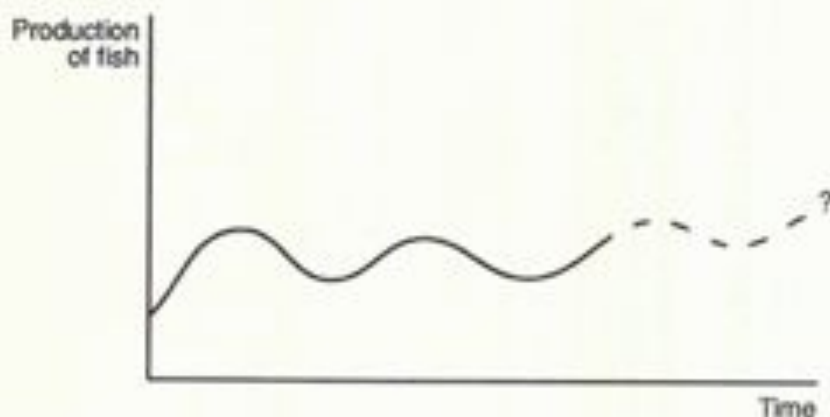
The mission's reasoning and the two alternative approaches to achieving the programme's objective, which is to develop, test and demonstrate effective methods which will induce small-scale farmers to produce more fish in fish-ponds, can be illustrated as in the figures 4 (below) and 5 (next page).

Alternative approach 1 represents the relative emphasis which in the evaluation mission's eyes, is today mainly pursued by the project, and also advocated strongly by the donor SIDA. It is one where most efforts go into studies and surveys and

Figure 4. Alternative 1: Relative more emphasis on studies and surveys



Figure 5. Alternative 2: Relative more emphasis on practical "trial and error" pilot activities in the villages with the farmers



where one is relatively modest and careful in "daring" to go out in the field and "try things out" with the farmers.

Alternative approach 2, the one advocated by this evaluation mission, is also based on studies and surveys, but is more active. Here the approach is more aggressive and "unafraid", and encourages project workers to visit farmers in the villages and together with them try to find the appropriate methodology by practical trial and error activities.

This alternative we feel is attractive not only for the psychological demonstration effect it may have (the effect may of course also be negative!) of showing people that something is being done. But also, we believe that farmers will learn better through their own mistakes than from conclusions emanating from studies.

Intermediate harvesting

One may also argue that somehow this second approach goes well together with the so-called strategy of "intermediate harvesting" which the ALCOM project is today interested in pursuing.

We wish to point out that the mission fully accepts and shares the notion that before actual development projects can take place, i.e. before one can actually on a large-scale teach farmers the appropriate things to do, research has to be done in order to find out and test the appropriate methodologies. So, the alternative

approaches 1 and 2 above do not differ in that basic point of departure. They describe two alternative ways in which research can be conducted. One is through emphasizing studies and surveys and applying a pilot field activity only on a limited scale and after some time. The other is based on studies and surveys, but uses pilot field activities almost from the outset and on a larger scale, and can be said to conduct research through trial and error together with the farmers in their villages.

End results

At the ending point of the two curves in the figure we have put two question marks, because we do not really know which one, in the final analysis, will produce the highest result. It could be one or the other. What we do claim however is that the second approach has something important which the first one is lacking; namely the psychological effect that "something practical is being done" and, not least importantly, the physical presence of fish-ponds and fish. This point may be a little difficult to elucidate, but turning the argument around one may point out the following picture: a project dealing with fish production and consumption of fish which would go on for several years without physically being associated with farmers, with digging of ponds, with water and with fish, would perhaps come to be seen in a negative light. It might be viewed as a "bureaucratic paper project" which could then create a negative psychological effect.

Choice of Headquarter site

The psychological aspect of being physically associated with fish-ponds and with fish is also one which the mission feels is relevant when it comes to making the choice of the site for the programme's headquarters. For, apart from technical advantages that the proximity of a headquarters office to fish-ponds and practical activity may have, there is the important psychological factor of being associated with practical work. The headquarters of a project dealing with fish production should be placed where visitors and passers-by can see fish-ponds rather than where they cannot.

ALCOM – A REGIONAL RESEARCH PROGRAMME OR A SERVICE INSTITUTION FOR NATIONAL PROGRAMMES

The present phase of activities has provided valuable insight into the status of aquaculture in Zambia and to a lesser extent into the SADCC countries. The project is carving out a niche for itself as an effective disseminator of information. It has also shown itself to be very capable of providing a forum for Africans to learn from each other. This is no small achievement and should be praised.

Sweden's critique

Sweden has complained that the development of aquaculture in Zambia has been given a far too large share of the programme so far, and that the programme's regional context as a result has been neglected. The regional aspect was strongly emphasized by Sweden already at the planning stage of the programme. In fact it was the Swedish side which insisted on it being a regional programme. On several occasions since then SIDA has stated that the programme must be one for all of Africa and not just for Zambia.

A memo from the National Swedish Board of Fisheries to SIDA, dated 4/9/1987 says that:

"There is a risk that the programme be seen as a normal national development project and that the regional character of ALCOM is lost."

It also goes on to say that:

"FAO has a difficulty in providing an overall description of the situation in the region. Perhaps FAO has based its priorities less on regional considerations than on national desires from the participating governments. This is reflected in the fact that the pilot project in Zambia for FAO has tended to become identical to the entire programme, or at least to a large part of the programme, while we from the Swedish side have only seen the pilot project as a means and as a secondary matter."

In a meeting with FAO in September 1987, the Swedish side remarked that:

"The nature of pilot project is that of a testing tool, according to the strategy built into the programme design, and not (underlined in the Minutes of the meeting) development of a country project";

and also stressed that:

"It was expected that the programme would pay due attention to the importance of promoting the broad global approach which the project objectives called for."



Small lakes, such as this one near Rukuzye in the Eastern Province of Zambia, offer potential for much higher fish production through a fisheries management program. Increased revenues for area residents, greater employment and improved nutrition for local villagers are all advantages to be found through development of such small waterbodies.

Conclusions

These are all very strong statements on the Swedish part. The mission can understand and sympathize with them to a certain extent because the mission has also been able to see a tendency on the part of the national governments, not only Zambia, to regard the programme as just another development aid programme which can perhaps provide the usual resources and inputs of development services for the government. The mission can detect such a tendency even though it is not said explicitly by the governments. On the other hand, the mission also feels that the programme needs to "dig in its heels" and establish itself in actual operations and become known for its achievements and develop a "platform" and prestige which will allow it to go out and play its role as a regional body for dissemination and co-ordination in the field of aquaculture.

We do not therefore share SIDA's strong impression that the project was at one time wrongly oriented in this respect. On the whole we conclude that the programme has managed to keep a reasonable balance. However, to keep this

balance in the future will probably become increasingly difficult as expectations of the host governments increase. It is therefore of great importance that the project – with the assistance of SIDA, FAO and SIDA's field offices – inform and instruct the governments of the special nature of this project. In saying this, we fully share SIDA's concern that the project at all times must be aware and guard against the risk of becoming (or being seen as becoming) basically an available consultancy or advisory capacity for the governments. For the programme's position must to a large measure be one of independence if it is to be effective in pursuing its research tasks as well as exercising its legitimate regional co-ordinating role.

While the mission generally shares the emphasis on the programme's interregional role, it does not see this role as all important. At least not for the first few years.

In the past, even though the programme mainly operated within Zambia, it created a fairly high profile in its contacts with other countries and institutions. While we do not see anything wrong with that in itself, we do see the risk that future expectations may be raised to a level far higher than the programme will be able to live up to. Without reflecting negatively on what has been done so far, we therefore feel that it is now time for the programme to concentrate and emphasize its research activities and establish itself as an organization which is known for getting things done and for producing interesting results. Only then, in the measure that such useful results concerning appropriate methodologies start coming out, will it be time to put increasing relative emphasis on international and other external contacts and, as it were, raise its profile.

SADCC's ROLE VS. DONOR's WISHES: POSSIBLE INCONSISTENCY OF GOALS

The mission believes there may be a possible inconsistency in the ambition of SIDA to apparently assume that it can involve the host governments and/or SADCC (formally or informally through the Advisory Board) in a real sense into a project which the donor strongly feels is and should remain a research and experimental activity. The possible conflict consists in that the host governments may have an instinctive, perhaps unconscious, inclination to regard any project – even a research programme as the present one – as one which will bring immediate benefits and provide support of various tangible kinds.

The repeated requests on the part of government representatives for the Programme to undertake various productive tasks in their countries (some of the country reports presented in the technical consultation meeting dwell more on needs than analyses for the scope of research activities in aquaculture) bear witness to this risk.

Information needed

The only way the programme can balance this risk is through an active, explicit public relations and information campaign directed to the host governments and vis-à-vis SADCC. The donor, FAO, and the project, need to convince the recipients that this is indeed not a normal development project which will provide resources and other benefits in the near future, but a research programme whose tasks/objectives are chiefly to carry out research and experimental pilot activities. Of course this research activity may – and it is certainly hoped that this will be the case – carry benefits in the future. But again it may not. The outcome of the programme will, at least in a technical sense, be a success even if its conclusions are that no viable worthwhile appropriate methodologies for the introduction of aquaculture into small-scale farmer development exists. In other words, it is in the nature of a research project that also a finding that no methods exist is a "successful" outcome of the project.

Latitude for ALCOM

In practice of course no one expects that situation to arise. If one did, the donor or FAO would presumably not pursue the programme. But it is nevertheless important to bring this view home to the host governments in order for them to have the proper attitude towards a programme like ALCOM. If it is to be effective, ALCOM needs to have a certain amount of latitude and independence and it would probably not function well if the Advisory Board acted as if it were a regular development project. The Advisory Board must – whether it is to have an advisory, steering or decision role – regard ALCOM as the research programme it purports to be and give it the corresponding latitude.

SIDA's Field Offices

SIDA's Head-office has failed to inform, in fact instruct, its respective field offices in the SADCC countries of the implications of a so-called FOM project. Interviews revealed that the relevant SIDA development co-operation offices were hardly aware of the existence of the Programme, much less were they aware that it has the special research and pilot characteristics. No wonder then that these field offices have not been able to assist in spreading information on the Programme to the SADCC host governments.

Ideally, the mission feels that they should explicitly have informed the respective governments that SIDA assumes that activities financed under the special research budget "FOM" should be able to function independently from other projects under the bilateral country frame. This lack of internal communication within SIDA with respect to FOM projects concerns not only ALCOM. In general

SIDA's field offices have been known to have only limited knowledge about FOM projects. In a way this may seem natural since the FOM programmes are initiated entirely from the head office divisions in Stockholm and are not like ordinary development projects where the field offices share in the supervisory responsibility.

Conclusion

The mission then recommends on this point that the programme must see as an important task to inform all concerned about the Programme's research character. We feel that it could have, and should have, been done much more forcefully by the donor during the planning phase and creation of the programme, and by FAO and the project during the implementation preparatory phases. But here is a case where "better-late-than-never" applies. The mission therefore recommends that SIDA now undertake the task of informing/educating its field offices of the FOM projects that its headquarters (through its agricultural division) has seen as important to engage in.

APPENDIX 1

Terms of reference

BACKGROUND

1. The overall objective of the programme is to develop, test and demonstrate strategies, methods and techniques for assisting rural people in improving their quality of life through the development of aquaculture, either in conjunction with land-based farming or as an alternative to fishing.

The main tasks of the programme during the preparatory phase in working towards its objectives are to:

- a) carry out in-depth studies on the socio, cultural, economic, biological, technical and environmental aspects of aquaculture in order to understand its role in and implications to rural development,
- b) establish one or more pilot projects at the community level,
- c) analyse the experiences obtained and define issues that are likely to arise in other similar development activities, and,
- d) prepare a set of guidelines and protocols for the selection, formulation, implementation, and evaluation of small scale aquaculture projects with people participation.

The programme is interregional in scope and it initially covers the region of Southern Africa and specifically SADCC countries. Pilot activities are carried out in Zambia, where ALCOM is based.

2. The preparatory phase of the programme became operational in 1986 and is scheduled to finish in October 1989. The donor contribution is SEK 7,100,000. An

additional amount of SEK 900,000 is at the disposal of the Swedish Board of Fisheries to collaborate with the programme.

PURPOSE AND SCOPE OF THE MISSION

3. The following items reflecting the scope of the mission will be addressed:

i) assess the effectiveness of the Programme in realizing its immediate objectives and the extent to which it has set the foundation for achieving the long-term development objective;

ii) assess the efficiency in the implementation and management of the Programme;

iii) assess the approach of the programme in relation to the problem identification in the background documents; special consideration should be given to the research and development design of the programme;

iv) based on the above, make specific recommendations for any reorientation of the second programme or follow-up measures for the *second* phase of the programme.

In particular the evaluation mission will pay special attention to the following aspects:

i) Effectiveness of Programme activities especially in the link-up between outputs and immediate objectives;

ii) Relevance of Programme activities and the sequence of these activities to the immediate objectives and to the long-term development objective;

iii) Contribution to date and expected contribution of the Programme activities and outputs to the broader economic and social targets established on a global basis by FAO and SIDA, in particular:

a) assess the approaches and methods utilized at the pilot project and other pilot activities carried out in Zambia with special attention to the appropriateness of fish farming technologies and inputs used, relative to local rural availabilities, environmental and socioeconomic conditions;

b) determine how effective and how relevant pilot activities have been or are likely to be to achieve developmental impact in the locality selected;

c) evaluate the relevance and interest of the programme approach within the group of countries selected for initial action;

iv) Determine to what extent the programme has been and is likely to be instrumental in promoting sectoral development in the region of southern Africa.

v) Evaluate the relevance of the programme activities in relation to the needs of the identified target group.

vi) Determine the extent to which the programme has been able to define the major issues associated with success or failure of development assistance in aquaculture for small-scale mixed-farming systems.

vii) Assess the likely input and impact of the programme towards contributing to the development of institutions engaged in development of rural fish farming.

viii) Assess the likely relevance and application of the knowledge to be gained by participating countries and institutions through the Programme protracted.

ix) Identify major factors that have facilitated or deterred the programme's efforts in achieving the intended outputs of the preparatory phase.

x) Evaluate the relevance of the target areas identified for future methodology development work, and in particular make recommendations for future action:

a) elaborate on the content of the broad lines for the second phase of the programme;

b) determine life span necessary for the formulation of a valid methodology to the development of rural fish farming.

xi) The mission should assess the timeliness, quantity and quality of inputs provided by SIDA, by the executing agency and the participating governments, and what have been the primary problems encountered in the course of implementation.

4. On the basis of the assessment of the programme design and its likely effectiveness and efficiency in addressing the present needs, the mission should

present its findings and make appropriate recommendations on the proposal for the second phase of the programme.

COMPOSITION, TIMING AND ITINERARY OF MISSION

5. The mission will be composed of two independent fishculture and/or rural development experts nominated by SIDA and FAO, and the governments of the countries visited by the mission will be invited to associate themselves with the mission's work. The expert nominated by SIDA will be the mission leader.

6. The mission will take place in May 1988 and will last approximately 15 days. The mission will meet in Rome on or about 16 May and be briefed first in FAO (two days), and then in Lusaka (two days). The mission will visit the pilot project site of Chipata (three days including one day travel) and will proceed to Zimbabwe (two days) and Malawi (one day) before returning to Lusaka (4 days) and Rome (1 day).

7. The mission will maintain close liaison with Representatives of FAO, of the donor agency and the governments, the FAO and their counterpart staff. Although the mission should feel free to discuss with the authorities concerned anything relevant to its assignment, it is not authorised to make any commitments on behalf of FAO or the donor.

8. The mission will discuss conclusions and recommendations with representatives of all interested parts before departure from Lusaka where they will prepare their draft report to be presented in Rome at a debriefing meeting to be held at FAO headquarters.

The final report will be submitted by FAO to SIDA within three weeks following the conclusion of the mission – FAO after agreement by SIDA will submit the report to the participating governments.

APPENDIX 2

Persons met and interviewed

Programme's FAO staff

Mr. Arne Andreasson, Programme Manager, Lusaka, Zambia

Mr. Boyd Haight, Aquaculturist, Chipata, Zambia

Mr. Rolf Larsson, Socio-Economist (APO), Lusaka, Zambia

Mr. Carl-Otto Wahlstrom, Aquaculturist (APO), Lusaka, Zambia

Mr. Hendrik van der Mheen, Aquaculturist (APO), Chipata, Zambia

Ms. Janet Sakala, Secretary/translator, Chipata, Zambia

Ms. Liseli Simasik Sikota, Senior Secretary, Lusaka, Zambia

Mr. S.A. Wadda, FAO Representative in Zambia, Lusaka

Mr. Mashingi, Director of Fisheries

Mr. E.D. Boma, Co-Director, GCP/ZAM/038/NET

Mr. E.DE. Muyanga, Director of Fisheries, Dept. of Fisheries, Chilanga

Mr. H.G. Mudenda, Senior Fisheries Research Officer, Fisheries Research Division, Department of Fisheries, P.O. Box 350100, Chilanga

Mr. G.Z. Sinkala, Provincial Fish Cultursit, Eastern Province, Chipata Fish Station

Mr. Arjo Rothuis, (APO), Aquaculturist, GCP/ZAM/038/NET, Chipata Fish Station

Mr. J. Mutale, Aquaculturist, ALCOM, Chipata Fish station

Mr. N. Ddihovu, Chief Regional Planner, Chipata Provincial Planning Unit

Mr. Muzulika, Regional Planner, Chipata Provincial Planning Unit

Miss L. Simwiinde, Fisheries Development Officer, Dept. of Fisheries, Siyuonga

Zambia

Mr. Crispin Mushota, Director of Catholic Secretariat, Lusaka, Zambia

Mr. Erik Bergstrand, Programme Officer, Swedish Embassy, Development Co-operation Office, Lusaka, Zambia

Mr. Vinod K. Diwan, Department of International Health Care Research, Box 60400, S-104 01 Stockholm, Sweden

Mr. Ernest A. Früchticht, Project Manager, Integrated Village fishpond Development Programme, P.O. Box 110035 Solwezi, Zambia

Zimbabwe

Mr. Knobbs, Chief Animal Production

Mr. Mufrendsa, Chief Aquaculturist

Mr. Shono, Fisheries Officer

Miss Farai Tambara, Extension Generalist, AGRICEX Fisheries Unit, Causeway, Harare, Zimbabwe

Mr. Messimba Vangessa, Audio Visual Aids Specialist

Mr. Jan Windriks, FAO Representative

Mr. Jan Streiffert, APO

Mr. Chimbuya, Chief Ecologist, Ministry of Natural Resources, Parks and Wildlife

Mrs. Thoko, Ruzvidzo, Assistant Secretary for projects, Ministry of Womens' Affairs, Harare

Mr. Wilfred Tichagwa, Undersecretary for research planning and projects, Harare

Mrs. Nella Nzuzu, Projects Officer, Harare

Ms. Kate Truscott, FAO Project, GCP/ZIM/007/ITA, Strengthening Womens' Role

Malawi

Mr. John Balarin, ICLARM, Domisi Fish Farm, Malawi

Mr. George Mburathi, FAO Representative in Malawi

Mr. Mkoko, Chief Fisheries Officer, Secretary Co-ordinator for SADCC's Fisheries and Forestry Division

Mr. Arnold Radi, Agricultural Division, USAID Malawi

Others

Ms. Laura Piriz, Programme Officer, National Swedish Fisheries Board, Gothenburg, Sweden

Mr. Ulf N. Wijkstrom, FAO Consultant (Socio-Economist)

Dr. M.N. Kutty, FAO Consultant (Aquaculturist)

Ms. Inger Amfast, Programme Officer, Agricultural Division, SIDA Stockholm.

Mr. Bo Gillgren, Agricultural Division, SIDA, Stockholm

Mr. Staffan Larsson, Head of the Secretariat of Development Co-operation, National Swedish Fisheries Board, Gothenburg, Sweden

Mr. N. Kojima, Director, Operations Service

Ms D. Blessich, Project Operations Officer

Dr. H.F. Henderson, Chief Inland Water Resources and Aquaculture Service

APPENDIX 3

References

1. Government of the Rep. of Zambia and Int'l. Union for Conserv. of Nature and Natural Resources (IUCN): The National Conservation Strategy for Zambia. Avon Litho Ltd, UK. 1985, 96 p.
2. GRZ and IUCN: The Nature of Zambia: A Guide to Conservation and Development Issues. No. 2. Albany House Ltd. Coleshill. 1987, 71 p.
3. FAO: Report on RAF/87/077. Integrated Approach to Aquaculture 1988 Development in Africa. Mission Report by Kutty.
4. ALCOM. Field Testing of Aquaculture in Rural Development Pilot Project. Eastern Province Zambia. Report in Draft for 1988 ALCOM/FAO/SIDA. GCP/INT/436/SWE. 58 p.
5. Wijkström, U and Aase H: Results of a Socio-economic Pilot Survey on Fish Farmers in Rural Communities in the Northern Province in Zambia. FAO/SIDA GCP/INT/436/SWE. 29 p.
6. FAO/SIDA: Report of the First Advisory Committee Meeting. Aquaculture for Local Community Development Programme. 1987 GCP/INT/436/SWE Lusaka, Zambia. 3-5/11/87. 15 p.
7. FAO/NORAD: The Contribution of Fisheries to Alleviating Malnutrition in Southern Africa. Report prepared by the Fish Utilization 1988 and Marketing Service of the FAO. 16 p.

8. ALCOM/FAO: Report of the Technical Consultation on Aquaculture in Rural Development. FAO/SIDA Project GCP/INT/436/SWE/RP/2 1987 Meeting 27-30 October 1987. 87 p.
9. FAO, UNDP/FAO NORWAY: Thematic Evaluation of Aquaculture – Rome 1985.
10. SIDA Decision Memorandum (Insatspromemoria) for support to research project in aquaculture in rural development, Stockholm 6 March 1986.
11. FAO/SIDA: Plan of Operation for Aquaculture for Local Community Development Programme (First phase) 5 March 1986.
12. SIDA, Agricultural Division Memorandum: Summary Record of Meeting with Swedish Delegation at FAO 8-9 September 1987.
13. FAO/SIDA, Aquaculture for Local Community Development: Half Yearly Reports Jan-July 1987 and July-Dec. 1983.
14. Swedish Agricultural University Study on the "FOM" projects. Unpublished draft May 1988, Uppsala, Sweden.
15. National Swedish Board of Fisheries: Report from Aquaculture Meeting in Sanga-Saby, Sweden 3-4 May 1984.
16. National Swedish Board of Fisheries: Minutes from the Workshop, "Aquaculture in a rural development context" 28-29 April 1986
17. FAO: "A Perspective on needs for technical co-operation in aquaculture in developing countries." A working paper prepared by FAO for a seminar in Sanga-Saby, Sweden 3-4 May 1984.
18. National Swedish Board of Fisheries: Development (Fisheries Development Series No. 10), "Förutsättningar för svenskt stöd till Akvakultur i u-länder samt förslag till riktlinjer för verksamheten", Gothenburg, Sweden, September 1983.

APPENDIX 4

Foreign assistance for fish farming in Zambia since 1979

Period	Assistance/ programme	Title	Area	Financial support US\$
1. 1979-86	UNDP/FAO/ZAM/79/005	Zambia Fish Culture Dev. - pilot dem. and training	Chilanga Chipata Mwekera	1,530,053 ^{1,2)}
2. 1987-	Netherlands GCP/ZAM/038/NET			1,321,225
3. 1982-84	UNHCR/USAID	Refugee Fish Pond Project	NW.Prov	200,000
4. 1984-88	ICARA/ICMC/GRZ	Integ. village fish pond project for refugees	NW.Prov	1,500,000
5. 1983-	JOVCS - Japan Overseas Coop. Volunteer service	Carp hatchery	Mwekera	260,000
6. 1987-	NORAD	Village agric. prog.(VAP) Fish Farming Project	N.prov.	2,300,000
7. 1984-88	FAO	Various short term TCP projects	Various	300,000
TOTAL 1979- 1988				7,411,278

1) Includes 1 volunteer at US\$ 20,000/year for five years

2) This is the total allocation to the ALCOM project, and thus includes some funds which go to other countries than Zambia.

APPENDIX 5

Physical and Climatological aspects of Zambia's Eastern Province

PHYSICAL AND CLIMATOLOGICAL ASPECTS OF THE AREA

The Eastern Province of Zambia is a marginal region in general for fish farming. Annual rainfall is limited (1014 mm) and concentrated between November and April. Evaporation averages 1448 mm, creating a rainfall deficit of 434 mm. Few perennial streams exist, which is a reflection of the often gravely coarse variable soils of low to moderate water retention capacity (ALCOM 1988). The area is lightly hilly with wide shallow valleys of gentle slope. Waters are slightly acidic and of low fertility. Open savanna-type vegetation covers the area.

Average elevation for the area is some 1032 metres and temperatures average 27.7 degrees centigrade maximum and a low 16.3 degrees centigrade minimum. Normal tilapia reproduction is probably limited to the six warmer months when average temperatures exceed 22 degrees centigrade from September through March.

From the physical and climatological aspects, the area calls for a cautious approach to fish farming development. Historically this was the case because of all the nine provinces in Zambia, the Eastern Province experienced the least development of fish farming during the past 20 years of government intervention. This is clearly shown by the presence of only 44 old ponds in the region which representing less than 1% of the total number of ponds in the country.

WATER STORAGE RESERVOIRS

Given the limited water available in this region some 213 water storage reservoirs were built in the 1950's and 60's covering some 2,000 ha. These are poorly maintained and poorly exploited. However, they offer a good resource for aquaculture development. One such effort launched by the IRDP ten years ago failed because the villagers felt the site was too distant and the soils were too hard for digging. Development in this area should therefore be done with caution. Two such reservoirs were visited by the mission in the Rukuzye area.

FISH FARMING FOR RURAL DEVELOPMENT

This report evaluates a SIDA/FAO pilot programme for assisting rural people in Southern Africa to improve their quality of life through introducing aquaculture, either in conjunction with land-based farming or as an alternative to farming.

While acknowledging its many positive aspects, the evaluation mission suggests that the programme in the future put relatively more emphasis on practical field work.

The evaluation was carried out by *Karlir Goppers*, Economist from SIDA and *Jim Miller*, FAO Fisheries expert.

Sweden's bilateral development co-operation, handled by SIDA since 1965, comprises 17 programme countries: Angola, Bangladesh, Botswana, Cape Verde, Ethiopia, Guinea Bissau, India, Kenya, Laos, Lesotho, Mozambique, Nicaragua, Sri Lanka, Tanzania, Vietnam, Zambia and Zimbabwe.

Each year some 30 of SIDA's over 200 projects are evaluated. A number of these evaluations are published in the Evaluation Series. Copies of the reports can be ordered from SIDA, S-105 25 Stockholm, Sweden.

