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REPORT AND RECOMMENDATION OF THE PRESIDENT

TO THE EXECUTIVE BOARD ON A PROPOSED

TECHNICAL ASSISTANCE GRANT

TO THE

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (FAO)

FOR THE

**SUBREGIONAL PROJECT FOR THE INTEGRATION OF AQUACULTURE INTO
IRRIGATED SMALL-FARMING SYSTEMS FOR SOUTHERN AFRICA**



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ABBREVIATIONS AND ACRONYMS

ALCOM	Aquatic Resource Management Programme for Local Communities
AWP/B	Annual work programme and budget
FAO	Food and Agriculture Organization of the United Nations
FARMESA	Farm-Level Applied Research Methods for East and Southern Africa
FFS	Farmer-field school
IAA	Integrated aquaculture-agriculture
ICLARM	International Centre for Living Aquatic Resources Management
NGOs	Non-governmental organizations
SADC	South African Development Community
SPFS	Special Programme for Food Security



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I submit the following Report and Recommendation on a proposed technical assistance grant (TAG) to the Food and Agriculture Organization of the United Nations (FAO) to support the Subregional Project for the Integration of Aquaculture into Irrigated Small-Farming Systems for Southern Africa, in the amount of USD 685 000 for a three-year period.

I. BACKGROUND

1. Water is a critical limiting resource in Southern Africa, with intense competition for supplies as population increases and demand grows. Reservoirs and ponds offer a means for year-round water storage. Because of the difficult climatic conditions, there is an increasing emphasis on irrigation development for smallholders. The relatively high investment required means that the returns earned from production activities should be maximized, and integrating fish farming into the smallholder irrigated cropping system represents one way of doing so.

2. Fish consume practically no water, but improve water quality by consuming plankton and removing aquatic weeds. Small-scale subsistence fish farming involves domesticated species in small (100-1 000m²) ponds. Pond water is enriched through fertilization and fish are fed household and farm by-products. A number of modifications on this basic formula are possible, including integrating aquaculture into irrigated agriculture.

3. **Integrated aquaculture-agriculture (IAA).** Investigations undertaken in 1996 in the Southern Africa region identified a number of scenarios whereby fish production units could be incorporated into small-scale irrigation schemes, to improve output and enhance water security. Aquaculture is in fact already integrated in irrigation schemes in some parts of Asia (Bangladesh for example), and has proved to be a substantial source of supplementary income to small farmers. Pilot efforts in Malawi have recorded a sixfold increase in financial returns to irrigated cropping when fish farming has been integrated in the production system. Farmers investing in irrigation can get a higher return if aquaculture is integrated in their agricultural activities to valorize the irrigation investment made.

4. About 30% of IFAD-supported projects in the East and Southern Africa region support some sort of water-management activity, and the preponderant share of these also involve investments in irrigated agriculture. Relative to the value of IFAD support provided for rainfed agriculture in the region, the investment costs for supporting irrigation development are high. Such a level of investment cost can be justified if higher returns can be earned. IAA techniques offer the potential to raise the economic and financial viability of irrigation investments supported by IFAD projects.

5. **Ongoing aquaculture support activities in the region.** Although the potential for fresh water fishery development to contribute to income in the Southern Africa region has long been recognized,



early aquatic resource development projects, such as fish farming in small water bodies, did not meet with success in the 1960s and 1970s. The reasons were manifold: poor site selection resulting in water shortages; heavy reliance on government support structures that were not able to fulfil their expected role; and diffusion of technology that had not been adequately tested under field conditions. A thematic evaluation of aquaculture in the region carried out in 1987 resulted in a redirection of the approach to support aquaculture development. Freshwater fish production is now promoted as part of the overall farming system in order to improve water management, food security and farm productivity.

6. The **Aquatic Resource Management Programme for Local Communities (ALCOM)**, executed by FAO, was designed to test and develop methods and techniques appropriate for rural small-scale fish farming and community-based fisheries managed.¹ With support from Sweden and Belgium, the programme has been under implementation for eleven years in four countries in the Southern Africa region. Belgium has recently agreed in principle to fund ALCOM through the year 2004. During this period aquaculture activities are to be integrated into the institutional frameworks of the South African Development Community (SADC) and of the participating countries. Two other ongoing FAO programmes are also collaborating with ALCOM. The Special Programme for Food Security (SPFS) aims to improve the smallholders' food security by introducing new irrigation techniques affordable for smallholder farmers. The regional programme for Farm-Level Applied Research Methods for East and Southern Africa (FARMESA), funded by Sweden, is also involved in water management and aquaculture-related projects in a number of countries. The proposed IFAD support will therefore be catalytic in mobilizing the technical knowledge gained for its own target groups.

7. The **International Centre for Living Aquatic Resources Management (ICLARM)** is one of the non-governmental organizations (NGOs) working in the IAA area. The ICLARM has conducted research on integrated systems in Malawi to learn about how farmers have accepted the concept and technology of integrating fish farming with crop production.

II. RATIONALE/RELEVANCE TO IFAD

8. **Rationale.** Although aquaculture techniques are known, the integration of aquaculture with agriculture is new to the Southern Africa region. Initial field trials have only been conducted since 1996, and only in limited areas as a research activity. To extend the technology to a wider number of farmers, field testing should be conducted in a variety of areas and under a diversity of climatic and cultural situations to develop appropriate technical recommendations.

III. THE PROPOSED PROGRAMME

9. The proposed grant will extend the research results emerging from eleven years of work on aquaculture under ALCOM for poor smallholders. The emphasis of the grant will be to ensure the development and design of an approach suitable for smallholders so that they can optimize the benefits to be derived from IAA technology. Smallholders, who are risk-averse, will see these techniques demonstrated in conditions similar to their own, and could assess first hand their potential benefits. Demonstration and validation of the technology with smallholders will be followed by awareness-building among policy makers and extension staff.

¹ See Appendix I.



10. **Linkage with IFAD projects.** The construction of a new reservoir or the rehabilitation of existing reservoirs offer opportunities for the introduction of a new management technique for fish stocks, particularly when communities have been involved in the civil works and when the fish farming management can be integrated into the overall water-management practices. The introduction of new management methods for irrigation schemes, of new irrigation techniques at rehabilitated or newly constructed schemes is a good entry point for the introduction of new techniques for the integration of aquaculture and irrigation. Consequently, IFAD projects that are at a very early stage in the implementation of civil works for water-management improvements have been selected. The proposed project will operate in close contact with the IFAD irrigation programmes in Malawi, Zambia and Zimbabwe. Initial field testing will be conducted at selected sites in these countries, and collaborators at the other programmes will be kept informed of project results. The technology generated and the training results will then be used under other IFAD projects in the region.

IV. EXPECTED OUTPUTS / EXPECTED BENEFITS

11. **Goal and objectives.** The grant's development objective is to adapt and extend the research results to the needs of poor smallholders. The general objective of the grant project is to introduce and develop farmer friendly techniques for integrating aquaculture into irrigated agriculture to raise the overall return per unit of land and quality of water used. The specific objectives of the grant are to lay the foundation for replication of the techniques developed and tested, and to promote the development of national programmes and a regional programme for IAA for smallholders.

12. The project will have four main project activities: (a) farmer friendly IAA technology development; (b) validation of IAA technology; (c) diffusion of IAA technology (for smallholder irrigated farming systems); and (d) national and regional awareness-building of IAA. An overview of planned project activities is provided in the logframe.²

13. **Farmer friendly technology development.** About ten sites representative of the different types of field conditions for IAA under each IFAD project in the respective countries will be selected together with the farmers. The most appropriate existing technology will be determined in light of the sites selected, and farmers (about 20 per site, or 200 per country for a total of about 600 farmers) will be introduced to the rationale behind IAA and the techniques that will be tested. The management strategies for IAA will be developed with them, using a farmer field schools (FFSs) approach for discovery learning and farmer participatory research. These on-farm trials will form the basis for developing adjustments and improvements to the technology that have already been tested at the research level.

14. **Technology validation.** Monitoring and validation of the technical packages developed will be carried out at each site in close collaboration with farmers. An initial baseline study will be carried out to assess the returns that smallholder farmers are currently getting with their irrigated crops. The full costs and returns from integrating fish farming into the irrigated crop system will be estimated. The farmers' perception of the constraints of the technology developed will be undertaken, in order to ensure that it is appropriate to their cultural values, their farming systems and their financial situation. Impact evaluation will be carried out each year, with special reference to the financial requirements for adopting IAA and the potential need for credit.

15. **Diffusion of IAA technology.** The outcome of the first two components will form the basis for developing extension and training materials to introduce the technology in the different smallholder irrigated farming systems. These results and training materials will be used by national extension

² See Appendix II.



systems as well as other IFAD projects and partners such as NGOs for wider introduction of IAA. About 40 change agents will be trained in the testing, management and monitoring of integrated aquaculture-agriculture systems and to conduct FFS in IAA. A participatory evaluation will be undertaken, and will include analysis of the impact at the household level; this impact assessment will be carried out with an external entity or NGO (such as ICLARM).

16. **National and regional awareness-building of IAA.** The suitability of the technology, and the appropriateness of the approach for further dissemination will be demonstrated through field visits and seminars to policy makers, technical advisors, other projects, and financial institutions. Information will also be made available to increase the national and regional capacity to plan and support policies for integrating fish and crop production in irrigated farming systems of smallholders.

V. IMPLEMENTATION ARRANGEMENTS

17. **Implementation arrangements.** FAO will have overall responsibility for the implementation and administration of the grant (submission of the annual work programme and budget (AWP/B), supervision and reporting on progress and expenditures). ALCOM has a regional office in Harare, Zimbabwe and field offices in various countries in Southern Africa, including Malawi and Zambia. The grant will be implemented from the Harare ALCOM office and will use ALCOM office space, vehicles, office equipment, support staff, training materials and library and information services. Fifteen months of international consultancy support will be required for the preparation of specific technical and training materials, the finalizing of reports and the organization of meetings. ALCOM will be responsible for grant management during the second and third years of operation. This ensures that the grant can become operational upon approval, and reduces overall costs. The project will work in direct collaboration with ALCOM, SADC, the national SPFS projects and IFAD-funded irrigation programmes.

18. Implementation will start at ten sites in Zambia and another ten sites in Malawi in project year (PY) 1, and PY 2 in Zimbabwe. After the second year field activities in Malawi and Zambia, field activities will commence in Zimbabwe. Because of the experiences obtained in Malawi and Zambia and the materials prepared, it is anticipated that activities in Zimbabwe can immediately combine activities undertaken in the first three components, although adaptations to location-specific conditions will be required. Implementation of the fourth component (IAA diffusion) will occur during the last year and will involve national staff from agricultural, fishery and irrigation ministries, representatives of relevant SADC agencies and NGOs.

19. **End of project situation.** Appropriate technologies adapted to site-specific conditions will have been identified, tested and demonstrated. Appropriate extension methods will have been developed and further IAA expansion could effectively be implemented. A better understanding of farmer credit needs will be achieved. Policy makers in the region will have acquired additional knowledge of the benefits of IAA technology, and decisions regarding IAA introduction will be based on this knowledge.

VI. INDICATIVE PROGRAMME COSTS AND FINANCING

20. **Grant Costs.** The total budget for the proposed IFAD grant project is USD 685 000 for implementation over three years³. A service charge of 13% has been included to cover supervision and administration by FAO. Government contributions will be in the form of technical staff to

³ See Appendix III.



support the implementation. ALCOM will provide its technical expertise and existing project coordination facilities in Harare. The value of national contributions and the use of ALCOM premises, vehicles, office equipment, other infrastructure as well as its existing knowledge base and technical expertise after the first 15 months have not been calculated but are substantial. The follow-up phase of ALCOM through year 2004 is expected to require about USD 6-7 million, while the investment made during the initial phase was about USD 12 million.

21. **Annual work programme and budget.** The grant will form the basis of the AWP/B to be prepared by FAO with input from national collaborators and IFAD projects and submitted to IFAD for approval.

22. **Disbursement.** IFAD grant funds will be channelled according to normal FAO procedures and will be disbursed in advance on the basis of the approved AWP/B in three tranches to FAO.

23. **Audit.** Existing FAO procedures that have been applied to previous grants provided by IFAD will be applied.

VII. RECOMMENDATION

24. I recommend that the Executive Board approve the proposed technical assistance grant in terms of the following resolution:

RESOLVED: that the Fund, in order to finance, in part, the Subregional Project for the Integration of Aquaculture into Irrigated Small-Farming Systems for Southern Africa for three years, commencing in July 1999, shall make a grant not exceeding six hundred and eighty five thousand United States Dollars (USD 685 000) to the Food and Agriculture Organization of the United Nations (FAO) upon such terms and conditions as shall be substantially in accordance with the terms and conditions presented to the Executive Board in this Report and Recommendation of the President.

Fawzi H. Al-Sultan
President



AQUATIC RESOURCE MANAGEMENT PROGRAMME FOR LOCAL COMMUNITIES (ALCOM)

1. ALCOM is a regional community-based aquatic resource management programme, executed by FAO. ALCOM's general objective is to enhance outputs from smallholder farming systems and economies through improved management of aquatic resources, focusing on aquaculture and fisheries practices. Programme activities began in Zambia in 1987 as a trust fund project funded by the Swedish International Development Agency (SIDA) (1987-1998), joined with support from the Government of Belgium (1992-1998) to amplify the work on the use of small water bodies (SWB) for fish production. FAO has also contributed through the financing of its own specific projects. ALCOM collaborates with all twelve SADC member countries and has field pilot projects in four. ALCOM has worked for the following NGOs: the World Conservation Union (IUCN), the World Wildlife Fund (WWF), the J L B Smith Institute of Ichthyology, the Communal Areas Management Programme for Indigenous Populations (CAMPFIRE), the Co-operative for Assistance and Relief Everywhere (CARE) International, the Zambezi Catchment Project and Mazowe Catchment Development Project and the African Reinsurance Corporation (AFRICARE).
2. The ALCOM approach is built upon the promise that there are commonalties among smallholder farmers in Southern Africa, and common strategies to problem solving can be identified. These strategies can then be adopted by other programmes in the region, compounding the number of beneficiaries from ALCOM's efforts in a timely and cost-effective manner.
3. ALCOM work has covered five action programmes:
 - (a) **Methodologies for agricultural extension.** Acknowledging the fact that the tight government budgets of the 1990s demand streamlined services, the programme is examining formal and informal communication channels for smallholder farmers. Mechanisms of information exchange are being identified and evaluated for the quality of delivery. ALCOM projects in Mozambique and Zambia have assessed mechanisms for incorporating aquatic production systems into classical land-based agricultural extension. A parallel project in Tanzania is aimed at developing sustainable farmer to farmer channels in the absence of a functioning extension service. Specific activities have so far included: adaptation of methodologies on participatory rural appraisal and rapid rural appraisal; advising on policy; testing communication tools; preparing extension materials; training in formal and informal communication channels; and hosting workshops focusing on extension organization and methodology.
 - (b) **Smallholder farming systems.** Ponds integrated into complex smallholder farming systems increase food security and offer opportunities for income-generation. These ponds also provide an appropriate means of water storage and water re-use; pond water often being used to irrigate vegetable crops or water livestock. ALCOM has embarked upon studies of integrated small-scale pond culture in Tanzania, Zambia and Mozambique; each area representing a different subset of smallholder circumstances. In aggregate, these sites offer opportunities with a variety of farming systems practised in Southern Africa. Specific activities include: evaluating economic and nutritional impact of different production strategies; developing systems for the privatization of production factors; identifying unused nutrient inputs; and assisting with the formation of self-help farmer associations.



APPENDIX I

- (c) **Utilization of small water bodies.** Dams and other small water bodies form an important under-utilized resource for fish production in Southern Africa. With renewed efforts on impounding water for drought relief and irrigation, few projects take a holistic approach to the management of these resources. ALCOM is studying a sample of dams in Malawi, Zambia, the United Republic of Tanzania and Zimbabwe in which the communities using these impoundments represent the variety of institutional and land-tenure systems. Specific tasks include: assessing the biological, chemical, and physical condition of each dam; describing the socio-cultural environment; and providing guidelines for enhanced management by local communities.
- (d) **Water resource database.** The establishment of a SADC water resource database (WRD) evolved from the need to estimate the potential of SWBs fisheries development. This data base integrates information on surface water bodies, watersheds, rivers, fish species distribution and related data in a Geographic Information System (GIS). It is currently the most comprehensive and complete source of information on surface water resources in the Southern African region. The SADC WRD is the product of collaboration with many professionals from the governmental and non-governmental sector. It is being used as well by a variety of organizations and individuals that are involved in one of the most precious resources of the SADC region, water.
- (e) **Information service.** ALCOM is committed to improving the quality and accessibility of information on aquaculture and use of water resources for fish production in Southern Africa. The programme uses state-of-the-art electronic media to collect and disseminate information. This programme includes: publishing a quarterly on-line newsletter, ALCOM News, preparing technical reports, field documents and extension pamphlets in several languages for a variety of audiences; and presenting photographic and slide exhibitions. The centrepiece of the information service is a library offering: research and reference services to scientists and officials of the region; a unique collection of aquatic resource, extension and developmental literature; computerized databases accessible to many organizations and departments of the region; and networking with libraries and other institutions throughout the region.

Plans for the future

4. With the support of the Belgian Government, the ALCOM programme is due to continue for the next six years, first through a transition phase of 15 months and later through a five-year project through SADC, implemented by FAO. The final phase of ALCOM will aim at: the consolidation of the results so far obtained in particular for SWB; the development of further integrated water resource management both for aquaculture; and SWB fisheries, and the institutionalization of the programme in the SADC structure.

LOGFRAME

Goal: To introduce and develop farmer friendly techniques for integrating aquaculture into irrigated agriculture to raise the over return per unit of land and water used.

General objective: To lay the foundation for widespread replication of the techniques developed and tested, and to promote the development of individual national programmes and a regional programme for the integration of aquaculture-agriculture for smallholders to promote higher returns for investments in irrigation in the East and Southern Africa region.

Specific Objectives	Outputs	Activities	Verifiable Indicator	Sources of Verification	Assumptions
3 1. To develop in participation with farmers, appropriate forms of aquaculture-irrigation integration at a variety of locations	1.1 An appropriate technology for the integration of aquaculture and irrigation identified, tested and demonstrated, for a variety of physical conditions and farming situations	1.1.1 Irrigation schemes, suitable for testing aquaculture under various scenarios will be identified 1.1.2 Area appraisals will be carried out to determine specific aquaculture-agriculture technologies to be introduced or enhanced at the different sites for validation and demonstration 1.1.3 Farmers at the selected sites will be informed about the programme, and interested farmers will be invited to participate in the testing of the IAA technology 1.1.4 Farm families will participate in regular FFS meetings, receive training and discuss necessary adjustments and improvements 1.1.5 Project coordination unit set up	<ul style="list-style-type: none"> • 30 irrigation schemes identified • 600 participating farmers identified • Selected farmers implementing integrated aquaculture agriculture and fisheries techniques • Description of site situation and adopted techniques for ten trial sites 	<ul style="list-style-type: none"> • Field visits • Report on the trial site results • Report on FFS meetings 	<ul style="list-style-type: none"> • Funds, equipment and staff available on time • Suitable irrigation schemes available • Interested farmers available
2. To validate optimal techniques and determine required inputs for adoption	2.1 Social and economic feasibility of the developed techniques demonstrated 2.2 Impact at the household level measured 2.3 Requirements for credit and inputs identified, as well as suitable mechanisms for supply	2.2.1 Base line study conducted 2.1.2 Final solutions to technical problems will be identified 2.2.1 Need for credit and other inputs will be identified using PRA or similar techniques 2.2.2 Suppliers of required inputs will be identified 2.3.1 Adoption and implementation will be closely monitored for validation 2.3.2 Impact analysis carried out	<ul style="list-style-type: none"> • Data available on feasibility of the different techniques • Impact analysis conducted • Data on credit available • Data available on required inputs and suppliers 	<ul style="list-style-type: none"> • Reports on impact analysis, input requirement and supply, and description techniques adopted • Monitoring system 	<ul style="list-style-type: none"> • IAA techniques adopted by participating farmers • No severe drought

Specific Objectives	Outputs	Activities	Verifiable Indicator	Sources of Verification	Assumptions
3. To integrate developed results into smallholder farming systems	<p>3.1 Appropriate extension material and training materials developed</p> <p>3.2 Appropriate information channels and change agents for the further dissemination of the technology identified</p> <p>3.3 Change agents trained in the testing, management and monitoring of integrated aquaculture-agriculture systems</p> <p>3.4 A methodology established for the introduction of integrated aquaculture and irrigation, with demonstrated effectiveness</p>	<p>3.1.1 The results of the monitoring and validation will be used for the preparation of training and extension materials</p> <p>3.2.1 Appropriate information channels that provide the best guarantee for further expansion of the introduction of IAA will be identified through survey and farmer interviews</p> <p>3.2.2 Change agents will be selected for participation in IAA training</p> <p>3.3.1 Key extension staff will be trained using the findings of the identification phase</p> <p>3.3.2 Change agents introduce IAA and conduct FFS in their respective areas</p> <p>3.3.3 Meetings will be held with change agents to share successes and tackle problems together, and receive extra training where necessary</p> <p>3.4.1 Results analysed to establish a methodology for further introduction of IAA</p>	<ul style="list-style-type: none"> • Training material available • Extension material available • Training courses conducted (three sessions of one week each for each participant) • A total of four meetings held with each participating extensionist 	<ul style="list-style-type: none"> • Training material • Extension material • Knowledge of extension staff of IAA 	<ul style="list-style-type: none"> • Suitable techniques identified • Input suppliers available • Extension staff available
4. To develop national programmes for integrated aquaculture-agriculture	<p>4.1 Policy makers, technical advisors and financial institutions aware of the potential for wider introduction of IAA</p> <p>4.2 An increased national and regional capacity to plan and support policies for integrating fish and crop production in irrigated farming systems of smallholders</p>	<p>4.1.1 Senior policy makers, technical advisors and financial managers will be informed and exposed to the results of the IAA programme</p> <p>4.2.1 A participatory impact evaluation of integrated aquaculture-agriculture and aquatic resource management will take place</p> <p>4.2.2 Results will be discussed at national meetings to disseminate findings, discuss successes and constraints, and plan for appropriate follow-up action</p> <p>4.2.3 Depending on the evaluation and national interest, a programme for the development of IAA in all suitable areas in the countries will be prepared</p>	<ul style="list-style-type: none"> • Information made available to senior staff • Field visits by senior staff to selected sites • National meeting conducted 	<ul style="list-style-type: none"> • Correspondence with senior staff • Proceedings of a national meeting 	<ul style="list-style-type: none"> • Senior staff interested • Positive results obtained from testing phase

4

**SUMMARY TABLE**

Description	Total
International experts	250 700
Administrative support staff	31 500
National experts/consultants	144 000
Travel project staff/Counterparts	36 000
Contracts (Evaluation)	25 000
General operating expenses	26 000
Materials and supplies	8 000
Equipment	30 000
Training	36 000
Subtotal costs	587 200
FAO service charge 13%	76 280
Contingencies (4% PY2 and 8% PY3)	21 520
Total	685 000