



**New Partnership for
Africa's Development (NEPAD)
Comprehensive Africa Agriculture
Development Programme (CAADP)**



**Food and Agriculture Organization
of the United Nations
Investment Centre Division**

GOVERNMENT OF THE REPUBLIC OF NAMIBIA

SUPPORT TO NEPAD–CAADP IMPLEMENTATION

**TCP/NAM/2903 (I)
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Volume VII of VII

BANKABLE INVESTMENT PROJECT PROFILE

Support to Aquaculture Development

July 2005

NAMIBIA: Support to NEPAD–CAADP Implementation

Volume I: National Medium–Term Investment Programme (NMTIP)

Bankable Investment Project Profiles (BIPPs)

Volume II: Infrastructure Upgrade of Rural Water Supply

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Volume IV: Development of Infrastructure for Marketing Horticultural Produce

Volume V: Integrated Farming Support Programme for Resettled Farmers

Volume VI: Livestock Improvement

Volume VII: Support to Aquaculture Development

NEPAD–CAADP BANKABLE INVESTMENT PROJECT PROFILE

Country: Namibia

Sector of Activities: Aquaculture

Proposed Project Name: **Support to Aquaculture Development**

Project Area: Kavango and Windhoek

Duration of Project: 2 years

Estimated Cost: Foreign Exchange US\$1.0 million
Local Cost.....US\$3.0 million
Total US\$4.0 million

Suggested Financing:

<i>Source</i>	<i>US\$ million</i>	<i>% of total</i>
<i>Government</i>	1.0	25
<i>Financing institution(s)</i>	1.0	25
<i>Beneficiaries</i>	0.2	5
<i>Private Sector (AgriBank & Development Bank)</i>	1.8	45
<i>Total</i>	4.0	100

NAMIBIA
NEPAD–CAADP Bankable Investment Project Profile
“Support to Aquaculture Development”

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Currency Equivalents

(July 2005)

Local Currency	=	Namibian dollar (N\$)
US\$1.00	=	N\$6.57
N\$1.00	=	US\$0.15

Abbreviations

ADB	African Development Bank
CAADP	Comprehensive Africa Agriculture Development Programme
DBN	Development Bank of Namibia
DNA	Deoxyribonucleic Acid
DOA	Directorate of Aquaculture
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
GDP	Gross Domestic Product
GRN	Government of the Republic of Namibia
IFAD	International Fund for Agricultural Development
MFMR	Ministry of Fisheries and Marine Resources
NCA	Northern Communal Area
NEPAD	New Partnership for Africa’s Development
NDP2	Second National Development Plan
NMTIP	National Medium–Term Investment Plan
MET	Ministry of Environment and Tourism
RNA	Ribonucleic Acid
PCR	Polymer Chain Reaction
VREC	Veterinary Rural Extension Centre

I. BACKGROUND

A. Origin and Preparation of the Project

I.1. This project has been developed by the *Ministry of Fisheries and Marine Resources* (MFMR) as part of the process to develop aquaculture as a sustainable production line, with the aim of addressing key development areas of concern as set out in the *Second National Development Plan 2001–2005* (NDP2) and in *Vision 2030*.

I.2. The project has vital link to Namibia’s strategy to address national and household food security, poverty reduction, employment creation, export diversification etc. Namibia’s aquaculture policy rests on four pillars; namely:

- Establishing an appropriate legal and administrative framework for aquaculture including establishing systems of tenure for commercial aquaculture;
- Establishing appropriate institutional arrangement for aquaculture;
- Maintaining genetic diversity and the integrity of the aquatic eco–system; and
- Ensuring responsible aquaculture production practices.

I.3. Within the context of the *Comprehensive Africa Agriculture Programme* (CAADP), the current project is covered under Pillar 5, which highlights livestock and fisheries as important components of agricultural development for the African continent. Investment in aquaculture development was one of the high priorities identified at a *National Stakeholders Workshop*, which took place in Windhoek in February 2005 to validate the *New Partnership for Africa’s Development* (NEPAD) CAADP’s *National Medium Term Investment Plan* (NMTIP).

B. General Information

I.4. **Agricultural Sector.** In Namibia, the primary significance of the agricultural sector lies in its potential contribution to the livelihood of the rural community. It is estimated that agriculture provides livelihood to more than 50 percent of the population, either as communal farmers or farm labourers. It is further estimated that the sector directly or indirectly supports about 70 percent of the population. About 75 percent of the poor are dependent on agriculture for at least some of their household consumption needs.

I.5. These features reflect not only the low technological level of many of the existing farms, but also more basic factors such as the aridity and uncertainty of rainfall.¹ In 2000, agriculture contributed 10 percent to the GDP of which 88 percent came from livestock production.² The livestock population of Namibia comprises of about 2.5 million cattle, 2.4 million sheep and 1.8 million goats. Cattle farming is concentrated in the in the central and northern parts of the country; the southern parts of the country are utilized mainly for small ruminant (sheep and goat) farming.

I.6. Namibia is a net exporter of livestock, meat and meat products. The production is simply too big to consume locally. Between 70 percent and 80 percent of all production is exported. Most is

¹ NEPRU, 1998.

² *Preliminary National Accounts 2000*, Central Bureau of Statistics (CBS).

exported to South Africa (much of this as live animals), but Namibia also currently exports beef cuts to the European Union, and is actively seeking other markets.

I.7. Apart from crop production, which is now being encouraged by the government through the Green Scheme mechanism, significant expansion of animal husbandry is not possible because of climatic reasons. And this is likely to put further strains on government’s desire to improve the living standards of the rural people, hence the development of aquaculture.

I.8. **Government Policy.** Current policy for this developing sector is laid out in the policy paper: *Towards the Responsible Development of Aquaculture* (2001). Under this policy, Namibia is committed to observing the principle of optimum sustainable yield in the exploitation of living natural resources and ecosystems. The government therefore has an obligation to promote and regulate responsible and sustainable development and management of aquaculture within national water bodies of all types, both natural and artificial.

I.9. The main objective of Namibia’s aquaculture policy is the responsible and sustainable development of aquaculture to achieve socio-economic benefits for all Namibians and to secure environmental sustainability.

I.10. In December 2002, H.E. the Former President of Namibia, Dr Sam Nujoma, signed a new *Aquaculture Act* into law. This prescribes, *inter alia*, the procedure for obtaining aquaculture licenses, monitoring, regulation, processing, marketing, environmental safety measures and consumer health and safety issues. The *Draft Regulation (Licensing, Imports and Exports)* has been finalized.

I.11. Aquaculture is identified as a development priority in the NDP–2. Sector-specific objectives relating to aquaculture are in the *Fisheries and Marine Resources* Chapter of NDP–2:

- Promote aquaculture activities in and around the productive unpolluted and nutrient rich waters off the coast of Namibia.
- Facilitate improvement of actual activities pertaining to aquaculture, by exploring the culture of other species, such as prawns, clams and other kind of fish, whether in freshwater or seawater, depending on scientific advice.

I.12. **Importance of Fisheries Sector.** The fisheries sector has largely been rehabilitated through sound policies and strategies that have been put in place and implemented rigorously after independence. The sector has therefore experienced significant growth and development as government pursues sustainable on-shore processing. It is in this context that sector contributed in 2000, 8.9 percent of the nation’s Gross Domestic Product (GDP), up from 5.2 percent in 1996. In 1990 export of fish products provided 12.5 percent of all exports, but by 2001 it had increased to 21 percent. The industries annual contribution to government revenue has been fluctuating between N\$68m and N\$133m. This figure is projected to increase to between N\$120m to N\$140m over the next five years³.

I.13. **Marine Culture.** The unpolluted rich Benguela Current off the Namibian coast holds great potential for marine culture. Commercial marine culture is currently dominated by oyster production in Walvis Bay, Swakopmund and Lüderitz. Both Pacific oysters (*Crassostrea gigas*) and European oysters (*Ostrea edulis*) are grown. Culture methods include baskets suspended from rafts and longlines and on-shore raceways and ponds.

³ Namibia Trade Directory, 2002.

I.14. Six companies are currently in operation, which collectively employ around 85 people. Most have plans to expand and other farms under construction — thus increase employment and reduce poverty in the coastal regions. Current production is 6 million oysters per annum, worth N\$6m.

I.15. **Freshwater Aquaculture.** Although culture of freshwater fish is in its infancy, excellent freshwater culture development potential exist along rivers such as the Okavango, Kunene, Orange and Zambezi, as well as lakes and dams. The production of Tilapia and crayfish in the brackish water resources in the Oshikoto Region can also be considered for future development.

I.16. **Global Trends in Aquaculture.** As global fish stocks are coming under increased pressure as the world’s population increases, moves to increase aquaculture production in many countries would take centre stage in development policy. According to FAO, in 2000 global aquaculture production was 46 million tonnes, worth an estimated US\$56.5bn. Finfish accounted for the 55.9 percent by value, molluscs 16.8 percent aquatic plants 9.9 percent and crustaceans 16.6 percent. The annual increase between 1970 and 2000, in world aquaculture production for the period 1999–2000 was 6.3 percent.

I.17. In 2000, mariculture production accounted for 23 million tonnes (53 percent of total aquaculture production) worth US\$23bn. Freshwater production accounted for 21 million tonnes (45.1 percent of total aquaculture production) worth US\$24.6bn. Brackish water production accounted for 21 million tonnes (4.6 percent of total) worth US\$8.8bn.

I.18. Africa, however, has been slow to develop aquaculture potential. Total aquaculture production within the Africa region in 2000 was 399,390 tonnes, worth US\$951m. This represented a mere 0.9 percent by weight and 1.7 percent by value of global production for that year. Since 1997, production in Egypt has grown very rapidly, and now accounts for just less than 350,000 tonnes of Africa’s total production. Nigeria is the second most important producer at around 25,000 tonnes. It is obvious that the potential of Africa is yet untapped.

I.19. At Lake Kariba, Zimbabwe, one commercial company, Lake Harvest Limited, employs 500 people in the production in processing of tilapia. Current annual production is around 3,500 tonnes. This farm is currently the largest tilapia producer in Africa. By the year 2005 production is said to increase to 5,000 tonnes.

II. PROJECT RATIONALE

II.1. Although aquaculture has not been practiced in Namibia at any significant commercial or subsistence scale, it nevertheless appears to have serious growth prospects, with wide ranging impact on food security, employment creation and growth in scientific and technical knowledge and skills — thus overall reduction in poverty in the country.

II.2. While Namibia remains a major fishing nation, its ability to expand its current level of production is pretty much closer to its available potential, and therefore it is most appropriate for Namibia to make a strategic move towards the development of aquaculture.

II.3. In the event of possible outbreak of diseases, which may threaten Namibia’s marine sector, aquaculture operations, where the potential to control environmental factors is greater would help ameliorate potential negative impact.

II.4. Worldwide aquaculture is forecast to be a major growth industry into the 21st century. In response to increasing constraint global supplies of finfish and shellfish and growing consumption of seafood products, aquaculture production has expanded in many regions of the world.

II.5. With over 80 percent of the population in Caprivi and Kavango, the main project areas lives in the rural area, and is engaged predominantly in the agricultural sector with crop production playing the lead role as a source of income and livelihood, will now have a chance to improve its livelihood on a sustainable basis with the introduction of aquaculture in Caprivi and Kavango as key project areas.

II.6. The rapidly growing domestic and international demand for aquaculture products offers great opportunities to Namibia through increased employment opportunities and job creation in the industrial sector including new and traditional spin-off industries in clued feed production, and pharmaceutical production, veterinarian services, processing, packaging and cold storage, transportation, equipment manufacturing (feeding, machines, pumps, cages, nets, boats, etc) and marketing.

II.7. According to conservative estimates, it is said that the aquaculture industry could produce significant growth prospects, from the current N\$20m to N\$250m in 2009, with direct employment expanding from the current 422 to 1,640 people in 2009. This employment rate only takes into account the labour used directly on the farms. The peripheral industries such as harvesting, processing, transportation, cold storage, marketing, cage construction, pumps, fish-feed production, etc., will increase proportionately and provide in excess of 1,000 additional jobs. Pending on the financial support available to the industry job creation can triple.

III. PROJECT AREA

III.1. The project area is spread over Namibia, but most of the activities are concentrated in north-east (Kavango).

IV. PROJECT OBJECTIVES

IV.1. The *overall objective* of the project, which is in line with NDP2 as priorities, is to increase household farm incomes and nutritional status through increased production of farmed fish for domestic and export markets, in a sustainable manner. This is anticipated to improve the livelihood of fish farming households and traders, improve nutritional levels, reduce poverty and facilitate rural development. The specific objectives of the project are:

- To promote private sector breeding of high quality fish species for sale to fish farmers to stock or restock their ponds and dams.
- To support research in and mass production of cost-effective commercial feeds using locally available feed ingredients, with full participation of the private sector.
- To improve the marketing of fish through addressing pertinent issues like product quality, shelf life, post-harvest handling, small scale processing, packaging and improving market information.
- To strengthen the capacity of farmers, extension staff and fish farmers’ organizations to undertake production (including the appropriate construction, equipping, stocking and managing of fish ponds) and marketing of products of aquaculture.

- To develop scientific, technical and managerial skills and knowledge in the area of aquaculture.
- To empower rural communities through environmentally–friendly aqua–farming.

IV.2. As far as possible, fish farming activities will be integrated into the crops and livestock (especially poultry) farming systems.

V. PROJECT DESCRIPTION AND COMPOSITION

V.1. The project involves the provision of technical support, equipping laboratories, construction of aqua research institute, training of rural fish farmers and staff of the MFMR. It would consist of the following *components*:

V.2. **Technical Assistance Support Component.** Qualified young fish farm managers cum instructors who have an in depth knowledge in the development and management of fish farms in fresh and brackish water and who have experience in the day to day running, maintenance and production of a fish farm (Annex 1).

V.3. **Aquaculture Education and Training Component.** Education and training are essential for the growth of aquaculture in Namibia. There are presently very few trained aquaculturists. Currently the fish farmers and extension officers rely on their own initiative to seek for advice. The government has taken the initiative in the identification of appropriate training programs on aquaculture which other governments have successfully implemented e.g. university degree programs, vocational training, extension services, and public/private education, research, and development activities. A summarized training needs analysis for staff employed by the ministry, is provided in Annex 2.

V.4. **Establishment of an Inland Fisheries Research Institute Component.** To promote aquaculture in the rural communities of Namibia, the Ministry realized the importance of erecting an Inland Fisheries Institute at Kamutjonga, on the western bank of the Okavango River adjacent to Mahango Game Park. Currently over 90 percent of the inland fisheries activities are found in the northern and north–eastern part of Namibia where four perennial rivers occur. The architectural drawings, Quantity Surveyor and Engineering reports for the proposed Inland Fishery Research Institute have already been completed. The building of the proposed institute shall include laboratories, a conference room, offices, ponds (open pit/under–roof), hatchery, etc. The institute will serve both as a research and educational centre with its aim to enhance aquaculture farming in the northern rural communities of Namibia.

VI. INDICATIVE COSTS

VI.1. In addition to the breakdown shown in Tables 1 and 2 below, *Training and Education* is estimated at N\$1.25m over the entire project period (see Annex 2). Hence, the total cost of the project shall amount to N\$25.8m, or about US\$4.0m.

Table 1: Construction Costs and Professional Fees

Estimate of escalated total building costs, excl. professional fees (31 May 2005)	20.5
Professional fees	3.3
Travelling costs (24 trips @N\$8,000/trip)	0.9
Travelling fees (24 trips @ N\$5,400/trip)	0.1
Total (N\$ million)	24.8

**Table 2: Cost of Laboratory Equipment
(Inland Aquaculture Centre at Kamutjonga)**

Item	Cost (N\$ million)
Microbiology	
Major equipment	0.30
Miscellaneous equipment and consumables	0.04
Sub-total	0.34
Phytoplankton	
Major equipment	0.31
Miscellaneous equipment and consumables	0.03
Subtotal	0.34
PCR (DNA/RNA)	
Major equipment	0.23
Miscellaneous equipment and consumables	0.04
Subtotal	0.27
Sampling Needs	0.04
Total	0.99

VII. PROPOSED SOURCING OF FUNDS

VII.1. The Government of the Republic of Namibia (GRN), development partners, the private sector, NGOs and the beneficiaries will finance the project. The GRN will through its budget contribute US\$1m or 25 percent of total project financing; while the development partners will contribute 25 percent, and beneficiaries contributing 5 percent. The private sector is expected to contribute US\$1.8m.

VII.2. Both multilateral and bilateral development partners might be interested in funding and providing technical assistance to the project. Such development partners could include the following; FAO, *European Union* (EU), the Rockefeller Foundation among others. The *African Development Bank* (ADB), *International Fund for Agricultural Development* (IFAD), France, Germany, Netherlands, etc.

VII.3. The private sector is viewed as an essential partner in development though a number of constraints still inhibit their growth and participation. They may be interested in providing counterpart funds to finance technical staff (resource persons), purchase and/or supply of vehicles and equipment under tender system, provision of office space and capacity building programmes at tertiary institutions.

VII.4. The beneficiaries will finance some aspects of the project through equity participation in form of land, cash and labour or both. This will call for sensitization of beneficiaries prior to and during project implementation in order for them to value the project as their own.

VIII. PROJECT BENEFITS

VIII.1. The project would immediately benefit current aquaculture farmers in the affected regions and areas by creating income-generating opportunities and increasing their skills and knowledge in dealing with issues related to aquaculture and business issues. The establishment of the Research Institute and other infrastructure would immediately create temporary jobs for many people in various communities. This is particularly true for those communities living along the key perennial rivers Kavango, Caprivi, Kunene and Ohangwena/Omusati/Oshana Regions, which comprise more than 50 percent of Namibia’s population.

VIII.2. Communities living along the proximity of State dams in the Khomas, Hardpan, Omaha, Eryngo and Otjozondjupa Regions would also benefit through additional employment opportunities, skills and business opportunities.

VIII.3. As the income of the farmers, employees etc would have increased as a result the implementation of the project. It is possible to have secondary impact on commercial activities in the project areas, on such areas as transport, storage, repair facilities for fish farming equipment etc.

VIII.4. The successful implementation of this project will promote improved environmental friendly fish farming methods and contribute to the sustainability of fishing in our northern rivers. This should lead to improved community standards by means of:

- Poverty reduction;
- Contribution to the GDP;
- Job creation (on fish farms) addressing the gender issue;
- Food security;
- Promotion of fish consumption;
- Increase in nutritional value of food.

IX. PROJECT IMPLEMENTATION

IX.1. The MFMR, through the *Directorate of Aquaculture (DOA)*, will be the lead implementing agency and will be responsible for the overall coordination, monitoring and evaluation of the project. In addition to the DOA, there will be a *National Steering Committee*, which shall consist of the representatives of the *Ministry of Environment and Tourism (MET)*, and of the *Ministry of Regional and Local Government and Housing and Rural Development*.

IX.2. Similarly, at the regional level, there shall be *Regional Steering Committee* consisting of the Office of the Regional Council, MET and local traditional authority.

IX.3. *National Steering Committee* will be responsible to guide the project by providing technical guidance. The steering committee will report to the MFMR Permanent Secretary. It will be responsible for project level planning, procurement, coordination, monitoring and evaluation, sensitization and accountability. The *National Steering Committee* will be assisted by a *National Project Coordinator* who will be responsible for the day-to-day running of the project, assisted by requisite staff from the MFMR.

IX.4. The private sector will be involved in the entire project implementation aspects ranging from financing, production, and marketing to training. It will also, through competitive bidding, at regional and local levels, be involved in supply of dam and pond construction materials, participate in the construction process and supply vehicles and equipment; it will also supply fish fry and fish feeds to farmers.

X. TECHNICAL ASSISTANCE REQUIREMENTS

X.1. Technical assistance both of short-term and longer-term nature would be required to ensure that the project is implemented successfully.

X.2. In addition to overseeing the implementation of the training programmes, such technical assistance would also be focused on undertaking scientific studies, developing training modules, establishment and management of hatcheries, fish breeding, post-harvest handling, packaging and processing techniques.

XI. ISSUES AND PROPOSED ACTIONS

XI.1. **Traditional leadership.** Since most of the project would be implemented in the rural areas with traditional leadership with their own ethos and limitation, it is necessary to ensure that traditional leaders of the respective areas are on board and have pledge and demonstrated their support and commitment.

XI.2. **Training of scientists and technicians.** Aquaculture, a new initiative promoted and supported by government will need, trained staff that are skilled to enhance fish farming practices. Technical education will increase the success rate of start-up aquaculture ventures. Successful start-ups are critical for financial support to the entrepreneurs. Extension services can provide necessary technical assistance to aquaculture operations, reducing the failure rate of start-ups, increasing production and mitigating losses from disease, predators, and other risk factors.

XI.3. There is presently no degree granting institutions with aquaculture programs in Namibia, and there is very limited application of aquaculture education at other levels. Formal education programs combined with industry-driven research have proven beneficial to aquaculture development in other countries. Aquaculture education programs in secondary schools and vocational-technical schools can easily be integrated into the national curricula. Biology, chemistry, engineering, business and writing skills are all necessary components to the multi-disciplinary field of aquaculture. Aquaculture training opportunities do exist in the region and should be evaluated and made use of while the Namibian training system is being put in place.

XI.4. A preliminary training needs for scientific and technical support has been compiled which addresses the immediate training needs of the newly established DOA within the MFMR (Annex 2). However, as the Directorate expands and aquaculture becomes a thriving industry, additional training needs of staff may arise.

XI.5. **Government policy.** Current policy for this developing sector is laid out in the policy paper: *Towards the Responsible Development of Aquaculture (2001)*. Under this policy, Namibia is committed to observing the principle of optimum sustainable yield in the exploitation of living natural resources and ecosystems. The government therefore has an obligation to promote and regulate

responsible and sustainable development and management of aquaculture within national water bodies of all types, both natural and artificial.

XI.6. **Environmental protection measures.** A policy and regulation are in place, which will ensure that all fish farming initiatives are managed according to the *FAO Code of Conduct: Aquaculture*.

XI.7. Mechanisms will be put in place to ensure that water utilized for fish farming purposes is either cleaned before pumping back to the rivers or to be used for agricultural purposes.

XI.8. **Socio-cultural aspects.** The Namibian people living along the four northern perennial rivers have for many generations been fishermen. One of the main objectives of the project will be to sustain traditional fish farming practices and to encourage and promote small-scale fish farming ventures with fish reared at the *Inland Fishery Research Institute*. The technical and scientific staff based at the proposed Institute will play an important role in providing ongoing technological know how and training to the communities living along the rivers.

XI.9. **Performance indicators.** The project will have a system through which it will be monitored and evaluated. To monitor and evaluate the project, measurable indicators will have to be developed, with their timeframes identified.

XI.10. **Institutional and management capacity.** The project will remain vulnerable in the area of capacity as Namibia is a late comer in the area of aquaculture, thus the need government and all the stakeholders to give this matter focus and deliberate attention. This should be at the central as well as at the regional/local level.

XI.11. **Environmental protection measures.** A policy and regulation are in place, which will ensure that all fish farming initiatives are managed according to the *FAO Code of Conduct: Aquaculture*. Mechanisms will be put in place to ensure that water utilized for fish farming purposes is either cleaned before pumping back to the rivers or to be used for agricultural purposes.

XI.12. **Annual budget.** Government needs to have annual budget for the sector to ensure its sustainability.

XII. RISKS ANALYSIS

XII.1. The risks that could possibly impede development and cause the project to fail or to operate at sub-optimal level include the following:

- **Non-availability of appropriate human resources to man the research institute.** Aquaculture development in Namibia is at infancy stage and current knowledge and skills in this sector are very scarce. It is therefore, likely that the project will experience shortfall in human resources, particularly at the research institute. It would therefore be advisable for the government to look very seriously for foreign expert knowledge and skills.
- **Water quality not conducive for aquaculture.** Needless to say, the water quality is at the heart of the success of aquaculture activity. Therefore, inputs to ensure right quality of water will have to be secured. Again, required expertise and equipment will have to be secured and maintained.

- ***Lack of support and commitment from the community.*** This is a new venture by and large and the community support might not necessarily be automatic. Community needs to be motivated and all stakeholders must ensure from the beginning that the community is involved and participate in planning and execution of the project.
- ***Bureaucratic delays and administrative red tape on the part of the MFMR.*** This demoralizes community and the government must be careful not to delay the project implementation because of bureaucratic delays. It is hoped that the project steering committee will operate flexibly and would not be affected by normal bureaucratic red tape.
- ***Major floods.*** Given recent experience, there is always the possibility of a flood. It would seem that there is very little that can be done. However, the project equipment and resources should be appropriately insured with short-term insurance companies.
- ***Outbreak of unknown diseases.*** It is possible that outbreak of disease would occur. This is particularly true if the project does not have system to detect and prevent outbreak of diseases. It would therefore be necessary for the project to establish a rigorous system to prevent, control and eliminate diseases.

ANNEXES

- Annex 1: Technical Support – Fish Farm Managers to be Deployed in the Regions**
- Annex 2: Aquaculture Education and Training – Preliminary Needs Analysis**
- Annex 3: Map Showing the 13 Administrative Regions of Namibia and the Locations of Main Aquaculture Centres under Construction or Planned**
- Annex 4: List of References**

Annex 1: Technical Support – Fish Farm Managers to be Deployed in the Regions

Terms of Reference: to provide training to members of the co-operatives, staff of the MFMR and existing and potential fish farmers.

Rural training and workshops – training of trainers: Presently a program is envisaged to train extension officers – training the trainers – and the Ministry is carrying this out marginally with limited resources. The long term goal is to establish a network of extension officers who are specialized in aquaculture and who can travel the length and breadth of their region advising farmers on their stock conditions, assisting in time of need, disease diagnosis and prevention, and advising on finished products – markets etc. This is an ambitious program just marginally touched on due to lack of funds. Regional centres are envisaged in Omahenene, Oshakati, Rundu, Katima Mulilo, Swakopmund and possibly Lüderitz. A central location in each region is being chosen, such as Omahenene training workshops presently undertaken and regular classes taught to potential and existing extension officers. Technical expertise is being sought in the form of mid-level lecturers, equipment for teaching such as power point projectors, microscopes, water analysis instrumentation, white boards and overhead transparency projectors. It follows that if we as a Ministry cannot adequately train our extension officers, the program will suffer. It is vital that extension officers are trained and equipped to go into the countryside in their respective regions and educate and assist our rural populations. It is vital that at least three young lecturers in aquaculture that can reside in the regions and assist the local populace with regular contact from the Ministry and guidance from it. As clearly listed in the EC Country Strategy Paper, the fundamental challenges facing Namibia are the reduction of poverty and inequality and the need to promote sustainable rural livelihoods, and better levels of education and health.

1 Farm Management/Instructor: To be deployed in the Caprivi and Kavango Regions, with duty station Rundu.

1 Farm Management/Instructor: To be deployed in Omusati, Oshana, Oshikoto and Ohangwena Regions, with duty station Oshikati.

1 Farm Management/Instructor: To be deployed in Karas, Khomas, Hardap, Omaheke, Otjoondjupa, Erongo Regions, with duty station Windhoek.

Annex 2: Aquaculture Education and Training – Preliminary Needs Analysis

Aquaculture Researchers

Nutrition and feeding of aquaculture species (2 scientists)

Aquatic Animal health (diseases) of cultured species (2 scientists)

Physiology and biology of indigenous aquaculture species (2 scientists)

Fish Farm Manager (at Hatchery)

Pond production system: management, planning, administration, maintenance and general insight in feeding, health and water quality (2 staff)

Technical staff for Researchers and Farm Managers

General exposure requested for one to two month courses for:

Research assistants (3)

Aquaculture farm assistant (3)

In water quality monitoring, feeding, animal diseases, hatcheries etc.

Technical Assistants and Lead Labourers

General exposure (one month courses) to be provided to these staff on the day-to-day running of production ponds (4 Technical Assistants and 2 Lead Labourers)

Staff listed above will need training in computers, electronics and pump systems

Researchers (6 staff)

Technical staff (8 staff)

Extension Officers

One of the objectives within the DOA is to provide assistance to new fish farmer entrepreneurs in rural areas. Competent teams of extension officers who are well conversant in Aquaculture need to be trained (8 staff)

Inspector Officer

Qualified person to carry out inspection at ponds to ensure correct procedures are followed e.g. water quality, health, alien species introduction (2 staff)

Budget: N\$1,250,000 – Includes airfares to aquaculture institutes abroad, accommodation, class fees, per diem.

Annex 3: Map Showing the 13 Administrative Regions of Namibia and the Locations of Main Aquaculture Centres under Construction and Planned



1. Inland Aquaculture Centre at Omahenene (in operation as from 1 December 2005)
2. Swakopmund Mariculture Centre (in development) at NatMIRC – National Marine Information and Research Centre
3. Aquaculture and Inland Fishery Institute at Kamutjonga (to be developed)
4. Hardap Dam Centre owned by Echo Fish (currently in operation)

Annex 4: List of References

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