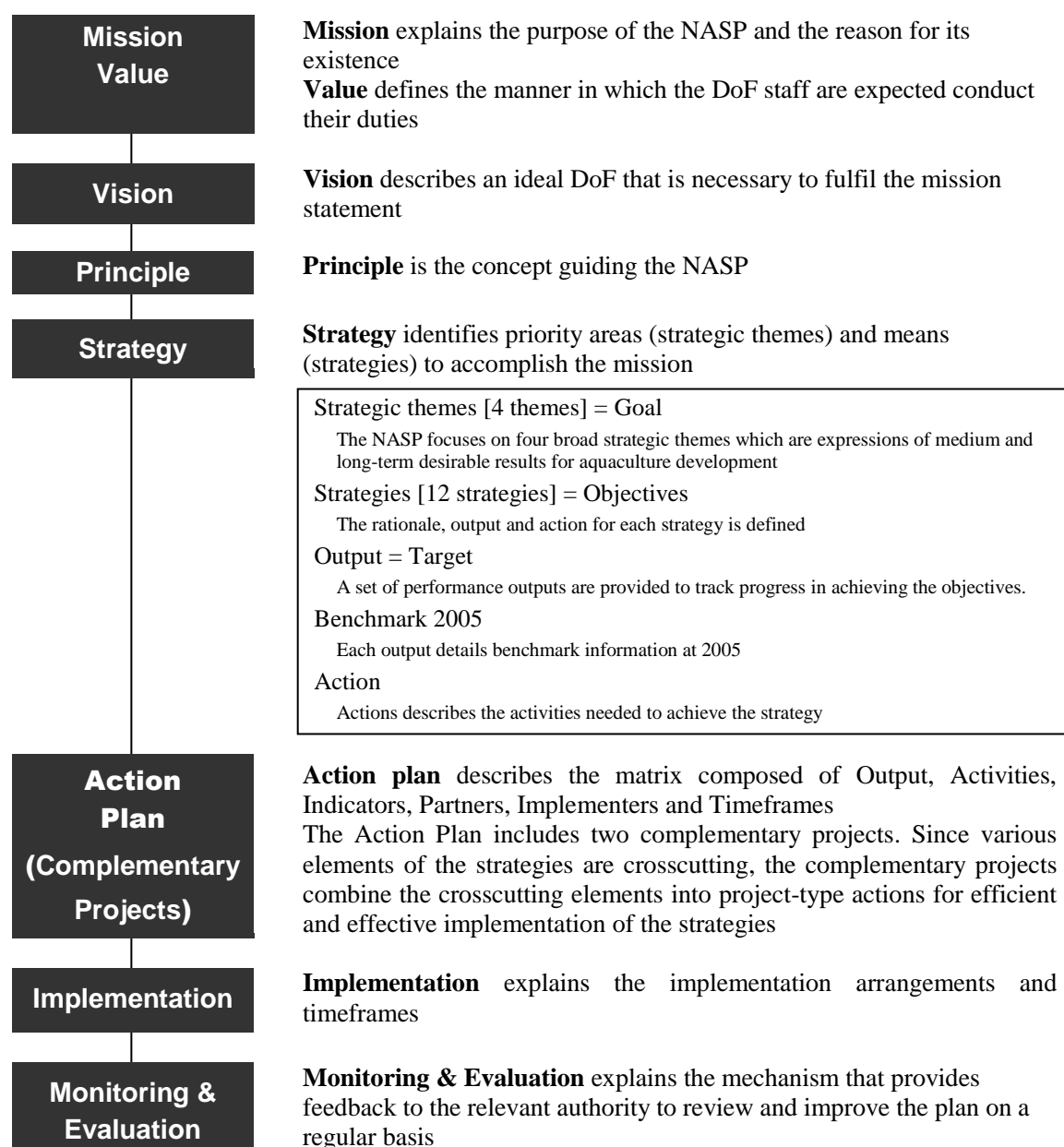


PART 2 THE STRATEGY

Part 1 of this report provided the background information to contextualize the aquaculture sector in Malawi. This information has been used as the basis to develop the NASP that is presented in detail in Part 2. The broad issues presented in the background document are narrowed down considerably in Part 2 to focus on the strategies and actions that are needed to advance aquaculture development in Malawi.

1. Structure of the NASP

This National Aquaculture Strategic Plan (NASP) is composed of the following components:



2. Mission and Value

2.1 Mission for the Aquaculture Sector

“Fostering a profitable and sustainable aquaculture sector”

Additionally, this mission is supported by the following:

To increase the economic and social benefits for fish producers and citizens in general, while contributing to sustainable fish supply, food security and economic growth. National poverty reduction and improved livelihoods will be achieved through the promotion of excellence and best practices of DoF services.

2.2 Best Value

The DoF supports best value. This refers to a needs based delivery of services in the most *cost effective manner*.

The core values guiding the delivery of services requires an organisation that is:

- ☆ **Responsible** Provide support for prospective aquaculture ventures that enable fish farmers to achieve high quality livelihoods
- ☆ **Professional** Enhance customer confidence in technical and professional competence
- ☆ **Efficient** Operate in a smart and practical way to solve problems
- ☆ **Trustworthy** Work in partnership with customers and other organizations, and
- ☆ **Quality** Ensures that staff are properly trained, equipped and supported to respond to customer needs.

3. Vision

The vision of the NASP is to create a practical DoF that is dedicated to improving technological innovation and extension for aquaculture development by the best possible use of available resources. It is anticipated that development in the aquaculture sector will continue along a dual pathway, comprising the small-holder and commercially-orientated subsectors. Taking this into consideration, and providing quality services, the DoF will strive to move the sector towards such that:

- Rural aquaculture forms a planned part of the on-farm production system and is integrated into the overall business activities of the farmer and moves towards a more scheduled and better-managed production system, which will increase cash income and improve the livelihoods of small-holder farmers.
- Small and large-scale commercial fish farming operations are competitive and are able to contribute significantly to the declining supply of tilapia from natural waters in Malawi, and support the rural economy through providing job opportunities for local people.
- The private sector is increasingly involved in service provision, through the provision of an enabling environment, thereby increasing the quality and efficiency of interventions.

Year	Phase	Category	Indicator	Conditions & Assumptions
1958	Initiation Phase		<ul style="list-style-type: none"> • Low level of aquaculture adoption • Income from fish farming is low and sporadic 	<ul style="list-style-type: none"> • Healthy capture fishery • Low fish price • Local fish preferred
2005	Developing Phase		<p>National Policy and Strategy (outputs from NASP)</p> <ul style="list-style-type: none"> • To facilitate the necessary institutional, legal, and administrative changes in the sector, and to increase the capacity of stakeholders • Improved DoF service delivery • Access to service improved • More farmers adopt aquaculture • Increased number of productive ponds • Some small-holder farmers move towards the commercialisation of their aquaculture activities. • Integrated operations introduced • Large-scale commercial sector initiated and growing 	<ul style="list-style-type: none"> • Declining capture fishery • High fish price • Intensive government and donor support • Enabling investor environment
2015				
2025	Maturation Phase	Integrated rural aquaculture	<ul style="list-style-type: none"> • Improved management • Improved household security • Greater integration • Scheduled income from fish farming • Increased adoption of fish farming technologies into overall livelihood system 	<ul style="list-style-type: none"> • Continued government and donor support • Stable national macro-economic climate • Appropriate regulations on fish trade • Water and environmental conservation
		Commercial Aquaculture	<ul style="list-style-type: none"> • Large-scale commercial sector established • Emerging commercial fish farmers derive most of their income from aquaculture 	
2040 ?	Sustainable Phase	Integrated rural aquaculture	<ul style="list-style-type: none"> • Household security • No outside financial support • Aquaculture plays pivotal role in livelihoods 	<ul style="list-style-type: none"> • Stable national macro-economic climate • Water and environmental conservation
		Commercial Aquaculture	<ul style="list-style-type: none"> • Independent private sector • Effective producer organizations • Financially independent from government and donor support • Export market established 	

Figure 2.1 Phases of aquaculture development in Malawi

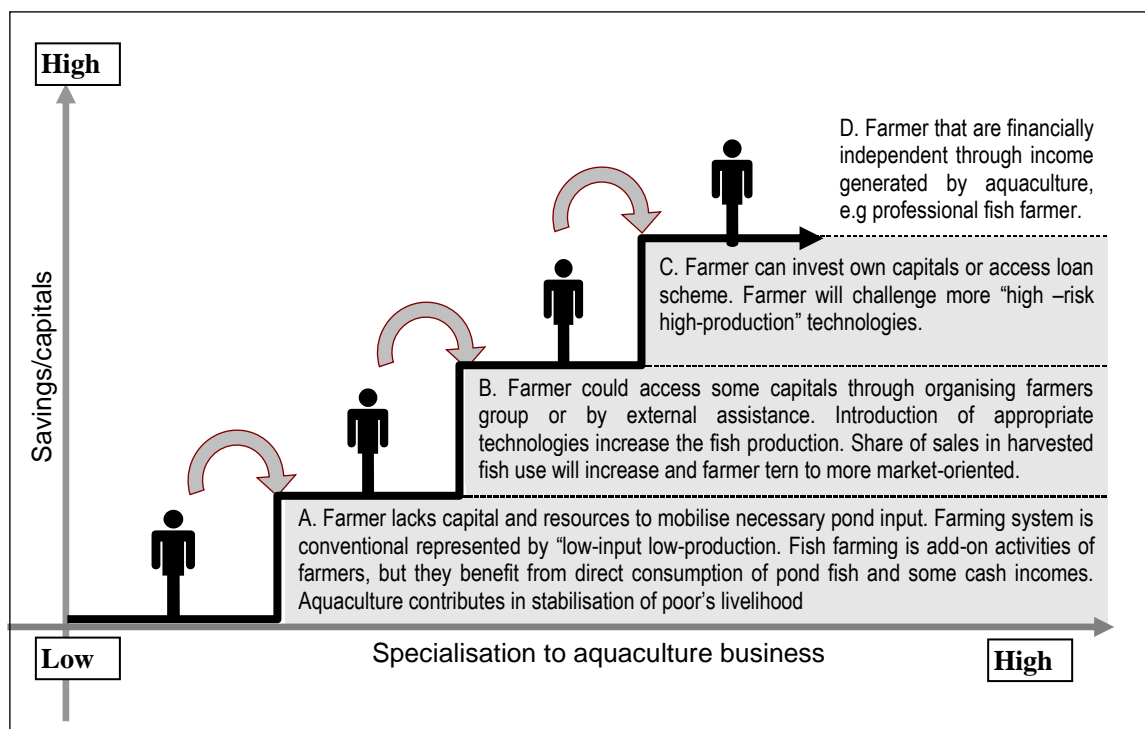


Figure 2.2 Path of progression of Malawian fish farmers

4. Overall Objective of the NASP

Given the current status of the sector, it is acknowledged that attaining the desired scenarios outlined in the Vision is a long-term process, spanning several decades (Figure 2.1). However, the NASP only encompasses a 10-year period, and its focus will therefore be on laying the foundation for this transformation process. Given this emphasis, the overall objective of the NASP is to facilitate the necessary institutional, legal, and administrative changes in the sector, and to increase the capacity of stakeholders to enable:

- *Improved livelihoods among rural small-holder fish farmers*
- *A successful commercial aquaculture sector*
- *The provision of quality aquaculture services at a national and local level*

5. Guiding Principle

The following five principles will be the pillars of the NASP:

A. The NASP should contribute to the national goal of eradicating poverty and hunger

A key theme behind the NASP initiative is poverty reduction, which also forms part of the broader development policy of Malawi and including the Millennium Development Goals (MDGs), Malawi Poverty Reduction Paper (MPRSP), National Strategy for Sustainable Development and Agenda 21. In addition, the NASP should form a part of National Fisheries and Aquaculture Policy (2002) reflecting the DoF's value, mission, and objectives. The NASP has to incorporate these imperatives in order to justify its implementation. With regard to potential funding for

implementation of the NASP, it is important for donors to place increasing emphasis on projects that contribute directly towards poverty reduction and economic growth.

B. The NASP should be a “customer-focused” initiative

The NASP has to be sensitive and responsive to the different needs of DoF customers, and as such should be “people-centred” and accountable. This means that the NASP must be “demand-driven”. The DoF’s customers and partners identified under the NASP include:

- | | |
|--------------------------|---|
| [End-Customers] | <ul style="list-style-type: none"> • Small-holder fish farmers • Commercial fish farmers • Civil society (Consumers, Fish traders, feed companies, etc.) |
| [Intermediate-Customers] | <ul style="list-style-type: none"> • NGOs • Local Governments • Farmers’ Organizations |
| [Partners] | <ul style="list-style-type: none"> • Universities • Collaborative Ministries • Donors • International research institutions |

The DoF has a responsibility to be accountable in the implementation of the NASP.

C. The NASP should be responsive to the needs and capacity of stakeholders

The NASP should be realistic with regard to the capacity of stakeholders and must therefore promote a demand-driven approach. To fully unlock the benefit of aquaculture, producers (particularly resource poor farmers) are required to respond to aquaculture technologies as well as to other mechanisms for rural development, such as cooperative/association management, basic education, financial/saving resources management, etc. Many fish farmers have limited capacity to respond effectively. The NASP should be responsive to the capacity of its stakeholders and assist all stakeholders appropriately.

D. The NASP should be an instrument to promote wider partnerships

The NASP must promote policy dialogue to facilitate the effective participation of stakeholders in the aquaculture development process. The NASP will support producer organizations, academic institutions, international research organization, donors and NGOs in sharing experiences and fostering closer coordination.

E. The NASP needs to encourage and facilitate a process of building the knowledge base

The NASP should be a mechanism to create a comprehensive knowledge base through its performance tracking and result management processes. Monitoring and evaluation are not only meant for ensuring implementation of the programme, but also to provide the opportunity for stakeholders to learn from experience through a feed back mechanism. Three requirements must be met to create these knowledge bases. Firstly, the NASP must include clear performance indicators. Secondly, monitoring and evaluation must be carried out by an independent professional with wide participation of stakeholders. Thirdly, there is a need for the DoF to be responsive to past experiences and be prepared to learn from these. The NASP will assist in creating these opportunities.

6. Conceptual Framework

The conceptual framework of the NASP is shown in the figure below. Since the NASP emphasises a ‘people-centred approach,’ three strata formed by different actors in the aquaculture sector comprise the spine of the framework. The first stratum includes the producers and other people directly benefiting from the aquaculture industry. In other words, they are the end-customers. Since they are the leading role players they are located at the top of the frame. The second stratum includes local government, NGOs and farmer organizations. They are considered as intermediate service providers between the producers and the DoF. Simultaneously, they are considered as the DoF’s customers (intermediate customer). The DoF forms the base of the NASP (3rd stratum) and supports the groups in the upper strata. Under the NASP, strategic themes are set up taking into account concepts of how the DoF should act and provide services according to these strata, in order to achieve its mission.

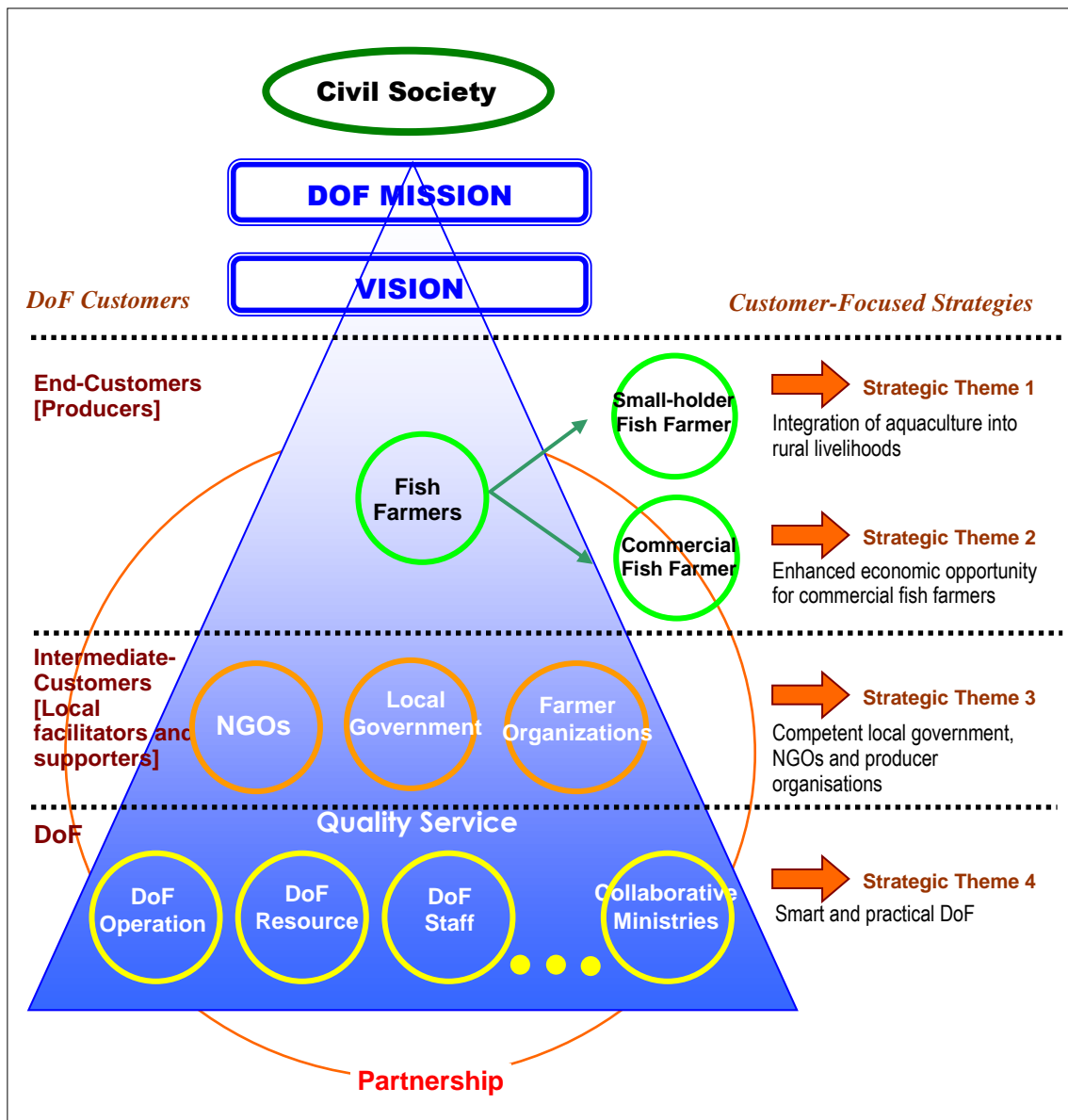


Figure 2.3 Conceptual Framework of the NASP

7. The Strategy

Four strategic themes and 12 strategies are proposed under the NASP. These should guide the focus of the DoF for the next 10 years in order to achieve their mission and vision. These themes and strategies are summarized in the table below:

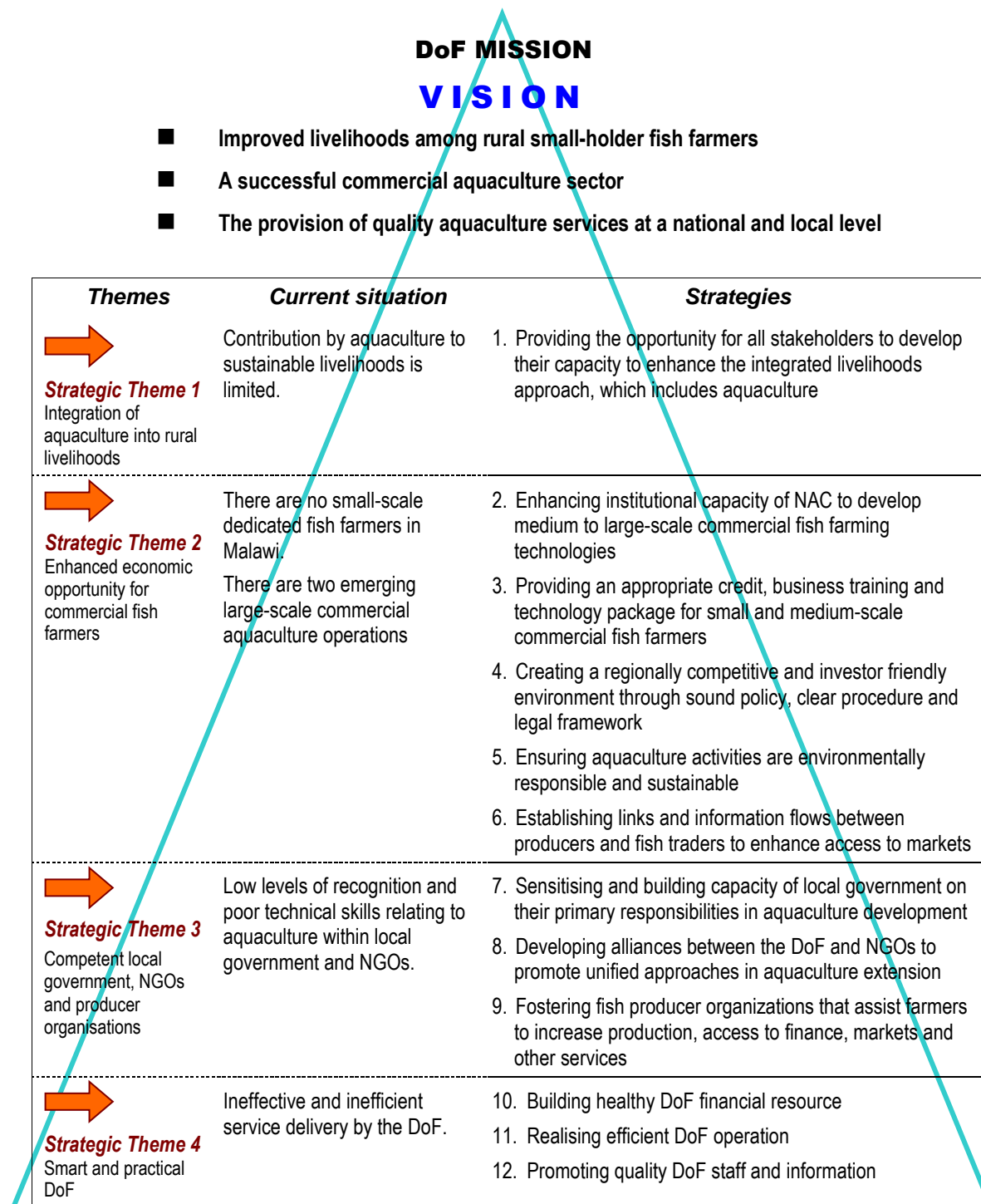


Figure 2.4 Strategic map of the NASP

Strategic theme 1

Integration of Aquaculture into Rural Livelihoods

“Aquaculture should not be viewed as an isolated technology, but be considered as one of the aspects of rural development, forming part of a holistic approach to development”

- Africa Regional Aquaculture Review. FAO. 2000 -

Current Status

Fish farming is one of a variety of activities that is combined to maximize food security of small-holder farmers. This suggests that fish farming needs to be viewed as part of the overall agricultural system, rather than a stand-alone activity. Agriculture and aquaculture performance is intimately linked to poverty and food insecurity, and up to 40% of Malawi's fish farmers are food insecure (JICA, 2003). Without the prospect of improved food security through increased crop production, many farmers have adopted aquaculture as an additional livelihood option, although this is often at a very low level. The poverty cycle is worsened through low production, as cash earnings are not sufficient to invest in improved crop production for the next season. It is widely accepted that poverty reduction (if poverty is defined as a condition that lacks (i) political capabilities, (ii) socio-cultural capabilities, (iii) economic capabilities, (iv) human capabilities, and (v) protective capabilities (OECD/DAC, 2001)) requires concerted cross-sectoral intervention. Although the role that aquaculture plays in rural livelihoods is recognized (for example through generating additional cash income, improving food security, acting as a rural safety net and having a synergistic effect on net farm production), the rural poor have to overcome many broad socio-economic obstacles.

The livelihoods approach as it relates to aquaculture development is a relatively new way of thinking. This approach views aquaculture as a mechanism which can contribute to overall poverty reduction among poor farmers, rather than simply aiming at improving fish production per unit area. Better knowledge and management capacities to support this approach are critical elements in this strategy. Although many Government and NGO extension officers recognize the importance of a holistic approach to aquaculture extension and research, they often do not have the opportunity to further their understanding of these approaches to facilitate effective implementation. Further, researchers involved in aquaculture development often lack familiarity with social dynamics and cross-sectoral approaches. Sufficient capacity of farmers and their supporters to implement and manage livelihood approaches is critical to effectively address this strategic theme.

The ADiM Project, together with an NGO, examined the processes involved in such an integrated approach at a number of farmer clubs in Chingale, Zomba District. This study involved assessing best practice approaches in these clubs over the period of one year. These studies indicated that certain factors affected the rate of adoption of the integrated approach within these clubs. These factors include: (1) the presence of an appropriate facilitator; (2) application of the farmer-centred approach that empowers farmers; (3) a realistic timeframe for adoption and implementation; and (4) the need for enhanced communication and collaboration among stakeholders.

As far as the above points are concerned; (1) An outsider who can facilitate and mobilise farmers is critical to initiate the process of adapting and adopting new information effectively in their day-to-day activities. (2) The dependence of farmers on outsider assistance is prominent in Malawi in general, and effort needs to be placed during the facilitation process on encouraging farmers to think, judge, and act for themselves, and be responsible for what they do. This will ensure true ownership of the process. (3) It needs to be recognised that this development approach requires significant time for implementation, as it involves a change in the manner in which farmers behave and view the project and the facilitation process. (4) Last but not least, good information on the best

approaches to take to ensure integration needs to be made available to the farmers, and this information should be appropriate to the needs of farmers. In this regard it is essential for different sectors to collaborate in order to develop and provide quality information on the integrated approach.

Outcome

Improved livelihoods among rural small-holder fish farmers.

Strategic objectives - by the year 2015

- + Best practices for an integrated aquaculture livelihoods approach will be defined.
- + Integrated aquaculture livelihoods projects will have been actively adopted in the 9, out of 27, environmentally most suitable Districts.
- + Smallholder fish farmers in at least 3 Districts will experience increased income and improved food security measured by verifiable quantitative indicators.

Achievement of the strategic objectives

The DoF will focus on a livelihoods approach for rural fish farmers that will allow for a sustainable increase in food security and income generation, and which addresses the critical needs of farmers.

Considering the ultimate objectives of this strategic theme, a systematic and strategic step-wise approach to its implementation is required. In the short-term the DoF will develop an institutional structure and implementation model that will strengthen the ability of stakeholders to adopt and carry out effective approaches. The fact that livelihood approaches are relatively new in the aquaculture sector means that lessons learnt from the implementation process need to be fed back into the model on an ongoing basis. A better understanding of how the integration of fish farming can contribute to poverty alleviation is needed, and this will form the basis of research activities carried out under this Strategic Theme.

Four outputs are expected from this process. These are:

- 1) *Adoption of cross-sectoral, integrated livelihood initiatives into government policies and actions*
- 2) *Projects that adopt the integrated livelihoods approach that includes aquaculture, and an institutional model that supports this process.*
- 3) *Broader understanding of the context between aquaculture and the socio-economic, institutional and political status of poor farmers*
- 4) *Capacity increased within the DoF, local government and NGO staff to utilise tools and methods necessary to support the integrated livelihoods approach.*

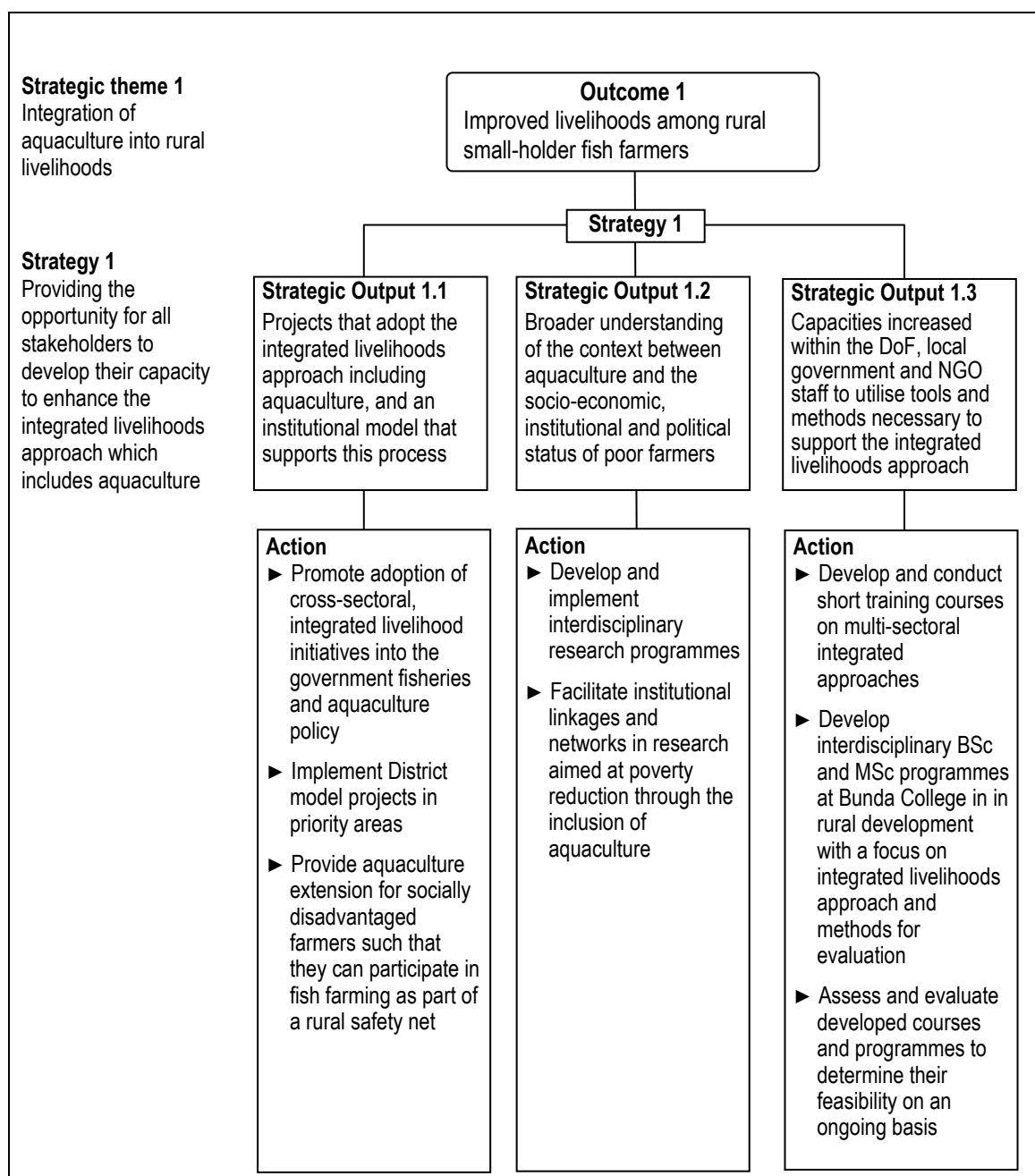


Figure 2.5 Strategic theme 1: strategies and outputs

Strategy 1 *Providing the opportunity for all stakeholders to develop their capacity to enhance the integrated livelihoods approach, which includes aquaculture*

Output 1.1 Projects that adopt the integrated livelihoods approach that includes aquaculture, and an institutional model that supports this process

A multi-sectoral livelihoods approach requires a sound environment and mechanism that brings partners from different sectors into the aquaculture development process. Importantly, it will be

necessary to initiate this process at a grass-roots level that will entail strong local organisation. From this standpoint, the DoF will develop and promote a model which places District Assemblies at the centre of the development process and its implementation. This will enable coordination of the sector through linking existing services within the District Assembly. For example, aquaculture extension can be provided together with crop and animal husbandry technologies more easily under the leadership of the District Assembly than as a stand-alone activity, especially after the pending decentralisation of extension systems. After decentralisation, it is anticipated that responsibility for all agricultural and natural resources functions will be combined at the District level.

The most effective means to develop institutions for this approach is through introducing a model project at District level that increases opportunities for the DoF, District Assemblies, donors, NGOs and other stakeholders to participate collaboratively. Introducing a scheme to encourage the adoption of livelihoods approaches into aquaculture development is directly aimed at improving the welfare of the poor. The scheme, tentatively called the “District Aquaculture Livelihoods Project” (see Section 8, Complementary Projects) will be implemented in priority Districts as a model approach that can be duplicated elsewhere at a later stage, if appropriate. Limited resources and different intensities of existing aquaculture practices and support mechanisms between Districts, suggests that a realistic short-term approach would be to focus on priority areas that can be considered ‘Pilot Projects’. Up to three Districts will be identified using criteria that include: (i) presence of suitable institutional arrangements, e.g. the DoF and NGOs, (ii) potential for strengthening capacity for the improvement and adoption of an integrated approach (in this regard, the density of existing fish farmers and of potential new areas for fish farming would be important), (iii) the potential for collaboration with farmers, e.g. the presence of innovative farmers, (iv) natural and economic conditions, and (v) the need for regional balance in project focus areas. Districts being considered include Zomba, Thyolo, and Chitipa Districts.

Benchmark 2005 DoF has limited knowledge and lacks the resources to implement integrated livelihood approaches that include aquaculture

Target Three model pilot projects in Zomba, Thyolo, and Chitipa Districts to be implemented by 2006.

Action

1. Promote adoption of cross-sectoral, integrated livelihood initiatives into the Government fisheries and aquaculture policy.
2. Implement District model projects in priority areas.
3. Provide aquaculture extension for socially disadvantaged farmers to have the opportunity to participate in fish farming practices as part of a rural safety net including women-headed households and households with HIV/AIDS orphans.

Output 1.2 Broader understanding of the context between aquaculture and the socio-economic, institutional and political status of poor farmers

Research is urgently needed to achieve this output. Primarily, knowledge of the impact of aquaculture on the livelihood of small-holder farmers is required. If aquaculture research is to respond effectively to the context and needs of poor farmers, increased investment in further interdisciplinary studies on livelihoods approaches is necessary. For the next 10 years, aquaculture research needs to take into consideration the following research agenda:

- Studies on developing a mechanism that can permit fish farmers to escape poverty.
- Studies on how fish farming can most effectively be integrated into other on-farm activities, including determining the actual value of fish farming to the overall livelihood of farmer households.
- Studies on a mechanism of interaction between fish farming and other development activities, in order to optimise synergies and minimise competition among these activities.

- Studies on community organisations, their importance in facilitating the effective use of community resources, and consequent effects on poverty.
- Studies on actual contribution of fish to human nutrition, changes over time, especially the impact on the incidence of poverty.
- Developing a common methodological framework, comparable definitions and data collection procedures for measuring poverty, coordination with other sectors, and evaluation against international standards.
- Defining appropriate and easily measurable poverty indicators which will ensure that the DoF activities can be adapted to impact positively on the livelihoods and well-being of the poor in particular.

Benchmark 2005 No current interdisciplinary research programme.

Target An interdisciplinary research programme is developed and implemented by 2006.

- Action
1. Develop and implement interdisciplinary research programmes that produce a comprehensive base of information on the integration of aquaculture into the overall livelihood systems. This information should be used by DoF policy-makers for further strategic planning, policy development and project assistance.
 2. Facilitate institutional linkages and networks in research aimed at poverty reduction through the inclusion of aquaculture. Institutional collaborators would include the NAC, Bunda College, Chancellor College, NGOs, donor projects and international research organizations.

Output 1.3 Capacities increased within the DoF, local government and NGO staff to utilise tools and methods necessary to support the integrated livelihoods approach

More specifically, these capacities include:

- Capacity in designing, operating and managing initiatives that follow an integrated livelihoods approach, and the tools and methods used in this.
- Capacity to generate knowledge and technologies that increase the impact of this approach.
- Capacity to assess and evaluate the results obtained through a multi-sector approach.

It is critical to be able to evaluate the benefit of adopting an integrated livelihoods approach. If quantitative or qualitative assessment cannot identify the advantage of using a particular approach, it is unlikely to be adopted and practised by either government or donors.

Benchmark 2005 There is no directed and systematic training programme to enhance capacity in the integrated livelihoods approach.

Target The integrated livelihoods approach needs to be incorporated into curricula and taught in relevant training institutions by 2007.

- Action
1. Develop and conduct short training courses on multi-sectoral integrated livelihood approaches.
 2. Develop an interdisciplinary BSc and MSc programmes at Bunda College in rural development with a focus on the integrated livelihoods approach and methods for evaluation.
 3. Assess and evaluate developed courses and programmes to determine their feasibility on an ongoing basis.

Strategic theme 2

Enhanced Economic Opportunities for Commercial Fish Farmers

“Aquaculture is our business!”

- Farmer’s opinion at National Planning Workshop. Lilongwe. 2005 -

Current Status

Establishing commercial aquaculture in Malawi is critical to the long-term economic sustainability and prosperity of the sector. However, contrary to the farmers statement above, examples of full-time dedicated fish farmers, or farmers who can sustain their livelihood solely through aquaculture, are rare in Malawi. In general, harvest of fish from ponds is not undertaken on a scheduled basis and a prolonged harvesting cycle is a widespread phenomenon. The tendency for farmers to hold fish for an extended period has been related to the pond being viewed as an asset and a savings bank rather than a production unit. This mindset is a constraint for profitable fish farming. Further, the entrepreneurial abilities of farmers have been suppressed to some extent through the lack of commercially orientated DoF services, and of donor assistance for commercially-orientated aquaculture development. Malawi’s aquaculture development has followed a donor-guided path to a large extent, which has often been focussed on the resource-poor farmers. Significant human resources have therefore been left under-utilized among some of the more progressive farmers. There is significant potential for the development of commercial aquaculture in the private sector. The existence of successful and financially independent fish producers who derive most of their income from aquaculture will provide great incentive for potential entrepreneurs to invest in fish farming. This will result in increased wealth in rural areas and contribute to stability in the rural economy.

The issue of farming with exotic fish species in Malawi has stimulated lively debate. Current thinking among stakeholders (and in particular fish producers) as determined by extensive consultation at national level, and a planning workshop held in Lilongwe on the 3rd and 4th February 2005, includes the following farmer opinions:

- National policy should be responsible but should be conducive to development needs.
- Producers are unable to ensure scheduled production using currently available species.
- Literature exists that shows that *C. carpio* can be grown to the market size in 6 months.
- There is uncertainty as to the length of time that Malawi will remain isolated from exotic species that are already present in neighbouring states, and what the approach of the DoF will be regarding those exotic species that are already present in certain parts of the country.
- The issue of exotic species is the most important issue that needs to be addressed in developing aquaculture in Malawi, particularly with regard to *C. carpio* and *O. niloticus*.
- Farmers are strongly in favour of farming with *C. carpio*, believing that the species is already in many of the watersheds of Lake Malawi in neighbouring countries, but caution was expressed with respect to *O. niloticus*.
- Information outlining the basis for banning common carp needs to be made available to farmers.

The issues raised by farmers would suggest that the development of improved strains of *O. karongae*, *O. shiranus* and *T. rendalli*, developing efficient on-farm technologies for the production of *C. gariepinus* fingerlings and effective farmer training with respect to fish feeds, feeding and fertilisation is a top priority for the NAC.

However, despite over 20 years of experience in aquaculture research, the DoF and donors are still struggling to determine the best aquaculture interventions, especially in situations where inputs are scarce and or limiting.

Outcome

Fish producers that are financially independent through income generated by aquaculture.

Strategic objectives - by the year 2015

- + Financially independent commercial fish farmers/enterprises established
- + An active and effective network of researchers for Malawian and African aquaculture, including national, regional, and international research institutions, contributing to the identification of the best technical options for aquaculture production and the dissemination of these outputs
- + An improved economic, legal and administrative environment with incentives to encourage entrepreneurial farmers. Amongst others, these incentives could include effective credit schemes, tax exemptions, and a simplified licensing system.

Achievement of the Strategic Objectives

The DoF plans to sharpen the focus of its services, research and technology transfer toward areas with potential for commercial aquaculture in Malawi. Five strategic outputs have been specifically identified to achieve this. Firstly, technology must be developed and validated. This will require an improved institutional base. Secondly, an effective and coordinated research programme, involving the NAC and other international research organisations needs to be established. This research programme needs to strengthen the capacity of local scientists and technologists to generate appropriate technologies to support commercial aquaculture development. Thirdly, these technologies must be transferred to producers, together with an appropriate back-up service. This process needs to incorporate a viable plan of action to secure adequate financial support. Fourthly, an attractive and regionally competitive investment environment that reduces business risk and provides incentives for investment needs to be established. Finally, a protocol for responsible environmental assessment and management needs to be developed.

To achieve the strategic objectives, the DoF will adopt the following five strategies:

- Strategy 2 Enhancing institutional capacity of NAC to develop medium to large-scale commercial fish farming technologies
- Strategy 3 Providing an appropriate credit, business training and technology package for small to medium-scale commercial fish farmers
- Strategy 4 Creating a regionally competitive and friendly investor environment through sound policy, clear procedure and legal framework
- Strategy 5 Ensuring aquaculture activities are environmentally responsible and sustainable
- Strategy 6 Establishing links and information flows between producers and fish traders to enhance access to markets

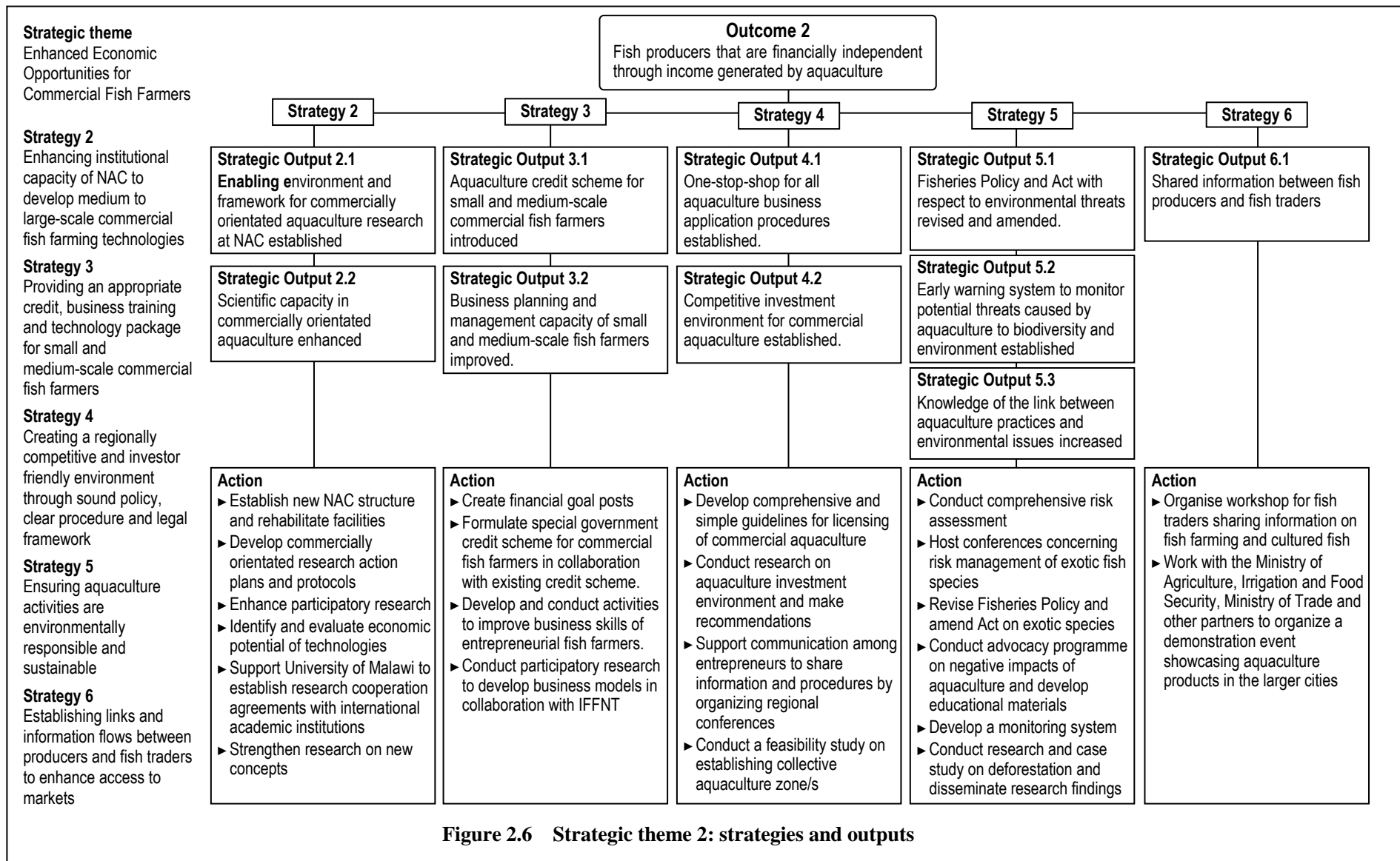


Figure 2.6 Strategic theme 2: strategies and outputs

Strategy 2 *Enhancing institutional capacity of NAC to develop medium to large-scale commercial fish farming technologies*

Although government fisheries stations played an important role in fingerling production and distribution in the past, this function has now been taken over to a large extent by private farmers. This has resulted in activities at the stations focussing more on research, and the maintenance of broodstock. These activities require a limited number of stations in the country, and available resources severely limit the effective operation of many stations. Concentration of resources and their use at selected stations is critical, and this is particularly vital as far as research activities are concerned. The NAC is identified as the centre that should be revitalised to adequately address the research needs of the aquaculture sector.

Research attention at the NAC was most often focused on the needs of resource-poor fish farmers, with little recognition of the development potential of commercially orientated aquaculture. Addressing the needs of this sector has the potential to yield the highest return on any research investment. Presently, there is a national need for, and a desire by, small and large-scale farmers to produce fish on a commercial and profit orientated basis. A quantum shift in research goals and approach therefore needs to take place. This includes the development of a new framework for the NAC in aquaculture research, which could encompass a re-definition of its role, structure and function, the rehabilitation of the facilities, enhancing the research network, and improving the capacity of researchers.

Output 2.1 Enabling environment and framework for commercially orientated aquaculture research at NAC established

DoF will organise workshops aimed at building consensus on a new structure of the NAC, its position within the DoF and orientation of its research action plan. This requires joint-planning and co-financing in collaboration with the Aquaculture Advisory Body, NAC staff, DoF top management, Bunda and Chancellor Colleges of the University of Malawi and invited external participants with knowledge of local conditions. DoF will also be required to rehabilitate the research ponds and water supply facilities.

Benchmark 2005 Activities at NAC are mainly orientated towards aquaculture for the resource-poor.

Target Research plans and protocols for commercially orientated aquaculture research to be developed by 2006 and works to be carried out.

- Action**
1. Establish a new NAC structure with staff redeployment and new job descriptions.
 2. Rehabilitate basic facilities at NAC.
 3. Develop research action plans and protocols to create knowledge and develop technologies to increase aquaculture production.
 4. Establish a database of farmers who have the necessary resources to make changes from subsistence to commercial fish farming (potential commercial farmers).
 5. Enhance participatory research.
 6. In collaboration with appropriate external consultants, assist the University of Malawi in identifying and evaluating the economic potential of emerging scientific discoveries and technologies.
 7. Working in collaboration with international research institutions, strengthen fundamental research on new concepts in business, marketing, and profit-orientated technologies.

Output 2.2 Scientific capacity in commercially orientated aquaculture enhanced.

The currently available expertise at NAC and at Bunda College is largely geared towards small-holder aquaculture and integration of aquaculture and agriculture. Hence there is a need to develop research capacity in experimental design, execution and interpretation of results for commercial scale aquaculture, and extension staff that understands the demands and needs of professional fish farmers and who can effectively promote its development in the country.

Benchmark 2005 There is not enough information and knowledge on commercial aquaculture in DoF.

Target Adequate number of personnel in commercial aquaculture to be trained by 2008 and disseminate their knowledge to other stakeholders in the aquaculture sector in Malawi.

- Action**
1. Develop systematic training programme with list of potential trainees
 2. Provide advanced technology training opportunities at appropriate international research institutions or in collaboration with international researchers. There are requirements for at least: 2 fish nutritionist, 2 feed technologist, 1 genetics specialist, 1 fish disease specialist, 1 aquaculture engineer, and 5 extension trainees (training to include business planning, fish food and feeding, marketing, etc.).
 3. Establish research and teaching agreements between University of Malawi and other international academic institutions in basic research and high-level education.
 4. Support participation of researchers at international and regional aquaculture conferences.

Strategy 3 *Providing an appropriate credit, business training and technology package for small and medium-scale commercial fish farmers*

Supportive business services will play a key role in the development of small and medium-scale commercial farmers. Collaboration with rural and agricultural business advisory agencies, as well as the Department of Commerce, private financing organizations, and NGOs will be necessary to enhance the capacity of emerging farmers. To contribute to this process, the DoF will facilitate interaction between these agencies and farmers and provide advice to farmers on where to obtain such services.

Lending institutions have limited information on the aquaculture sector in general and are not easily able to assess the credit worthiness of farmers. Banks need to be sensitised and informed, and farmers need to be guided as to the process they need to follow in the preparation of project proposals and business plans. The DoF could assist farmers and the IFFNT with the preparation of bankable proposals with which to approach lending institutions, and in determining the requirements of these institutions. The DoF could greatly assist in this process by preparing an information package to be used by both lending institutions and farmers. This package could include definitions of perceived constraints such as limited collateral and guarantees, poor records of income and expenditure at farm level, and limited use of bank accounts. In addition, lending institutions need information on different categories of farms (on the basis of size, number of ponds, water supply, soil and climatic conditions), minimum infrastructural requirements and repayment ratios that qualify small scale farmers and fishermen in other parts of Africa and in other developing countries.

Output 3.1 Aquaculture credit scheme for small and medium-scale commercial fish farmers introduced

The DoF will promote collaboration with existing financial institutions and programmes, such as the ADB fisheries loan, MASAF, the Billion Kwacha Loan Fund, SEDOM, Compass II, NASFAM, and others to facilitate access to these services by fish farmers, where appropriate. The DoF will need to conduct a number of seminars for managers of these programmes to inform them of the requirements and nature of the fish farming sector, and to determine the conditions necessary to access their services.

Benchmark 2005	Farmers do not have access to financial services and credit.
Target	Farmers will have access to financial services and credit through support of the DoF by 2008.
Action	<ol style="list-style-type: none"> 1. Create financial goalposts for farmers to “graduate” from the current situation to small to medium-scale commercial level. 2. Formulate special credit schemes for small and medium-scale commercial fish farmers in collaboration with existing credit schemes such as the ADB Fisheries Loan Scheme, MASAF, the Billion Kwacha Loan Fund, SEDOM, etc. 3. Conduct economic study of fish farming and its marketing.

Output 3.2 Business planning and management capacity of small and medium-scale fish farmers improved

Changing the attitude of farmers from one where aquaculture forms a minor component of the farming system to one where it is the dominant activity is critical to enable small and medium-scale commercial aquaculture. The DoF recognises the importance of raising awareness, and knowledge of commercial aquaculture. The DoF will be required to promote advocacy activities and training, including participatory research for business models, aimed at supporting farmers to develop their business strategies. An important element of this process is to identify and support farmers and farmer clubs that have the capacity to act as models for business-orientated approaches. These farmers would then be in a position to train others in best practice, and their model approaches can act as incentives for other farmers throughout the country.

Benchmark 2005	Farmers in Malawi have severely restricted in business management skills.
Target	100 farmers will receive business training and they will plan their own business strategies such that aquaculture is their principal source of income by 2008.
Action	<ol style="list-style-type: none"> 1. Conduct business training and seminars to potential small to medium-scale farmers with provision of technology package. 2. Conduct consultative activities for entrepreneurial fish farmers to improve their business skills. Innovative Fish Farmers Network Trust and successful farmer clubs will be consulted to develop scenarios (business cases) with DoF. 3. Conduct participatory research enabling business models in collaboration with IFFNT.

Strategy 4 *Creating a regionally competitive and investor friendly environment through sound policy, clear procedure and legal framework*

The current investment environment in Malawi is not conducive for the development of commercial fish farming, and in comparison to Mozambique is not competitive. Though some incentives exist, they are often not implemented and/or take too long to be implemented, or are too little for rapid

capital redemption and application procedures are cumbersome. Hence, if Malawi wishes to attract investors in aquaculture there is a need to revise policy and legislation and to streamline procedures.

Output 4.1 One-stop-shop for all aquaculture business application procedures established

The DoF will design a streamlined application procedure, and align and sensitise relevant departments such that applications and EIA procedures are clear and unambiguous. The DoF will become a one-stop-shop for applications.

Benchmark 2005 The procedure to start commercial aquaculture is complex.

Target DoF to become an efficient one-stop-shop for investors to initiate commercial aquaculture by 2009.

Action

1. In collaboration with the Department of Environment, Ministry of Lands, and the Ministry of Local Government, develop comprehensive and simple guidelines for business licensing of commercial aquaculture ventures.

Output 4.2 Competitive investment environment for commercial aquaculture established

The Malawi Investment Promotion Agency needs to align policy and incentives for foreign and national direct investment with those offered by neighbouring countries and exceed these where possible (e.g. tax holidays, import duty on capital goods and raw materials, etc.) and to design and implement rapid compensation procedures. The concept idea of “collective aquaculture zones” may be one of the options for encouraging investment in commercial aquaculture.

Benchmark 2005 There is no clear understanding of, and guidelines for investment incentives for commercial aquaculture in Malawi.

Target The basic legal, fiscal and administrative environment for commercial investment to be established by 2007.

Action

1. Conduct research on the aquaculture investment environment that establishes a basis for the introduction of efficient and appropriate incentives and subsidies, including tax exemption for aquaculture operations and materials.
2. Support communication among entrepreneurs to share information and procedures by organizing regional conferences.
3. Conduct a feasibility study on establishing “collective aquaculture zone/s”, such that basic infrastructure is established through a joint venture between the public and private sector and in which small to medium-scale farmers could buy participatory shares.

Strategy 5 Ensuring aquaculture activities are environmentally responsible and sustainable

Recognising that the country does not currently face major environmental threats from commercial aquaculture it is incumbent upon the DoF to ensure that the sector grows in a responsible and sustainable manner. Probably, the most urgent threat to the biodiversity of the lake is the translocation of exotic species such as *O.niloticus*, and others, from neighbouring countries into the catchment. Although common carp was introduced by the FAO to Malawi in 1976, *O. niloticus* has not yet been introduced. In 1983, the DoF developed guidelines for carp farming in Malawi. Though the current policy prohibits carp aquaculture, it is being farmed in the lower Shire and Zomba area. The current policy on carp was based on the outputs of a workshop held in 1991 and accepted on the basis of a majority vote. This process did not follow any recognised procedures or protocols and is

flawed and requires revision upon which a more informed decision can be taken on the use of exotics and legislated accordingly. Pressure to introduce exotic species for aquaculture, particularly *C. carpio* and *O. niloticus* is mounting. Hence, there is a need for a revision of the policy on exotic species with due respect to the conservation of biodiversity and international agreements to which Malawi is a signatory and to align policy with opportunities and needs, where appropriate and legislate.

Output 5.1 Fisheries Policy and Act with respect to environmental threats revised and amended.

The current fisheries policy and act are ambiguous and unclear on species introductions. To ensure responsible environmental management there is a need to review and amend the policy and the act. It is essential that the decision on exotic species and other environmental threats be informed by the best scientific expertise and available information. The assessment should be undertaken by an experienced panel of experts according to the most appropriate protocol/s and led by a respected international expert on fish introductions and translocations. The Director of Fisheries should be guided by the panel of experts to revise the policy and the Fisheries Act accordingly. Among other aspects, the assessment will require knowledge of the current distribution of *C. carpio* and *O. niloticus* in Mozambique, Tanzania and Zambia, with particular emphasis on the Lake Malawi catchments and appropriate multi-lateral action where necessary. It is anticipated that this would require at least two meetings of fisheries experts from the four countries.

Benchmark 2005 Policy and Act are unclear with regard to species introductions in Malawi.

Target Based on a comprehensive study on exotic species and their introduction, the Fisheries Policy will be revised and the Act amended by 2009.

Action

1. Conduct comprehensive risk assessment with respect to conservation of biodiversity and international agreements and align with opportunities and needs, where appropriate and legislate.
2. Host conferences on contemporary issues concerning risk management and introductions of exotic fish species in collaboration with the Governments of Tanzania, Mozambique and Zambia.
3. Revise Fisheries Policy and amend Act with respect to exotic species.

Output 5.2 Early warning system to monitor potential threats caused by aquaculture to biodiversity and environment established.

Negative impacts of aquaculture activities should be avoided. Much can be done to avoid negative environmental impacts on aquatic environments in Malawi by aquaculture if adequate information on potential threats is available at an early stage. An early warning system should be set up to monitor urgent threats to biodiversity and disseminate this information widely to national and international authorities so that appropriate actions are swiftly mobilized.

The early warning mechanism should monitor:

- Introduction of exotic species and genetically modified fish, especially *O. niloticus*.
- Translocation of *O. mossambicus* and *C. carpio* into the Lake Malawi catchment.
- Water quality around fish cages in the lake.
- Use of hormones.
- Fish diseases and parasites.

Community fisheries organisations, NGOs and scientists working in the field are the best source of information. The challenge is to make this information widely available to DoF and other authorities,

so that appropriate actions are swiftly taken. Emphasis on advocacy for these groups is required to raise awareness of the environmental threat of aquaculture. For this purpose, country studies on alien and invasive fish species can also provide valuable baseline information for monitoring long-term trends.

Benchmark 2005 There is no effective early warning or monitoring system for possible negative environmental impacts of aquaculture.

Target An effective early warning system to monitor possible negative impacts of aquaculture to be established by 2010.

Action

1. Conduct advocacy programme for fish farmers and fishers on the potential negative impacts of aquaculture and mitigation measures through various types of aquaculture training programmes and seminars.
2. Develop guidelines and educational material that warn against introduction of exotic fish into the Lake catchment.
3. Develop a monitoring system that can also be used by capture fisheries law enforcement officers.

Output 5.3 Knowledge of the link between aquaculture practices and environmental issues increased

Over the decades, Malawi has experienced increasing pressure on soil, water and forest resources. Escalation of deforestation and a decrease in water resources are direct threats to sustainable aquaculture. In the short-term, the DoF needs to increase information on the impacts emerging from environmental degradation on aquaculture practices.

Benchmark 2005 Information on environmental degradation is limited within the sector and no systematic study is available for aquaculture practitioners.

Target Research and communication on the impact of environmental degradation on aquaculture will be shared amongst stakeholders by 2010.

Action

1. Conduct research and case studies on deforestation and water resources and how this impacts on aquaculture potential.
2. Disseminate research findings so that a common understanding of the impact of environmental degradation on aquaculture is developed amongst stakeholders.

Strategy 6 Establishing links and information flows between producers and fish traders to enhance access to markets

If a producer wishes to sell a certain quantity of product in the urban markets, an efficient means of transportation and marketing should be developed. Most traders currently do not have any information about aquaculture and farmed fish. The DoF should work with producers, fish traders and buyers to strengthen linkages between them, which will lead to scheduled harvests, and shipping of product to urban markets through appropriate contractual arrangements. The DoF will educate and inform traders on fish availability, fish farming practices and regulations through the mass media and various types of purpose designed workshops.

Output 6.1 Shared information between fish producers and fish traders

To create incentives for fish traders to handle farmed fish, dissemination of information about the product is required.

Benchmark 2005	No fish traders handle farmed fish.
Target	Through the dissemination of information fish traders will become involved in handling farmed fish.
Action	<ol style="list-style-type: none">1. Organise a workshop for fish traders and share information on fish farming and cultured fish.2. Work with the Ministry of Agriculture, Irrigation and Food Security, Ministry of Trade and other partners to organise a demonstration event showcasing aquaculture products in the larger cities.

Strategic theme 3

Competent Local Government, NGOs and Producer's Organizations

Current Status

Needs-based service delivery requires decentralised functions, and should adopt a bottom-up and participatory approach to ensure stakeholder involvement. Local government, NGOs and producer organizations have an important role to play in this approach. DoF services, especially extension, are important contributors to this emerging decentralisation process. In December 1998, the Malawi Parliament approved the National Decentralization Plan (NDP) to devolve various functions of the national government to the local District Assemblies (DAs). Although this process has been delayed, the DoF intends to complete the devolvement of extension responsibilities to the District offices by the end of 2005.

Constraints to the implementation of devolution of aquaculture services include: (i) lack of awareness on aquaculture practice among policy-makers and planners at District/village level, (ii) inadequate institutional and technical capacity, (iii) lack of information, (iv) inappropriate legislative framework, and (v) inadequate District funding.

NGOs currently provide important aquaculture extension services in various parts of Malawi. There has been a significant increase in the number of new ponds since the early 1990s. The most dramatic increase occurred from 1999 to the present, and this is largely a consequence of NGO activities. For example, in Thyolo District, the number of ponds has increased to more than 1,000 from only 44 in the 1990s. This is largely due to the active involvement of OXFAM in aquaculture promotion. OXFAM financially supports and collaborates with the District Assembly and involves them in their rural development programmes. In line with their activities, District fisheries officers and extension staff are encouraged to promote aquaculture. On the other hand, World Vision Malawi is supporting about 300 fish farmers utilising its own extension officers to promote aquaculture in the Chingale area, Zomba District with occasional support from DoF extension staff. These joint and collaborative initiatives are extremely important for the development of the sector. However, there is clear evidence that the capacity of the NGO and DoF extension staff needs to be improved to develop small-holder aquaculture, particularly with respect to site selection, pond design and management, food and feeding and poor technical follow-up for new fish farmers.

The lack of an officially recognised producer organisation has made the dissemination of information a very difficult task. The Innovative Fish Farmers Network Trust (IFFNT) was established in 2004 as one of the ADiM Pilot Projects to contribute to the organisation and empowerment of fish farmers. This pilot project verified that fish farmer organisations are: (i) an effective way of sharing relevant information on best practices, (ii) effective as a lobbying mechanism that reflects customer needs, and (iii) can build partnerships between NGOs, research institutions and individuals to address common goals. However, the financial sustainability of the IFFNT is still in question. Uncertainty still exists as to the ideal organisational structure needed to allow fish farmer organisations to be most effective in the long term. A better understanding is required of the actual impact of such organisations and the types of organisations that are likely to have the greatest beneficial impact, if these structures are to be supported through DoF interventions.

Outcome

Quality aquaculture services become available at grass-roots level.

By the year 2015

- + Regional and national farmer organisations will have strengthened their capacity to manage aquaculture activities effectively.
- + All Districts will be able to provide quality aquaculture services through networks linking the DoF and NGOs.
- + There will be evidence of an increased number of extension officers who can advise on aquaculture, through the inclusion of fish farming extension into the job descriptions of all extension staff working in the natural resources sector at District level.

Achievement of the Strategic Objectives

To achieve this, the DoF will adopt the following three strategies:

- Strategy 7 Sensitising and building capacity of local government on their primary responsibilities in aquaculture development
- Strategy 8 Developing alliances between DoF and NGOs to promote unified approaches in aquaculture extension
- Strategy 9 Fostering fish producer organizations that assist farmers to increase production, access to finance, markets and other services

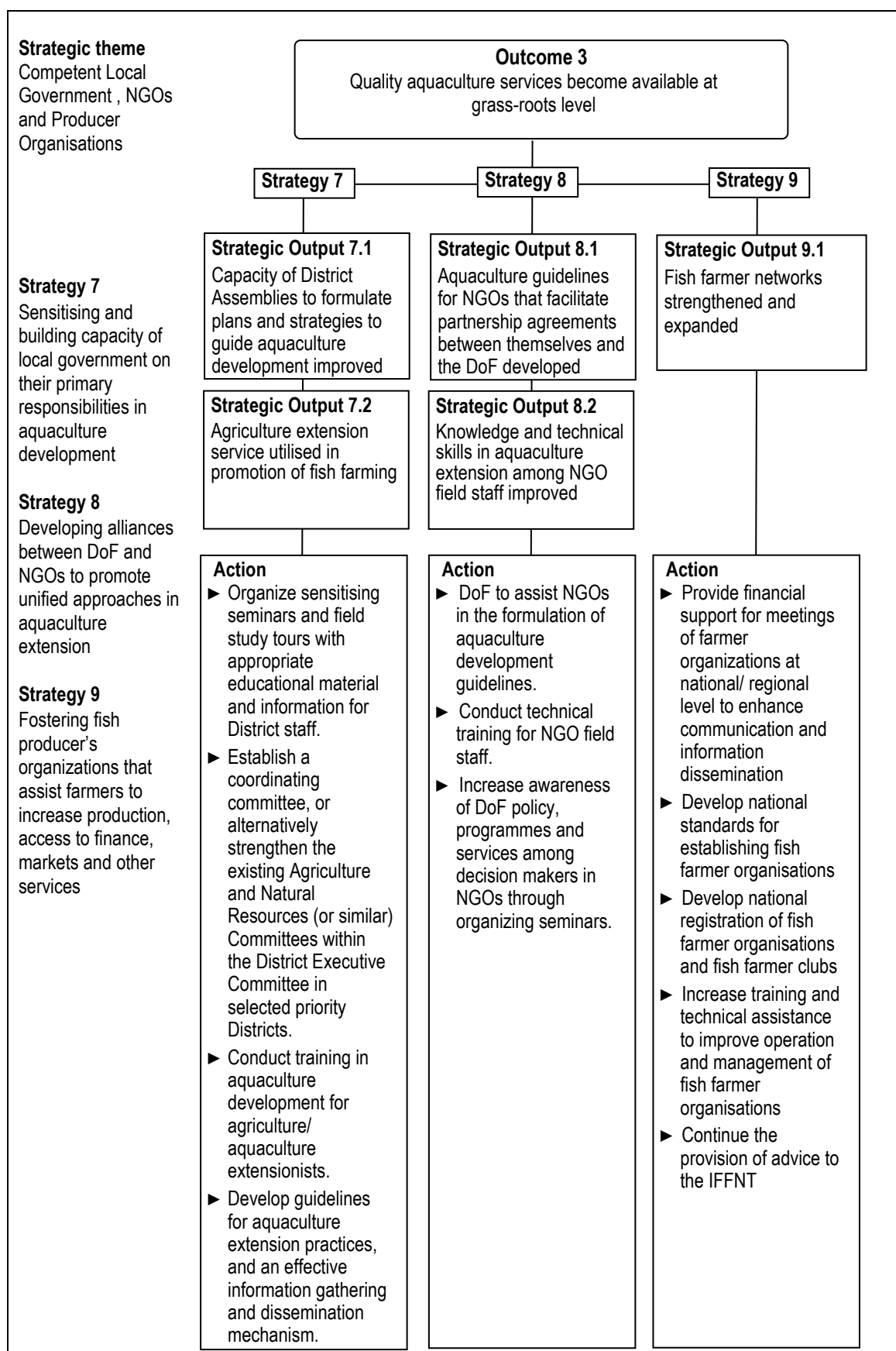


Figure 2.7 Strategic theme 3: strategies and outputs

Strategy 7 *Sensitising and building capacity of local government on their primary responsibilities in aquaculture development*

This strategy addresses institutional strengthening of DAs so that Districts can carry out effective aquaculture extension and development. In other words, the strategy supports decentralisation in decision-making and formulation of extension programme in aquaculture development. Currently, insufficient knowledge and understanding of aquaculture among the policy-makers and planners at District level are severe constraints to achieving this strategic objective.

Output 7.1 Capacity of District Assemblies to formulate plans and strategies to guide aquaculture development improved

In the early stages, devolving part of the DoFs functions to the District level will require focus on raising awareness of aquaculture and strengthening the links between the DoF and DA Office. Capacity in aquaculture technology and extension will need to be enhanced and extended to the agriculture and livestock extension sections in the DA. This is a new and exploratory approach for the DoF and therefore, the process will need to be monitored and evaluated carefully.

Benchmark 2005 There are only two Districts that include aquaculture programmes in their current DDPs 2001-05.

Target Aquaculture component will be incorporated in the DDPs in the three Districts where model pilot projects are implemented by 2010. Subsequently, at least ten Districts will incorporate an aquaculture program in their DDPs by 2015.

Action

1. Redefine responsibilities of DA in aquaculture development with emphasis on stakeholder participation.
2. Organize sensitising seminars and field study tours with appropriate educational material (such as video programmes), and information (e.g. District Aquaculture Profile) for District staff. Target audiences include: District Commissioner (DC), District councillors, District Executive Committee (DEC), Village Development Committee (VDC) and relevant community services and social welfare sections of the DA.
3. Establish a coordinating committee, or alternatively strengthen the existing Agriculture and Natural Resources (or similar) Committees within the DEC in selected priority Districts.
4. Develop guidelines for aquaculture extension practices, and an effective information gathering and dissemination mechanism that facilitates information sharing between the DoF and the DA office.

Output 7.2 Existing agriculture extension services utilised in promotion of fish farming

Benchmark 2005 There are very limited Districts (e.g. Tyolo District with support from Oxfam) that agriculture extension staff are encouraged to include fish farming when they provide extension services.

Target Agriculture extension services to be utilised for further extension on aquaculture as well as integrated livelihood approach through enlightening agriculture extension staff with knowledge on aquaculture.

Action

1. Conduct training in aquaculture development for agriculture extension officers as well as aquaculture staff based on redefined roles of the DA in the sector.
2. Assign and train advisors to the agriculture extension staff.

Strategy 8 *Developing alliances between DoF and NGOs to promote unified approaches in aquaculture extension*

Aquaculture development has occurred in many areas as a result of interventions by NGOs. These organisations often deal with situations at grass roots level where government services cannot effectively reach. NGOs are also generally committed to fostering community organization and empowerment that is an essential requirement for an integrated livelihoods approach that includes aquaculture. On the other hand, NGOs tend to be less able to deliver technical services than the DoF. The DoF can benefit from collaboration with NGOs, especially with regards to their broader-based and more people-orientated competence. Presently, five international NGOs are involved in aquaculture development. However, systematic coordination between the DoF and NGOs, or among NGOs themselves, is lacking. In addition, no specific training programmes on the technological aspects of aquaculture exist for NGOs.

Output 8.1 Aquaculture guidelines for NGOs which facilitate partnership agreements with the DoF developed

Benchmark 2005 There are 8 NGO programmes that have included aquaculture in their approach.

Target Alliances between the DoF and NGOs involved in aquaculture will be established by 2008.

Action 1. The DoF needs to assist the NGOs in the formulation of aquaculture development guideline.

Output 8.2 Knowledge and technical skills in aquaculture extension among NGO field staff improved

Benchmark 2005 In the past 3 years, there has been no training programme for NGO staff in aquaculture.

Target All NGO field staff in at least the 3 priority Districts will participate in a basic aquaculture training course.

Action 1. Conduct technical training for NGO field staff.
2. Increase awareness of the DoF policy, programmes and services among the decision makers of NGOs through seminars.

Strategy 9 *Fostering fish producer's organizations that assist farmers to increase production, access to finance, markets and other services*

Output 9.1 Fish farmer networks strengthened and expanded

The DoF will continue to work with the Innovative Fish Farmers Network Trust (IFFNT) to strengthen their potential functions. The DoF needs to assist the IFFNT (through the provision of grants and technical assistance) to move toward financial independence and to improve and expand their information-sharing capabilities at district and national level. The DoF also needs to support unregistered community-level fish farmer organisations, such as farmers club. This would include registration of these organisations, undertaking research to identify key constraints and opportunities

associated with their activities, and management and technical assistance.

Benchmark 2005 IFFNT exists as an officially registered fish farmers organisation.

Target IFFNT to be financially independent by 2012. Farmer organisations to be established in the three aquaculture priority Districts by 2009.

Action

1. Provide financial support for meetings of farmer organizations at national/regional level to enhance communication and information dissemination among farmers.
2. Develop national standards for establishing fish farmers organisations.
3. Develop national register of fish farmer organisations and fish farmers clubs.
4. Increase training and technical assistance to improve operation and management of fish farmer organisations.
5. Continue the provision of advice to the IFFNT.

Strategic theme 4

Smart and Practical DoF

“Effective national institutional arrangement and capacity, policy, planning and regulatory framework in aquaculture are essential to support aquaculture development”

- Aquaculture Development beyond 2000. Bangkok Declaration -

Current Status

For the DoF to provide the best possible service to its customers (described previously under Strategic Themes 1-3) depends on the strong institutional capacity of the Department. The NASP cannot be successful without a practical, smart and efficient DoF. Challenges to be addressed in order to revitalise the DoF include:

Insufficient development budget within the DoF is a fundamental constraint to aquaculture promotion. Lack of resources such as vehicles and fuel to visit farmers has contributed to low staff motivation and a general poor quality of service offered to farmers. Donor assistance has been needed to fill the shortfall in development funding since the 1980s. The level of donor assistance in the fisheries and aquaculture sectors has declined in recent years, reflecting redirection of donor priorities and in some cases a shrinking budget for overseas development assistance. The DoF currently has 11 aquaculture stations that have to a large extent been established and operated through donor assistance in the past. Apart from the NAC, which is currently assisted by Japan, the DoF does not have the funds to resource the other stations effectively and this has de-motivated the staff. This constrains effective aquaculture extension to small-scale and aspirant commercial fish farmers. Moreover, because of the lack of operating expenses, equipment and ponds are deteriorating rapidly and the stations cannot carry out their mandate. Although financial autonomy of the DoF stations through generation of their own revenue from sales of fingerlings and other services may be possible, a system of revenue retention is generally not feasible under current government policy.

Increasing efficiency and flexibility in the DoF is critical. This will be attained through decentralising its services, contracting out services and sharing the cost of services with the private sector. During the course of this study, an important step towards involving the private sector in DoF operations has been the partial-privatisation of the Kasinthula station in 2004. The impact of this initiative is not yet fully apparent. However, it is probable that the initiative will add value through income from facility rental, employment of DoF staff by private farmers, the privately funded rehabilitation of the facility, and the generation of useful information on the economics of extensive aquaculture. Partnerships, such as this, will have a major effect on the sustainability of DoF stations in the future. It is also apparent in other countries that food fish and fingerling production is increasingly becoming the domain of the private sector, as a consequence of down-sizing within government. Privatization of government stations (refer to Part 1 of the NASP) is still a new concept to the DoF and more information on the processes followed in other countries, as well as guidelines for decision-making and implementation, are urgently required.

Lack of reliable statistical information and an inadequate information gathering system is a serious constraint to monitoring and evaluation of the aquaculture sector. Without reliable information on production, yield and number of fish farmers, it is difficult to formulate realistic development plans for aquaculture in the country. This problem is exacerbated by the widely scattered distribution of fish farmers in rural areas, which makes data collection a difficult task with limited resources available for mobilisation. Furthermore, inadequate information flow between researchers and information users (policy-makers, extension staff, private farmers, NGOs, etc.) limit the usefulness of information that is generated.

Outcome

High performing DoF and staff.

By the year 2015

- + There will be evidence of an increase in aquaculture development funding
- + Sustainability of services supporting aquaculture will increase due to improved capacity for planning, management, and coordination among stakeholders
- + Quality information (such as reliable aquaculture statistics) and adequate access to this information will improve the quality of DoF services

Achieving the Strategic Objectives

To achieve this, DoF will adopt the following three strategies:

Strategy 10 Building healthy DoF financial resources

Strategy 11 Realising efficient DoF operation

Strategy 12 Promoting quality DoF staff and information

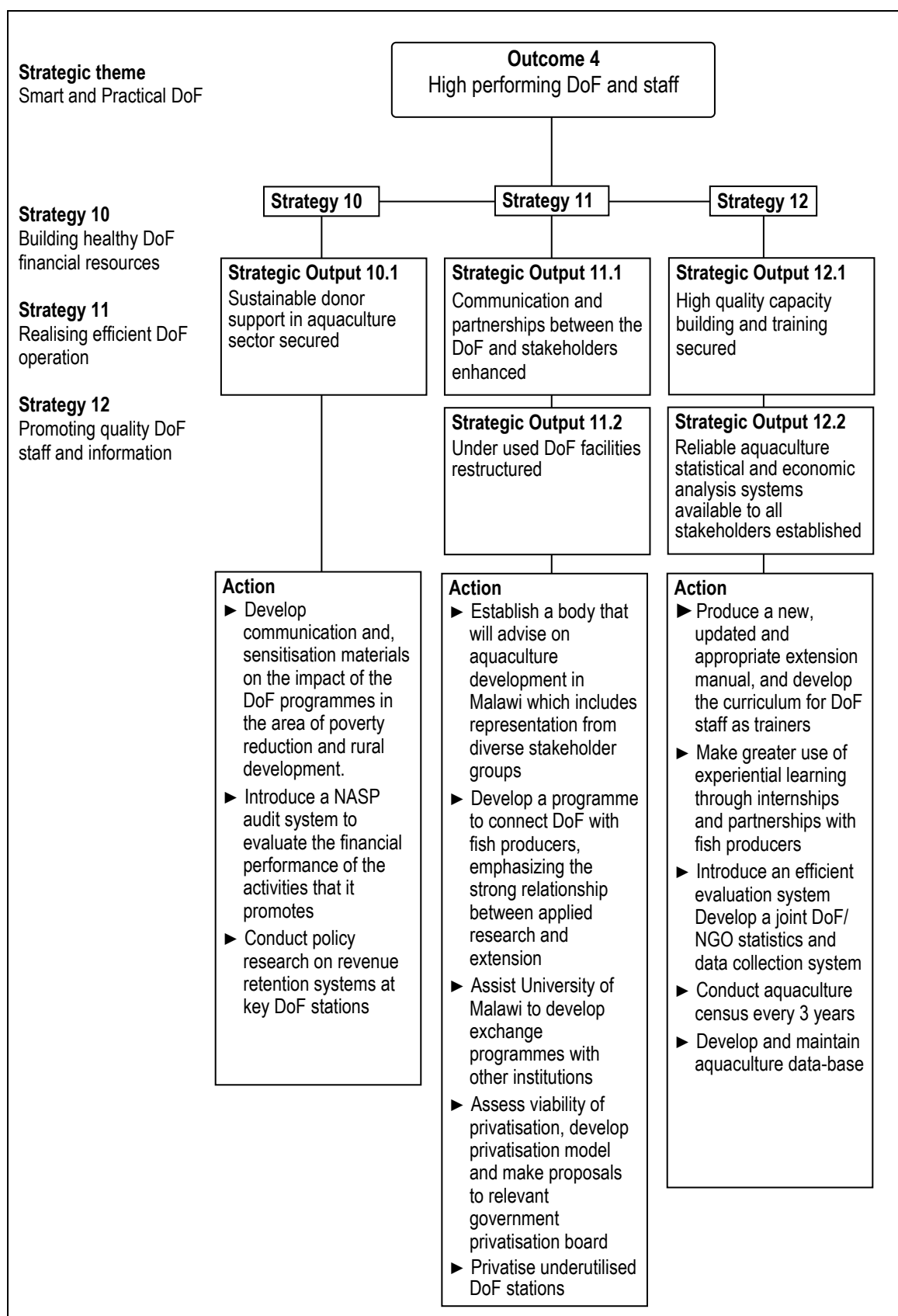


Figure 2.8 Strategic theme 4: strategies and outputs

Strategy 10 Building healthy DoF financial resources

The current macro-economic situation in Malawi is not conducive to increasing the DoF budget in the short term and cannot be considered as a realistic option in terms of the NASP. Therefore, increasing external financial contributions, economising on current expenditure, and introducing revenue retention systems are considered as key strategies for the DoF in order to implement the NASP. However, it is recognised that these options are often outside of the control of the DoF and are regulated by government policy. The necessary changes in policy need to be addressed through a comprehensive advocacy and dialogue process with relevant authorities.

Output 10.1 Sustainable donor support for the aquaculture sector secured

It is inevitable that the DoF will depend on donor agencies for development funding for the next 10 years. Strategic sensitisation of high-level officers in government and donor agencies on how aquaculture can fit into the PRSP and Country Assistance Strategies is pivotal.

Benchmark 2005 Only JICA has committed assistance for aquaculture-focused support.

Target At least partial support provided to aquaculture development from several donors by 2007.

- Action**
1. Develop sensitisation materials on the impact of the DoF programmes in the area of poverty reduction and rural development. These should include publications, national media campaigns and web-based information.
 2. Introduce a NASP audit system to evaluate the financial performance of the activities that it promotes
 3. Conduct policy research on revenue retention systems at key DoF stations.

Strategy 11 Realising efficient DoF operation

Efficiency of the DoF aquaculture services will be improved by focusing on better communication among stakeholders, and organisational reform strategies. In addition, the NASP has identified priority areas (Zomba, Thyolo, Chitipa, and parts of the lake shore) for aquaculture extension to further concentrate the limited resources.

Output 11.1 Communication and partnerships between the DoF and stakeholders enhanced

The DoF is required to interact with a diverse set of stakeholders. Strong, open relationships with stakeholders can improve the effectiveness of DoF programmes. The DoF must strengthen its communication and connection with stakeholders to more effectively address important issues and to help in building public support for the DoF mission. The DoF will also focus on strengthened strategic partnerships with international and regional institutions to support their aquaculture development efforts.

Benchmark 2005 Limited interaction among DoF and stakeholders in aquaculture

Target Scheduled periodic meetings with key stakeholders in aquaculture sector to be established by 2006.

- Action**
1. Establish a body that will advise on aquaculture development in Malawi which includes representation from diverse stakeholder groups.
 2. Develop a programme to connect DoF with fish producers, emphasizing the strong relationship between applied research and extension, and how this can be

used to address practical problems of aquaculture in Malawi.

3. Assist University of Malawi to develop exchange programmes with institutions from countries where aquaculture is advanced.

Output 11.2 Under-utilised DoF facilities restructured

The eleven government demonstration stations (excluding the NAC) are unable to fulfil their mandates as a consequence of financial and capacity constraints. Consideration should be given to their partial or complete privatisation. Hence there is a need to undertake a complete evaluation of all stations (inclusive of the land) and to develop a business plan for each station to assess the level of privatisation that is possible. The mechanism of privatisation, through outright purchase or leasing, will be determined by the policy on state assets. The idea also provides opportunity for the Department to retrench supernumerary staff in a manner where incentives to these staff are provided, while at the same time retaining their services.

For example, the smaller stations, inclusive of the accompanying agricultural land, could be leased to officers to operate for their own account. The cost of the lease could be redeemed by the officer in exchange for continuing to provide extension services and fingerlings to small-scale farmers in the area and operating the station as a farmer school, thus furthering the development of aquaculture. Clearly, controls have to be put in place but the cost of such controls would be significantly lower than the salaries of station officers and their support staff. To make the process fair, aspirant retrenchees should be offered an opportunity to submit a proposal, a business plan and a plan for continuing extension services provision. Offers should be made to specific officers on the strength of their applications. Successful applicants should then be offered the farm (ponds and land) on a trial basis before signing a longer term lease agreement.

Commercially orientated business plans need to be developed for the larger stations (Mzuzu, Nchena-chena, the remainder of Kasinthula and part of the NAC). If the models are commercially viable then the business plans should be published and the farms put out to tender on a lease basis. This provides opportunity for the farms to contribute towards fish production and creation of wealth, the promotion of commercial scale aquaculture on a regional basis, and to ease the budgetary constraints of the DoF.

Benchmark 2005 Majority of the Government stations are under-utilised.

Target Through privatisation and retrenchment, all stations should be operational by 2013.

- Action
1. Assess viability of privatisation, develop final privatisation models and make proposals to relevant government privatisation board.
 2. Privatisation under-utilised DoF stations through workshops with interested and affected parties and a tendering process.

Strategy 12 Promoting quality DoF staff and information

The capacity of DoF staff to carry out their duties effectively depends on their motivation. The development of an appropriate evaluation system, good training, and access to quality information can contribute to higher motivation levels among staff towards their work.

Output 12.1 High quality capacity building training secured

Regular refresher courses aligning concepts of the NASP for DoF staff needs to be established. The curriculum development at the Malawi College of Fisheries at Mpwepe will further enhance the quality of the training courses. Useful materials (e.g. manuals) need to be developed and utilised

during these courses. At the same time, an effective evaluation system will be introduced and its impact monitored through the performance and outputs of staff.

Benchmark 2005	Poor motivation among DoF staff
Target	An evaluation system will be in place by 2007 and performance of staff will be monitored. All staff of the DoF from TA level and above will undergo the alignment training at least once by 2012.
Action	<ol style="list-style-type: none">1. Produce a new manual, including basic guidance on current fish farming extension and technologies.2. Revise the curriculum at Malawi College of Fisheries in accordance with the NASP components.3. Develop the new curriculum at Bunda College and provide training for trainers in accordance with the NASP components.4. Make greater use of experiential learning through internships and partnerships with fish producers.5. A proper evaluation system will be introduced.

Output 12.2 Reliable aquaculture statistical and economic analysis system for DoF staff and other stakeholders developed.

Under a best-bet scenario, it is recognised that extensive quantitative and qualitative assessments are necessary to fully monitor the development of the aquaculture sector. However, limited financial and human resources means that assessments are limited to key data necessary for monitoring. Because NGOs play an important role in promoting aquaculture in rural areas that are often inaccessible to the DoF, the Department should work collaboratively with NGOs to reach these farmers. The DoF will take initiatives to develop a new information network through including NGOs in a joint statistical data collection system, and conduct the necessary advocacy and training required by NGOs. The ADiM study team has already identified indicators of change among fish farmers over time, which could form the basis for designing the follow-up monitoring system.

Benchmark 2005	There is no reliable statistical and economic aquaculture analysis system
Target	Statistical and economic analysis systems to be established and the first aquaculture census to be implemented by 2009.
Action	<ol style="list-style-type: none">1. Develop DoF/NGO joint statistic and data collection system.2. Conduct aquaculture census every 3 years.3. Develop and maintain aquaculture data-base.

PART 3 ACTION PLAN AND IMPLEMENTATION

CHAPTER I ACTION PLAN

1. Action Plan

The NASP details the outputs of the 12 strategies, required actions, and by whom and when these should be carried out, as well as indicators to evaluate each output. The Action Plan will provide the basis for the DoF to develop annual work plans for implementation of the NASP.

For the swift and integrated implementation of the strategies, **two complementary projects are proposed**. The complementary projects aim at an integrated approach, and as such incorporate a range of the strategies and actions required to achieve the expected outputs of the NASP. This “packaged” approach is applicable because of the complex framework within which the aquaculture sector will develop in Malawi. These projects reflect aspects of the Action Plan outlined above and encompass some of those actions that will be implemented in the short-term, concentrating resources on priority areas for best effect. Two complementary projects, “District Aquaculture Livelihoods Project” and “Chambo Research Programme” are explained in detail in Annex 3.

Strategic Theme 1 Integration of Aquaculture into Rural Livelihoods

Outcome 1: Improved livelihoods among rural small-holder fish farmers

Output	Action	Indicators for Output	By whom	By when
<i>Strategy 1: Providing the opportunity for all stakeholders to develop their capacity to enhance the integrated livelihoods approach, which includes aquaculture</i>				
Output 1.1: Projects that adopt the integrated livelihoods approach that includes aquaculture, and an institutional model that supports this process	Promote adoption of cross-sectoral, integrated livelihood initiatives into the Government fisheries and aquaculture policy.	-Inclusion of an emphasis on integrated livelihood approaches in the policy	DoF DA, NGOs, WorldFish Center	2006
	Implement District model projects in priority areas.	-Development of a pilot project model plan -Implementation of the model in three priority Districts -Number of capacity building WSs implemented in target area		2006-2010 will then be ried in other areas)
	Provide aquaculture extension for socially disadvantaged farmers to have the opportunity to participate in fish farming practices as part of a rural safety net.	-Number of personnel from different Ministries who participated in the WSs -Increase in the number of fish farmers in the target Districts -Number of farmers adopting integrated livelihood approaches that include aquaculture		Late 2006-2010
Output 1.2: Broader understanding of the context between aquaculture and the socio-economic, institutional and political status of poor farmers	Develop and implement interdisciplinary research programmes that produce a comprehensive and integrated base of information on the integration of aquaculture into the overall livelihood systems. This information should be used by DoF policy-makers.	-Inclusion of an interdisciplinary research approach in the policy -Developed interdisciplinary research programmes -Number of courses or programmes implemented	DoF Univ. of Malawi, International research institutes	2006-2008
	Facilitate institutional linkages and networks in research aimed at poverty reduction through the inclusion of aquaculture.	-Number of papers and reports produced		2007-
Output 1.3: Increased capacity of DoF, local government and NGO staff to utilise tools and methods necessary to support the integrated livelihoods approach	Develop and conduct short training courses on multi-sectoral integrated livelihoods approach.	-Methods for integrated livelihood approaches developed	DoF, Bunda College, NGOs, WorldFish Center	Early 2007-
	Develop an interdisciplinary BSc and MSc programmes at Bunda College in rural development with a focus on the integrated livelihoods approach and methods for evaluation.	-Number of short training course conducted -Number of trainees attending the short courses -Number of trainees who utilise the methods learned in practice		Early 2007-
	Assess and evaluate developed courses and programmes to determine their feasibility on an ongoing basis.			2009

Strategic Theme 2 Enhanced Economic Opportunities for Commercial Fish Farmers

Outcome 2: Fish producers that are financially independent through income generated by aquaculture

Output	Action	Indicators for Output	By whom	By when
<i>Strategy 2: Enhancing institutional capacity of NAC to develop medium to large-scale commercial fish farming technologies</i>				
Output 2.1: Enabling environment and framework for commercially orientated aquaculture research at NAC established	Establish a new NAC structure with staff redeployment and new job descriptions.	-Changed policy	DoF, Univ. of Malawi (collaboration with international research institutions)	2006-
	Rehabilitate basic facilities at NAC.	-New established structure at NAC		2006-
	Develop research action plans and protocols to create knowledge and develop technologies to increase aquaculture production .	-Research plans and protocols developed		2006-
	Establish a database of farmers who have the necessary resources to make changes from subsistence to commercial fish farming.	-Research papers published in reputable regional and international journals		2006-
	Enhance participatory research.	-Network established		2006-
	In collaboration with appropriate external consultants, assist the University of Malawi in identifying and evaluating the economic potential of emerging scientific discoveries and technologies.	-Agreement made between University of Malawi and other universities		2006-
	Working in collaboration with international research institutions, strengthen fundamental research on new concepts in business, marketing, profit-orientated technologies.	-Number of workshops/ meetings held for exchanging information		2006- 2007- 2007-
Output 2.2: Scientific capacity in commercially orientated aquaculture enhanced	Develop systematic training programme with a list of potential trainees	-Systematic training programme in commercial aquaculture	DoF, Bunda College	2006
	Provide advanced technology training opportunities at appropriate international research institutions or in collaboration with international researchers.	-Number and kinds of training courses provided		2007-2008
	Establish research and teaching agreements between University of Malawi and other international academic institutions in basic research and high-level education.	-Number of trainees		2006
	Support participation of researchers at international and regional aquaculture conferences.	-Network or an agreement established between DoF and Universities		2008-

Output	Action	Indicators for Output	By whom	By when
Strategy 3: Providing an appropriate credit, business training and technology package for small to medium-scale commercial fish farmers				
Output 3.1: Aquaculture credit scheme for small commercial fish farmers introduced	Create financial goalposts for farmers to “graduate” from current situation to small to medium-scale commercial level.	-Number of sensitisation workshops on fish farming organised by DoF for financial institutions	DoF, Partner organisation, NGOs, Commercial Bank	2007-
	Formulate special credit schemes for small and medium-scale commercial fish farmers in collaboration with existing credit schemes.	-Financial goalposts for farmers created -Number of farmers successfully accessing financial support		Early 2008-
	Conduct economic study of fish farming and its marketing.			Early 2008-
Output 3.2: Business planning and management capacity of small and medium-scale fish farmers improved	Conduct business training and seminars to potential small to medium-scale farmers with provision of technology package.	-Formation of technology package based on needs assessment	DoF, Partner organisation, private sector	2007-
	Conduct consultative activities for entrepreneurial fish farmers to improve their business skills. IFFNT and successful farmer clubs will be consulted to develop scenarios (business cases) with DoF.	-Number of training sessions on awareness building with respect to commercial aquaculture/ -Number of trainees participating in training programmes		
	Conduct participatory research enabling business models in collaboration with IFFNT	-Impact of trainees’ on their peers -Changes in trainees’ aquaculture practices		2007-
Strategy 4: Creating a regionally competitive and investor friendly environment through sound policy, clear procedure and legal framework				
Output 4.1: One-stop-shop for all aquaculture business application procedures established	In collaboration with Department of Environment, Ministry of Land, Ministry of Local Government, develop comprehensive and simple guidelines for business licensing of commercial aquaculture ventures.	-One-stop-shop to be established at DoF for initiating commercial aquaculture -Number of investors utilising the system -Dissemination of information to attract investors	DoF, Dept. of Environment, Min. of Land, Min. of Local Government, Min. of Trade	2007 (to be completed)
Output 4.2: Competitive investment environment for commercial aquaculture established	Conduct research on the aquaculture investment environment that establishes a basis for the introduction of efficient and appropriate incentives and subsidies, including tax exemption for aquaculture operations and materials.	-Research material prepared -Dissemination of information to attract entrepreneurs -The basic infrastructure for commercial investment established	DoF Malawi Investment Promotion Agency, Min. of Commerce, DA	2007-
	Support communication among entrepreneurs to share information and procedures by organizing regional conferences.	-Number of investors utilising the system		2008-
	Conduct a feasibility study on establishing “collective aquaculture zone/s”, such that basic infrastructure is established through a joint venture between the public and private sector and in which small to medium-scale farmers could buy participatory shares.			2008-2009

Output	Action	Indicators for Output	By whom	By when
Strategy 5: Ensuring aquaculture activities are environmentally responsible and sustainable				
Output 5.1: Fisheries Policy and Act with respect to environmental threats revised and amended	Conduct comprehensive risk assessment with respect to conservation of biodiversity and international agreements and align with opportunities and needs, where appropriate and legislate.	-Report on comprehensive risk assessment -Conference on risk management -Policy revised	DoF, DoF from neighbouring countries	2008-
	Host conferences on contemporary issues concerning risk management and introductions of exotic fish species in collaboration with the Governments of Tanzania, Mozambique and Zambia.	-Act amended		2009
	Revise Fisheries Policy and amend Act with respect to exotic species.			2009
Output 5.2: Early warning system to monitor potential threats caused by aquaculture to biodiversity and environment established	Conduct advocacy programme for fish farmers and fishers on the potential negative impacts of aquaculture and mitigation measures through various types of aquaculture training programmes and seminars.	-Number of advocacy programmes on potential negative impacts of aquaculture implemented -Number of participants in the programme -Educational materials developed	DoF, DoF from neighbouring countries, World Wildlife Fund (WWF)	2009-
	Develop guidelines and educational material that warn against introduction of exotic fish into the Lake catchment.	-Established monitoring system		2009-
	Develop a monitoring system that can also be used by capture fisheries law enforcement officers.			2009-2010
Output 5.3: Knowledge of the link between aquaculture practices and environmental issues increased	Conduct research and case studies on deforestation and water resources and how this impacts on aquaculture potential.	-Report on the results of a research -Meetings and WSs for disseminating of research findings	DoF, Department of Forestry, MAIFS, and other organisations	2010
	Disseminate research findings so that a common understanding of the impact of environmental degradation on aquaculture is developed amongst stakeholders.	-Number of participants in the meetings and WSs -Planned action for way forward		2010
Strategy 6: Establishing links and information flows between producers and fish traders to enhance access to markets				
Output 6.1: Shared information between fish producers and fish traders	Organise a workshop for fish traders and share information on fish farming and cultured fish.	-Number of WSs organised and held -Number of fish traders who participated in the WSs	DoF, fish producers and traders, Ministry of Agriculture, Irrigation and Food Security, Ministry of Trade	2009-
	Work with the Ministry of Agriculture, Irrigation and Food Security, Ministry of Trade and other partners to organise a demonstration event showcasing aquaculture products in the larger cities.	-Number of fish traders who show interests in selling cultured fish after the event		2010

Strategic Theme 3 Competent Local Government, NGOs and Producer's Organizations

Outcome 3: Quality aquaculture services become available at grass-roots level

Output	Action	Indicators for Output	By whom	By when
Strategy 7: Sensitising and building capacity of local government on their primary responsibilities in aquaculture development				
Output 7.1: Capacity of District Assemblies to formulate plans and strategies to guide aquaculture development enhanced	Redefine responsibilities of DA in aquaculture development with emphasis on stakeholder participation.	-Number of sensitizing seminars and field study tours -Material established	DoF, DA, VDC	2006-
	Organize sensitising seminars and field study tours with appropriate educational material (such as video programmes), and information (e.g. District Aquaculture Profile) for District staff. Target audiences include: District Commissioner (DC), District councillors, District Executive Committee (DEC), Village Development Committee (VDC) and relevant community services and social welfare sections of the DA.	-Number of materials distributed -Number of participants in seminars and study tours -Coordinating committee established -Number of training workshops on basic aquaculture implemented -Number of people trained at the training workshops -Guidelines developed		
	Establish a coordinating committee, or alternatively strengthen the existing Agriculture and Natural Resources (or similar) Committees within the DEC in selected priority Districts.	-Information system developed -Number of districts with an aquaculture component in their DDP		
Output 7.2: Existing agriculture extension services utilised in promotion of fish farming	Conduct training in aquaculture development for agriculture extension officers as well as aquaculture staff based on redefined roles of the DA in the sector.	-Training course developed - Material established and number of materials distributed	DoF, DA, VDC	2007-
	Assign and train advisors to the agriculture extension staff.	-Number of trainings for advisors and number of advisors registered to DA as advisors -Number of farmers advisor cover for further training		
Strategy 8: Developing alliances between DoF and NGOs to promote unified approaches in aquaculture extension				
Output 8.1: Aquaculture guidelines for NGOs which facilitate partnership agreements	The DoF needs to assist the NGOs in the formulation of aquaculture development guidelines.	-Aquaculture development guidelines developed -Meetings conducted between DoF and NGOs	DoF, NGO, WorldFish Center	2008

Output	Action	Indicators for Output	By whom	By when
with the DoF developed				
Output 8.2: Knowledge and technical skills in aquaculture extension among NGO field staff improved	Conduct technical training for NGO field staff.	-Number of training courses implemented -Number of NGO field staff who have participated in the training -Number of key personnel in NGOs sensitised	DoF, NGO, WorldFish Center	2008-
	Increase awareness of DoF policy, programmes and services among the decision makers of NGOs through seminars.			2008-
<i>Strategy 9: Fostering fish producer's organizations that assist farmers to increase production, access to finance, markets and other services</i>				
Output 9.1: Fish farmer networks strengthened and expanded	Provide financial support for meetings of farmer organizations at national/ regional level to enhance communication and information dissemination among farmers.	-Number of meeting held -National standards for establishing of fish farmers organisations developed. -Number of fish farmers' organisations and fish farmer clubs registered -Number of training and technical assistance sessions implemented	DoF, IFFNT, DA	2006-
	Develop national standards for establishing fish farmers organisations.			2006-
	Develop national register of fish farmer organisations and fish farmers clubs.			2007-
	Increase training and technical assistance to improve operation and management of fish farmer organisations.			2006-
	Continue the provision of advice to the IFFNT.			2006-

Strategic Theme 4 Smart and Practical DoF

Outcome 4: High performing DoF and staff

Output	Action	Indicators for Output	By whom	By when
<i>Strategy 10: Building healthy DoF financial resources</i>				
Output 10.1: Sustainable donor support for the aquaculture sector secured	Develop sensitisation materials on the impact of the DoF programmes in the area of poverty reduction and rural development. These should include publications, national media campaigns and web-based information.	-Materials for sensitising donors in aquaculture developed -Number of media campaigns about aquaculture conducted	DoF, Donor	2006
	Introduce a NASP audit system to evaluate the financial performance of the activities that it promotes.	-Number of meetings for sharing the concept of the NASP with donors		2007-
	Conduct policy research on revenue retention systems at key DoF stations.	-Research papers on donors' engagement in each sector - Research papers on revenue retention system		2006
<i>Strategy 11: Realising efficient DoF operation</i>				
Output 11.1: Communication and partnerships between the DoF and stakeholders enhanced	Establish a body that will advise on aquaculture development in Malawi which includes representation from diverse stakeholder groups.	-A body that will advise on aquaculture development in Malawi established -Linking programme established	DoF, Bunda College	2005
	Develop a programme to link DoF with fish producers, emphasizing the strong relationship between applied research and extension, and how this can be used to address practical problems of aquaculture in Malawi.	-Regular meetings between DoF, fish producers, and other stakeholders implemented -Number of exchange programme offered by the University		2006-
	Assist University of Malawi to develop exchange programmes with institutions from countries where aquaculture is advanced.			2007-
Output 11.2: Under-utilised DoF facilities restructured	Assess viability of privatisation, develop final privatisation models and make proposals to relevant government privatisation board.	-Privatisation model developed and recognised by the respective board -Number of workshops conducted for tendering process	DoF, Bunda College	2006-
	Privatise under-utilised DoF stations through workshops with interested and affected parties and a tendering process.	-Assessment of privatised stations carried out -Number of operational privatised stations		2007- by 2013, all stations to be operational)

Output	Action	Indicators for Output	By whom	By when
<i>Strategy 12: Promoting quality DoF staff and information</i>				
Output 12.1: High quality capacity building secured	Produce a new manual, including basic guidance on current fish farming extension and technologies.	-Materials developed. -Number of DoF staff who have completed experiential training -An evaluation system established	DoF, Bunda College	2006
	Revise the curriculum at Malawi College of Fisheries in accordance with the NASP components.			2007-
	Develop the new curriculum at Bunda College and provide training for trainers in accordance with the NASP components.		DoF	2008
	Make greater use of experiential learning through internships and partnerships with fish producers.			
	A proper evaluation system will be introduced.			
Output 12.2: Reliable aquaculture statistical and economic analysis system for DoF staff and other stakeholders instituted	Develop joint DoF/NGO statistics and data collection system.	-Data collection system established. -Census to be implemented -Data obtained -Accessibility of data	DoF, NGO	2008-2009
	Conduct aquaculture census every 3 years.			2009- onwards
	Develop and maintain aquaculture data-base.			2009-

2. Implementation Cost Estimates of the NASP

A cost estimation for each output of the NASP strategies is presented on the following page. This includes costs for both complementary projects, as well as a consultant fee for technical assistance (which is further discussed in Chapter II). These costs are calculated based on the proposed actions. The cost estimation needs to be reviewed during the planning phase of each strategy, and once a detailed action plan is developed.

Table 3.1 Cost estimates for the NASP

	Output	Cost (USD)
Strategy 1	1.1: Projects that adopt integrated livelihoods approach	548,750
	1.2: Broader understanding of the context between aquaculture and socio-economic, institutional and political status of poor farmers	
	1.3: Increased capacity of DoF, local government and NGO staff to utilise tools and methods necessary to support the integrated livelihoods approach	
Strategy 2	2.1: Enabling environment and framework for commercially orientated aquaculture research at NAC established	794,220
	2.2: Scientific capacities in commercially orientated aquaculture enhanced	
Strategy 3	3.1: Aquaculture credit scheme for small commercial fish farmers introduced	10,625
	3.2: Business planning and management capacity of small to medium-scale fish farmers improved	12,500
Strategy 4	4.1: One-stop-shop for all aquaculture business application procedures established	7,500
	4.2: Competitive investment environment for commercial aquaculture established	21,875
Strategy 5	5.1: Fisheries Policy and Act with respect to environmental threats revised and amended	14,500
	5.2: Early warning system to monitor potential threats caused by aquaculture to biodiversity and environment established	16,000
	5.3: Knowledge of the link between aquaculture practices and environmental issues increased	12,500
Str. 6	6.1: Shared information between fish producers and fish traders	8,000
Str. 7	7.1: Capacity of DA to formulate plans and strategies to guide aquaculture development enhanced	37,500
	7.2: Existing agriculture extension services utilised in promotion of fish farming	
Strategy 8	8.1: Aquaculture guidelines for NGOs which facilitate partnership agreements with the DoF developed	6,750
	8.2: Knowledge and technical skills in aquaculture extension among NGO field staff improved	23,875
Str. 9	9.1: Fish farmer networks strengthened and expanded	27,750
Str. 10	10.1: Sustainable donor support for the aquaculture sector secured	25,550
Strategy 11	11.1: Communication and partnerships between the DoF and stakeholders enhanced	179,300
	11.2: Under-utilised DoF facilities restructured	6,550
Strategy 12	12.1: High quality capacity building secured	22,750
	12.2: Reliable aquaculture statistical and economic analysis system for DoF staff and other stakeholders instituted	25,500
	Sub-total	1,801,995
	Technical assistance	1,397,800
	TOTAL	3,199,795

CHAPTER II IMPLEMENTATION

1. Institutional Arrangement

1.1 Implementation Structure

The implementing body of the NASP is the Ministry of Mines, Natural Resources and Environment, through the Department of Fisheries (DoF). Because the aquaculture section within the DoF is relatively small in comparison to the capture fisheries section, and levels of financial support for implementation of the NASP are not yet certain, the implementation body should be small and flexible, and utilise existing structures and staff within the DoF.

Efficient implementation of the NASP will be achieved through establishing a body that will advise on aquaculture development in Malawi (an appropriate name and the status of the Aquaculture Advisory Body will have to be developed by the DoF). This body will function as the executive body and it will be responsible for supervising the implementation of the NASP. In addition, a **NASP Coordination Committee** will be responsible for the day-to-day implementation of the scheduled activities at a national level. At District level, **District Committees** will be established in at least the three priority areas and be responsible for coordinating local level NASP activities, especially the Complementary Projects, and also for ensuring that these projects fit into the overall development plans for the District.

DoF's development projects are heavily dependent on external aid. Inadequate donor coordination could lead to a duplication of effort, and contradictory policy advice, which will further erode the productivity of existing institutions. To avoid these risks, only two bodies will be established under the NASP (the Aquaculture Advisory Body and the NASP Coordination Committee), and these will coordinate all aquaculture projects and allow the DoF to effectively control and harmonize policies and actions. The figure below suggests the recommended organisational structure for the implementation of the NASP.

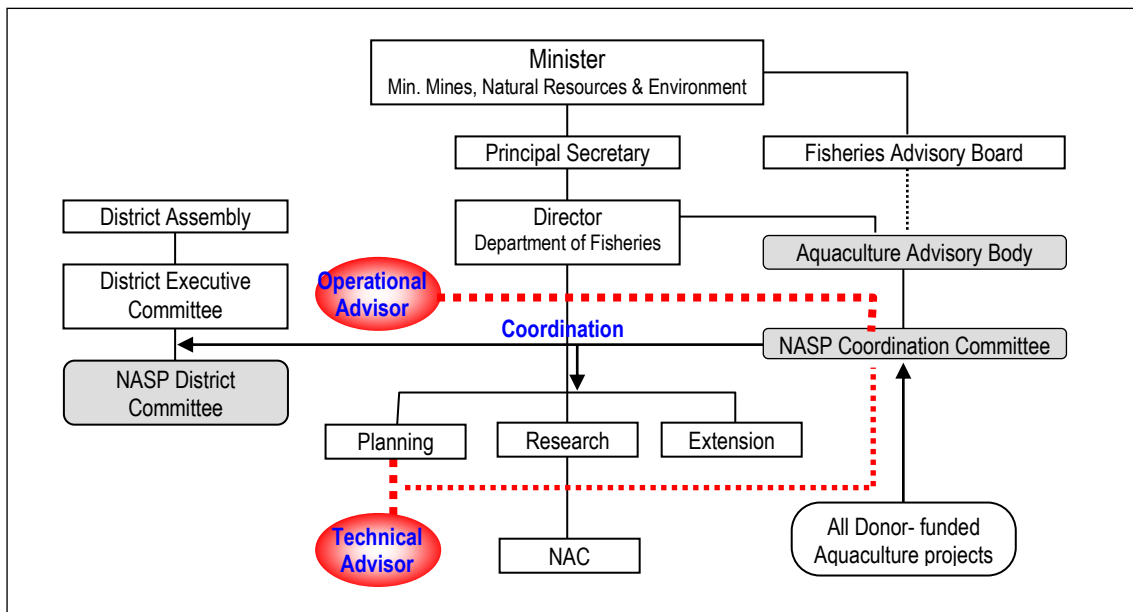


Figure 3.1 Organizational chart of the NASP implementing bodies

(1) Aquaculture Advisory Body

The Director of Fisheries will serve as the chair of the Aquaculture Advisory Body and the Board will be comprised of representatives of the public and private sector, and collaborating institutions (refer Strategy 11). The Director will also appoint representatives from the relevant Ministries and agencies such as the Ministry of Mines, Natural Resources and Environment, Ministry of Food and Agriculture, Ministry of Local Government and others, as needed. The Board will be responsible for ensuring the effective and uninterrupted implementation of the NASP and for coordinating actions with other sectors as required.

(2) NASP Coordination Committee

This Committee will draft the detailed annual work plans for the NASP and will coordinate the inputs from the DoF to ensure smooth day-to-day operations. Further, the Committee will be responsible for monitoring and evaluating the operation and management of activities, as well as reviewing and prioritising activities and their implementation on an ongoing basis. Regular monitoring reports must be submitted to the Advisory Board for their consideration and action. The Deputy Director of Fisheries will serve as the chair of this committee, and it will be comprised of four section heads (planning, research, extension, and the NAC). The Committee's main functions are as follows:

- (a) Selection of personnel needed to implement the NASP, and carry out budgetary planning and control for the programme.
- (b) Coordinate the work schedule of the Action Plan, secure capital, and efficiently distribute human resources.
- (c) Designate and dispatch technical experts (local and/or international) to assist with the activities of the Action Plan as needed.
- (d) Carry out monitoring and evaluation activities with the cooperation of District Committees to implement the District Projects, and revise and make changes as needed to resolve problems that arise.

(3) NASP District Committees

The District Committees will be established when the DoF initiates the "District Aquaculture Livelihood Projects" in the three focus Districts (Chitipa, Zomba, Thyolo). These Committees will be chaired by the District Planning Officer and comprise representatives of the section involved in the Project, as well as private organizations (fish farmer groups, NGOs). The Committee will be responsible for implementation of the Project and reporting to the Coordination Committee. In addition, the District Committees will ensure that the projects are aligned with local development policies and activities conducted as part of District Development Plans.

	Aquaculture Advisory Body	NASP Coordination Committee	NASP District Committees	DoF each sections	Operational Advisor (Foreign expert)	Technical Advisors (Foreign experts)
Planning and preparation for implementation						
Continuous sensitisation of key stakeholders in the NASP		●		○	●	
Set up the NASP as the official aquaculture development plan of the Ministry		●		○	●	
Preparation of an annual work plan		●		○	●	○
Budgeting for the annual work plan		●		○	●	
Approval of the implementation plan	●				●	
Implementation				●		●
Implementation of the annual plan			○	●		●
Implementation of complementary project 1			●	●		●
Implementation of complementary project 2			○	●		●
Coordination of activities		●	●		●	○
Monitoring & Evaluation						
Monitoring /preparing monitoring report		●		○	●	○
Organising annual evaluation meeting	○	●	●	○	●	○
Review of outputs	●				●	○

Remarks ●: Responsible body ○: Participation or collaborative body

Figure 3.2 Summary functions of responsible implementation persons and committees

1.2 Implementation Partners

Implementation of the NASP requires extensive collaboration and partnerships between the different sections in the DoF, other agencies and the private sector. The following table lists the DoF sections and prospective partners that will carry the primary responsibility for implementation of the various actions within the NASP.

Table 3.2 Primary DoF sections and partners

	Outputs	DoF Primary Sections	Partners
Strategy I	1.1: Projects that adopt integrated livelihoods approach	Planning Unit/ Extension Unit/ District Fisheries Office	DA, NGOs, WorldFish Center
	1.2: Broader understanding of the context between aquaculture and socio-economic, institutional and political status of poor farmers	Planning Unit/ Research Unit/ NAC	DA, NGOs, WorldFish Center, Univ. of Malawi, international research institutes*

	Outputs	DoF Primary Sections	Partners
	1.3: Increased capacity of DoF, local government and NGO staff to utilise tools and methods necessary to support the integrated livelihoods approach	Malawi College of Fisheries (MCF)/ NAC	Bunda College, NGOs, WorldFish Center
Strategy 2	2.1: Enabling environment and framework for commercially orientated aquaculture research at NAC established	NAC/ Aquaculture advisory body/ Planning Unit	Univ. of Malawi
	2.2: Scientific capacities in commercially orientated aquaculture enhanced	NAC	Bunda College
Strategy 3	3.1: Aquaculture credit scheme for small commercial fish farmers introduced	Planning Unit	Partner organisations, NGOs, Commercial Bank
	3.2: Business planning and management capacity of small to medium-scale fish farmers improved	Planning Unit	Partner organisations, private sector
Strategy 4	4.1: One-stop-shop for all aquaculture business application procedures established	Planning Unit	Dept. of Env., Min. of Land, Min. of Local Gov.
	4.2: Competitive investment environment for commercial aquaculture established	Planning Unit	Investment Promotion Agency, Min. of Commerce, DA
Strategy 5	5.1: Fisheries Policy and Act with respect to environmental threats revised and amended	Aquaculture advisory body/ FRU/ NAC	DoF from neighbouring countries
	5.2: Early warning system to monitor potential threats caused by aquaculture to biodiversity and environment established	Aquaculture advisory body/ FRU/ NAC	DoF from neighbouring countries, World Wildlife Fund (WWF)
	5.3: Knowledge of the link between aquaculture practices and environmental issues increased	Aquaculture advisory body/ FRU/ NAC	Dept. of Forestry, MAIFS, etc.
Str. 6	6.1: Shared information between fish producers and fish traders	Planning Unit	Fish producers and traders, MAIFS, Min. of Trade
Str. 7	7.1: Capacity of DAs to formulate plans and strategies to guide aquaculture development enhanced	MCF/ District Fisheries Office	DA, VDC
	7.2: Existing agriculture extension services utilised in promotion of fish farming	MCF/ District Fisheries Office	DA, VDC
Strategy 8	8.1: Aquaculture guidelines for NGOs which facilitate partnership agreements with the DoF developed	Planning Unit	WorldFish Center, NGO
	8.2: Knowledge and technical skills in aquaculture extension among NGO field staff improved	MCF / NAC/ Extension unit	WorldFish Center, NGO
Str. 9	9.1: Fish farmer networks strengthened and expanded	Extension Unit	IFFNT, DA
Str. 10	10.1: Sustainable donor support for the aquaculture sector secured	Director of Fisheries	Donor
Str. 11	11.1: Communication and partnerships between the DoF and stakeholders enhanced	Aquaculture advisory body	Bunda College
	11.2: Under-utilised DoF facilities restructured	Planning Unit	
Strategy 12	12.1: High quality capacity building secured	MCF	Bunda College
	12.2: Reliable aquaculture statistical and economic analysis system for DoF staff and other stakeholders instituted	NAC/ FRU/ Extension Unit	NGO

Remarks: *International research institutes which JICA ADiM Study Team have been collaborating with are: WorldFish Center; Asian Institute of Technologies (Thailand); GIFT Foundation (Philippines); Central Luzon State Univ. (Philippines); Univ. of Arizona (USA); Univ. of Hawai'i (USA); Univ. Stirling (UK); Rhodes Univ. (South Africa); Swansea Univ. (UK);, Univ. of Stellenbosch (South Africa); Tokyo Univ. of Marine Science and Technology (Japan).

1.3 Technical Assistance

The management and monitoring capabilities of each of the committees and their members, involved in implementing the NASP, must be strengthened for the purposes of long-term sustainability. To contribute to this process, a proportion of the funds provided by international donor partners will be allocated to foreign technical assistance in the following disciplines: (1) NASP Implementation and Operation, (2) Institution arrangement, (3) Aquaculture technology, (4) Rural development and (5) Monitoring and evaluation and act as **operational and technical advisors** who will assist the Coordination Committee. The detailed Terms of Reference of the ‘operational advisor’ and the ‘technical advisor’ should be defined by the Department of Fisheries, in consultation with the relevant donor (Annex 6 shows the preliminary Terms of References for operational and technical advisors).

In addition to above operational and technical advisors, eight months are allocated to non-specific specialists who may be required for specific input as the NASP is implemented. Most of the specialists will be posted during the first 5 years of NASP implementation. After 5 years, the technical advisor will hand over to local expertise. The operational advisor will continue to assist in implementation and operation of the NASP. Those specialists should be involved in various committees and aquaculture advisory body as observer status.

Table 3.3 Time frame for foreign specialists’ assignments

Unit: month

Title of specialists	Year										Total month
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
1. NASP Operation	■		■	■	■	■	■	■	■	■	37
2. Institutional arrangement	■										5
3. Aquaculture technology	■	■	■	■	■						38
4. Rural development		■									9
5. Monitoring & Evaluation	■	■	■	■	■						9
Others (non-specific specialist)	■	■	■	■							8
	19	26	13	19	14	3	3	3	3	3	106

2. Implementation Schedule

To ensure the efficient implementation of the NASP the DoF needs to undertake the following key steps and activities.

- Be responsible for continuous sensitisation of key stakeholders on the objectives of the NASP through appropriate documentation (100 NASP brochures will be prepared and submitted by JICA to the DoF with this report), use of the mass-media and meetings,
- Formulate the NASP as the official aquaculture development plan of the Ministry and seek the , endorsement of the Malawi National Aquaculture Strategic Plan by Cabinet,
- Develop an annual work plan that will be prepared by the DoF/NASP Coordination Committee and participating donors. The work plan should include a detailed implementation schedule for the Action Plan,
- In association with donors the DoF will develop a budget for the NASP for 2006/07.

Currently, no international donor has committed to assisting with the implementation of the NASP. Therefore, during the early stages the annual work plans must be flexible enough to respond quickly and effectively to potential changes in budget allocations and the needs of beneficiaries. The Action Plan will be closely monitored and adapted according to the budget available for a particular year.

3. Monitoring and Evaluation Plan

The internal mechanisms for project monitoring and evaluation (M&E) that are currently in place in the DoF need to be strengthened to be effective in tracking progress in the implementation of the NASP. The NASP therefore incorporates an M&E plan to assist the DoF in this process.

Objective	The objectives of the M & E are to learn from experience, provide an objective basis for assessing the DoF's work and provide accountability in the achievement of its objectives. Performance information will integrate into DoF's annual budget decisions.
Indicators	Monitoring will be carried out based on performance indicators, which will be identified as the programme develops (monitoring indicators for the NASP are shown in the Action plan).
Source of Indicators	<ul style="list-style-type: none"> A. DoF's ongoing monitoring system B. Census and surveys C. Participatory evaluation workshops with stakeholders D. Regular financial/cost reports on NASP implementation
Institutional Framework	<p>Overall responsibility for monitoring and evaluation of the NASP and the Complementary Projects lies with the Director of Fisheries and the NASP Coordination Committee.</p> <p>The Monitoring and Evaluation systems currently in place within the DoF are insufficient. To strengthen this component external assistance will be provided, at least in the initial stages.</p>
Time frame	The DoF will publish an annual evaluation report on the NASP, detailing what the DoF has achieved and highlighting the areas where improvement is necessary, and up-dating performance indicators (output measures). Periodic reviews of the NASP activities are essential so that strategies and actions can be revised and up-dated at least every three years.

PART 4 EVALUATION AND RECOMMENDATION

CHAPTER I EVALUATION

Malawi has a vast potential for aquaculture development. The decline in production of key species from natural waters (particularly tilapiine fishes), and increased competition for limited fish resources on a global level, suggests that aquaculture must play an increasingly key-role in ensuring self-sufficiency in fish supply and food security in Malawi. Aquaculture also provides an additional livelihoods option for resource-poor farmers who are often unable to produce enough crops to feed their families. Aquaculture is still in its nascent phase in Malawi and this provides opportunity to establish a strong fish farming sector comprising both small-scale farmers and larger scale commercial enterprises.

The focus of the NASP is on capacity building of the aquaculture sector as a whole and is not only geared towards technologies that will increase fish production. Many of the benefits that will be achieved through the NASP will be indirect and as such difficult to measure quantitatively in terms of improved national fish production.

1. Consistency of NASP with Existing Policy and Plans

The NASP was conceived to recognise and address the most pertinent international and national development frameworks and this is illustrated in Table 4.1.

Table 4.1 Relationships between the NASP and the most pertinent development frameworks

Existing policy and plans	Linkage between the NASP and the development frameworks
<p>A. Millennium Development Goals (MDG) The MDG describes the international development goals for 2015 and focuses the efforts of the world community on achieving significant improvement in peoples lives. The direct target of Goal 1 of the MDG is to “eradicate extreme poverty and hunger”.</p>	<p>The Mission of DoF guided by NASP is “To increase the economic and social benefits for fish producers and citizens in general, while contributing to sustainable fish supply and economic growth. National poverty reduction and improved livelihoods will be achieved through the promotion of excellence and best practices of DoF services.”</p>
<p>B. Malawi Poverty Reduction Strategic Paper (MPRSP) The MPRSP is built around four strategic pillars one of which is pro-poor economic growth for which agriculture has been identified as one of the key development sectors. The MPRSP also emphasises the importance of economically empowering the poor and growth of the private sector.</p>	<p>The NASP directly addresses the eradication of poverty and hunger. To achieve this NASP will empower farmers in economic activities through the promotion of profit-orientated aquaculture and strongly promotes the development of commercial aquaculture (MPRSP pillar 1). Increased fish supply from the sector will contribute nutritional status of the people of the people and will reduce children’s malnutrition (MPRSP pillar 2). The NASP also pays attention to socially disadvantaged farmers for them to have the opportunity to participate in fish farming practices as part of a rural safety net, including women-headed households and households with HIV/AIDS orphans (MPRSP pillar 3). The NASP directly targets local government and NGO in their capacity building. The success of the</p>

Existing policy and plans	Linkage between the NASP and the development frameworks
	NASP contributes to decentralisation process (MPRSP pillar 4).
<p>C. The National Fisheries and Aquaculture Policy 2002 and other DoF initiatives</p> <p>The principal aquaculture goal of this policy is to increase and sustain fish production from small-holder and large fish farming operations. The “Chambo restoration strategic plan 2003-2015” is one of the initiatives of DoF to recover the Tilapia stocks in the lakes.</p>	The NASP has recognised this policy and was guided by it in developing the strategies and action plans, to achieve DoF’s goal of sustainable fish supply. In particular actions have been identified to increase the production of chambo as a means with which to partially compensate for the decline of the stocks in the lakes
<p>D. FAO Code of Conduct for responsible fisheries</p> <p>Article 9 of the Code refers specifically to aquaculture development (including culture-based fisheries) with four sub-articles, namely responsible development of aquaculture under national jurisdiction; responsible development within trans-boundary aquatic ecosystems; use of aquatic genetic resources; and responsible aquaculture at the production level.</p>	The NASP strongly promotes the use of indigenous fish species and advocates responsible development of the large-scale commercial sector through several of its strategies and action and has recommended the undertaking of a comprehensive risk assessment for the farming of common carp.
<p>E. National Environmental Action Plan 2002 (Revised Draft Feb 2003)</p> <p>Strategy 1.5 of this Action Plan promotes aquaculture and focuses on the promotion of farmer clubs.</p>	The NASP recognises the value of farmer clubs for the promotion of the integrated livelihood approaches as a means to improve food security at the household level (refer to Strategies 1, 8 and 9).
<p>F. Agenda 21</p> <p>Agenda 21 of the Earth Summit (Rio de Janeiro 1992), to which Malawi is a signatory, is a blueprint for sustainable development into the 21st Century. It deals specifically with social and economic dimensions such as poverty, conservation and management of resources and biodiversity.</p>	The NASP will lead to increased fish production and alleviate poverty thereby reducing pressure on natural resources,

2. Effect of the NASP

A Equity, Efficiency and Sustainability

Through the promotion of integrated livelihood approaches the NASP will lead to greater equity (in terms of improving the living standard of poor fish farmers), efficiency and sustainability (in terms of aquaculture service provision).

Equity

Strategic theme 1 focuses on empowerment of the DoF and stakeholders in developing and implementing livelihood approaches aimed at improving the welfare of vulnerable people in rural areas, rather than directly focusing on increasing fish production. The approaches adopted are “people-centred” and “result-orientated” and are guided by clear targets and indicators of change to ensure that the NASP impacts on rural people. The strategies under this theme are directly geared towards the enhancement of the livelihoods of resource-poor farmers and improving their income

and food supply. This will contribute to poverty alleviation. The NASP also includes, as a target group, the most vulnerable people such as house-holds with AIDS orphans and women headed households, and this ensures equity in its implementation.

Efficiency

Strategic theme 2 is focused on capacity building in the development of production technologies. The NASP seeks to facilitate the most appropriate mechanisms to achieve increased production from aquaculture to address the shortfall in national fish supply from natural waters. In addition, this theme also addresses the need to build aquaculture into a meaningful contributor to the rural economy. A key element of the strategies within this theme is geared towards facilitating the greater participation of the private sector in developing aquaculture in Malawi. This will be ensured by:

- Promotion of participatory research, the results of which can be adopted and developed by innovative farmers and entrepreneurs (Strategy 2)
- Privatisation and leasing of under-utilised DoF facilities (Strategy 2)

Sustainability

The NASP is a medium to long-term sector plan. The influence that its implementation will have on government policy, strategies and actions in the aquaculture sector will be the most important output and will serve to guide future commitment and funding to the sector from the government and the donor community.

Furthermore, the NASP will promote participation and self-sufficiency which will contribute to increased sustainability of development efforts. This will be achieved by:

- Formation and strengthening farmer organizations to act as service providers and develop the capacity of their members (Strategy 9)
- Strengthen “Farmer-to Farmer” extension approaches, which will assist farmers in thinking, planning and acting by themselves (Strategy 1)
- Working with NGOs who assist farmers at grassroots level through improving the capacity for self-sufficiency. This will be achieved through an integrated approach rather than focusing only on fish farming as a stand-alone activity (Strategy 8)

B Regional impact

A key to the success of the NASP is international cooperation. Networking with international research institutions to address common regional problems in rural aquaculture and production technology development are important elements of Strategies 1 and 2, and will contribute to the development of aquaculture in Malawi and throughout the region. Recently several regional countries such as Zambia, Ghana, Cameroon has adopted aquaculture master plan. NASP encourage to link with these initiatives in exchange the experience and information. DoF, Malawi could play a leading role to coordinate with these countries in collaboration with FAO.

C Fish Production

The NASP focusses on increasing fish production and building the necessary capacity to support the development of the aquaculture sector. Should these approaches be successful, it is probable that increased resources will be attracted to the sector, resulting in a more rapid development. The

fundamental supporting mechanisms need to be in place for this development to occur. Assuming that the supportive conditions are established for aquaculture development as a result of the implementation of the NASP, some estimates regarding future aquaculture production can be made.

Table 4.2 Estimated aquaculture production by 2015

Category	2003	2015	Assumption
Rural fish farming	119 mt	441 mt	[2003 Base year] No. of ponds: 9,500 Production: 12.5kg/pond (706kg/ha: 2003) [Year 2015] No. of ponds: 29,815 (10% growth in pond numbers) Production scenario 1 : 90% of total ponds @ 12.5kg/pond (706kg/ha) Production scenario 2: 10% of total ponds @ 35.5kg/pond (2,000kg/ha)
Commercial fish farming	0 mt	3,500 –5,000 mt	[2003 Base year] no commercial operation [Year 2015] MALDECO produce at least 3,500 mt by cage culture G.K. Aquafarms produce at least 100 mt (10,000kg x 10ha-two crops) 20 innovative farmers produce 12 t (4,000kg x 3ha) Two additional commercial farms produce each producing 125 mt (=250 mt)
Total	119 mt	4,303 mt	

Source: Compiled by JICA Study Team (2003-2005)

3. Environmental Impact

The NASP is expected to have a positive impact on environmental management of the sector. Aquaculture development needs to proceed in a responsible manner that minimises environmental impacts. Of particular concern is the need to reduce potential risks to the biodiversity of the Lake, and other water bodies. Strengthening the capacity of the DoF will have a positive impact on their regulatory functions, especially with regard to managing the risks associated with large-scale pond culture, cage culture and the translocation of exotic species.

Strategy 7 of the NASP supports measures to enhance environmental protection. Enhancing awareness among private fish producers and ensuring their cooperation in environmental management would further reduce the potential for environmental degradation of the Lake. It will be important for DoF staff to be trained in appropriate environmental safeguards to enable them to carry out their research and monitoring functions effectively and responsibly.

CHAPTER II RECOMMENDATIONS

1. Recommendations

A. Fostering a long-term vision through an integrated livelihoods approach

Current understanding of the concept of rural aquaculture among both farmers and extension staff in Malawi is not always conducive to stimulate development of the sector. The sector faces many challenges. Many of these are related to inadequate organizational and technical capacity, which is exacerbated by financial and infrastructural constraints. However, development is further hampered by the mind-set of many small-scale farmers who do not view aquaculture as a means of increasing the overall production of their farm but rather as a ‘savings bank’ that provides fish or cash in difficult times. This approach does not encourage active management of fish ponds and results in many small-holders becoming ‘fish keepers’ rather than fish farmers. Fortunately, there is a growing realization that the integration of aquaculture into the farming system has the potential of increasing the overall viability of the smallholding, especially if the farming operation is managed correctly. There is a need to investigate options for maximizing the potential of this integrated approach, as it is probable that the majority of farmers will continue to rely on a number of on-farm activities, rather than risk focusing on fish farming alone as a livelihood option. The NGO sector has a particularly important role to play in advocating this approach in collaboration with the DoF, as their programmes often take a holistic view of development that would greatly facilitate successful integration of aquaculture into the farming system. Those farmers who do have the resources, and are prepared to risk focusing on fish farming, should be encouraged to do so, such that they may advance beyond the current level.

B. Effective farmer participation in aquaculture development

Aquaculture development efforts in Malawi have focused largely on rural small-scale aquaculture and consequently resource poor farmers have been the target of most donor-supported projects. However, the concept that fish farming can form the basis of a viable business has been embraced by some of the more innovative farmers, who see themselves as emerging fish farmers who will eventually focus their efforts on aquaculture as their main activity. This has become an increasingly attractive option as the price of fish in the country has risen dramatically in recent years. This trend is likely to result in a growing small-scale commercial aquaculture sector. Successes at this level will have the effect of encouraging other farmers to seriously consider fish production as a business.

To support this process, the DoF needs to provide services that will facilitate development of innovative and entrepreneurial farmers, and develop technologies that are appropriate to maximise profit. In addition, participation of such farmers in the development of fish farming in general needs to be encouraged. These farmers have the capacity to contribute towards fish supply in the country, as well as acting as agents for aquaculture promotion and development. The last point is particularly relevant with regard to the development of small-scale operations in rural areas, where innovative farmers are in daily contact with their fellow farmers.

C. International cooperation in aquaculture development

The importance of international cooperation in aquaculture development, especially as far as information exchange, research and capacity building is concerned, has been highlighted in various sections of the NASP for the following reasons:

- International research cooperation is vital for developing new information and technologies, as well as in promoting responsible research practices. This cooperation will synchronize national efforts with global initiatives in tilapia culture.
- The introduction of exotic species has trans-boundary implications in the watershed of Lake Malawi. Therefore national fisheries and aquaculture policies cannot be formulated in isolation. Regional policies are interlinked and the setting of regional goals is necessary to ensure the protection of the biodiversity of the Lake.
- Malawi is economically disadvantaged and physically vulnerable

In supporting international cooperation, it is recommended that the DoF and donors seek to strengthen communication and networking among existing partners in line with the NASP framework.

D. Midterm reviews

Flexibility in project implementation is essential to enable rapid responses to changes and uncertainties during the implementation of the NASP. A comprehensive review process of the NASP Action Plan will be required at least every 3 years to enable appropriate changes to be incorporated in the course of implementation.

E. Effective donor coordination

Inadequate donor coordination could lead to a duplication of effort, and contradictory policy advice, which will further erode the productivity of existing institutions. To avoid these risks, the NASP recommends that there should only be two bodies (the Aquaculture Advisory Body and the NASP Coordination Committee) responsible for coordinating all aquaculture projects in the country. This will allow the DoF to effectively control and harmonize policies.