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EVOLUTION OF AQUACULTURE IN SUB-SAHARAN AFRICA

SUMMARY

This paper discusses the evolution of aquaculture development in the Africa Region. It describes and explains the origins for a new approach to aquaculture development in the Region which is incorporated into a **Strategic Framework for National Aquaculture Development**. This approach is founded on lessons learnt from past decades when significant resources were spent to develop the sub-sector, but with little sustainable impact. The new approach aims at using the Region's natural and human resources to the benefit of profitable and sustainable aquaculture enterprises. The key to this approach is concentrating available resources where they will provide the greatest returns; invariably, this approach requiring a selection process whereby some activities are supported while others are not. Central elements of this approach include: increasing the involvement of the private sector; focusing effort on high potential areas; redefining government's role; divesting public infrastructure; increasing the empowerment and organisation of producers; developing methods for monitoring and evaluation; and elaborating flexible national aquaculture strategies. Adoption of these factors will require objectivity and tenacity to make the difficult decisions, with the overarching political will. This process will also likely require extrabudgetrary support to national agencies as well as support of sub-regional and regional structures. If adopted in a timely and holistic fashion, incorporating inputs for all major stakeholders, **strategic frameworks** will provide the needed orientation to the sub-sector and ensure that aquaculture will achieve its expected goals of increased fish supply and improved economic growth. This paper sets the stage for the sister presentation: Current Economic Opportunities in Sub-Saharan Africa (CIFA/2004/6).

I. INTRODUCTION

1. The *Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000* (*Report of the Conference on Aquaculture in the Third Millennium*, NACA/FAO 2000), acknowledging that, globally, aquaculture has become the fastest growing food production sector and is an increasingly important contributor to national economic development, with a great portion of aquaculture production coming from developing countries, stated that the primary responsibility for developing and implementing strategies for the development of aquaculture rests "with States and their private sectors."

2. There is no question that aquaculture is receiving increasing attention in the Africa Region; albeit this Region produces less than one percent of the world total of aquacultural products. In part, this attention is due to the growing supply gap, where shrinking provisions from natural fish stocks cannot keep pace with growing demand from swelling populations. However, this renewed awareness is also catalysed by a mounting appreciation of the potential profits to be made in producing aquatic products.

3. This renaissance of recognition of the potential of aquaculture as a food-producing and income-generating enterprise must be moderated by an understanding of the history of the development of aquaculture in the Region, coupled by a comprehension of how approaches to aquaculture development must evolve if current and planned interventions are to be sustainable.

II. BACKGROUND

4. The history of aquaculture development in Africa, covering a period of nearly five decades, is well documented. Among important milestones, in 1975, FAO organised the *First Regional Workshop on Aquaculture* (ADCP/REP/75/1). This workshop recognised the importance of aquaculture and the high priority attached to it by many governments. It was further noted:

> "failures of some of the ill-conceived programmes during the early part of the century have continued to remain a major constraint in convincing the farmers and investors of the economic viability of aquaculture. Insufficient appreciation of the basic requirements of an effective aquaculture development programme and consequent inadequacy of governmental support activities, have handicapped the orderly and rapid development of the industry."

5. A generation later, it was accepted that the aquaculture sub-sector had not developed as anticipated; still suffering from the oft-cited and omni-present constraints relating to persistent lack of seed, feed, capital (credit), information (extension) and markets. In 1999, FAO organized the *Africa Regional Aquaculture Review* with the objective of bringing together aquacultural practitioners whose combined expertise could be used to assess why aquaculture has not established a solid and economically viable foundation in Africa, in spite of millions of donor dollars devoted to its promotion. The Review concluded that: (a) aquaculture was now known throughout Africa as a result of previous extension efforts and (b) adoption/acceptance, even if on a modest scale, had been noted in most countries. The Review further used key lessons learnt from previous developmental efforts to derive recommendations for the way forward; these recommendations included the need for:

- national development plans in consultation with stakeholders;
- reduced government infrastructure;
- private sector production of feed and seed;
- credit for medium- and large-scale producers;
- revised aquaculture extension;
- farmer-friendly technologies;

- collaboration, coordination and information exchange between national and regional aquaculture institutions and agencies; and
- formation of farmers' associations.

6. At the national level, the recommendations of the Review were implemented to varying degrees in several African countries; at times, with the assistance of specific TCP (Technical Co-operation Programme) support from FAO. Results of these national efforts have been synthesized into updated strategies for aquaculture development and form the basis for much of the present document. Many of these issues are also encapsulated in the Limbé Declaration (Annex III, CIFA/2004/5).

7. At the regional level, aquaculture has been incorporated into a number of sub-regional and regional activities including NEPAD. The NEPAD report *Towards a Comprehensive African Fisheries Development Programme* (Fisheries Department, FAO, Rome: January 2004) states one of the basic strategies to increase supply of fish in Africa is to "vigorously promote aquaculture". This document notes that previously there had been much support for aquaculture as "a supplementary activity for rural farmers aiming to improve food security, more than as an activity that would take on a commercial nature." This has led to the present situation where there were fishponds in many mixed farming systems which, most often, did not have a significant impact on the volume of fish supplied at national level.

8. The NEDAP document further highlights the fact that earlier efforts targeting diversification and household food security "depended on the State being a provider of services: numerous government stations and hatcheries serving as hubs of development efforts and providing dedicated extension services with subsidised inputs." However, today it is most often impossible for "States to maintain these public fish culture stations and it is now necessary for governments to become a facilitator and help the private sector become a provider of goods and services to the sector."

9. There are once again high expectations for aquaculture and its contribution to the livelihoods of those living in the Africa Region. These new expectations acknowledge that, for goals to be achieved there must be changes in the aquaculture development paradigm. Identifying these changes requires careful analyses of lessons learnt. Implementation of these changes requires political will.

III. EXPLANATION OF KEY TERMS AND CONCEPTS[1]

Prioritisation of aquaculture zones

10. In most countries, the biophysical[2] and socio-economic[3] potential for aquaculture is not uniform, with some zones having greater intrinsic capacity for aquaculture growth than others. A first step in determining where resources to develop aquaculture could be efficaciously used is the identification of those areas with highest potential. This screening should be supplemented with a comparison of existing aquaculture activities, including the concentration of existing producers and the presence of government and other infrastructure[4].

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[1] "Terms and Concepts" were derived in the process of elaborating the *Strategic Framework for Sustainable Aquaculture Development in Cameroon* (2003).

[2] Biophysical criteria include water quantity and quality, ambient temperature, soil quality and water holding capacity, etc.

[3] Socio-economic criteria to evaluate include cultural aspects, availability of inputs (fingerlings, feeds, fertilizers)

access to markets, range of partners, production technologies, etc.

[4] Aguilar-Manjarrez, J. & S. S. Nath. 1998. A strategic reassessment of fish farming potential in Africa. CIFA Technical Paper 32. FAO, Rome.

11. Zones based on biophysical and socio-economic potential may well be subdivided into areas that correspond to input supply/delivery. For example, to the extent that private seed supply comes from specialised private hatcheries, these hatcheries will operate within areas circumscribed by the economic ability to deliver seed to producers.

Definition of target groups

12. Categorising fish farmers and farms according to relative sizes, degree of capitalisation and profit motivation is always difficult. In the aggregate, these categories are part of a spectrum that covers the full scope of production systems[5]. If this spectrum reflects production intensity and investment level, individuals at the low end will likely internalise their aquaculture activities with little contribution to the public purse and little benefit from public services. Conversely, individuals at the high end of the scale may make important contributions to national aquaculture production but have relatively little need of public support.

13. For conceptual purposes, producers have been divided into two categories: commercial and non-commercial. Commercial producers can be small medium or large-scale, and are active participants in the market. They purchase inputs (including capital and labour) and engage in off-farm sales of the fish produced. For these individuals, aquaculture is a principal economic activity[6]. Non-commercial producers may also purchase inputs, mainly seed and feed, but rely chiefly on family labour and on-farm sales of the produce. An additional feature of non-commercial aquaculture is that it is but one of the variety of enterprises comprising the farming system; it is undertaken to diversify production, improve resource use and reduce risks of such events as crop or market failure.

A Workable Model for Aquaculture Outreach

14. Some level of technical information dissemination is generally considered as necessary to support the aquaculture sub-sector. This is achieved through public-sector-supported outreach. A wide range of experiences, indicate that: (i) some long-term technical assistance for producers is necessary; (ii) generalist/unified extension services lack the specific technical expertise to assist aquaculture producers; and, (iii) extension services dedicated to aquaculture assistance must be limited in scope due to corresponding limitations in human and financial resources.

15. In this light, high quality technical support needs to be carefully assembled and targeted. This support needs to include research and extension working as a unit that can transfer technical knowledge and experience more effectively than the habitual system of training and visit (T&V), where research plays only a supporting role. Depending upon specific circumstances, established paradigms for the conduct of participatory research can be used to guide the process of joint learning among farmers and the outreach team[7].

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[5] An aquaculture system is a combination of: type of culture unit, level of intensity, culture species and scale or size of exploitation

[6] In addition to these characteristics, commercial aquaculture can be defined as the farming of aquatic organisms, including fish, molluscs and crustaceans and aquatic plants with the goal of maximizing profits. Thus, the distinction between commercial and non-commercial aquaculture operations relies primarily on the existence or absence of a business orientation and on how factors of production such as labour will be paid.

[7] Brummett, R.E. & R. Noble. 1995. Aquaculture for African smallholders. ICLARM Technical Report 46. WorldFish Centre, Penang, Malaysia.

Elements of the strategic framework: the role of public & private sectors

16. Sustainable aquaculture development relies on a number of conditions that must be met and addressed in any strategy in a flexible way. The most prominent of these are: (1) suitable production systems; (2) availability and cost of inputs (feeds, seed, capital, etc.); (3) outreach; (4) research; (5) education and training; (6) marketing; (7) producer organisations and; (8) regulation, control and monitoring.

17. These central issues must address aquaculture development for each of the two types of aquaculture (i.e., commercial and non-commercial); defining the roles of the public[8] and private[9] sectors. In view of limited human and financial resources, Government is, in general, shifting, and should shift, from its role as a direct investor and development promoter to one as a facilitator of an independent and commercially viable aquaculture sub-sector. The private sector is composed of two general groups of actors: direct investors, including producers along with service providers, and partners, principally producer organisations and CSOs.

IV. DEVELOPMENTAL CONTEXT

18. Aquaculture is once again receiving significant attention in the Africa Region; attention akin to that bestowed in the 1970s and 80s. However, the current consideration is not due to donor efforts to introduce a new innovation for improved family income and nutrition. Major donor support waned in the latter 1990s and has only sporadically reappeared in recent years.

19. The present interest in aquaculture is driven by national and sub-regional recognition of aquaculture as a viable option for fish production; this appreciation guided by, among others:

- the lack of few other alternatives for producing more fish for the aforementioned fish supply gap;
- aquaculture becoming an acknowledged production system in the Region with proven applicable technologies;
- enhanced and expanding links with the private sector;
- a realization of the production and profit potentials of aquaculture;
- a growing group of investors (national and international) willing to invest in aquaculture at all scales;
- globalization and the spreading of worldwide markets for aquatic products making aquaculture a favourable choice for earning hard currencies; and,
- increasing use of irrigation combined with greater attentiveness to rational use of scarce water resources fostering such technologies as integrated irrigation/aquaculture (IIA).

20. This current support of aquaculture in the Region is, in most cases, not due to a corresponding support of government aquacultural agencies. To a large extent, the public aquaculture sub-sector is still suffering from decade-old ills:

- chronic shortages of government-supplied seed and feed persist;
- ineffectual institutions are widespread, information flow at all levels weak at best, with government research and extension services frequently functioning poorly after enforced structural adjustment programmes;

[8] Includes the ministry in charge of aquaculture, the national research institute, and the government extension service.

[9] Includes producers, investors (in both fish farming and related sectors), non-governmental organizations (NGOs), commercial banks, universities and development agencies.

- staff shortages are increasing, with technical and managerial personnel adversely affected by the combined impact of HIV/AIDS, imposed early retirement programmes, declining civil service benefits and the loss of qualified individuals to other employers;
- the majority of government infrastructure is abandoned, or quasi-abandoned;
- markets for aquatic products are incompletely understood and aquacultural credit not available from many lending institutions; and,
- few countries have the necessary strategic guidelines to foster rapid growth of the sub-sector.

21. These problems are exacerbated by:

- dispersed nature of fish farmers;
- insufficient partnerships, including meager involvement of the private sector;
- lack of verifiable aquaculture data and statistics to demonstrate the potential production/profit at the farm level as well as impact at national level;
- unclear institutional settings;
- inadequate understanding of the socio-economic environment;
- lack of networking at all levels;
- lacking of, or overly complex aquaculture regulations/legislation; and,
- donor dependence.

22. Yet, in spite of the difficulties and stigma of underachievement, there is real optimism with regard to aquaculture's future in the Region. The stage seems set for aquaculture to establish itself as a profitable and sustainable production enterprise.

V. THE WAY FORWARD

23. The future must take heed of the past and make practical use of those technologies and practices that have worked. The way forward involves:

- increasing the involvement of the private sector;
- focusing effort on high potential areas;
- redefining government's role;
- divesting public infrastructure;
- increasing the empowerment and organisation of producers;
- developing methods for monitoring and evaluation; and
- elaborating flexible national aquaculture strategies.

24. Within this context, the private sector should:

- be responsible for production and distribution of all production inputs (e.g., seed, feed, etc.) through for-profit operations;
- facilitate market-driven, for-profit action;
- take an active partnership role in the management of the sub-sector; and,
- contribute to such functions as extension, research, information flow, etc.

25. These actions should focus on high potential areas which:

- have the possibilities for providing the best returns for effort;
- are sites where there is a convergence between the social, economic and environmental factors – a marriage between selected aquaculture production systems and available resources;
- represent a concentration of producers or would-be producers; and,
- should be the focus of public sector investment.

26. In this new structure, the role of government should:

- no longer be as a provider and manager, but now as a facilitator and monitor;
- promote information flow (extension) and support research;
- collect and analyse data/statistics;
- control quality (e.g., feed, seed, food fish, etc.) and enforce regulations; and,
- assist producer groups.

27. As government's role evolves, public infrastructure needs to be re-evaluated. This process should consider that infrastructure:

- designed for seed production, demonstrations or food fish production should be closed – these functions assumed by the private sector;
- divested stations could be sold or leased to private producers or converted to other uses;
- government facilities retained should have limited and well targeted functions in research, training and/or brood stock maintenance; and
- probably one government facility per major agro-ecological zone is sufficient.

28. As the role of the State changes, so must that of the producer. In general, producers should:

- have a voice in the management of the sub-sector;
- interact through viable producer associations; and,
- play an important role the feed- forward and feedback of information and in training.

29. Efficient and sustainable implementation of this process requires effective monitoring and evaluation which:

- is the responsibility of all stakeholders;
- requires correct record keeping and statistics;
- requires responsive institutions; and,
- should be guided by **national development strategies** and should feedback into the up-dating of these strategies.

30. These prerequisite, production-based strategies:

- have previously been neglected in favour of policies or "master" plans;
- must be developed through a participatory process that is both complex and iterative;
- need to be broad-based and multi-disciplinary; and,
- should be overseen by a national aquaculture Task Force.

31. More details on the composition of a prototypic national strategy are included in Annex I.

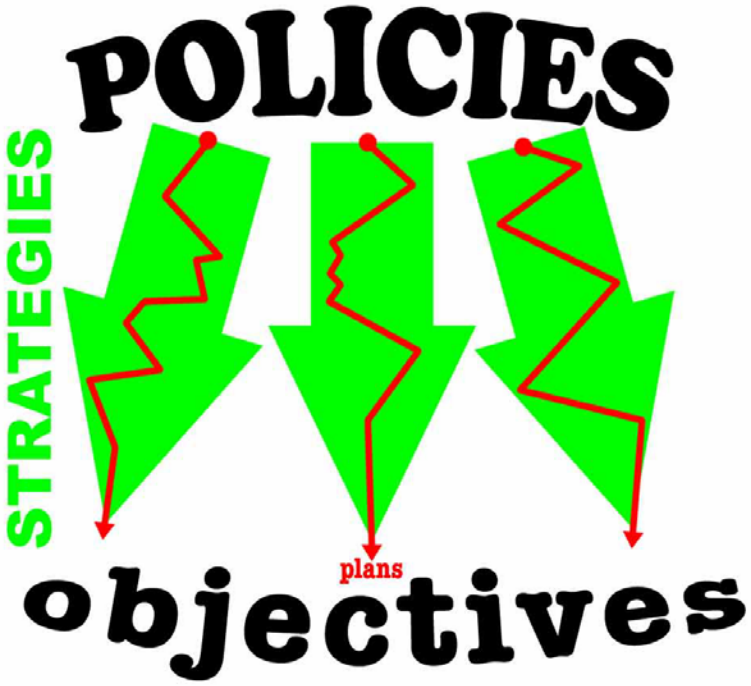
VI. SUGGESTED ACTION BY THE COMMITTEE

32. The Committee is invited to adjust, as appropriate, and approve the elements cited in *The Way Forward* as the best process to promote sustainable aquaculture development in the Africa Region.

33. The Committee is further invited to propose mechanisms at the national, sub-regional and regional levels which could catalyse and facilitate these processes.

34. Finally, the Committee is invited to make specific recommendations to such regional structures as NEPAD as how best, within the context of the present document, to assist Member Countries in elaborating and implementing strategic aquaculture development measures.

Annex I: Elements of National aquaculture strategies



National aquaculture development strategies:

- ✓ form the critical links between policies and objectives;
- ✓ define the parameters for specific development plans;
- ✓ must be flexible and holistic;
- ✓ are technical guidelines for the implementation of the national programme; and
- ✓ are composed of a series of topics that encompass the national programme and which must be periodically up-dated.

An essential component of any strategy must address the seed production and distribution issue. Seed production and distribution:

- ✓ have been major impediments to growth of the sub-sector, distribution at times being more of a problem than production;
- ✓ must be undertaken for-profit by the private sector;
- ✓ are one of the principal keys to aquaculture development where crucial short-term benefits can be achieved and high-density/potential areas encouraged;
- ✓ can be done by small- and medium-scale producers;
- ✓ can use available technologies and inputs;
- ✓ can be the best avenue for rapid development but must be carefully monitored; and,
- ✓ must initially deal with a limited number of existing and acceptable species.

The accompanying issue of feeds:

- ✓ is a significant problem that cannot easily be addressed in the short-term, but which will improve as the agriculture sector evolves;
- ✓ must be produced by commercial millers or prepared by producers themselves;

- ✓ relies on inputs that are determined by the development of the overall agricultural sector – over which aquaculture stakeholders have limited control;
- ✓ will ultimately account for a major part of the producers' investment in producing aquatic products; and,
- ✓ must be controlled to ensure minimal quality.

Of the other major inputs, capital in the form of credit:

- ✓ is not for all, but necessary for some;
- ✓ should not be provided by projects or government but by established formal or informal lending institutions; and,
- ✓ must be based on good business plans which, along with good record keeping, are necessary for all commercial (for-profit) producers.

Strategies must be inextricably linked to the market. For these relationships to function:

- ✓ producers should produce for the market;
- ✓ producers should be aware that the smallest size acceptable product is generally the most profitable; and
- ✓ they should also know that high intensity production is generally not desirable – increasing the size of the production area as opposed to intensifying.

As the roles of the publics and private sectors change, the structure and function of services will cage accordingly. Research and education:

- ✓ are the responsibilities of government with research being practical, demand-driven with a strong on-farm component;
- ✓ should be institutionally and practically linked to extension; and,
- ✓ may have some aspects where there is a comparative advantages when addressed from sub-regional or regional level.

The umbilical cord to the farm is extension. In the new paradigm, it is important to recognize that extension:

- ✓ is probably the most difficult of all issues to efficiently address;
- ✓ is necessary for the foreseeable future;
- ✓ requires well trained, experienced and motivated agents;
- ✓ is expensive;
- ✓ requires transport;
- ✓ can be fully government-supported;
- ✓ alternatively, can be completely assigned to the private sector;
- ✓ may be a public-private partnership; or
- ✓ be dissolved with a reliance on "distance learning" via the media (radio, television & the press) for transmitting messages.

For national aquaculture strategies to be sustainable, they must be:

- ✓ supported by the producers themselves;
- ✓ designed to be able to be undertaken with available resources;
- ✓ prepared with realistic targets; and,
- ✓ profitable.