The investment that is NACA

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NACA did not go the way many projects had gone; it flourished after project funding ended. This largely reflects the correctness of the strategy of FAO and UNDP in establishing a network organization based on Technical Cooperation among Developing Countries, and the wisdom of the NACA Governments' decision to continue to invest in NACA. This is the third of a series on "The Lessons from NACA." The earlier ones are in the previous issues of Aquaculture Asia. It casts NACA as a public investment and, with some figures, tries to answer the question as to whether it is paying off.

The annual percent rate of growth or APR of the value of aquaculture production in Asia between 1988 and 1997 (in the wake of the operation of the UNDP/FAO Regional Project to establish NACA) was 11 percent by volume from 13.4 to 34 M mt and 9 percent by value from US$ 19.3 B to US$ 42 B. In perspective, the total cash input over 11 years between 1981 and 1991, from donor and government funds to the NACA Project and the UNDP/FAO Seafarming Development Project (this 4-year project was also managed by NACA), was US$ 9 M.

UNDP/FAO project funding to the NACA Project totaled US$ 7.2 M, with an additional US$ 800 000 for the Seafarming Development and Demonstration Project that NACA also managed from 1987 to 1991. Participating governments contributed to the NACA Project US$ 804 500 from 1985 to 1989 including US$ US 400 000 by China PR (TCDC/IPF) and the Thai Aid Programme in support of special activities, and voluntary contributions from Bangladesh, Indonesia, India, DPR Korea, Malaysia, Nepal, the Philippines, Singapore, Sri Lanka, and Viet Nam, which were then participants of the Project. In-kind contributions could not be estimated but the Chinese, Indian and Thai governments upgraded from their own national funds, with assistance from UNDP, the Regional Lead Centres (in Wuxi, Bhubaneshwar and Bangkok) to very high standards in line with their participation in the network as lead centres. The Philippines' Aquaculture Department of SEAFDEC hosted the Regional Lead Centre in the Philippines as well as the Senior Aquaculturist Training Programme, which ran for 9 years graduating 137 senior personnel from eight classes (the degree was awarded by the University of the Philippines in the Visayas (UPV), which collaborated in teaching the program). Investments to the 10-year project and an additional year for the Seafarming Project (1987-1991) was therefore around US$ 9 M. Various other sources of assistance, mostly from donor organizations like IDRC, ADB, CIDA, Commonwealth Fund, JICA, USAID, ODA (now DFID), the AusAid and ACIAR, were generated for the numerous specific training, research, and information activities and for exchange of experts.

Carrying on the Investment

The NACA Project evolved into an autonomous organization and expanded its scope and operations after project funding ceased. For example, the Regional Seafarming Project was absorbed into the NACA program and the seafarming centres became part of the regional network. As an independent body owned and operated by its member-governments, NACA adopted a change in operational strategy. It had to (i) become self-sustaining in order to finance core activities such as technical advice, information exchange, and network coordination and administration, (ii) generate revenues by provision of services against payments, (iii) develop programs and projects for collaborative assistance, and (iv) forge partnerships with other institutions. These measures made it possible for NACA to continue as a focal point for the implementation of multilaterally and bilaterally funded regional and national projects.

The total government core contribution to NACA from 1991 to 2005 has been US$ 4.42 M. The total external and other non-core sources of funding it generated over the same period was US$ 10.53 M or a ratio of 2.38, which is in effect the amount generated for every dollar invested by governments. It has been increasing: the average ratio for 2000-2005 was 2.63, and those in 2004 and 2005 were 2.97 and 3.24, respectively.

The in-kind contribution of members has not been quantified, but can be illustrated: China P.R., starting in 1992, took over and funded under its Technical Cooperation among Developing Countries (TCDC) program the 3-month training course on integrated fish farming (IFF) at the NACA Regional Lead Centre in Wuxi. The course intake is usually 40 from Asia-Pacific, Latin America, Africa, the Near East and Eastern Europe. Over 25 years of uninterrupted yearly offering, the IFF has trained nearly 1 000 personnel. Centres in Thailand, Indonesia, and India also offer or host regular and periodic courses for personnel from government, industry, farmer associations and NGOs. Their courses are partially supported by the governments. Secondly, regional projects require national coordinators and the governments and sometimes universities provide the institutional (and a person) focal point for these regional projects, on an honorary basis.

NACA also operates, on request, government-funded or bilaterally-funded national projects. Two cases can provide an example of this aspect of its program, in India (government-funded) and Vietnam (donor-funded). An important point to be made of these two cases is that the results of national projects are shared among countries through NACA's networking and TCDC activities. The experiences in India had in fact informed the work in Vietnam and Iran on shrimp health management. In turn, these have been benefited by the results of ACIAR-assisted projects (in which NACA is also involved) on shrimp diseases in Thailand and Indonesia. ACIAR has also embedded a research and capacity building project into the project in India. A second point is that external expert assistance is minimal; a cadre of young local professionals and technicians is trained to provide the technical assistance to the farmers. Capacity building activities includes the farmers associations and the institutions providing farm services.

Since 2000, NACA has been providing technical and management assistance to India's Marine Products Export Development Authority (MPEDA) in a shrimp health management program for small farmers. Starting with a few farmers in Andhra Pradesh, it has expanded to 900 farmers in five states. The project is fully funded by the Government's Ministry of Commerce, which has disbursed, in 2000-2005, the sum of US$ 81 400 (paid directly to NACA for expert assistance on the various studies that led to the formulation, start-up and initial assistance to the project) and Indian Rupees 3.05 M (or around US$ 70 000) for in-country activities including the salaries of a team (at present 15) young Indian technicians, recruited and trained by NACA, MPEDA with expert assistance from ICAR through its Central Institute of Brackishwater Aquaculture. This team provides technical assistance to farmers. The technical team works with MPEDA's field officers and is provided backstopping from ICAR's CIBA and the NACA Headquarters (HQ). One of the technical backstopping personnel is a shrimp farmer from Thailand. Funds for HQ and external assistance personnel came from an ACIAR grant of AU$ 56 000 AUD. The project has recently expanded to 5 states and now includes a marketing component. After the study and planning phase, NACA has not taken a single Rupee out of India in helping operate this project. A second phase has been approved by MPEDA.

The other case is NACA's support to a donor-funded (DANIDA) Fisheries Sector Support Program in Viet Nam. NACA was also requested by the Government to provide technical support to the Brackishwater and Mariculture components of the project. A NACA-recruited aquatic health management officer was fielded and took the lead role in the health management component of the project, which essentially was focused on shrimp. A NACA field office was established in Hanoi and from implementing DANIDA-supported project, has diversified into providing assistance to other donor-funded projects, also with backstopping from HQ. The value of the NACA-implemented component of the project was US$ 326 500 from 2003 to 2005. The Government has made the same request to NACA for continuing its support for the second phase of the project.

Investment Focus in Asian Aquaculture

The viability and relevance of NACA as an investment can be seen in a better perspective in the context of the progress of the sector. Between 1976 -- when the idea of a ***Network*** organization was hatched during the 1976 Kyoto Global Conference on Aquaculture organized by FAO/UNDP -- and today there have been four discernible areas of emphasis in Asian Aquaculture: (1) Higher Productivity and Better Returns; (2) Better Environmental Performance; (3) Enhanced Livelihood Opportunities and Socially Responsible Farming; and (4) Market Access and Trade. These four areas are not mutually exclusive; while emphasis shifted over the years, the focus of investments broadened to eventually embrace all four, described as follows:

1. Higher Productivity and Returns: As expected, in a newly emerging industry, the years after the Kyoto Conference of 1976 saw the establishment of pilot-scale models to test technical and economic viability of commercial-scale operations. These were initially based on existing basic information on new aquaculture species and farming systems. To improve productivity and attract public investments in more research and private sector investments in commercial farming, R & D gave priority to better production technologies as well as

species development. Traditional production systems largely developed as an art by farmers through the ages, e.g. integrated fish farming in China and composite culture of several carp and other species in the Indian subcontinent which produced much more biomass and used farm energy and wastes, began to be studied by scientists. This enabled technological improvement on the systems and made them more susceptible to dissemination and adaptation to other countries.

To increase the impact of innovations, a mechanism to coordinate and integrate the various and increasing number of R & D initiatives that began to get underway was devised. This would also avoid duplication of efforts and therefore waste of investments. It enabled researchers, otherwise isolated and working alone, to exchange results and collectively improve on them. It used scarce national resources, pooled through cooperation, more cost-effectively. The model, designed and implemented through a UNDP/FAO global programme on aquaculture development coordination, was regional networking among aquaculture centres run by governments and operating under the principle of TCDC - technical cooperation among developing countries - in short, NACA. To bring aquaculture on a par with livestock husbandry became the long-term objective of NACA. This required intensified disciplinary and interdisciplinary research. The mechanism encouraged and promoted basic and applied research, as well as the application to aquatic organisms of knowledge from research and farming systems development of terrestrial animals. The orientation of technology development and transfer and capacity building during this stage was the expansion of regional aquaculture development in general and commercial–scale aquaculture enterprises in particular. The provision of credit was linked to a feasible business plan.

2. Better Environmental Performance: If the global growth of aquaculture between 1980 and 1990, which was sustained at 10 percent, can be an indicator, the NACA strategy, as advocated by the Kyoto Declaration, had succeeded and the investment on the NACA project had paid off. More than that, this growth owed much to aquaculture becoming an increasingly science- and technology-based activity. The rapid growth from the mid-80s was carried into the mid-90s and spurred further expansion and intensification. This rapid and generally uncontrolled growth however raised concerns of its effects on the environment, natural resources, other sectors, and its own sustainability.

Increasing fish disease problems drove home the message that aquaculture as practiced is threatening its own continued viability. An ADB-NACA regional study in Asia-Pacific[1] in 1989-90 for the first time came up with an estimate of losses to aquaculture from diseases of US$1.4 B a year and made farmers aware of the links between disease occurrence and environmental deterioration. This spurred investments into improving policies, regulations, management systems, and regional and national capacities for aquatic animal health management. The harsh spotlight trained on shrimp aquaculture drew investments away from production technology to more environmentally benign systems and technologies, and more efforts on the development of regulations and policies to lessen or manage the impacts of aquaculture on the environment and on itself.

[1] ADB/NACA.1991. Fish Health Management in Asia-Pacific. Report of a Regional Study and Workshop on Fish Disease and Fish Health Management. ADB Agriculture Department Report Series No.1. Network of Aquaculture Centres in Asia-Pacific, Bangkok, Thailand.

UNDP/FAO/NACA[2] spearheaded a regional development project (1987-1991) that promoted exchange of seafarming technologies among countries, training of technicians and farmers, and the planning and orderly management of coastal aquaculture. Guidelines were developed for planning. Coastal aquaculture was then beginning to expand with increasing emphasis on shrimp aquaculture and cage culture of finfish. This regional seafarming development and demonstration project, apart from promoting the exchange of technology among countries and training seafarming practitioners, provided or developed regulatory and management guidelines that improved the environmental performance of aquaculture farms.

FAO and NACA, through a regional TCP[3] in 1992-1993 conducted a regional study on Environmental Management and Assessment of Aquaculture Development that focused on the different impacts of aquaculture on the environment and on itself and the other sectors' impacts on aquaculture. The study highlighted technologies, practices, and capacities that needed to be developed.

The earlier ADB/NACA study on health management and the FAO/NACA TCP on environmental assessment and aquaculture development prompted governments to look for more guidelines for sustainable farming systems and the policies that would ensure them. This was met by an ADB/NACA Regional study[4] on "Aquaculture Sustainability and the Environment". A product of this study was the Aquaculture Sustainability Action Plan adopted by the Developing Member Countries of ADB. The farmer representatives to the final workshop of this project (October 1995, Beijing) also requested NACA and ADB to initiate activities to organize a regional aquafarmers' network. NACA has since taken this recommendation up with a number of activities.

With greater awareness of the importance of health management governments and private sector began to invest more in capacity building for disease prevention and control. At this stage NACA, OIE or World Animal Health Organization and the FAO formed a stronger alliance for health management and implemented in Asia-Pacific various collaborative regional projects. Notable among these were (i) an FAO TCP[5] project with NACA on Responsible Movement of Live Aquatic Species that led to the formulation of the Technical Guidelines and National Strategies for Responsible Movement of Aquatic Animals, Disease Diagnostic Guide, and Surveillance, Reporting and Information System for Aquatic Animal

[2] TCP/RAS/87 and 90. Regional Seafarming Demonstration and Development Project, with nine participating governments including China, Hong Kong , Indonesia, India, Korea DPR, Korea Rep, Malaysia, Philippines, Singapore, Thailand; it operated from 1987 to 1991.
[3] TCP/RAS/2253 Environmental Assessment and Management of Aquaculture
[4] ADB-NACA. 1998. Report of the Study and Workshop on Aquaculture Sustainability and the Environment (RETA 5534). Bangkok. 492p.

[5] TCP/RAS/6714 (A) and 9065 (A) Assistance for the Responsible Movement of Live Aquatic Animals launched in 1998 and participated by 21 countries (Australia, Bangladesh, Cambodia, China P.R., Hong Kong SAR, India, Indonesia, Iran, Japan, Korea (DPR), Korea RO, Lao PDR, Malaysia, Myanmar, Nepal, the Philippines, Pakistan, Singapore, Sri Lanka, Thailand, Viet Nam)

Pathogens; and (ii) a capacity building project for import risk assessment with APEC[6] as well as the SPC, ASEAN and SEAFDEC and various other organizations, that involved APEC economies, other non-APEC countries in Latin America and the Caribbean as well as in Asia-Pacific. Others included harmonization of procedures on introductions; development of action plans to implement the various policies on introductions, early warning and preparedness; specific studies on introduction of certain species like *P. vannamei*; a workshop on aquatic invasive alien species; molluscan health, and policy development on introductions, etc. Expertise from such countries with advanced knowledge and experiences in these areas like Australia, Canada, France, Japan, New Zealand, Japan, U.K and the U.S.A were brought into the region through these various linter-linked and collaborative projects.

It was during this period that the environmental and socio-economic issues took primacy over the productivity, economic viability, and profitability concerns. Economic concerns broadened from cost- and-returns (private benefit) to internalizing environmental and social costs of polluting and resource-degrading practices (environmental benefits). The influence of this period on attitudes of farmers is that it made good business sense to be environmentally responsible.

3. Better Livelihoods and Social Responsibility: At the close of the decade of the 90s, a regional aquaculture planning workshop (in August 1999) attended by 19 Asia-Pacific governments came up with the assessment that aquaculture in most Asian countries generally had become a better-organized economic sector, characterized by stronger private sector participation and increasing state support. It noted a number of fundamental shifts:

(i) that farmers' aspirations for higher yields and better returns from innovations in production technology have been tempered with concerns for *sustainability;*
(ii) that the aim of gaining higher returns has been joined by schemes to *share benefits equitably;* and
(iii) that the primary purposes of producing more food, earning higher incomes and improving economies have expanded to ensuring that enough food is produced and made accessible to the masses and that the poorer participants in the aquaculture sector gain a better livelihood.

The observation on equity and livelihoods reflected the increasing attention by development assistance institutions, donor agencies, civil society, and governments on the impact of aquaculture and aquatic resources exploitation on the societal objectives of poverty alleviation and assuring food security. The review on financing and institutional support for aquaculture development made at the 2000 Conference on Aquaculture in the Third Millennium noted that international development assistance was increasingly directed towards poverty alleviation, and urged that the assistance needs to adhere to basic principles of social equity, including gender, environmental sustainability, technical feasibility, economic viability and good governance.

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[6] Arthur, J.R., M.G. Bondad-Reantaso, F.C. Baldock, C.J. Rodgers and B.F. Edgerton. 2004. Manual on risk analysis for the safe movement of aquatic animals (FWG/01/2002). APEC/DoF/NACA/FAO. 59 p. APEC Publication Number: APEC # 203-FS-03.1.

The FAO Code of Conduct for Responsible Fisheries was adopted in 1995. During this stage, research, technology, policy and institutional services were increasingly oriented to the needs of small producers including subsistence farmers, and paid more attention to the circumstances of the disadvantaged groups (the landless, the women especially those that are heads of families, aquatic product gatherers, farm workers, etc.). Social responsibility, in addition to environmental friendliness of aquaculture, began to permeate project planning during this period. Ways to focus aquaculture on poverty alleviation (or not having it exacerbate poverty) were studied.

It was at this period when the trend began in the down-sizing of most public-funded initiatives. Among other responses, assessments were carried out on the impacts of the R & D efforts of the past 20 years. Generally, because of the regional coordination mechanism, it was found to be cost-effective: resources were pooled, results were shared, efforts were not duplicated, and governments did not have to go through the costly exercise of reinventing the wheel. Mixed results however were found in local applications. The findings highlighted that the effectiveness of research application depended on institutional capacities. The outcome was to include institutional strengthening as a researchable issue. Thus began the research studies and pilot programs on co-management, voluntary management mechanisms, and more broadly participatory planning and implementation mechanisms. Aquaculture planning became integrated into overall rural development planning.

4. Better Access to Market and Fair Trade: This is the current area of priority concern and in which governments have been investing resources, spurred largely by food safety issues that ramified into broader market access and trade issues. They now include eco-labeling to enable consumers to express their environmental and social concerns. Farmers now have to contend not only with the quality and price of products but how they are produced and what impacts the farming practice has on the environment, biodiversity and welfare of farm workers (now also of the fish).

The global trade liberalization agenda has had a marked impact on seafood trade. Resolutions and agreements on market access issues, regulatory measures on health and food safety requirements, and a host of other forms of technical barriers to trade are expected to affect seafood exports, especially from developing countries. A driving force has also been the need to comply with an ever increasing number and stringency of market requirements. The flashpoint likely had been the rejection of shrimp exports by EU but a combination of technical barriers of trade, Sanitary and Phyto-Sanitary measures, and non-tariff barriers to trade prompted the broadening and hastening of initiatives that were already in place such as ASEAN's focus on competitiveness in trade, and the Consortium (of FAO, NACA,WB, WWF and UNEP) on Shrimp Farming and the Environment's work on international principles for responsible shrimp farming that are aimed at developing uniform certification standards and best management practices.

Government and private sector institutions are developing policies on and embarking in food safety programmes (i.e. Thailand's "Farm to Plate") like HACCP, investing in research, extension, hardware (to detect banned antibiotics and drugs at the level required by importers and train personnel to run the HACCP schemes and operate the equipment) investing in IT program development (for traceability, as in Thailand), and developing

regulations as well as promoting voluntary management mechanisms such as Codes of Conduct and Best Management Practices to support producers, especially the small-scale, address the complex issues surrounding food safety and ecolabelling.

Governments' responses and those of the production and processing sectors are seen as beneficial to aquaculture in the long run, largely by making the sector more competitive and environmentally responsible. On the other hand, apprehensions have been expressed as to their impacts on the small and poor farmers, which do not enjoy the economy of scale to be able to comply cost-effectively with the requirements. On this point, experiences from NACA projects and those under the STREAM Initiative[7] are providing examples that organizing small farmers and poor aquatic gatherers and adoption of voluntary mechanisms like BMPs and Codes of Practices can improve their productivity and quality of their product, provide environmental benefits, enable them to attain economy of scale and be able to transact with suppliers and buyers on a stronger footing and at less cost, and comply with increasingly stringent market access requirements.

NACA's development coincided with these four areas of emphasis and its regional work programme addressed the associated issues. To operate the work programme and address the issues, NACA generated support for major regional and national activities from bilateral, multilateral and investment agencies; since 1990 there have been more than 65 collaborative projects, workshops, assessments, and information development activities of regional, subregional and national as well as inter-regional scope. In the aftermath of the tsunami, NACA became involved in various planning, learning, and management activities to restore livelihoods and develop the stricken communities. It joined a consortium[8] comprising BOBP-IGO, FAO, SEAFDEC and World Fish Centre that has since jointly organized regional activities to develop, with affected countries, NGOs and other organizations, strategies and guidelines for rehabilitating and developing livelihoods based on aquaculture and capture fisheries.

No attempt has been made to measure the internal rate of return to FAO and UNDP's, other donors, and the subsequent Governments' investments in the NACA Project and in the NACA Organization, but the multiplier effects of this small investment, which is little more than US$ 13 M spread over 25 years or some US$ 500 000 a year, could not be small.

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[7] STREAM (short for Support to Regional Aquatic Resources Management) was established by a consortium of DFID, FAO, NACA and Voluntary Services Overseas, an international NGO. The fore-runner of STREAM in NACA was an earlier FAO-NACA programme called Aquaculture for Sustainable Rural Livelihoods Development, which was subsequently recast into an initiative based on DFID's Sustainable Livelihoods Approach. See www.streaminitiative.org

[8] CONSRN is the acronym of the Consortium to Restore Shattered Livelihoods in Tsunami-Devastated Nations. See www.apfic.org. Go to the tsunami web page for CONSRN Reports